



**FACULTY OF ENGINEERING AND TECHNOLOGY**

**OUTCOME BASED EDUCATION**

**Curriculum and Syllabus**

**B.Tech (Information Technology)**

**2022 Regulation**

**(For the Students Admitted in 2022-2023 )**

**DEPARTMENT OF INFORMATION TECHNOLOGY**



## **FACULTY OF ENGINEERING AND TECHNOLOGY**

### **DECLARATION**

I, **Dr. N. KANYA**, Head of Information Technology department, hereby declare that this copy of the syllabus from Page no 1 to 271 (B. Tech – Information Technology- Full Time 2022 Regulation) is the final version which is being taught in the class and uploaded in our university website. I assure that the Syllabus available in our university website is verified and found correct. The curriculum and Syllabi have been approved by our Academic Council / Vice Chancellor.

Date:

Signature



## **FACULTY OF ENGINEERING AND TECHNOLOGY**

### **Vision**

To create technology proficient and ethically enriched IT professionals through holistic and state of art curriculum.

### **Mission**

- To update the IT skills of students and faculty adapting recent technology developments in the curriculum as recommended by academicians, industry experts and alumni.
- To establish equipped laboratories to present excellent education in the conventional and modern vicinity of Information Technology.
- To create responsible IT professionals with ethical values and social responsibilities.
- To stimulate entrepreneurial mind-set among the students and enhance competency through regular industrial exposure.
- To utilize the family of alma mater through strong interaction and networking making them instrumental for development of academic and industrial linkage.

### **Quality Policy**

- Learn, Teach and Practice validated procedures with Transparency

### **Program Educational Objectives (PEOs)**

Graduates will be able to:

- **PEO 1:** Excel by taking up key roles in IT and related industries, Government organizations and academia through strong leadership skills.
- **PEO 2:** Undertake higher studies and/or research in the field of Information Technology, management or other related domains.
- **PEO 3:** Develop innovative products and implement novel solutions to real world problems in IT and related interdisciplinary areas.
- **PEO 4:** Understand the societal impact of IT services and use their skills in an ethical, responsible and professional manner.
- **PEO 5:** Be updated with continuous learning and have a global perspective, so as to remain current in their profession while meeting the needs of the industry and nation at large.



## FACULTY OF ENGINEERING AND TECHNOLOGY

### Program Outcomes

- **PO1 Engineering Knowledge:** Apply the Knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO2 Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering Problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
- **PO3 Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental consideration.
- **PO4 Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO5 Modern tool usage:** Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO6 The engineer and society:** Apply reasoning informed by the contextual knowledge to access societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO7 Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.
- **PO8 Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO9 Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO10 Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO11 Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team to manage projects and in multidisciplinary environments.
- **PO12 Life –long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change



## FACULTY OF ENGINEERING AND TECHNOLOGY

### Program Specific Outcomes (PSOs)

- **PSO1** Ability to augment the understanding of broad themes of STEM using Information Technology.
- **PSO2** Ability to analyze, design, develop and implement sustained IT solutions as a team to improve the productivity of the organization with social and economic constraints.
- **PSO3** Ability to apply ethical decision making, use IT industry recognized best practices and standards in the development, implementation and management of IT system integrating multiple domains.
- **PSO4** Ability to understand and update current trends in web technology, distributed infrastructure, data management, software engineering, system engineering and secured applications.

### PEO WITH MISSION STATEMENT

PEO WITH MISSION STATEMENT	M1	M2	M3	M4	M5
PEO1	3	1	3	1	2
PEO2	2	3	1	1	1
PEO3	3	3	2	3	3
PEO4	2	2	3	3	2
PEO5	2	3	1	3	3



## FACULTY OF ENGINEERING AND TECHNOLOGY

### MAPPING PEO WITH PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>PEO 1</b>	2	2	2	2	2	3	2	2	2	3	2	2
<b>PEO 2</b>	2	2	2	2	1	1	-	2	2	2	2	3
<b>PEO 3</b>	2	2	2	2	1	3	3	2	3	3	3	2
<b>PEO 4</b>	1	1	1	1	1	2	2	3	2	2	2	-
<b>PEO 5</b>	1	1	1	1	1	2	2	2	2	2	2	3

### MAPPING PEO WITH PSO

	PSO 1	PSO 2	PSO 3	PSO 4
<b>PEO 1</b>	3	3	3	3
<b>PEO 2</b>	3	2	2	3
<b>PEO 3</b>	3	3	3	3
<b>PEO 4</b>	1	1	3	1
<b>PEO 5</b>	3	2	1	3

Strength of correlation,3-High,2-Medium,1-Low



## FACULTY OF ENGINEERING AND TECHNOLOGY

I SEMESTER								
S. No	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL/IE	L	T/SLr	P/R	C	Category
1	EBEN22001	Technical English	Ty	2	0/0	0/0	2	HS
2	EBMA22001	Mathematics – I	Ty	3	1/0	0/0	4	BS
3	EBPH22ET1	Engineering Physics	ETL	2	0/0	2/0	3	BS
4	EBCH22ET1	Engineering Chemistry	ETL	2	0/0	2/0	3	BS
5	EBME22ET1	Basic Mechanical & Civil Engineering	ETL	2	0/0	2/0	3	ES
PRACTICALS								
6	EBCC22I01	Orientation To Entrepreneurship & Project Lab	IE	1	0/0	1/0	1	ES
7	EBCS22ET1	C Programming and MS Office Tools	ETL	1	0/0	2/0	2	ES
Credits Sub Total							18	

II SEMESTER								
S. No	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL/IE	L	T/SLr	P/R	C	Category
1	EBMA22003	Mathematics – II	Ty	3	1/0	0/0	4	BS
2	EBPH22001	Solid state physics	Ty	3	0/0	0/0	3	BS
3	EBCH22001	Technical chemistry	Ty	3	0/0	0/0	3	BS
4	EBME22001	Engineering graphics	Ty	2	0/0	2/0	3	ES
5	EBIT22001	Essentials of Information Technology	Ty	3	0/0	0/0	3	PC
PRACTICALS								
6	EBCC22I02	Communicative English Lab	IE	1	0/0	1/0	1	HS
7	EBCS22ET2	Python programming	ETL	1	0/0	2/0	2	ES
8	EBCC22I03	Environmental Science (Audit Course)	IE	1	0	1/0	0	HS
Credits Sub Total							19	

**C: Credits, L: Lecture, T: Tutorial,SLr: Supervised Learning, P: Problem / Practical  
R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation**



## FACULTY OF ENGINEERING AND TECHNOLOGY

III SEMESTER								
S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/S.Lr	P/R	C	Category
1	EBMA22006	Discrete Mathematics	Ty	3	0/1	0/0	4	BS
2	EBIT22002	Data Structures and Algorithms	Ty	3	0/1	0/0	4	PC
3	EBIT22003	Software Engineering	Ty	3	0/0	0/0	3	PC
4	EBIT22004	Computer Organization and Architecture	Ty	3	0/0	0/0	3	PC
5	EBEC22ID1	Digital Principles and System Design	Ty	3	0/0	0/0	3	ID
PRACTICALS								
1	EBCC22ET1	Universal human values 2:Understanding harmony	ETL	1	0/0	2/0	2	HS
2	EBIT22L01	Data Structures and Algorithms lab	Lb	0	0/0	3/0	1	PC
3	EBIT22ET1	Object Oriented Programming with C++	ETL	2	0/0	2/0	3	PC
4	EBEC22IL1	Digital Systems Lab	Lb	0	0/0	3/0	1	ID
<b>Credits Sub Total</b>							<b>24</b>	

IV SEMESTER								
S.NO	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/S.Lr	P/R	C	Category
1	EBMA22011	Statistics for Computer Engineers	Ty	3	0/1	0/0	4	BS
2	EBIT22005	Database Management Systems	Ty	3	0/0	0/0	3	PC
3	EBIT22006	Operating System	Ty	3	0/0	0/0	3	PC
4	EBEC22ID2	Microprocessors and Microcontrollers	Ty	3	0/0	0/0	3	ID
5	EBCC22I04/ EBCC22I05	The Indian Constitution/ The Indian Traditional Knowledge	IE	2	0/0	0/0	0	HS
PRACTICALS								
1	EBEC22IL2	Microprocessors and Microcontrollers Lab	Lb	0	0/0	3/0	1	ID
2	EBIT22L02	Database Management Systems Lab	Lb	0	0/0	3/0	1	PC
3	EBIT22L03	Operating system lab	Lb	0	0/0	3/0	1	PC
4	EBIT22ET2	Java Programming	ETL	2	0/0	2/0	3	PC
5	EBIT22I01	Technical Skill I	IE	0	0/0	2/0	1	SC
6	EBCC22I06	Soft Skill I -Employability skills	IE	0	0/0	2/0	1	SC
<b>Credits Sub Total</b>							<b>21</b>	

**C: Credits L: Lecture T: Tutorial S.Lr: Supervised Learning P: Problem / Practical R: Research Ty/Lb/ETL: Theory /Lab/Embedded Theory and Lab \* Internal Evaluation**





## FACULTY OF ENGINEERING AND TECHNOLOGY

V SEMESTER								
S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/S.Lr	P/R	C	Category
1	EBIT22007	Enterprise Resource Planning	Ty	3	0/0	0/0	3	PC
2	EBIT22008	Professional Ethics	Ty	3	0/0	0/0	3	HS
3	EBIT22009	Computer Networks	Ty	3	0/0	0/0	3	PC
4	EBIT22EXX	Program Elective I	Ty	3	0/0	0/0	3	PE
5	EBXX22OEX	Open Elective I	Ty	3	0/0	0/0	3	ID
6	EBOL22I01	Online Course(NPTEL / SWAYAM / Any MOOC Approved by AICTE/ UGC)	IE	1	0/0	1/0	1	ID
PRACTICALS								
1	EBIT22L04	Enterprise Resource Planning Lab	Lb	0	0/0	3/0	1	PC
2	EBIT22L05	Network Programming Lab	Lb	0	0/0	3/0	1	PC
3	EBIT22ET3	Computer Graphics and Multimedia	ETL	2	0/0	2/0	3	PC
4	EBIT22I02	Technical Skill II	IE	0	0/0	2/0	1	SC
<b>Credits Sub Total</b>							<b>22</b>	

VI SEMESTER								
S. NO	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/S.Lr	P/R	C	Category
1	EBIT22010	Mobile Communication	Ty	3	0/0	0/0	3	PC
2	EBIT22011	Embedded System and IoT	Ty	3	0/0	0/0	3	PC
3	EBIT22012	Data Warehousing and Data Mining	Ty	3	0/1	0/0	4	PC
4	EBIT22EXX	Program Elective II	Ty	3	0/0	0/0	3	PE
5	EBXX22OEX	Open Elective II	Ty	3	0/0	0/0	3	ID
PRACTICALS								
1	EBIT22L06	Embedded System and IoT Lab	Lb	0	0/0	3/0	1	PC
2	EBIT22L07	Data Mining Lab	Lb	0	0/0	3/0	1	PC
3	EBCC22I07	Soft Skill II (Qualitative and Quantitative Skills)	IE	0	0/0	3/0	1	SC
4	EBIT22I03	Technical Skill III	IE	0	0/0	2/0	1	SC
5	EBIT22I04	Mini Project/ Internship	IE	0	0/0	3/0	1	SC
<b>Credits Sub Total</b>							<b>21</b>	



## FACULTY OF ENGINEERING AND TECHNOLOGY

VII SEMESTER								
S.NO	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/S.Lr	P/R	C	Category
1	EBIT22013	Cloud Computing	Ty	3	0/0	0/0	3	PC
2	EBIT22014	Software Testing	Ty	3	0/0	0/0	3	PC
3	EBIT22015	Cryptography and Network security	Ty	3	0/0	0/0	3	PC
4	EBIT22016	Web Technology and Web services	Ty	3	0/1	0/0	4	PC
5	EBIT22EXX	Program Elective III	Ty	3	0/0	0/0	3	PE
PRACTICALS								
1	EBIT22L08	Web Technology and Web services Lab	Lb	0	0/0	3/0	1	PC
2	EBXX22OLX	Open Lab	Lb	0	0/0	3/0	1	ID
3	EBIT22ET4	Mobile application Development	ETL	2	0/0	2/0	3	PC
4	EBIT22I05	Project Phase – 1	IE	0	0/0	3/3	2	P
5	EBFL22IXX	Foreign Language	Lb	1	0/0	1/0	1	HS
Credits Sub Total							24	

VIII SEMESTER								
S.N O	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/S.Lr	P/R	C	Category
1	EBCC22ID2	Principles of Management and Behavioral science	Ty	3	0	0/0	3	ID
2	EBIT22EXX	Program Elective IV	Ty	3	0/0	0/0	3	PE
3	EBIT22EXX	Program Elective V	Ty	3	0/0	0/0	3	PE
PRACTICALS								
4	EBIT22L09	Project Phase – II	Lb	0	0/0	12/12	8	P
Credits Sub Total							17	

**Note (Category of Courses)**

**PC: Programme Core, PE: Programme Elective, HS: Humanities and Science, ES: Engineering Science, BS: Basic Science, ID: Inter Disciplinary, SC: Skill Component, P: Project**



## FACULTY OF ENGINEERING AND TECHNOLOGY

PROGRAM ELECTIVE – I								
S.No	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/S.Lr	P/R	C	Category
1	EBIT22E01	Fundamentals of Digital Image Processing	Ty	3	0/0	0/0	3	PE
2	EBIT22E02	Geographical Information System	Ty	3	0/0	0/0	3	PE
3	EBIT22E03	Database Tuning	Ty	3	0/0	0/0	3	PE
4	EBIT22E04	Design And Analysis of Algorithms	Ty	3	0/0	0/0	3	PE
5	EBIT22E05	Artificial Intelligence	Ty	3	0/0	0/0	3	PE
6	EBIT22E06	Human Computer Interaction	Ty	3	0/0	0/0	3	PE
7	EBIT22E07	Agile Methodologies	Ty	3	0/0	0/0	3	PE
8	EBIT22E08	E-Commerce	Ty	3	0/0	0/0	3	PE
9	EBIT22E09	Fundamental of Ethical Hacking	Ty	3	0/0	0/0	3	PE

PROGRAM ELECTIVE – II								
S.No	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/S.Lr	P/R	C	Category
1	EBIT22E10	C# and .NET Programming	Ty	3	0/0	0/0	3	PE
2	EBIT22E11	Social Network Analysis	Ty	3	0/0	0/0	3	PE
3	EBIT22E12	Games Designing	Ty	3	0/0	0/0	3	PE
4	EBIT22E13	Risk Management	Ty	3	0/0	0/0	3	PE
5	EBIT22E14	Information Security Management	Ty	3	0/0	0/0	3	PE
6	EBIT22E15	TCP/IP Design and Implementation	Ty	3	0/0	0/0	3	PE
7	EBIT22E16	Management Information Systems	Ty	3	0/0	0/0	3	PE
8	EBIT22E17	Advanced Network	Ty	3	0/0	0/0	3	PE

PROGRAM ELECTIVE – III								
S.No	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/S.Lr	P/R	C	Category
1	EBIT22E18	Web Mining	Ty	3	0/0	0/0	3	PE
2	EBIT22E19	Data Science and Big Data Analytics	Ty	3	0/0	0/0	3	PE
3	EBIT22E20	Software Quality Management	Ty	3	0/0	0/0	3	PE
4	EBIT22E21	Software Project Management	Ty	3	0/0	0/0	3	PE
5	EBIT22E22	Machine Learning Techniques	Ty	3	0/0	0/0	3	PE
6	EBIT22E23	Cyber Forensics and Internet Security	Ty	3	0/0	0/0	3	PE
7	EBIT22E24	Information Retrieval	Ty	3	0/0	0/0	3	PE
8	EBIT22E25	Natural Language Processing	Ty	3	0/0	0/0	3	PE
9	EBIT22E41	Block chain Technologies	Ty	3	0/0	0/0	3	PE



## FACULTY OF ENGINEERING AND TECHNOLOGY

PROGRAM ELECTIVE – IV & V								
S.No	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/S.L	P/R	C	Category
1	EBIT22E26	Robotics	Ty	3	0/0	0/0	3	PE
2	EBIT22E27	Distributed Computing	Ty	3	0/0	0/0	3	PE
3	EBIT22E28	Artificial Neural Network	Ty	3	0/0	0/0	3	PE
4	EBIT22E29	Green Computing	Ty	3	0/0	0/0	3	PE
5	EBIT22E30	Service-Oriented Architecture	Ty	3	0/0	0/0	3	PE
6	EBIT22E31	Information Storage Management	Ty	3	0/0	0/0	3	PE
7	EBIT22E32	Foundations of Parallel Programming	Ty	3	0/0	0/0	3	PE
8	EBIT22E33	Hadoop And Big Data Technology	Ty	3	0/0	0/0	3	PE
9	EBIT22E34	Digital Marketing Technique	Ty	3	0/0	0/0	3	PE
10	EBIT22E35	Pervasive Computing	Ty	3	0/0	0/0	3	PE
11	EBIT22E36	Wearable Computing	Ty	3	0/0	0/0	3	PE
12	EBIT22E37	Wireless Adhoc & Mesh Networks	Ty	3	0/0	0/0	3	PE
13	EBIT22E38	Next-Generation Network	Ty	3	0/0	0/0	3	PE
14	EBIT22E39	Web Engineering	Ty	3	0/0	0/0	3	PE
15	EBIT22E40	R Programming	Ty	3	0/0	0/0	3	PE

## OPEN ELECTIVE APPLICABLE FOR IT STUDENTS

ELECTRONICS AND COMMUNICATION ENGINEERING							
S.NO	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/SLr	P/R	C
1	EBEC22OE1	Internet of Things and its Applications	Ty	3	0/0	0/0	3
2	EBEC22OE2	Cellular Mobile communication	Ty	3	0/0	0/0	3
3	EBEC22OE3	Satellite and its Applications	Ty	3	0/0	0/0	3
4	EBEC22OE4	Fundamentals of Sensors	Ty	3	0/0	0/0	3
5	EBEC22OE5	Microprocessor Based System Design	Ty	3	0/0	0/0	3
6	EBEC22OE6	Industry 4.0 Concepts	Ty	3	0/0	0/0	3



## FACULTY OF ENGINEERING AND TECHNOLOGY

ELECTRICAL AND ELECTRONICS ENGINEERING							
S.NO	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/SLr	P/R	C
1	EBEE22OE1	Electrical Safety for Engineers	Ty	3	0/0	0/0	3
2	EBEE22OE2	Energy Conservation Techniques	Ty	3	0/0	0/0	3
3	EBEE22OE3	Electric Vehicle Technology	Ty	3	0/0	0/0	3
4	EBEE22OE4	Biomedical Instrumentation	Ty	3	0/0	0/0	3
5	EBEE22OE5	Industrial Instrumentation	Ty	3	0/0	0/0	3
6	EBEE22OE6	Solar Energy Conversion System	Ty	3	0/0	0/0	3
7	EBEE22OE7	Wind Energy Conversion System	Ty	3	0/0	0/0	3
8	EBEE22OE8	Energy Storage Technology	Ty	3	0/0	0/0	3
9	EBEE22OE9	Electrical Machines	Ty	3	0/0	0/0	3

MECHANICAL ENGINEERING							
S.NO	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/SLr	P/R	C
1	EBME22OE1	Industrial Engineering	Ty	3	0/0	0/0	3
2	EBME22OE2	Refrigeration and Air conditioning	Ty	3	0/0	0/0	3
3	EBME22OE3	Automobile Engineering	Ty	3	0/0	0/0	3
4	EBME22OE4	Industrial Robotics	Ty	3	0/0	0/0	3
5	EBME22OE5	Sustainable Energy	Ty	3	0/0	0/0	3
6	EBME22OE6	Composite Materials	Ty	3	0/0	0/0	3
7	EBME22OE7	Industry 4.0	Ty	3	0/0	0/0	3
8	EBME22OE8	Virtual and Augmented Reality	Ty	3	0/0	0/0	3



## FACULTY OF ENGINEERING AND TECHNOLOGY

CIVIL ENGINEERING							
S.NO	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/S Lr	P/R	C
1	EBCE22OE1	Water Pollution and Its management	Ty	3	0/0	0/0	3
2	EBCE22OE2	Air Pollution Control	Ty	3	0/0	0/0	3
3	EBCE22OE3	Green Building and Vastu Concepts	Ty	3	0/0	0/0	3
4	EBCE22OE4	Climate Change and Sustainable Development	Ty	3	0/0	0/0	3
5	EBCE22OE5	Intelligent Transportation Systems	Ty	3	0/0	0/0	3
6	EBCE22OE6	Environment, Health and Safety in Industries	Ty	3	0/0	0/0	3
7	EBCE22OE7	Industrial Pollution Prevention and Cleaner Production	Ty	3	0/0	0/0	3
8	EBCE22OE8	Fundamentals of nanoscience	Ty	3	0/0	0/0	3

BIOTECHNOLOGY							
S.NO	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/S Lr	P/R	C
1	EBBT22OE1	Food and Nutrition	Ty	3	0/0	0/0	3
2	EBBT22OE2	Human Physiology	Ty	3	0/0	0/0	3
3	EBBT22OE3	Clinical Biochemistry	Ty	3	0/0	0/0	3
4	EBBT22OE4	Bioprocess Principles	Ty	3	0/0	0/0	3
5	EBBT22OE5	Biosensors and Biomedical Devices in Diagnostics	Ty	3	0/0	0/0	3
6	EBBT22OE6	Basic Bioinformatics	Ty	3	0/0	0/0	3



## FACULTY OF ENGINEERING AND TECHNOLOGY

CHEMICAL ENGINEERING							
S.NO	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/SLr	P/R	C
1	EBCT22OE1	Fundamentals of Nanoscience	Ty	3	0/0	0/0	3
2	EBCT22OE2	Electrochemical Engineering	Ty	3	0/0	0/0	3
3	EBCT22OE3	Alternative Fuels And Energy System	Ty	3	0/0	0/0	3
4	EBCT22OE4	Petrochemical Unit Processes	Ty	3	0/0	0/0	3
5	EBCT22OE5	Principles of Desalination Technologies	Ty	3	0/0	0/0	3
6	EBCT22OE6	Piping Design Engineering	Ty	3	0/0	0/0	3
7	EBCT22OE7	E- Waste Management	Ty	3	0/0	0/0	3

Dr APJ Abdul Kalam Center For Research							
S.NO	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/SLr	P/R	C
1	EBMG22OE1	Technical Entrepreneurship	Ty	3	0/0	0/0	3

### OPEN LAB -APPLICABLE FOR IT STUDENTS

ELECTRONICS AND COMMUNICATION ENGINEERING							
S.N O	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/SLr	P/R	C
1	EBEC22OL1	Sensors and IoT Lab	Lb	0	0/0	3/0	1
2	EBEC22OL2	Robotics Control Lab	Lb	0	0/0	3/0	1
3	EBEC22OL3	Basics of MATLAB	Lb	0	0/0	3/0	1



## FACULTY OF ENGINEERING AND TECHNOLOGY

ELECTRICAL AND ELECTRONICS ENGINEERING							
S.NO	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/SLr	P/R	C
1	EBEE22OL1	Transducer Lab	Lb	0	0/0	3/0	1
2	EBEE22OL2	PLC and SCADA Lab	Lb	0	0/0	3/0	1
3	EBEE22OL3	Electrical Maintenance Lab	Lb	0	0/0	3/0	1
4	EBEE22OL4	Power Electronics Lab	Lb	0	0/0	3/0	1
5	EBEE22OL5	Bio Medical Instrumentation Lab	Lb	0	0/0	3/0	1
6	EBEE22OL6	Electrical Machines Lab	Lb	0	0/0	3/0	1

MECHANICAL ENGINEERING							
S.NO	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/SLr	P/R	C
1	EBME22OL1	Internal Combustion Engines and Steam Lab	Lb	0	0/0	3/0	1
2	EBME22OL2	Computer Aided Design and Simulation Lab	Lb	0	0/0	3/0	1
3	EBME22OL3	Engineering Metrology Lab	Lb	0	0/0	3/0	1
4	EBME22OL4	Automation Lab	Lb	0	0/0	3/0	1
5	EBME22OL5	Virtual and Augmented Reality Lab	Lb	0	0/0	3/0	1

CIVIL ENGINEERING							
S.NO	SUBJECT CODE	SUBJECT NAME	Ty/Lb / ETL	L	T/SLr	P/R	C
1	EBCE22OL1	Building Drawing Practice using Auto CADD	Lb	0	0/0	3/0	1
2	EBCE22OL2	Geographical Information System And Mapping Lab	Lb	0	0/0	3/0	1
3	EBCE22OL3	Environmental Engineering Laboratory	Lb	0	0/0	3/0	1





## FACULTY OF ENGINEERING AND TECHNOLOGY

BIOTECHNOLOGY							
S.NO	SUBJECT CODE	SUBJECT NAME	Ty/Lb/E TL	L	T/SLr	P/R	C
1	EBBT22OL1	Basic Biochemistry Lab	Lb	0	0/0	3/0	1
2	EBBT22OL2	Basic Bioprocess Lab	Lb	0	0/0	3/0	1
3	EBBT22OL3	Basic Microbiology Lab	Lb	0	0/0	3/0	1
4	EBBT22OL4	Basic Bioinformatics Lab	Lb	0	0/0	3/0	1

CHEMICAL ENGINEERING							
S.NO	SUBJECT CODE	SUBJECT NAME	Ty/Lb/E TL	L	T/SLr	P/R	C
1	EBCT22OL1	Chemical Separation Lab	Lb	0	0/0	3/0	1
2	EBCT22OL2	Chemical Composition Analysis Lab	Lb	0	0/0	3/0	1
3	EBCT22OL3	Alternate Fuel Lab	Lb	0	0/0	3/0	1
4	EBCT22OL4	Food Testing Laboratory	Lb	0	0/0	3/0	1

### OPEN ELECTIVE - APPLICABLE FOR OTHER DEPARTMENT STUDENTS

OPEN ELECTIVE							
S.No.	Subject Code	Subject Name	Ty/ Lb / ETL	L	T/ S.Lr	P/R	C
1	EBIT22OE1	Web Design	Ty	3	0/0	0/0	3
2	EBIT22OE2	Digital Marketing	Ty	3	0/0	0/0	3
3	EBIT22OE3	Cyber Security Essentials	Ty	3	0/0	0/0	3
4	EBIT22OE4	Introduction to Multimedia	Ty	3	0/0	0/0	3

### OPEN LAB - APPLICABLE FOR OTHER DEPARTMENT STUDENTS

OPEN LAB							
S.No	Subject Code	Subject Name	Ty/Lb/E TL	L	T/ S.Lr	P/R	C
1	EBIT22OL1	Visual Programming Lab	Lb	0	0/0	3/0	1
2	EBIT22OL2	Web Design Lab	Lb	0	0/0	3/0	1
3	EBIT22OL3	Digital content creation Lab	Lb	0	0/0	3/0	1
4	EBIT22OL4	Computer Network Lab	Lb	0	0/0	3/0	1
5	EBIT22OL5	PHP / MySQL Programming	Lb	0	0/0	3/0	1



## FACULTY OF ENGINEERING AND TECHNOLOGY

FOREIGN LANGUAGES			
S.No	Subject Code	Subject Name	Category
1	EBFL22I01	French	HS
2	EBFL22I02	German	HS
3	EBFL22I03	Japanese	HS
4	EBFL22I04	Arabic	HS
5	EBFL22I05	Chinese	HS
6	EBFL22I06	Russian	HS
7	EBFL22I07	Spanish	HS

SEMESTER	CREDIT
I	18
II	19
III	24
IV	21
V	22
VI	21
VII	24
VIII	17
<b>Total</b>	<b>166</b>



## FACULTY OF ENGINEERING AND TECHNOLOGY

**Table 1: Credit Distribution Format**

Course Component	Description	No. of Courses	Credits	Total	Credit Weightage (%)	Contact hours
<b>Basic Science`</b>	Theory	6	22	28	16.87	450
	Lab	-	-			
	ETL	2	6			
<b>Engineering Science</b>	Theory	1	3	11	6.63	240
	Lab	1	1			
	ETL	3	7			
<b>Humanities and Social Science</b>	Theory	3	5	9	5.42	240
	Lab	3	2			
	ETL	1	2			
<b>Program Core</b>	Theory	16	48	68	40.96	1320
	Lab	8	8			
	ETL	4	12			
<b>Program Electives</b>	Theory	5	15	15	9.04	225
	Lab	-	-			
	ETL	-	-			
<b>Open Elective</b>	Theory	2	6	7	4.22	135
	Lab	1	1			
	ETL	-	-			
<b>Inter-disciplinary</b>	Theory	3	9	12	7.23	255
	Lab	3	3			
	ETL	-	-			
<b>Skill Component</b>		6	6	6	3.61	210
<b>Project</b>	Project Phase -I	1	2	10	6.02	90
	Project Phase - II	1	8			
<b>Others if any</b>						
<b>Total</b>			<b>166</b>		<b>100</b>	<b>3165</b>



## FACULTY OF ENGINEERING AND TECHNOLOGY

**Table 2: Revision/modification done in syllabus content:**

S.No	Course (Subject) Code	Course (Subject) Name	Concept/ topic if any, removed in current curriculum	Concept/topic added in the new curriculum	% of Revision/ Modification done
1	EBIT22001	Programme Core – Essentials of Information Technology	-	New Subject Added in second semester	100%
2	EBIT22004	Computer Organization and Architecture	-	New Subject Added in third semester	100%
3	EBIT22003	Software Engineering	Object Oriented Content has been removed.	-	50%
4	EBIT22005	Database Management Systems	-	Relational model – structure – relational algebra- relational calculus- views removed in Unit I and added in Unit II Unit IV, V is updated with new topics & content	70%
5	EBIT22006	Operating System	Unit I Assemblers Compilers Loaders & Linkers has been Removed	Syllabus had been modified with. Operating Systems Structures, File System, I/O System title & content. Instead of SSOS	80%
6	EBIT22ET2	Java Programming	Removed Unit IV streams and object serialization	Syllabus had been modified with AWT & Swings in detail as unit IV & V	50%
7	EBIT22007	Enterprise Resource Planning	-	Elective Subject Changed to core subject in fifth semester	100%
8	EBIT22008	Professional Ethics	-	New Subject Added in fifth semester	100%



## FACULTY OF ENGINEERING AND TECHNOLOGY

S.No	Course (Subject) Code	Course (Subject) Name	Concept/ topic if any, removed in current curriculum	Concept/topic added in the new curriculum	% of Revision/ Modification done
9	EBIT22ET3	Computer Graphics and Multimedia	Removed Unit III, IV & V Three-Dimensional Graphics, Polygon rendering method	Syllabus had been modified Multimedia Systems Design, Multimedia File Handling, Hypermedia Unit III, IV, V is updated with new topics & content	70%
10	EBIT22010	Mobile Communication	Removed unit 2 satellite system and broadcast system	Course title modified	30%
11	EBIT22011	Embedded System and IoT		New Subject Added in sixth semester Previously it was in elective III as IOT now it is modified as Embedded systems and IOT	100%
12	EBIT22012	Data Warehousing and Data Mining	Unit II – ETL (Extract, Transform, Load) and business tools removed	More content in unit I, II IV, V has been modified ,Unit III Association rules topic & content included.	40%
13	EBIT22013	Cloud Computing		Unit IV Cloud application completely changed	20%
14	EBIT22014	Software Testing	-	New Subject Added in seventh semester	100%
15	EBIT22015	Cryptography and Network security	-	New Subject Added in seventh semester previous it was in Elective II	100%
16	EBIT22016	Web Technology and Web Services		Unit I Website basics Unit III Client side scripting Unit V Case studies is added.	60%
<b>Laboratory</b>					
17	EBIT22L03	Operating system lab	Two Programs has been altered	Two program included	25%



## FACULTY OF ENGINEERING AND TECHNOLOGY

S.No	Course (Subject) Code	Course (Subject) Name	Concept/ topic if any, removed in current curriculum	Concept/topic added in the new curriculum	% of Revision/ Modification done
18	EBIT22L04	Enterprise Resource Planning Lab	-	New Subject Added in fifth semester	100%
19	EBIT22L06	Embedded System and IoT Lab	-	New Subject Added in sixth semester	100%
20	EBIT22L07	Data Mining Lab		New Experiments have included	100%
<b>Electives</b>					
21	EBIT22E01	Fundamentals of Digital Image Processing	-	Digital Image Fundamentals, Image Restoration, Colour, Image Processing and Multi-Resolution Processing, Image Segmentation units topic & content modified	80%
22	EBIT22E07	Agile Methodologies		New subject Added in elective-I	100%
23	EBIT22E09	Fundamental of Ethical Hacking	-	New subject Added in elective-I	100%
24	EBIT22E10	C# and .NET Programming		New subject Added in elective-II	100%
25	EBIT22E11	Social Network Analysis		New subject Added in elective-II	100%
26	EBIT22E12	Games Designing		New subject Added in elective-II	100%
27	EBIT22E14	Information Security Management		Open elective subject changed to Program elective II	100%
28	EBIT22E17	Advanced Network		New subject Added in elective-II	100%
29	EBIT22E18	Web Mining		Syllabus had been modified with title & content completely.	100%
30	EBIT22E20	Software Quality Management		New subject Added in elective-III	100%



## FACULTY OF ENGINEERING AND TECHNOLOGY

S.No	Course (Subject) Code	Course (Subject) Name	Concept/ topic if any, removed in current curriculum	Concept/topic added in the new curriculum	% of Revision/ Modification done
31	EBIT22E21	Software Project Management		New subject Added in elective-III	100%
32	EBIT22E22	Machine Learning Techniques		Syllabus had been modified with title & content completely.	100%
33	EBIT22E24	Information Retrieval		New subject Added in elective-III	100%
34	EBIT22E25	Natural Language Processing		New subject Added in elective-III	100%
35	EBIT22E41	Block chain Technologies		New subject Added in elective-III	100%
36	EBIT22E26	Robotics		New subject Added in elective-IV & V	100%
37	EBIT22E27	Distributed Computing		Syllabus had been modified with title & content completely.	100%
38	EBIT22E28	Artificial Neural Network		New subject Added in elective-IV & V	100%
39	EBIT22E29	Green Computing		New subject Added in elective-IV & V	100%
40	EBIT22E30	Service-Oriented Architecture		New subject Added in elective-IV & V	100%
41	EBIT22E34	Digital Marketing Technique		New subject Added in elective-IV & V	100%
42	EBIT22E35	Pervasive Computing		New subject Added in elective-IV & V	100%



## FACULTY OF ENGINEERING AND TECHNOLOGY

S.No	Course (Subject) Code	Course (Subject) Name	Concept/ topic if any, removed in current curriculum	Concept/topic added in the new curriculum	% of Revision/ Modification done
43	EBIT22E36	Wearable Computing		New subject Added in elective-IV & V	100%
44	EBIT22E37	Wireless Adhoc & Mesh Networks		New subject Added in elective-IV & V	100%
45	EBIT22E38	Next-Generation Network		New subject Added in elective-IV & V	100%
46	EBIT22E40	R Programming		New subject Added in elective-IV & V	100%





## FACULTY OF ENGINEERING AND TECHNOLOGY

**Table 3: List of New courses/ value added courses//life skills/Electives/interdisciplinary /courses focusing on employability/entrepreneurship/skill development.**

S. No	New courses (Subjects)	Value added courses	Life skill	Electives	Inter Disciplinary	Focus on employability/ entrepreneurship/ skill development.
1	BIT22001 Programme Core – Essentials of Information Technology	Technical Skill I	Universal human values 2: Understanding harmony	Elective I	Digital Systems	Soft Skill I (Career & Confidence Building)
2	BIT22003 Computer Organization and Architecture	Technical Skill II	The Indian Constitution*/ The Indian Traditional Knowledge*	Elective II	Digital Systems Lab	Soft Skill II (Career & Confidence Building)
3	BCS22005 Operating System	Technical Skill III		Elective III	Microprocessors and Microcontrollers	Orientation to Entrepreneurship
4	BIT22006 Enterprise Resource Planning			Elective IV	Microprocessors and Microcontrollers Lab	
5	BIT22007 Professional Ethics			Elective V		



## **FACULTY OF ENGINEERING AND TECHNOLOGY**

# **I Semester**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBEN22001	Subject Name: TECHNICAL ENGLISH					Ty/Lb/ETL	L	T/SLr	P/R		C	
	Prerequisite: Pass in Plus 2 English					Ty	2	0/0	0/0		2	
C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
OBJECTIVES												
To refresh and stimulate students’ English learning through Content Integrated Language Learning to have an in-depth understanding of the components of English language and its use in communication that they are competent in inter-personal and academic communication for a successful career.												
COURSE OUTCOMES (COs)Students completing this course were able to												
CO1	Refresh and stimulate their English learning through Content Integrated Language Learning Ming											
CO2	Have an in-depth understanding of the components of English language and its use in communication.											
CO3	Strengthen their vocabulary and syntactic knowledge for use in academic and technical communication											
CO4	Learn to negotiate meaning in inter-personal and academic communication for a successful career											
CO5	Engage in organized academic and professional writing for life-long learning and research											
Mapping of Course Outcome with Program Outcome (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	1	1	3	1	1	2	3	3	1	3
CO2	-	1	-	2	3	2	1	1	3	3	-	3
CO3	1	1	1	1	2	1	-	2	3	3	1	3
CO4	1	2	1	1	3	-	1	-	2	2	1	2
CO5	1	2	1	-	2	1	-	1	3	3	1	3
COs/PSOs		PSO1			PSO2				PSO3		PSO4	
CO1		2							1			
CO2		2			1						1	
CO3		2			1				1		1	
CO4		2			1				1		1	
CO5		2			1				1		1	
3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low												
Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/Project	Internships/Tech nical Skills	Soft Skills			
			√									



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name TECHNICAL ENGLISH	Ty/Lb/ETL	L	T/SLr	P/R	C
<b>EBEN22001</b>	Prerequisite: Pass in Plus 2 English	<b>Ty</b>	<b>2</b>	<b>0/0</b>	<b>0/0</b>	<b>2</b>

### Unit I Vocabulary Development:

**6 Hrs**

Affixes: prefixes and suffixes and word formation–synonyms and antonyms-nominal compounds, expanding using numbers and approximation - preposition, prepositional phrases, preposition + relative pronoun- adjective: degrees of comparison, formation of adjectives, irregular comparatives- Infinitive and Gerunds

### Unit II Grammar

**6 Hrs**

Tenses- auxiliary and modal –voice: active, passive and impersonal passive - Questions:Wh-pattern, Yes/no questions, tag questions – adverbs and adverbial clauses- ‘If’ clause, cause and effect’, ‘purpose’- Concord: subject-verb agreement

### Unit III Reading

**6 Hrs**

Comprehension: extracting relevant information from the text, by skimming and scanning and inferring, identifying lexical and contextual meaning for specific information, identifying the topic sentence and its role in each paragraph, comprehension exercises - Note - making - Précis writing-instructions, suggestions and recommendations.

### Unit IV Writing

**6 Hrs**

Jumbled sentences - paragraph writing coherence devices- discourse markers. Essay writing- Letter writing, Informal and formal: seeking permission to undergo practical training, letter to an editor of a newspaper complaining about civic problems and suggesting suitable solutions

### Unit V Visual Aids in Communication

**6 Hrs**

Interpretation of diagrams - tables, flow charts, pie charts and bar charts, and their use in Business reports

**Total Hours: 30**

### Text book

Panorama\_: Content Integrated Language Learning for Engineers,  
M. Chandrasena Rajeswaran & R. Pushkala, Vijay Nicole Imprints Pvt. Ltd., Chennai

### References

1. Bhatnagar & Bhatnagar, Communicative English for Engineers and Professionals, Pearson
2. Wren and Martin: Grammar and Composition, Chand & Co, 2006
3. <https://learnenglish.britishcouncil.org> [www.better-english.com/grammar/preposition](http://www.better-english.com/grammar/preposition).



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name MATHEMATICS-I						Ty/Lb/ETL	L	T/SLr	P/R	C	
EBMA22001	Prerequisite: Higher secondary Mathematics						Ty	3	1/0	0/0	4	
C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
OBJECTIVES												
<ul style="list-style-type: none"><li>• Apply the Basic concepts in Algebra</li><li>• Use the Basic concepts in Matrices</li><li>• Identify and solve problems in Trigonometry</li><li>• Understand the Basic concepts in Differentiation</li><li>• Apply the Basic concepts in Functions of Several variables</li></ul>												
COURSE OUTCOMES (COs)Students completing this course were able to												
CO1	Find the summation of given series of binomial, exponential and logarithmic											
CO2	Transform a non-diagonal matrix into an equivalent diagonal matrix using orthogonal transformation											
CO3	Find the expansion of trigonometric function into an infinite series and separate real and imaginary parts											
CO4	Find the maxima and minima of the given function											
CO5	Evaluate the partial/total differentiation and maxima/minima of function of several variable											
Mapping of Course Outcome with Program Outcome (POs)												
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	2	2	3	3	1	3
CO2	3	3	1	2	3	2	1	2	3	1	2	3
CO3	3	3	1	2	2	3	1	1	2	3	2	1
CO4	3	2	2	2	1	2	2	2	2	3	2	2
CO5	3	3	1	2	1	1	2	1	2	2	1	3
COs/PSOs		PSO1			PSO2			PSO3			PSO4	
CO1		2			1			1			2	
CO2		2			1			1			2	
CO3		2			1			1			2	
CO4		2			1			1			2	
CO5		2			1			1			2	
3/2/1 Indicates Strength of Correlation, 3 –High, 2- Medium, 1- Low												
Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/ Project	Internships/ Technical Skills	Soft Skills			
	✓											



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name MATHEMATICS-I	Ty/Lb/ETL	L	T/SLr	P/R	C
EBMA22001	Prerequisite: Higher secondary Mathematics	Ty	3	1/0	0/0	4

### UNIT I ALGEBRA

**12 Hrs**

Binomial, Exponential, Logarithmic Series (without proof of theorems) – Problems on Summation, Approximation and Coefficients.

### UNIT II MATRICES

**12 Hrs**

Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values – Cayley - Hamilton theorem(without proof) – Orthogonal reduction of a symmetric matrix to Diagonal form.

### UNIT III TRIGONOMETRY

**12 Hrs**

Expansions of  $\sin n\theta$ ,  $\cos n\theta$  in powers of  $\sin\theta$  and  $\cos\theta$  – Expansion of  $\tan n\theta$  – Expansions of  $\sin^n\theta$  and  $\cos^n\theta$  in terms of Sines and Cosines of multiples of  $\theta$  – Hyperbolic functions – Separation into real and imaginary parts.

### UNIT IV DIFFERENTIATION

**12 Hrs**

Basic concepts of Differentiation –Elementary differentiation methods –Parametric functions – Implicit function –Leibnitz theorem(without proof) – Maxima and Minima – Points of inflection.

### UNIT V FUNCTIONS OF SEVERAL VARIABLES

**12 Hrs**

Partial derivatives – Total differential – Differentiation of implicit functions – Taylor's expansion – Maxima and Minima by Lagrange's Method of undetermined multipliers – Jacobians.

**Total Periods: 60**

### Text & Reference Books:

- 1) Kreyszig E., *Advanced Engineering Mathematics (10<sup>th</sup> ed.)*, John Wiley & Sons, (2011).
- 2) Grewal B.S., *Higher Engineering Mathematics*, Khanna Publishers, (2012).
- 3) John Bird, *Basic Engineering Mathematics (5<sup>th</sup> ed.)*, Elsevier Ltd, (2010).
- 4) Veerarajan T., *Engineering Mathematics (for first year)*, Tata McGraw Hill Publishing Co., (2008).
- 5) P.Kandasamy, K.Thilagavathy and K. Gunavathy, *Engineering Mathematics Vol. I (4<sup>th</sup> Revised ed.)*, S.Chand & Co., Publishers, New Delhi (2000).
- 6) John Bird, *Higher Engineering Mathematics (5<sup>th</sup> ed.)*, Elsevier Ltd, (2006).



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name ENGINEERING PHYSICS	Ty/Lb/ ETL	L	T/SLr	P/R	C						
EBPH22ET1	Prerequisite : Higher secondary Physics	ETL	2	0/0	2/0	3						
C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
OBJECTIVES												
<ul style="list-style-type: none"><li>Outline the relation between Science, Engineering &amp; Technology.</li><li>Demonstrate competency in understanding basic concepts.</li><li>Apply fundamental laws of Physics in Engineering &amp; Technology.</li><li>To identify &amp; solve problems using physics concepts.</li><li>Produce and present activities associated with the course through effective technical communication</li></ul>												
COURSE OUTCOMES (COs)Students completing this course were able to												
CO1	Demonstrate competency in understanding basic concepts.											
CO2	Utilize scientific methods for formal investigations & demonstrate competency with experimental methods and verify the concept to content knowledge.											
CO3	Identify and provide solutions for engineering problems.											
CO4	Relate the technical concepts to day to day life and to practical situations.											
CO5	Think analytically to interpret concepts.											
Mapping of Course Outcome with Program Outcome (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	2	2	2	1	-	1	2	-	1
CO2	3	3	2	2	2	2	1	-	2	2	1	1
CO3	3	3	3	2	2	2	1	1	1	2	1	2
CO4	3	3	2	2	1	2	2	1	2	2	1	2
CO5	3	3	2	1	1	2	1	2	1	2	1	1
COs/PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			2			-			-		
CO2	3			2			-			-		
CO3	3			1			1			2		
CO4	3			2			1			2		
CO5	3			1			1			2		
3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low												
Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/Project	Internships/ Technical Skills	Soft Skills			
	√											





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name ENGINEERING PHYSICS	Ty/Lb/ETL	L	T/SLr	P/R	C
EBPH22ET1	Prerequisite: Higher secondary Physics	ETL	2	0/0	2/0	3

### UNIT I PROPERTIES OF MATTER

12 Hrs

Elasticity - stress, strain and Hook's law - Poisson's ratio - three moduli of elasticity - twisting couple on a wire - Shafts - Solid & Hollow Shafts - Bending moment - Young's Modulus Determination by nonuniform bending - I form of girders.

viscosity - flow of liquid through a narrow tube: Poiseuille's law (Qualitative)- Ostwald's viscometer - Lubrication

**Lab Component – 1. Coefficient of Viscosity determination using Poiseuille's Method**

### UNIT II ACOUSTICS & ULTRASONICS

12 Hrs

Fundamentals of acoustics - reverberation- reverberation time - factors affecting acoustics. Ultrasonics- Production of ultrasonic waves - detection of ultrasonic waves+ - acoustic grating - application of ultrasonic waves.

**Lab Component – 2. Ultrasonic Velocity Determination**

### UNIT III WAVE OPTICS

12 Hrs

Huygen's principle - interference of light - wave front splitting and amplitude - air wedge - Newton's rings - Michelson interferometer and its applications - Fraunhofer diffraction from a single slit - diffraction grating

**Lab Component – 3. Spectrometer – Grating**

### UNIT IV LASER

12 Hrs

Laser principle and characteristics - amplification of light by population inversion - properties of laser beams: mono-chromaticity, coherence, directionality and brightness - different types of lasers - Ruby laser-Nd-YAG laser-He-Ne laser-CO<sub>2</sub> laser - semiconductor laser - applications of lasers in science, engineering and medicine.

**Lab Component – 4. Determination of Wavelength of the given Laser source & Particle size determination**

### UNIT V FIBER OPTIC COMMUNICATION

12 Hrs

Total Internal Reflection - Propagation of Light in Optical Fibers - Numerical aperture and Acceptance Angle - Types of Optical Fibers (material, refractive index, mode) - Fiber Optical Communication system (Block diagram) - Attenuation-Transmitter, Receiver, Dispersion, Modulation/Demodulation Advantages of Fiber Optical Communication System - IMT, PMT, Wavelength Modulated & Polarization Modulated Sensors - Endoscope Applications.

**Lab Component – 5. Determination of Numerical Aperture of Optical Fiber**

**Total Periods: 60**

### TEXT BOOKS

1. Brijlal, M. N. Avadhanulu & N. Subrahmanyam, Text Book of Optics, S. Chand Publications, 25<sup>th</sup> edition, 2012
2. R. Murugesan, Electricity and Magnetism, S.Chand Publications, 10<sup>th</sup> edition, 2017
3. R. Murugesan & Kiruthiga Sivaprasath, Modern Physics, S.Chand Publications, 2016

### REFERENCE BOOKS

1. Dr. Senthil Kumar Engineering Physics I VRB Publishers, 2016
2. N Subrahmanyam & Brijlal, Waves and Oscillations, Vikas Publications, New Delhi, 1988
3. N Subrahmanyam & Brijlal, Properties of Matter, S. Chand Co., New Delhi, 1982
4. N Subrahmanyam & Brijlal, Text book of Optics, S. Chand Co., New Delhi, 1989
5. R. Murugesan, Electricity and Magnetism, S. Chand & Co., New Delhi, 1995
6. Thygarajan K & Ajay Ghatak, Laser Theory and Applications, Macmillan, New Delhi, 1988
7. Dr. S. Muthukumaran, Dr.G.Balaji, S.Masilamani - PHYSICS LABORATORY I & II by Sri Krishna Hitech Publishing Company Pvt.Ltd.





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code		Subject Name <b>ENGINEERING CHEMISTRY</b>					Ty/Lb/ ETL	L	T/SLr	P/R	C	
<b>EBCH22ET1</b>		Prerequisite: Higher secondary Chemistry					<b>ETL</b>	<b>2</b>	<b>0/0</b>	<b>2/0</b>	<b>3</b>	
C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
<b>OBJECTIVES</b>												
1.To deduce practical application of theoretical concepts 2.To provide and insight into fundamental concepts of chemical thermodynamics 3.To articulate the water treatment methods 4. To impart the knowledge in electrical conductance and EMF 5. To create awareness about the modern Nano composites along with concepts of polymers 6.To introduce analytical tools for characterization techniques.												
<b>COURSE OUTCOMES (COs)</b>												
Students completing this course were able to												
CO1	Apply relevant instrumentation techniques to solve complex problems											
CO2	Recall the fundamentals and demonstrate by understanding the first principles of Engineering sciences.											
CO3	Examine the appropriate techniques to interpret data to provide valid conclusion											
CO4	Demonstrate the collaboration of science and Engineering to recognize the need for life long learning.											
CO5	Analyse the impact of contextual knowledge to access the health and society issues.											
<b>Mapping of Course Outcome with Program Outcome (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	3	3	3	-	-	-	2	-	-	-
CO2	3	3	-	-	-	3	-	-	-	-	-	3
CO3	3	-	2	3	-	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	3	-	-	-	3
CO5	3	-	-	-	-	2	3	2	-	-	-	3
COs/PSOs		PSO1		PSO2			PSO3			PSO4		
CO1		3		-			3			3		
CO2		3		-			3			3		
CO3		3		-			3			3		
CO4		3		-			3			3		
CO5		3		-			3			3		
3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low												
Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/Project	Internships/ Technical Skills		Soft Skills		
	√											



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/SLr	P/R	C
<b>EBCH22ET1</b>	<b>ENGINEERING CHEMISTRY</b>					
	Prerequisite: Higher secondary Chemistry	<b>ETL</b>	<b>2</b>	<b>0/0</b>	<b>2/0</b>	<b>3</b>

### UNIT -I CHEMICAL THERMODYNAMICS

**12 Hrs**

Introduction, Terminology in thermodynamics –System, Surrounding, State and Path functions, Extensive and intensive properties. Laws of thermodynamics – I and II laws-Need for the II law. Enthalpy, Entropy, Gibbs free energy, Helmholtz free energy - Spontaneity and its criteria. Maxwell relations, Gibbs -Helmholtz equation (relating E & A) and (relating H & G).

### UNIT -II TECHNOLOGY OF WATER

**12 Hrs**

Water quality parameters – Definition and expression. Analysis of water – alkalinity, hardness and its determination (EDTA method only). Boiler feed water and Boiler Troubles-Scales and sludges, Caustic embrittlement, Priming and Foaming and Boiler corrosion. Water softening processes – Internal conditioning, external conditioning – Demineralization methods. Desalination processes-RO and Electrodialysis.

**Lab Component-1. Analyze the water quality parameters for the given water sample.**

### UNIT -III ANALYTICAL AND CHARACTERIZATION TECHNIQUES

**12Hrs**

Chromatographic techniques – column, thin layer and paper. Instrumentation-working with block diagram- UV-Visible Spectroscopy, IR Spectroscopy, Scanning electron microscope, Transmission electron microscope.

**Lab Component-1. Determination of R<sub>f</sub> values of various components using thin layer chromatography.**

**2. Compute and interpret the structures of the given molecules using Chem Draw.**

### UNIT – IV ELECTROCHEMISTRY

**12 Hrs**

Conductance – Types of conductance and its Measurement. Electrodes and electrode potential, Nernst equation – EMF measurement and its applications-Electrochemical series- Types of electrodes- Reference electrodes- Standard hydrogen electrode- Saturated calomel electrode-Determination of P<sup>H</sup> using these electrode.

**Lab Component-1. Studies on acid-base conduct metric titration. 2. Determination of redox potentials using potentiometry**

### UNIT – VPOLYMERS AND NANO COMPOSITES

**12 Hrs**

Polymers-Introduction-Monomers – Functionality – Degree of polymerization-Tactility. Classification- Plastics – Thermoplastics and thermosetting plastics, Compounding of plastics – Compression moulding, injection moulding and extrusion processes. Nano composites: particulates, clay and carbon nano tubes. nano composites and its applications.

**Lab Component-1. Polymeric analysis using capillary viscometer**

**Total Periods: 60**

### References

1. Jain & Jain *Engineering Chemistry* 17<sup>th</sup> Edition, Dhanpat Rai Publishing Company
2. Vasant R. Gowariker,, N. V. Viswanathan, Jayadev Sreedhar, *Polymer Science*, New Age International, 1986
3. B.K. Sharma, *Polymer Chemistry*, Goel Publishing House
4. Y. R. Sharma, *Elementary Organic Spectroscopy*, S. Chand & Company Ltd.
5. N. Krishnamurthy, K. Jeyasubramanian, P. Vallinayagam, *Applied Chemistry*, Tata McGraw-Hill Publishing Company Limited, 1999.
6. Chichester, *polymer-clay-nano composites*, Johnwiley (2000)



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name <b>BASIC MECHANICAL &amp; CIVIL ENGINEERING</b>						Ty/Lb/ ETL	L	T/SLr	P/R	C	
<b>EBME22ET1</b>	<b>Prerequisite: None</b>						<b>ETL</b>	<b>2</b>	<b>0/0</b>	<b>2/0</b>	<b>3</b>	
C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
<b>OBJECTIVES</b>												
<ul style="list-style-type: none"><li>To understand the fundamentals and applications of IC Engines, power plants, manufacturing processes and mechanics.</li><li>To expose the students to the various construction materials and their applications.</li></ul>												
<b>COURSE OUTCOMES (COs)</b>												
Students completing this course were able to												
<b>CO1</b>	Demonstrate the working principles of power plants, IC Engines and boilers.											
<b>CO2</b>	Utilize the concept of metals forming, joining process and apply in suitable machining process											
<b>CO3</b>	Understand the various machining process in machine tool											
<b>CO4</b>	Utilize the concept of Building materials and construction able to perform concrete mix and masonry types											
<b>CO5</b>	Demonstrate how Roads, Railways, dams, Bridges have been constructed											
<b>Mapping of Course Outcome with Program Outcome (POs)</b>												
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	2	-	3	3	3	-	3
CO2	3	-	-	-	1	2	-	1	2	2	-	2
CO3	3	3	-	-	1	1	-	1	2	2	-	2
CO4	3	-	-	-	1	1	-	-	2	2	-	2
CO5	3	-	-	-	1	1	-	1	2	2	-	2
COs/PSOs		PSO1		PSO2			PSO3			PSO4		PSO5
CO1		1		-			-			-		-
CO2		1		-			-			-		-
CO3		1		-			-			-		-
CO4		1		-			-			-		-
CO5		1		-			-			-		-
3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low												
Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/Project		Internships/Tech nical Skills			Soft Skills
		√										



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/SLr	P/R	C
	<b>BASIC MECHANICAL &amp; CIVIL ENGINEERING</b>					
<b>EBME22ET1</b>	<b>Prerequisite: None</b>	<b>ETL</b>	<b>2</b>	<b>0/0</b>	<b>2/0</b>	<b>3</b>

### UNIT I THERMAL ENGINEERING

**12 Hrs**

Classification of internal combustion engine – Working of two stroke, four stroke petrol and diesel engines. Classification of Boilers – Cochran boiler – Locomotive boilers – Power plant classification – Working of Thermal and Nuclear power plant- Working of Solar-Wind - Tidal and Geothermal power plants.

**Lab component: Study of Boilers and IC engines**

### UNIT II MANUFACTURING PROCESS

**12 Hrs**

Metal forming processes – Rolling, forging, drawing, extrusion and sheet metal operations- fundamentals only. Metal Joining processes – Welding - arc and gas welding, Soldering and Brazing. Casting process – Patterns - Moulding tools - Types of moulding - Preparation of green sand mould -Operation of Cupola furnace.

**Lab component: Sheet metal works,**

**Fitting- Cutting (T, V, L and dovetail joints)**

### UNIT III MACHINING PROCESS

**12 Hrs**

Basics of metal cutting operations – Working of lathe- parts-Operations performed. Drilling machine – Classification – Radial drilling machine - Twist drill nomenclature. Milling machine-types-different operations performed.

**Lab component: Lathe operation: Step turning and Taper turning**

**Drilling operation- Making hole drilling**

### UNIT IV BUILDING MATERIALS AND CONSTRUCTION

**12 Hrs**

**Materials:** Brick - Types of Bricks - Test on bricks - Cement – Types, Properties and uses of cement – Steel - Properties and its uses – Ply wood and Plastics.

**Construction:** Mortar – Ingredients – Uses – Plastering - Types of mortar - Preparation – Uses – Concrete – Types – Grades – Uses – Curing – Introduction to Building Components (foundation to roof) – Masonry – Types of masonry (Bricks & Stones)

**Lab component: Carpentry: Joints (Tee halving, Cross Lap, Dovetail Joint)**

**Plumbing works- Pipe connections**

### UNIT V ROADS, RAILWAYS, BRIDGES & DAMS

**12 Hrs**

Roads – Classification of roads – Components in roads – Railways -Components of permanent way and their function – Bridges – Components of bridges – Dams – Purpose of dams – Types of dams.

**Total Periods: 60**

### TEXT BOOKS

1. S. Bhaskar, S. Sellappan, H.N.Sreekanth,, (2002), “*Basic Engineering*” –Hi-Tech Publications
2. K. Venugopal, V. Prabhu Raja, (2013-14), “*Basic Mechanical Engineering*”, Anuradha Publications.
3. K.V. Natarajan (2000), *Basic Civil Engineering*, Dhanalakshmi Publishers
4. S.C. Sharma(2002), *Basic Civil Engineering*, Dhanpat Raj Publications

### REFERENCES

1. PR.SL. Somasundaram, (2002), “*Basic Mechanical Engineering*” –, Vikas Publications
2. S.C. Rangawala(2002), *Building Material and Construction*, S. Chand Publishes



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name <b>ORIENTATION TO ENTREPRENEURSHIP &amp; PROJECT LAB</b>	Ty/Lb/ ETL	L	T/SLr	P/R	C
<b>EBCC22I01</b>	Prerequisite : None	<b>IE</b>	<b>1</b>	<b>0/0</b>	<b>1/0</b>	<b>1</b>

C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical  
R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation

### OBJECTIVES

- Understand how entrepreneurship Education transforms individuals into successful leaders.
- Identify individual potential & S have career dreams
- Understand difference between ideas & opportunities
- Identify components & create action plan.
- Use brainstorming in a group to generate ideas.

### COURSE OUTCOMES (COs)

Students completing this course were able to

<b>CO1</b>	Develop a Business plan & improve ability to recognize business opportunity
<b>CO2</b>	Do a self-analysis to build an entrepreneurial career.
<b>CO3</b>	Articulate an effective elevator pitch.
<b>CO4</b>	Analyze the local market environment & demonstrate the ability to find an attractive market
<b>CO5</b>	Identify the required skills for entrepreneurship & develop

### Mapping of Course Outcome with Program Outcome (POs)

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	2	2	3	2	2	2	-	2	2	2	1
CO2	3	2	-	3	2	3	2	3	3	3	2	2
CO3	-	2	2	2	-	3	-	3	3	3	-	-
CO4	-	3	2	2	2	2		3	2	2	3	-
CO5	-	2	2	3	2	2	3	3	2	2	3	1

COs/PSOs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	-	1	-	2	-
CO2	-	1	-	1	-
CO3	-	1	-	2	-
CO4	-	2	1	2	1
CO5	-	-	-	1	-

3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low

Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/ Project	Internships/ Technical Skills	Soft Skills
								√	



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/SLr	P/R	C
<b>EBCC22I01</b>	<b>ORIENTATION TO ENTREPRENEURSHIP &amp; PROJECT LAB</b>	<b>IE</b>	<b>1</b>	<b>0/0</b>	<b>1/0</b>	<b>1</b>

### UNIT I CHARACTERISTICS OF A SUCCESSFUL ENTREPRENEUR

**6 Hrs**

Introduction to entrepreneurship education – Myths about entrepreneurship – How has entrepreneurship changed the country – Dream it. Do it - Idea planes - Some success stories – Global Legends – Identify your own heroes.

### UNIT II ENTREPRENEURIAL STYLE

**6 Hrs**

Entrepreneurial styles – Introduction, concept & Different types - Barrier to Communication – Body language speaks louder than words

### UNIT III DESIGN THINKING

**6 Hrs**

Introduction to Design thinking – Myth busters – Design thinking Process - Customer profiling – Wowing your customer – Personal selling – concept & process – show & tell concept – Introduction to the concept of Elevator Pitch

### UNIT IV RISK MANAGEMENT

**6 Hrs**

Introduction to risk taking & Resilience – Managing risks (Learning from failures, Myth Buster) – Understanding risks through risk takers – Why do I do? – what do I do?

### UNIT V PROJECT

**6 Hrs**

How to choose a topic – basic skill sets necessary to take up a project – creating a prototype – Pitch your project – Project presentation.

**Total Periods: 30**

### Reference Books & Website

1. Encyclopedia of Small Business (2011) – (e book)
2. Oxford Handbook of Entrepreneurship (2014)–(e book)
3. lms.learnwise.org





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBCS22ET1</b>	<b>Subject Name</b> <b>C PROGRAMMING AND MS OFFICE TOOLS</b>						<b>Ty/Lb/ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: Nil						<b>ETL</b>	<b>1</b>	<b>0/0</b>	<b>2/0</b>	<b>2</b>	
C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
<b>OBJECTIVES:</b> <b>The student should be made to:</b> <ul style="list-style-type: none"><li>• learn a programming language.</li><li>• learn problem solving techniques.</li><li>• write programs in C and to solve the problems.</li><li>• familiarize the students in preparation of documents and presentations with office automation tools.</li></ul>												
<b>COURSE OUTCOMES (COs): After Completing the course, the student can be able to</b>												
<b>CO1</b>	Understand and trace the execution of programs written in C language.											
<b>CO2</b>	Write the C code for a given algorithm.											
<b>CO3</b>	Apply Arrays and Functions concepts to write Programs											
<b>CO4</b>	Apply Structures and pointers concepts for writing Programs											
<b>CO5</b>	To perform documentation, accounting operations and presentation skills											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	2	2	2	2	1	1	1	1	1	1	2	2
<b>CO2</b>	2	2	2	2	1	1	1	1	1	1	2	2
<b>CO3</b>	2	2	3	2	1	1	1	1	1	1	3	2
<b>CO4</b>	2	2	3	3	1	1	1	1	1	1	3	2
<b>CO5</b>	1	1	1	1	1	1	0	0	2	3	2	0
<b>COs / PSOs</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
<b>CO1</b>	3			3			2			1		
<b>CO2</b>	3			3			2			1		
<b>CO3</b>	3			3			2			1		
<b>CO4</b>	3			2			2			1		
<b>CO5</b>	2			2			0			0		
<b>3/2/1 Indicates Strength of Correlation, 3 – High, 2- Medium, 1- Low</b>												
<b>Category</b>	<b>Basic Sciences</b>	<b>Engineering Sciences</b>	<b>Humanities and Social Sciences</b>	<b>Program Core</b>	<b>Program Electives</b>	<b>Open Electives</b>	<b>Practical / Project</b>	<b>Internships / Technical Skill</b>	<b>Soft Skills</b>			
				✓								



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBCS22ET1</b>	Subject Name <b>C PROGRAMMING AND MS OFFICE TOOLS</b>	Ty/Lb/ETL	L	T/S.Lr	P/R	C
	Prerequisite: Nil	ETL	1	0/0	2/0	2

### UNIT I Introduction

**9 Hrs**

Basic Structure of C programme - Constants, Variables and data types, Keywords, Identifiers- Operators and expressions- executing a C Program

### UNIT II Decision making statements and looping statements

**9 Hrs**

Decision making with if statement, Simple if statement, else-if statement, Nesting if-else statement, The else if ladder, The switch statement, The go to statement, The while statement, The do while statement, The for statement, jumps in loops

### UNIT III Arrays and Functions

**9 Hrs**

Introduction to Arrays- One dimensional arrays, Two dimensional array, and Multidimensional array- Introduction to Functions- calling a function, category of functions- arguments with return values, argument with no return values- parameter passing Mechanism: Call by Value and Call by Reference. Recursion.

### UNIT IV Structures & Pointers

**9 Hrs**

Structures definition, giving values to members, Structure initialization, comparison of structure variables, Structure within structures, Understanding pointers, accessing the address of the variable, declaring and initializing pointer, accessing a variable through its pointer and arrays

### UNIT VMS-Office

**9 Hrs**

Introduction to MS-Word- Menus- Introduction to MS-Excel: features of MS- Excel, spread sheet/worksheet, parts of MS-excel window, functions in excel sheet, chart, Introduction to MS-Power point

**Total Periods: 45**

### TEXT BOOKS:

1. E. Balaguruswamy, Programming in ANSI C
2. Padma Reddy ,Computer Concepts & 'C' Programming
3. Shobha Hangirke, Computer Application For Business

### List of Experiments : C PROGRAMMING

1. Find the factorial of a given positive number using function.
2. Calculate X raised to y using function.
3. Find GCD and LCM of two given integer numbers using function.
4. Find the sum of N natural numbers using function.
5. Book information using Structure.
6. Student information using Structure.
7. Print the address of a variable and its value using Pointer
8. Find area and perimeter of a circle
9. Check whether the given number is palindrome or not
10. Check whether the given number is prime or not
11. Calculate sum of the digits of the given number
12. Display Fibonacci series up to N terms
13. Check whether a given character is alphabetic, numeric or special character
14. Count vowels and consonants in a given string
15. Find product of two matrices

### MS-OFFICE

16. Preparing a news letter:
17. To prepare a newsletter with borders, two columns text, header and footer and inserting a graphic image and page layout.
18. Creating and editing the table
19. Printing envelopes and mail merge.
20. Using formulas and functions: To prepare a Worksheet showing the monthly sales of a company in different branch offices
21. Prepare a Statement for displaying Result of 10 students in 5 subjects.





## FACULTY OF ENGINEERING AND TECHNOLOGY

# II Semester



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code: <b>EBMA22003</b>	Subject Name <b>MATHEMATICS-II</b>					<b>Ty/Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>		
	Prerequisite: Higher secondary Mathematics					Ty	3	1/0	0/0	4		
<b>C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation</b>												
<b>OBJECTIVES:</b> <b>The student should be made to:</b> To be able to understand basic concepts in integration To understand the concepts in multiple integrals To use the basic concepts in ordinary differential equations To be able to apply concepts of analytical geometry To be able to understand the basic concept of vector calculus												
<b>COURSE OUTCOMES (COs):</b>												
<b>CO1</b>	Integrate the given function by using methods of integration and to find the area under curve and the volume of a solid by revaluation											
<b>CO2</b>	Evaluate the multiple integrals /area/volume and to change the order of integration											
<b>CO3</b>	Apply concepts in Ordinary Differential equations and to solve Euler’s differential equation											
<b>CO4</b>	Find equation of planes, lines and sphere and shortest distance between skew lines											
<b>CO5</b>	Verify green/stokes/gauss divergence theorem											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	3	3	2	2	2	2	1	2	2	2	1	3
<b>CO2</b>	3	3	1	2	2	3	2	2	3	3	2	2
<b>CO3</b>	3	3	1	2	2	3	1	1	3	3	2	2
<b>CO4</b>	3	3	2	2	1	2	2	2	2	3	2	2
<b>CO5</b>	3	3	1	2	2	2	2	1	2	3	1	2
<b>COs /</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
<b>CO1</b>	2			1			1			2		
<b>CO2</b>	2			1			1			2		
<b>CO3</b>	2			1			1			2		
<b>CO4</b>	2			1			1			2		
<b>CO5</b>	2			1			1			2		
<b>3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
	√											



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code: <b>EBMA22003</b>	Subject Name <b>MATHEMATICS-II</b>	<b>Ty/Lb/ETL</b>	<b>L</b>	<b>T/S.Lr</b>	<b>P/R</b>	<b>C</b>
	Prerequisite: Higher secondary Mathematics	Ty	3	1/0	0/0	4

### UNIT I INTEGRATION

**12 Hrs**

Basic concepts of Integration – Methods of Integration– Integration by substitution – Integration by parts – Definite integrals– Properties of definite integrals – Problems on finding Area and Volume using single integrals (simple problems).

### UNIT II MULTIPLE INTEGRALS

**12 Hrs**

Double integral in Cartesian and Polar Co-ordinates – Change of order of integration – Triple integral in Cartesian Co-ordinates – Spherical Polar Co-ordinates – Change of variables (simple problems).

### UNIT III ORDINARY DIFFERENTIAL EQUATIONS

**12 Hrs**

First order differential equations – Second and higher order linear differential equations with constant coefficients and with RHS of the form:  $e^{ax}$ ,  $x^n$ ,  $\sin ax$ ,  $\cos ax$ ,  $e^{ax}f(x)$ ,  $x f(x)$  where  $f(x)$  is  $\sin bx$  or  $\cos bx$  – Differential equations with variable coefficients (Euler's form) (simple problems).

### UNIT IV THREE-DIMENSIONAL ANALYTICAL GEOMETRY

**12 Hrs**

Direction Cosines and Ratios – Equation of a straight line – Angle between two lines – Equation of a plane – Co-planar lines – Shortest distance between skew lines – Sphere – Tangent plane.

### UNIT V VECTOR CALCULUS

**12 Hrs**

Scalar and Vector functions – Differentiation – Gradient, Divergence and Curl – Directional derivatives – Irrotational and Solenoidal fields– Line, Surface and Volume integrals – Green's, Stoke's and Gauss divergence theorems (statement only) – Verification.

**Total periods : 60**

### Reference Books:

- 1) Kreyszig E., *Advanced Engineering Mathematics (10<sup>th</sup> ed.)*, John Wiley & Sons, (2011).
- 2) Grewal B.S., *Higher Engineering Mathematics*, Khanna Publishers, (2012).
- 3) John Bird, *Basic Engineering Mathematics (5<sup>th</sup> ed.)*, Elsevier Ltd, (2010).
- 4) Veerarajan T., *Engineering Mathematics (for first year)*, Tata McGraw Hill Publishing Co., (2008).
- 5) P.Kandasamy, K.Thilagavathy and K. Gunavathy, *Engineering Mathematics Vol. I (4<sup>th</sup> Revised ed.)*, S.Chand & Co., Publishers, New Delhi (2000).
- 6) John Bird, *Higher Engineering Mathematics (5<sup>th</sup> ed.)*, Elsevier Ltd, (2006).



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name <b>SOLID STATE PHYSICS</b>						Ty/Lb/ ETL	L	T/SLr	P/R	C	
<b>EBPH22001</b>	<b>Prerequisite: Engineering Physics</b>						<b>Ty</b>	<b>3</b>	<b>0/0</b>	<b>0/0</b>	<b>3</b>	
<b>C:</b> Credits, <b>L:</b> Lecture, <b>T:</b> Tutorial, <b>SLr:</b> Supervised Learning, <b>P:</b> Problem / Practical <b>R:</b> Research, <b>Ty/Lb/ETL/IE:</b> Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
<b>OBJECTIVES</b>												
<ul style="list-style-type: none"><li>• Design, conduct experiment and analyze data.</li><li>• Develop a Scientific attitude at micro and nano scale of materials</li><li>• Understand the concepts of Modern Physics</li><li>• Apply the science of materials to Engineering &amp; Technology</li></ul>												
<b>COURSE OUTCOMES (COs)</b> Students completing this course were able to												
<b>CO1</b>	Enable the student to employ the classical & quantum theories & Laws in general											
<b>CO2</b>	Critically evaluate to build models to understand the solid state fundamentals											
<b>CO3</b>	Formulate & understand the behaviour of solid state devices											
<b>CO4</b>	Articulate the physical properties of condensed matter											
<b>CO5</b>	Interpret the role of solid state physics in the advanced technological developments											
<b>Mapping of Course Outcome with Program Outcome (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1			2		1
CO2	3	3	1	2	2	1	1		1	2		1
CO3	3	3	3	3	2	2	2	1		2	1	1
CO4	3	3	3	3	2	2	1	1	3	2	1	1
CO5	3	2	2	2	2	1	1	1	2	2	1	1
COs/PSOs		PSO1			PSO2			PSO3			PSO4	
CO1		3			3			1			1	
CO2		3			3			1			1	
CO3		2			2			1			1	
CO4		1			2			1			1	
CO5		2			2			1			2	
3/2/1 Indicates Strength of Correlation, 3 – High, 2- Medium, 1- Low												
Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/Project	Internships/ Technical Skills		Soft Skills		
	✓											



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/SLr	P/R	C
<b>EBPH22001</b>	<b>SOLID STATE PHYSICS</b> <b>Prerequisite: Engineering Physics</b>	<b>Ty</b>	<b>3</b>	<b>0/0</b>	<b>0/0</b>	<b>3</b>

### UNIT I CRYSTAL STRUCTURE

**9 Hrs**

Space Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC and HCP structures – Ceramic Materials & Graphite Structures – Crystal Growth Techniques (Slow Evaporation Method & Melt Growth)

### UNIT II CONDUCTORS & SUPER CONDUCTORS

**9 Hrs**

Qualitative analysis of Free electron theory – Electrical & Thermal Conductivity (Derivation) - Fermi energy & its importance – Qualitative analysis of conductors, semiconductors & insulators – Important electrical materials Superconductors – Transition temperature – BCS theory – Properties of super conductors – Types – Low & High temperature superconductors – AC & DC Josephson effect – SQUIDS, Magnetic Levitation – Applications of super conductors

### UNIT III SEMICONDUCTOR PHYSICS

**9 Hrs**

Bonds in Semiconductors – Types – Importance of Germanium & Silicon – Other Commonly Used Semiconducting materials - Carrier concentration in Intrinsic Semiconductors (Electron and Hole Density) – Band Gap Determination – Carrier Transport in Semiconductors – Drift, Mobility and Diffusion – Hall effect – Determination of Hall Coefficient and its Applications – Dilute Magnetic Semiconductors (DMS) & their Applications construction, working and characteristics of semiconductor diode, Zener diode, transistor (n-p-n and p-n-p transistor), Transistor characteristics (CB, CE, CC), JFET ( Construction and its characteristics ).

### UNIT IV MAGNETIC & DIELECTRIC PHYSICS

**9 Hrs**

Magnetic Materials: Types – Comparison of Dia, Para and Ferro Magnetism – Heisenberg's interpretation – Domain theory – Hysteresis – Soft and Hard Magnetic Materials – Application of Magnetic Resonance Imaging – Important Magnetic, Insulating & Ferro electric materials.  
Dielectric Materials: Electrical Susceptibility – Dielectric Constant – Concept of Polarization – Frequency and Temperature Dependence of Polarization – Dielectric loss – Dielectric breakdown – Commonly used Dielectric materials and their practical applications.

### UNIT V OPTO ELECTRONICS

**9 Hrs**

Properties & Classification of Optical Materials – Absorption in Metals, Insulators & Semiconductors – Composite Materials – Nano Materials – Bio Materials – MEMS – NEMS – LED's – Organic LED's – LCD's – Laser diodes – Photodetectors – Tunneling – Resonant Tunneling Diodes (RTD's) – Carbon Nanotubes – Various Types of Optical Materials with Properties.

**Total Periods: 45**

### TEXT BOOKS & REFERENCE BOOKS

1. V. Rajendran&Mariakani "Materials Science", Tata McGraw Hill (2004).
2. P.K.Palanisamy, "Materials science", Scitech Publication(2002).
3. Dr.SenthilKumar, "Engineering Physics II" VRB Publishers (2016).
4. V. Arumugam, "Materials Science", Anuradha Agencies, (2003 Edition).
5. Pillai S.O., "Solid State Physics", New Age International, (2005)



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code		Subject Name <b>TECHNICAL CHEMISTRY</b>						Ty/Lb/ ETL			L	T/SLr		P/R	C
<b>EBCH22001</b>		Prerequisite :Engineering Chemistry						Ty			3	0/0		0/0	3
		C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation													
		<b>OBJECTIVES:</b>													
		1.To identify the application of semiconductors in optics and solar cells. 2.To analyze the radical improvement in electrical energy storage devices. 3. To understand the degradation of electrical fittings and metallic joints. 4. To solve chemical problems by simulation. 5.To differentiate the various engineering materials by understanding its properties.													
		<b>COURSE OUTCOMES (COs)</b> Students completing this course were able to													
<b>CO1</b>		Paraphrase the engineering knowledge by identifying proper chemical science technique.													
<b>CO2</b>		Interpret appropriate solution for complex problems by using modern engineering and IT tools.													
<b>CO3</b>		Retrieve and show the design solutions for safety and sustainable development.													
<b>CO4</b>		Integrate the electrical and electronic concepts with professional ethics.													
<b>CO5</b>		Articulate the technological changes recognizing the need for lifelong learning.													
		<b>Mapping of Course Outcome with Program Outcome (POs)</b>													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7		PO8	PO9	PO10	PO11	PO12		
CO1	3		2		3										
CO2	3		3	3	3										
CO3	3		3	3			3		2						
CO4	3								3				3		
CO5	3		3				3						2		
COs/PSOs		PSO1			PSO2				PSO3			PSO4			
CO1		3			3				2			2			
CO2		3			3				2			2			
CO3		3			3				2			2			
CO4		3			3				2			2			
CO5		3			3				2			2			
		3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low													
Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective		Practical/Project	Internships/Tech nical Skills	Soft Skills					
	√														



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/SLr	P/R	C
<b>EBCH22001</b>	<b>TECHNICAL CHEMISTRY</b>					
	Prerequisite : Engineering Chemistry	Ty	3	0/0	0/0	3

### UNIT – 1 CHEMISTRY OF SEMICONDUCTORS

**9 Hrs**

Semiconductors – Introduction – holes and electrons-Band theory-properties of semi conductors- Types of semiconductors-Intrinsic-Extrinsic semiconductors -Mobility of electrons and Holes - Fermi level in Semiconductors- Industrial application of Semiconductors-Semiconductors in Optics - LEDs, OLEDs, Semiconductors in solar cells- Types - First generation solar cells - Single crystalline and poly crystalline solar cells -Czochralski Process of single crystalline silicon synthesis

### UNIT -2 ELECTROCHEMICAL CELLS AND BATTERY TECHNOLOGY

**9 Hrs**

Electrochemical cells: Galvanic cell (Daniel cell);Batteries: Classification of batteries, primary batteries (dry cells) and secondary batteries -nickel-cadmium ,lead-acid battery, Solid state batteries – Lithium battery, Lithium Sulphur battery, Fuel cells.

### UNIT -3 DEVICES CORROSION

**9 Hrs**

Introduction – chemistry of IC and PCB- causes of corrosion on IC, PC-miniaturization, complex material utilization, production and service factors –environmental contamination (airborne contaminants) - Forms of corrosion – anodic, cathodic corrosion- Electrical Contact and metallic joints degradation- fretting corrosion - corrosion costs – corrosion protection of computer hardware.

### UNIT-4 COMPUTATIONAL CHEMISTRY

**9 Hrs**

Introduction, Software tools available for chemistry and its applications, Chem Draw- Designing a Chemical Structure- Shortcuts and Hotkeys on designing a chemical structure, Biopolymer Drawing, Advanced drawing Techniques. Structure Analysis, Creating 3D Models, Estimating and displaying Proton and carbon-13 NMR chemical shifts, Creating TLC Plates to find Rf values, Chem Draw/Excel functions.

### UNIT -5 MODERN ENGINEERING MATERIALS FOR ELECTRONIC DEVICES

**9 Hrs**

Alloys and Need for Alloys - Modern Electronic grade alloys-Applications in electrical components, transducers, electromagnetic shielding of computers, telecommunications equipment and rocket motor casings. Thin films- Preparation by the Sol-Gel Method-Application of thin films.

**Total Periods : 45**

### References

1. Oleg Roussak & H. D. Gesser, *Applied Chemistry: A Textbook for Engineers and Technologists*, Springer.
2. Samuel Glasstone, *An Introduction of Electrochemistry*, Franklin Classics Trade Press.
3. Kharton V.V, *Solid state electrochemistry II: Electrodes, interfaces and ceramic membranes*, Wiley
4. Jain and Jain, *Engineering Chemistry*, Dhanpat Rai Publishing Company.
5. *Chemdraw 16.0 User Guide*, Perkin Elmer Informatics Inc.
6. Rolf E. Hummel, *Electronic Properties of Materials*, Springer





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code		Subject Name <b>ENGINEERING GRAPHICS</b>					Ty/Lb/ ETL	L	T/SLr	P/R	C	
<b>EBME22001</b>		Prerequisite : None					TY	2	0/0	2/0	3	
C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
<b>OBJECTIVES</b>												
<ul style="list-style-type: none"><li>To acquire knowledge in geometrical drawing.</li><li>To expose the students in computer aided drafting.</li></ul>												
<b>COURSE OUTCOMES (COs)</b>												
Students completing this course were able to												
<b>CO1</b>	Utilize the concept of Engineering Graphics Techniques to draft letters, Numbers, Dimensioning in Indian Standards											
<b>CO2</b>	Demonstrate the drafting practice visualization and projection skills useful for conveying ideas in engineering applications.											
<b>CO3</b>	Identify basic sketching techniques of engineering equipment											
<b>CO4</b>	Demonstrate the projections of Points, Lines, Planes and Solids. And											
<b>CO5</b>	Draw the sectional view of simple building drawing.											
<b>Mapping of Course Outcome with Program Outcome (POs)</b>												
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	2	2			3	3		3
CO2	3	3	3	2	2	2			3	3		3
CO3	3	3	3	1		2			2	2		2
CO4	3	3	2	2		3		2	3	3		3
CO5	3	3	3	2	3	1		2	3	3		3
COs/PSOs		PSO1			PSO2			PSO3			PSO4	
CO1								1				
CO2		1										
CO3								1				
CO4					1							
CO5												
3/2/1 Indicates Strength of Correlation, 3 – High, 2- Medium, 1- Low												
Category	Basic Sciences	Engg.Science	Humanities & social Science		Program Core	Program Elective	Open Elective	Practical/Project	Internships/ Technical Skills		Soft Skills	
		√										





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/SLr	P/R	C
<b>EBME22001</b>	<b>ENGINEERING GRAPHICS</b>					
	Prerequisite: None	TY	2	0/0	2/0	3

### CONCEPTS AND CONVENTIONS (Not for examination)

**12 Hrs**

Introduction to drawing, importance and areas of applications – BIS standards – IS: 10711 – 2001 : Technical products Documentation – Size and layout of drawing sheets – IS 9606 – 2001: Technical products Documentation – Lettering – IS 10714 & SP 46 – 2003: Dimensioning of Technical Drawings – IS : 15021 – 2001 : Technical drawings – Projections Methods – drawing Instruments, Lettering Practice – Line types and dimensioning – Border lines, lines title blocks Construction of polygons – conic sections – Ellipse, Parabola, Hyperbola and cycloids.

### UNIT I PROJECTION OF POINTS, LINES AND PLANE SURFACES

**12 Hrs**

Projection of points and straight lines located in the first quadrant – Determination of true lengths and true inclinations – projection of polygonal surface and circular lamina in simple position only.

### UNIT II PROJECTION OF SOLIDS

**12 Hrs**

Projection of simple solids like prism, pyramid, cylinder and cone in simple position  
Sectioning of above solids in simple vertical position by cutting plane inclined to any one of the reference plane and perpendicular to the other.

### UNIT III DEVELOPMENT OF SURFACES

**12 Hrs**

Development of lateral surfaces of simple and truncated solids – prisms, pyramids, cylinders, and cones.

### UNIT IV ISOMETRIC PROJECTION

**12 Hrs**

Principles of isometric projection – isometric scale – isometric projections of simple solids, like prisms pyramids, cylinders and cones.

### UNIT V ORTHOGRAPHIC PROJECTIONS

**12 Hrs**

Orthographic projection of simple machine parts – missing views

**BUILDING DRAWING** Building components – front, Top and sectional view of a security shed.

**(Basic Auto CAD commands to be taught- not for Examinations)**

**Total periods: 60**

**Note: First angle projection to be followed.**

### TEXT BOOKS

1. Bhatt, N.D. and Panchal, V.M. (2014) Engineering Drawing Charotar Publishing House
2. Gopalakrishnan, K.R. (2014) Engineering Drawing (Vol.I& II Combined) Subhas Stores, Bangalore.
3. Natrajan K.V., “A Text Book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2018.
4. Venugopal K. and Prabhu Raja V., “Engineering Graphics”, New Age International (P) Limited, 2008.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name ESSENTIALS OF INFORMATION TECHNOLOGY	Ty/Lb/ ETL/IE	L	T/SLr	P/R	C						
EBIT22001	Prerequisite: None	Ty	3	0/0	0/0	3						
C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
<b>OBJECTIVES:</b> To provide a fundamental knowledge of Computer Engineering, which includes evolution of computers and its various components and applications												
<b>COURSE OUTCOMES (COs): (3 – 5)</b> Students completing the course were able to												
CO1	Know the Fundamental of Computer & Programming											
CO2	Understand the Hardware and Software components of computer											
CO3	Familiarize the Basic Concepts of Fundamentals of Operating Systems											
CO4	Provide A Basic Knowledge Fundamentals of Database Management											
CO5	Define Fundamentals of Networks											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	2	3	2	-	-	-	1
CO2	-	-	-	-	-	2	3	-	-	2	-	1
CO3	-	-	-	-	-	2	3	2	-	-	-	1
CO4	-	-	-	-	-	2	3	2	-	2	-	1
CO5	-	-	-	-	-	2	3	-	-	2	-	1
CO/PSO		PSO1			PSO2			PSO3		PSO4		
CO1		2			2			1		2		
CO2		1			2			2		2		
CO3		2			2			3		3		
CO4		2			2			3		3		
CO5		2			2			3		3		
3/2/1 indicates strength of correlation 3 – High, 2 – Medium, 1 – Low												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project		Internships / Technical Skills		Soft Skills	
				√								



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name: ESSENTIALS OF INFORMATION TECHNOLOGY	Ty/Lb/ETL/IE	L	T/SLr	P/R	C
EBIT22001	Prerequisite: None	Ty	3	0/0	0/0	3

### UNIT-I INTRODUCTION 9 Hrs

Characteristics of computers–Evolution of Computers–Computer generations– Coding data in storage – Program planning– Algorithms– Evaluation of Algorithms- Flowcharts–Pseudo codes.

### UNIT – II SOFTWARE & HARDWARE 9 Hrs

Generation of Languages – Types of Software – Application Software – System Software – Compiler& Interpreters– Procedural programming – Object oriented programming – Basiccomputeroperations–Classificationofcomputers–Hardwarecomponents– I/O Devices - Storage Devices.

### UNIT-III FUNDAMENTALS OF OPERATINGSYSTEMS 9 Hrs

Introduction to OS –Concepts of OS – structure of OS – Operations of OS - Role of OS – Types of OS – Functions of OS.

### UNIT- IV FUNDAMENTALS OF DATABASE MANAGEMENT 9 Hrs

File based approach and Database approach– Evolutions of data models–Three levels architecture for DBMS – Data independence - Database users.

### UNIT-V FUNDAMENTALS OF NETWORKS 9 Hrs

Definition and purpose of computer Networks –Types of networks – Topologies in Network Design – Open systems interconnections (OSI Layers)– Internet (www).

**Total Periods:45**

#### TEXTBOOK:

1. Pradeep K. Sinhaand Priti Sinha, Computer Fundamentals, Third Edition, BPB Publications, NewDelhi,2003.
2. Carl Reynolds and Paul Tymann, Principles of Computer Science, Schaum’sOutline Series, McGraw Hill, New Delhi, 2008.
3. Sanjay Silakari and Rajesh K. Shukla, Basic Computer Engineering, Wiley-India, 2011.

#### REFERENCE:

1. Bhanu Pratap., Computer Fundamentals, Cyber Tech Publications, New Delhi, 2011.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name <b>COMMUNICATIVE ENGLISH LAB</b>						Ty/Lb/ ETL	L	T/SLr	P/R	C	
<b>EBCC22I02</b>	Prerequisite :Pass in Plus 2 English						<b>IE</b>	<b>1</b>	<b>0/0</b>	<b>1/0</b>	<b>1</b>	
C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
<b>OBJECTIVES</b>												
<ul style="list-style-type: none"><li>To engage students in meaningful oral English communication and organized academic and professional reading and writing for a successful career.</li></ul>												
<b>COURSE OUTCOMES (COs)</b>												
Students completing this course were able to												
<b>CO1</b>	Engage in meaningful oral communication in English with writing as a scaffolding activity.											
<b>CO2</b>	Have an in-depth understanding of the components of English language and its use in oral communication.											
<b>CO3</b>	Strengthen their vocabulary and syntactic knowledge for use in academic and technical communication											
<b>CO4</b>	Learn to negotiate meaning in inter-personal and academic communication for a successful career.											
<b>CO5</b>	Engage in organized academic and professional writing for life-long learning and research											
<b>Mapping of Course Outcome with Program Outcome (POs)</b>												
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	1	1	3	2	1	1	3	3	-	3
CO2	2	1	1	1	3	3	1	2	3	3	1	2
CO3	1	1	1	1	2	1	-	2	3	3	1	3
CO4	1	-	-	2	3	1	2	1	2	2	-	3
CO5	-	1	1	2	3	1	1	-	3	1	1	2
COs/PSOs		PSO1			PSO2			PSO3			PSO4	
CO1		2			-			-			1	
CO2		2			-			-			1	
CO3		2			-			-			1	
CO4		2			-			-			1	
CO5		2			-			-			1	
3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low												
Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/Project	Internships/ Technical Skills	Soft Skills			
			√									



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/SLr	P/R	C
<b>EBCC22I02</b>	<b>COMMUNICATIVE ENGLISH LAB</b>	<b>IE</b>	<b>1</b>	<b>0/0</b>	<b>1/0</b>	<b>1</b>
	Prerequisite :Pass in Plus 2 English					

### Unit I Listening

**6 Hrs**

Authentic audios and videos

Prescribed Book: English Pronunciation in use – Mark Hancock,

### Unit II Speaking

**6 Hrs**

**Individual- Solo:** Self introduction, Describing, anchoring, welcome address, vote of thanks,

**Pair & Group:** Role play- formal -informal, narrating stories, film review, analysing newspaper headings and reports, interpreting Advertisement pamphlets

**Group discussion,** mock interviews, formal presentation, power point presentation

Prescribed Book: J. C. Richards with J. Hull &S.Proctor, Interchange, Cambridge University Press, 2015.

### Unit III Reading

**6 Hrs**

Extensive, focused reading,

Strategies for effective reading - Reading comprehensions – Note making- summarizing- paraphrasing, Review

Suggested reading: Short stories, news paper reports, film reviews

### Unit IV Writing

**6 Hrs**

Extensive writing practices – note taking, Cognitive and metacognitive strategies to inculcate a sense of organising ideas into coherent sentences and paragraphs, Formal letters, Business letters. Resume with covering letter

### Unit V Non verbal communication/ charts, diagrams and table

**6 Hrs**

Interpretation of charts Flow chart, pie chart, bar diagram, table, tree diagram, etc.,

**Total Periods :30**

### Prescribed Text:

1. J. C. Richards with J. Hull &S.Proctor, Interchange, Level 2, Cambridge University Press, 2021.
2. M. ChandrasenaRajeswaran&R.Pushkala, English - Communication Lab Work book

### Reference

1. Hancock, Mark, English Pronunciation in Use; Cambridge Univ. Press, 2013
2. Dutt, K, Rajeevan, G & Prakash, CLN 2008, *A Course on Communication Skills*, 1st edn, Cambridge University Press, Chennai



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBCS22ET2</b>	Subject Name <b>PYTHON PROGRAMMING</b>						<b>T / L/ ETL</b>	<b>L</b>	<b>T / S.Lr</b>	<b>P/ R</b>	<b>C</b>	
	Prerequisite: C Programming and MS Office Tools						<b>ETL</b>	1	0/0	2/0	2	
C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
<b>OBJECTIVE :</b> The student should be made to: <ul style="list-style-type: none"><li>Develop a basic understanding of <i>programming</i> and the <i>Python programming</i> language</li><li>Write programs in Python to solve real world problems</li><li>See the value of <i>programming</i> in a variety of different disciplines, especially as it relates in engineering.</li></ul>												
<b>COURSE OUTCOMES (COs) : After Completing the course, the student can be able to</b>												
CO1	Remember the syntax and semantics of python programming language											
CO2	Understand how functional and operations are to be utilized											
CO3	Apply the fundamental programming constructs like variables, conditional logic, looping, and functions to build basic programs											
CO4	design object-oriented programs with Python classes											
CO5	Apply the knowledge to solve various real world problems											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
CO1	3	3	3	2	2	1	1	1	1	-	1	1
CO2	3	2	2	2	2	1	1	1	1	-	1	1
CO3	3	2	2	2	2	1	1	1	1	-	1	1
CO4	3	3	3	2	2	1	2	-	2	-	2	2
CO5	3	3	3	3	2	1	2	-	2	-	2	2
<b>COs / PSOs</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
CO1	3			3			2			1		
CO2	3			2			2			1		
CO3	3			3			2			1		
CO4	3			2			2			1		
CO5	3			3			2			1		
<b>H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	T / L/ ETL	L	T / S.Lr	P/ R	C
<b>EBCS22ET2</b>	<b>PYTHON PROGRAMMING</b>					
	Prerequisite: C Programming and MS Office Tools	<b>ETL</b>	1	0/0	2/0	2

### UNIT I INTRODUCTION

**9 Hrs**

History of Python, Need of Python Programming, Applications Basics of Python Programming Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation.

### UNIT II TYPES, OPERATORS AND EXPRESSIONS

**9 Hrs**

Types - Integers, Strings, Booleans; Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations Control Flow- if, if-elif-else, for, while, break, continue, pass.

### UNIT III FUNCTIONS

**9 Hrs**

Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables.

### UNIT IV LISTS, TUPLES, DICTIONARIES

**9 Hrs**

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: selection sort, insertion sort, mergesort, histogram.

### UNIT V OBJECT ORIENTED PROGRAMMING OOP IN PYTHON

**9 Hrs**

Classes, 'self variable', Methods, Constructor Method, Inheritance, Overriding Methods, Data hiding.

**Total Hours: 45**

#### List of Experiments:

1. Develop a Python program using function to compute the factorial of a given number.
2. Develop a Python program to find the sum of 'N' natural number using function.
3. Develop a Python program to display only the positive elements of the list.
4. Develop a Python program to find the second largest digit from a number using function.
5. Develop a Python program to find the largest digit from a number using function.
6. Develop a Python program to check the given string is palindrome or not.
7. Develop a Python program to count the number of vowels in the given string.
8. Develop a Python program to calculate the number of characters and the number of words present in a string without using built-in functions and string methods.
9. Develop a Python program to remove the duplicate items from a list.
10. Develop a Python program to read in a list of 'N' integers and print its elements in reverse order without using reverse slicing, reverse method.

#### TEXT BOOKS:

1. Python Programming: A Modern Approach, VamsiKurama, Pearson.
2. Think Python: How to Think Like a Computer Scientist'', 2nd edition Updated for Python 3, Shroff/O'Reilly Publishers, Allen B. Downey
3. Learning Python, Mark Lutz, O'Reilly.

#### REFERENCE BOOKS:

1. Core Python Programming, W.Chun, Pearson.
2. Introduction to Python, Kenneth A. Lambert, Cengage



## FACULTY OF ENGINEERING AND TECHNOLOGY

<b>Subject Code</b> <b>EBCC22I03</b>	<b>Subject Name</b> <b>ENVIRONMENTAL SCIENCE</b>	<b>T / L/</b> <b>ETL</b>	<b>L</b>	<b>T /</b> <b>S.Lr</b>	<b>P/ R</b>	<b>C</b>						
	Prerequisite: None	IE	1	0	1/0	0						
C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
<b>OBJECTIVES:</b> <ul style="list-style-type: none"><li>To acquire knowledge of the Environment and Ecosystem &amp; Biodiversity</li><li>To acquire knowledge of the different types of Environmental pollution</li><li>To know more about Natural Resources</li><li>To gain understanding of social issues and the Environment</li><li>To attain familiarity of human population and Environment</li></ul>												
<b>COURSE OUTCOMES (COs): (3 – 5)</b> Students completing the course were able to												
<b>CO1</b>	Know about Environment and Ecosystem & Biodiversity											
<b>CO2</b>	Comprehend air, water, Soil, Marine, Noise, Thermal and Nuclear Pollutions and Solid Waste management and identify the importance of natural resources like forest, water, and food resources											
<b>CO3</b>	Discover water conservation and watershed management											
<b>CO4</b>	Identify its problems and concerns climate change, global warming, acid rain, ozone layer depletion etc.,											
<b>CO5</b>	Explain family welfare programme and role of information technology in human health and environment											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						2	3	2				1
CO2						2	3			2		1
CO3						2	3	2				1
CO4						2	3	2		2		1
CO5						2	3			2		1
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project		Internships / Technical Skills		Soft Skills	
			√									





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBCC22I03	Subject Name Environmental Science	T / L/ETL	L	T / S.Lr	P/ R	C
	Prerequisite: None	IE	1	0	1/0	0

### UNIT I ENVIRONMENT AND ECOSYSTEM

**6 Hrs**

Definition, Scope and Importance of environment – need for public awareness – concept, structure and function of an ecosystem- producers, consumers and decomposers – energy flow in the ecosystem. Biodiversity at national and local levels – India

### UNIT II ENVIRONMENT POLLUTION

**6 Hrs**

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Nuclear hazards (g) E-Wastes and causes, effects and control measures

### UNIT III NATURAL RESOURCES

**6 Hrs**

Forest resources: Use and over-exploitation, deforestation. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems.

### UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT

**6 Hrs**

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns climate change, global warming, acid rain, ozone layer depletion, nuclear accidents, central and state pollution control boards- Public awareness.

### UNIT V HUMAN POPULATION AND THE ENVIRONMENT

**6 Hrs**

Population growth, variation among nations – population explosion, environment and human health – human rights – value education – HIV/AIDS – women and child welfare – role of information technology in environment and human health

#### (A) AWARENESS ACTIVITIES:

- i) small group meetings about water management, promotion of recycle use, generation of less waste, avoiding electricity waste
- ii) Slogan making event
- iii) Poster making event
- iv) Cycle rally
- v) Lectures from experts

#### (B) ACTUAL ACTIVITIES:

- i) Plantation
- ii) Gifting a tree to see its full growth
- iii) Cleanliness drive
- iv) Drive for segregation of waste
- v) To live some big environmentalist for a week or so to understand his work
- vi) To work in kitchen garden for mess
- vii) To know about the different varieties of plants
- viii) Shutting down the fans and ACs of the campus for an hour or so

**Total Hours: 30**

#### TEXT BOOKS

1. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education (2004).
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGrawHill, New Delhi, (2006).

#### REFERENCES

1. Vairamani, S. and Dr. K. Sankaran. *Elements of Environmental and Health Science*. Karaikudi: KPSV Publications, 5<sup>th</sup> Edition, July 2013.
2. Ifthikarudeen, Etal, *Environmental Studies*, Sooraj Publications, 2005.
3. R.Murugesan, *Environmental Studies*, Millennium Publishers and Distributors, 2<sup>nd</sup> Edition, July, 2009



## **FACULTY OF ENGINEERING AND TECHNOLOGY**

# **III Semester**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBMA22006</b>	Subject Name <b>DISCRETE MATHEMATICS</b>						<b>Ty/Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: First year Engineering Mathematics						Ty	3	0/1	0/0	4	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To understand the Basic concepts in Truth Table, Mathematical Logic and Inference Theory</li><li>To understand the Basic concepts in Mathematical Induction and Recurrence relations</li><li>To understand the Basic concepts in Group theory, Rings and Fields</li><li>To understand the Basic concepts in Finite Automata, Finite state machine.</li><li>To understand the Basic concepts in Graph theory</li></ul>												
<b>COURSE OUTCOMES (COs) : Students will be able</b>												
<b>CO1</b>	To understand the Basic concepts in Logic and Predicate calculus											
<b>CO2</b>	To understand the Basic concepts in Combinatorics											
<b>CO3</b>	To understand the Basic concepts in Group theory											
<b>CO4</b>	To understand the Basic concepts in Automata											
<b>CO5</b>	To understand the Basic concepts in Graph theory											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>3</b>
<b>CO2</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>3</b>
<b>CO3</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>3</b>
<b>CO4</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>2</b>
<b>CO5</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>3</b>
<b>COs / PSOs</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
<b>CO1</b>	<b>2</b>			<b>3</b>			<b>1</b>			<b>2</b>		
<b>CO2</b>	<b>1</b>			<b>2</b>			<b>1</b>			<b>3</b>		
<b>CO3</b>	<b>1</b>			<b>2</b>			<b>1</b>			<b>2</b>		
<b>CO4</b>	<b>2</b>			<b>3</b>			<b>1</b>			<b>3</b>		
<b>CO5</b>	<b>1</b>			<b>3</b>			<b>1</b>			<b>3</b>		
<b>3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low</b>												
<b>Category</b>	<b>Basic Sciences</b>	<b>Engineering Sciences</b>	<b>Humanities and Social Sciences</b>	<b>Program Core</b>	<b>Program Electives</b>	<b>Open Electives</b>	<b>Interdisciplinary</b>	<b>Skill component</b>	<b>Practical / Project</b>			
	✓											



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBMA22006	DISCRETE MATHEMATICS	Ty	3	0/1	0/0	4

### UNIT I      LOGIC 10 hrs

Statements – Truth Table – Connectives – Normal Forms – Predicate Calculus – Inference Theory.

### UNIT II      COMBINATORICS 12 hrs

Mathematical Induction – Pigeon Hole Principle – Principle of Inclusion and Exclusion – Recurrence Relations – Generating Functions.

### UNIT III      GROUPS 12 hrs

Basic Concepts – Groups – Subgroups – Homomorphism – Kernel – Cosets – Lagrange's theorem - Group Homomorphisms – Rings and Fields (Definitions and simple theorems and problems).

### UNIT IV      AUTOMATA 12 hrs

Finite Automata – Regular grammar – Introduction – Context free grammar – Introduction to Turing machine – Finite state machine – Introduction – Language Recognition

### UNIT V      GRAPHS 14 hrs

Introduction to Graphs – Terminology – Matrix representation of Graphs: Incidence matrix, Adjacency matrix – Graph Isomorphism – Connectivity – Euler and Hamiltonian Paths (simple theorems and problems).

**Total Hrs: 60**

#### Reference Books:

- 1) Veerarajan T., *Discrete Mathematics*, Tata McGraw Hill Publishing Co., (2008).
- 2) Tremblay J.P., Manohar R., *Discrete Mathematical structures with applications to Computer science*, Tata McGraw Hill Publishing Co., (2008).
- 3) Kolman, Busby, Ross, *Discrete Mathematical Structures*, Pearson, (2014).
- 4) Kenneth Rosen, *Discrete Mathematics and its applications (SIE)*, Tata McGraw Hill Publishing Co., (2007).



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22002</b>	Subject Name <b>DATA STRUCTURES AND ALGORITHMS</b>						<b>Ty/Lb/ETL</b>	<b>L</b>	<b>T/S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: NIL						Ty	3	0/1	0/0	4	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To implement the linked data structures such as linked lists and binary trees</li><li>To Understand AVL trees and hash tables.</li><li>To learn several sub-quadratic sorting algorithms including quicksort, merge sort and heapsort</li><li>To know the concepts of graph algorithms such as shortest path and minimum spanning tree</li><li>To make use of various algorithm design methods and its application</li></ul>												
<b>COURSE OUTCOMES (COs) : Student will be able to</b>												
CO1	Choose appropriate data structure as applied to specified problem definition											
CO2	Handle operations like searching, insertion, deletion, traversing mechanism on various data structures.											
CO3	Apply concepts learned in various domains like DBMS, compiler construction etc.											
CO4	Use linear and non-linear data structures like stacks, queues , linked list etc											
CO5	Aware of various Algorithmic design methods used in problem solving.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	3	2	1	1	1	1	1	-	2
CO2	3	3	3	1	2	1	2	2	3	1	-	2
CO3	3	2	3	3	3	2	1	2	3	1	-	2
CO4	3	3	3	3	2	1	2	2	3	1	-	2
CO5	3	2	3	3	3	2	1	2	3	1	-	2
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			3			1			1		
CO2	3			3			2			1		
CO3	3			2			1			1		
CO4	3			3			1			1		
CO5	3			2			1			1		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
				✓								



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22002	DATA STRUCTURES AND ALGORITHMS	Ty	3	0/1	0/0	4

### UNIT I LINEAR DATA STRUCTURES

**12 Hrs**

Algorithm Basics and Analysis-List-Stacks- Queues - Implementation and Applications - Singly linked list- Doubly linked Lists-Applications

### UNIT II NON LINEAR DATA STRUCTURES

**12 Hrs**

Trees – Binary Trees – Binary Search Tree Implementation – Tree Traversals – AVL trees- 2-3 tree, 2- 3- 4 tree.

### UNIT III SEARCHING AND SORTING TECHNIQUES

**12 Hrs**

Types of searching - Linear and Binary Searching Analysis – types of sorting-Quick Sort - Heap Sort - Merge Sort - Selection Sort - Bubble Sort - Insertion Sort – Sorting Comparison.

### UNIT IV GRAPH ALGORITHMS

**12 Hrs**

Graph Operations – DFS – BFS - Applications of Graphs - Minimum Cost Spanning Tree - Kruskal's Algorithm - Prim's Algorithm

### UNIT V ALGORITHM DESIGN METHODS

**12 Hrs**

Greedy method – Traveling Sales Person Problem - Divide and Conquer – Strassen's Matrix Multiplication - Dynamic Programming - Knapsack problem- Back Tracking – N Queens Problem .

**Total Hours: 60**

### TEXT BOOKS :

1. Horowitz, E. Sahani, S. &Mehta.(2007) Fundamentals of Data Structures in C++, Galgotia.

### REFERENCE BOOKS:

1. Weiss Mark Allen (2007) *Data Structures and Algorithm Analysis in C, (3rd ed.)*, Pearson
2. Horowitz, E. Sahni & Sanguthevar Rajasekaran.(2007) *Fundamentals of Computer Algorithms*, Galgotia Publications



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name <b>SOFTWARE ENGINEERING</b>							Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
<b>EBIT22003</b>	Prerequisite: None							Ty	3	0/0	0/0	3
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES:</b> <ul style="list-style-type: none"><li>To understand the phases in a software project</li><li>To understand fundamental concepts of requirements engineering and Analysis Modeling.</li><li>To understand the various software design methodologies</li><li>To learn various testing and maintenance measures</li><li>To Manage project schedule, estimate project cost and effort required</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Learn the different phases in software Development											
CO2	Demonstrate software requirements and analysis											
CO3	Gain practical knowledge of software designing along with object-oriented design approach and its methodology.											
CO4	Compare and contrast various software testing											
CO5	Discuss about the software integration and project management											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	3	3	-	-	-	-	-	-	-	3
CO2	1	3	3	3	-	-	-	-	-	-	-	3
CO3	1	3	3	3	3	-	-	3	-	-	-	3
CO4	1	3	3	3	3	-	-	3	-	-	-	3
CO5	1	3	3	3	3	-	-	3	-	-	-	3
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			1			1			3		
CO2	3			3			3			3		
CO3	3			3			3			3		
CO4	3			3			2			3		
CO5	3			3			3			3		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
				✓								





## FACULTY OF ENGINEERING AND TECHNOLOGY

SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22003	SOFTWARE ENGINEERING	Ty	3	0/0	0/0	3

### Unit I SOFTWARE PROCESS AND AGILE DEVELOPMENT

**9Hrs**

**Introduction to Software Engineering** - Professional software development, Software engineering ethics, **Software processes**- Software process models, Process activities, Coping with change, Process improvement, **Agile software development**- Agile methods, Agile development techniques, Agile project management, Scaling agile methods

### Unit II REQUIREMENTS ANALYSIS AND SPECIFICATION

**9Hrs**

**Software Requirements**: User requirements, System requirements, Functional and Non-Functional, Software Requirements Document – **Requirement Engineering Process**: Feasibility Studies, Requirements elicitation, Requirement Specification, Requirements validation, Requirement change.

### Unit III SOFTWARE DESIGN AND IMPLEMENTATION

**9Hrs**

**System modeling**-Context models, Interaction models, Structural models, Behavioral models, Model-driven architecture, **Architectural design**- Architectural design decisions, Architectural views, Architectural patterns, Application architectures, **Design and implementation**- Object-oriented design using the UML, Design patterns, Implementation issues

### Unit IV SOFTWARE TESTING AND QUALITY MANAGEMENT

**9Hrs**

**Software testing** - Development testing, Test-driven development, Release testing, User testing, **Quality management**- Software quality, Software standards, Reviews and inspections, Quality management and agile development, Software measurement

### Unit V SOFTWARE MANAGEMENT

**9Hrs**

**Project management**- Risk management, Managing people, Teamwork, **Project planning**- Software pricing, Plan-driven development, Project scheduling, Agile planning, Estimation techniques, COCOMO cost modeling

**Total Hours: 45**

### TEXT BOOK

1. Sommerville I., “Software Engineering”, 10th edition, Addison Wesley, 2016.

### REFERENCES

1. Roger S. Pressman, ‘Software Engineering: A Practitioner Approach’, 9th edition, McGraw-Hill, 2020
2. David Gustafson, “Software Engineering”, Schaum’s outlines, Tata McGraw-Hill, 2003.
3. Fairley, “Software Engineering Concepts”, McGraw-Hill, 1985.





## FACULTY OF ENGINEERING AND TECHNOLOGY

<b>Subject Code</b> <b>EBIT22004</b>	<b>Subject Name</b> <b>COMPUTER ORGANIZATION AND ARCHITECTURE</b>						<b>Ty/Lb/ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: None						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To understand the major components of a computer including CPU, memory, I/O and storage, understand the uses for cache memory,</li><li>To understand a wide variety of memory technologies both internal and external,</li><li>To understand the role of the operating system in interfacing with the computer hardware</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Conceptualize the theoretical basics of structure of the computer.											
CO2	Illustrate the basic operations of CPU.											
CO3	Design a central processing unit.											
CO4	Understand the concepts of memory organization											
CO5	Understand concepts of I/O processing unit.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/ POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
CO1	3	3	1	2	-	-	1	-	-	-	-	3
CO2	3	3	3	3	-	-	-	-	-	-	-	3
CO3	3	2	2	2	-	1	-	-	-	-	-	3
CO4	3	2	2	2	-	1	-	-	-	-	-	3
CO5	3	2	2	2	-	1	-	-	-	-	-	3
<b>COs /</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
CO1	3			1			-			3		
CO2	3			3			1			3		
CO3	3			3			1			3		
CO4	3			3			1			3		
CO5	3			2			-			3		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
				✓								



## FACULTY OF ENGINEERING AND TECHNOLOGY

SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22004	COMPUTER ORGANIZATION AND ARCHITECTURE	Ty	3	0/0	0/0	3

### UNIT I BASIC STRUCTURE OF COMPUTERS

**9 Hrs**

Basic structure of Computer Hardware-Von-Neumann Architecture-Functional units – Bus Structures - Software performance - Memory locations and addresses - Memory operations -Instruction and instruction sequencing

### UNIT II ARITHMETIC AND LOGIC UNIT

**9 Hrs**

Fixed point arithmetic operation-addition – subtraction – multiplication - division Floating point arithmetic operation-Design of ALU

### UNIT III PROCESSOR UNIT

**9 Hrs**

Data path implementation-Control unit-hardwired control - micro programmed control, Nano programming - Concepts of pipelining - Pipeline hazards

### UNIT IV MEMORY SYSTEM

**9 Hrs**

Memory hierarchy-Internal organization of RAM – ROM - Interleaved memory-Cache and associative memories -Virtual memory - Memory organization and cache coherence issues

### UNIT V INPUT/OUTPUT AND PERIPHERALS

**9 Hrs**

Accessing I/O devices – Programmed Input/ Output -Interrupts – Direct Memory Access – IO Processor - Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB) - I/O devices

**Total Hours: 45**

### TEXT BOOKS:

1. John Hayes (2012), (2007) digitized Computer Architecture and Organization, Tata McGraw Hill
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, "Computer Organization and Embedded Systems", Sixth Edition, Tata McGraw Hill, 2012.

### REFERENCE BOOKS:

1. Morris Mano (2009) Computer System Architecture, (3rd ed.), Pearson Education
2. John L. Hennessey and David A. Patterson, "Computer Architecture – A Quantitative Approach", Morgan Kaufmann / Elsevier Publishers, Fifth Edition, 2012.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code: <b>EBEC22ID1</b>	Subject Name <b>DIGITAL PRINCIPLES AND SYSTEM DESIGN</b>						Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C	
	Prerequisite: None						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To introduce number systems and codes and its conversions</li><li>To introduce Boolean algebra and its applications in digital systems</li><li>To introduce the design of various combinational digital circuits using logic gates</li><li>To bring out the analysis for synchronous and asynchronous Sequential circuits</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
<b>Upon the completion of the course the students will be able to</b>												
CO1		Acquired knowledge about number systems and its conversions										
CO2		Acquired knowledge about boolean algebra										
CO3		Ability to identify, analyze & design combinational circuits										
CO4		Ability to identify & analyze synchronous & asynchronous circuits										
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	1	1	1	1	1	1	2	1	1
CO2	3	2	1	1	1	1	1	1	1	1	1	1
CO3	2	2	3	1	1	2	1	1	2	2	1	1
CO4	2	2	3	1	1	2	1	1	2	2	1	1
COs / PSOs	PSO1		PSO2				PSO3			PSO4		
CO1	1		3				1			1		
CO2	1		3				1			1		
CO3	3		2				1			1		
CO4	3		2				1			1		
3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
							✓					



## FACULTY OF ENGINEERING AND TECHNOLOGY

SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBEC22ID1	DIGITAL PRINCIPLES AND SYSTEM DESIGN	Ty	3	0/0	0/0	3

### UNIT I NUMBER SYSTEMS

**9 Hrs**

Review of Decimal, Binary, Octal And Hexadecimal Number Systems- Binary Addition Subtraction, Multiplication & Division—Number Conversions – Signed Magnitude form – 1's and 2's Complement - Binary weighted codes- Binary arithmetic – codes – BCD code, Gray code, Excess-3 Code.

### UNIT II BOOLEAN ALGEBRA

**9 Hrs**

Binary logic Functions- Boolean laws –Boolean Algebra – Reduction of Boolean Expressions De Morgan's Theorems, Sum of Products –Product of Sums –Karnaugh map- Quine McCluskey Method.

### UNIT III COMBINATIONAL LOGIC

**9 Hrs**

Logic gates – AND, OR, NOT, NOR, NAND and EX-OR Gates– Half adder –Full adder- Half subtractor–Full subtractor - Multiplexer - Demultiplexer- Encoder – Decoder.

p

### UNIT IV SYNCHRONOUS/ASYNCHRONOUS SEQUENTIAL LOGIC

**9 Hrs**

Latches-R-S- Flip Flop, S-R Flip Flop, D Flip Flop, JK Flip Flop, T Flip-Flop - Master slave Flip-Flop - Counters –Up Down counters- Binary counters-Ring counter- Shift Registers. Asynchronous counters –Decade counters - State diagram - State Table – State Reduction – State Assignment- Excitation Table-Analysis of Asynchronous sequential circuits - Design of Asynchronous Sequential Circuits.

### UNIT V MEMORY DEVICES

**9Hrs**

Basic memory structure – ROM -PROM – EPROM – EEPROM –EAPROM, RAM – Static and dynamic RAM - Programmable Logic Devices – Programmable Logic Array (PLA) -Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA) – Implementation of combinational logic circuits using PLA, PAL.

**Total Hours: 45**

### TEXT BOOKS:

1. Charles H. Roth & Larry L.Kinney, "Fundamentals of Logic Design", Cengage Learning, 7th Edition.
2. M. Morris Mano & Michael D.Ciletti (2008) Digital Design. Pearson Education
3. Thomas.L.Floyd (2013) "Digital Fundamentals", 10<sup>th</sup> Edition Pearson Education
4. A.Anand Kumar —Fundamentals of Digital Circuits, 4th Edition, PHI Learning Private Limited, 2016.
5. Soumitra Kumar Mandal — Digital Electronics, McGraw Hill Education Private Limited, 2016.

### REFERENCE BOOKS:

1. Ronald J. Neal S. Gregory L (2009), "Digital Systems", 10<sup>th</sup> Edition, Pearson Prentice Hall.
2. R P Jain, (2010), "Modern Digital Electronics", 4<sup>th</sup> Edition, Tata Mcgraw Hill Ed. Pvt. Ltd.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBCC22ET1</b>	Subject Name <b>UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY</b>	Ty/Lb/ ETL	L	T/ S.Lr	P/R	C
	Prerequisite: None, UHV1 (Desirable)	ETL	1	0/0	2/0	2

L:Lecture T:Tutorial SLr: Supervised Learning P:Project R:Research C:Credits T/L/ETL:

Theory/Lab/Embedded Theory and Lab

### OBJECTIVES:

**Human Values Courses:** During the Induction Program, students would get an initial exposure to human values through Universal Human Values – I. This exposure is to be augmented by this compulsory full semester foundation course.

1. Development of a holistic perspective based on self- exploration about themselves (human being), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

### COURSE OUTCOMES(COs) : (3–5) The students will be able to

<b>CO1</b>	Relate self and surroundings and identify responsibility in life
<b>CO2</b>	Associate human relationship and nature to handle problems and provide sustainable solutions
<b>CO3</b>	Develop critical ability and engage in reflective and independent Thinking
<b>CO4</b>	Show commitment towards understanding of values
<b>CO5</b>	Apply Human values in day to day setting in real life

### Mapping of Course Outcomes with Program Outcomes(POs)

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	-	-	1	1	-	2	1	-	1	1	-	2
<b>CO2</b>	-	-	2	2	1	2	3	1	-	2	-	2
<b>CO3</b>	-	-	1	1	1	2	-	-	1	2	-	3
<b>CO4</b>	-	-	2	-	1	1	1	3	1	1	-	3
<b>CO5</b>	-	-	1	-	-	2	1	2	1	1	-	3

COs/PSOs	PSO1	PSO2	PSO3	PSO4
<b>CO1</b>	-	-	-	-
<b>CO2</b>	-	-	-	-
<b>CO3</b>	-	-	-	-
<b>CO4</b>	-	-	-	-
<b>CO5</b>	-	-	-	-

3/2/1 indicates strength of correlation 3 – High, 2 – Medium, 1 – Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project
			✓						



## FACULTY OF ENGINEERING AND TECHNOLOGY

SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/S.L r	P/R	C
EBCC22ET1	UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY	ETL	1	0/0	2/0	2

### UNIT I Introduction - Need, Basic Guidelines, Content and Process for Value Education

9 Hrs

Purpose and motivation for the course, recapitulation from Universal Human Values-I – Self Exploration–what is it? - Its content and process; ‘Natural Acceptance’ and Experiential Validation–as the process for self-exploration. – Continuous Happiness and Prosperity–A look at basic Human Aspirations - Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority – Understanding Happiness and Prosperity correctly–A critical appraisal of the current scenario – Method to fulfil the above human aspirations : understanding and living in harmony at various levels. Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking.

### UNIT II Understanding Harmony in the Human Being - Harmony in Myself!

9 Hrs

Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’.- Understanding the needs of Self (‘I’) and ‘Body’ - happiness and physical facility. - Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer). - Understanding the characteristics and activities of ‘I’ and harmony in ‘I’ - Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail - Programs to ensure Sanyam and Health. Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one’s own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

### UNIT III Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

9 Hrs

Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship - Understanding the meaning of Trust; Difference between intention and competence - Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship - Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals - Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family. Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students’ lives

### UNIT IV Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

9 Hrs

Understanding the harmony in the Nature - Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature - Understanding Existence as Co-existence of mutually interacting units in all-pervasive space - Holistic perception of harmony at all levels of existence - Include practice sessions to discuss human being as cause of imbalance in nature (film “Home” can be used), pollution, depletion of resources and role of technology etc.

### UNIT V Implications of the above Holistic Understanding of Harmony on Professional Ethics

9 Hrs

Natural acceptance of human values - Definitiveness of Ethical Human Conduct - Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order - Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems. - Case studies of typical holistic technologies, management models and production systems - Strategy for transition from the present state to Universal Human Order: ((a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers, (b) At the level of society: as mutually enriching institutions and organizations - Sum up

Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions e.g. To discuss the conduct as an engineer or scientist etc.

**Total Hours: 45**





## FACULTY OF ENGINEERING AND TECHNOLOGY

### Text Book

1. *Human Values and Professional Ethics* by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

### Reference Books

1. *Jeevan Vidya: Ek Parichaya*, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. *Human Values*, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. *The Story of Stuff* (Book).
4. *The Story of My Experiments with Truth* - by Mohandas Karamchand Gandhi.
5. *Small is Beautiful* - E. F Schumacher.
6. *Slow is Beautiful* - Cecile Andrews
7. *Economy of Permanence* - J C Kumarappa
8. *Bharat Mein Angreji Raj* – Pandit Sunderlal
9. *Rediscovering India* - by Dharampal
10. *Hind Swaraj or Indian Home Rule* - by Mohandas K. Gandhi
11. *India Wins Freedom* - Maulana Abdul Kalam Azad
12. *Vivekananda* - Romain Rolland (English)
13. *Gandhi* - Romain Rolland (English)





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22L01</b>	Subject Name <b>DATA STRUCTURES AND ALGORITHMS LAB</b>						Ty/Lb / ETL	L	T/ S.Lr	P/R	C	
	Prerequisite: Data Structures and Algorithms						Lb	0	0/0	3/0	1	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To strengthen their problem solving ability by applying the characteristics of an object-oriented approach.</li><li>To introduce object oriented concepts in C++ and Java.</li><li>To analyze Space and Time Complexity.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Explain what constitutes an object-oriented approach to programming and identify potential benefits of object-oriented programming over other approaches											
CO2	Apply an object-oriented approach to developing applications of varying complexities											
CO3	Describe the basic operations on arrays, lists, stacks and queue data structures											
CO4	Implement the tree structure.											
CO5	Implement the graph structure.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	2	1	-	2	2	2	2
CO2	3	3	2	2	1	2	3	-	2	1	3	2
CO3	3	2	2	2	1	2	1	-	2	2	2	2
CO4	2	3	2	2	2	2	1	-	2	2	2	2
CO5	2	3	2	2	2	2	1	-	2	1	2	2
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			3			2			2		
CO2	3			2			2			2		
CO3	2			2			2			3		
CO4	2			2			2			3		
CO5	2			3			2			2		
<b>3/2/1 indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
									✓			



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
<b>EBIT22L01</b>	<b>DATA STRUCTURES AND ALGORITHMS LAB</b>	Lb	0	0/0	3/0	1

### EXERCISES:

- 1) Operation on arrays – insertion and deletion
- 2) Linked lists-creation, insertion, deletion of single lists.
- 3) Linked lists-creation, insertion, deletion of double lists.
- 4) Stack- operations using arrays
- 5) Stack- operations using linked list
- 6) Infix to postfix conversion and evaluation
- 7) Queue operations using arrays
- 8) Queue operations using linked list
- 9) Binary tree traversals- In order, pre order, post order using recursion
- 10) Binary search
- 11) Sorting – Selection Sort
- 12) Sorting - Quick sort.
- 13) Depth first search of a graph
- 14) Breath first search of a graph
- 15) Prim's algorithm
- 16) Knapsack problem
- 17) N-Queens problem
- 18) Travels sales problem

**Total Hours : 45**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name OBJECT ORIENTED PROGRAMMING WITH C++						Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C	
EBIT22ET1												
	Prerequisite: None						ETL	2	0/0	2/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVES : <ul style="list-style-type: none"><li>To distinguish OOP features with procedural Oriented and analyze these features to a real-world object,</li><li>To analyze generic data type for the data type independent programming which relate it to reusability.</li><li>To understand the concepts of C++ programs and develop basic programs using C++</li></ul>												
COURSE OUTCOMES (COs) :												
CO1	Recognize and recall the OOP principles											
CO2	Understand the concepts of Classes, Objects and Functions											
CO3	Understand the concepts of Constructor & Destructor											
CO4	Illustrate the inheritance and polymorphism											
CO5	Develop an application using C++											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	3	2	2	2	1	-	-	2	2	2
CO2	2	2	2	1	2	3	1	1	2	2	2	2
CO3	3	1	2	-	2	2	2	2	2	2	2	2
CO4	3	1	2	1	-	2	1	2	2	2	2	2
CO5	2	2	1	2	2	3	2	1	2	1	2	2
COs / PSOs	PSO1				PSO2			PSO3		PSO4		
CO1	3				3			2		3		
CO2	3				2			3		3		
CO3	2				3			2		1		
CO4	3				3			2		3		
CO5	3				2			2		3		
H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22ET1	OBJECT ORIENTED PROGRAMMING WITH C++	ETL	2	0/0	2/0	3

### UNIT I BASICS, TOKENS, EXPRESSIONS

**12 Hrs**

Software Evolution, Procedure Oriented Programming, Object Oriented Programming Paradigm, Basic Concepts of OOP, Benefits of OOP, Object Oriented Languages, Features of OOP. How OOP Differ from POP. Applications of OOP, A Simple C++ Program, Structure of C++ Program. Tokens, Keywords, Identifiers and Constants, Basic Data Types, User Defined Data Types, Derived Data Types, Dynamic Initialization of Variables, Reference Variables, Operators in C++, Scope Resolution Operator, Member Dereferencing Operators, Memory Management Operators.

### UNIT II FUNCTIONS, CLASSES AND OBJECTS

**12 Hrs**

Introduction of Classes, Specifying a Class, Defining a Member Functions, A C++ Program with Class Access Specifiers, Inline functions, Nesting of Member Functions, Memory Allocation for Objects, Static Data Members, Static Member Functions, Arrays of Objects, Objects as Function Arguments, Default Arguments, Const Arguments, Function Overloading, Friend Functions.

### UNIT III CONSTRUCTORS AND DESTRUCTORS

**12 Hrs**

Introduction, Constructors, Default constructors, Copy Constructors, Dynamic Constructors, Parameterized Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic initialization of Objects, Destructors.

### UNIT IV INHERITANCE

**12 Hrs**

Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi Level Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Abstract Classes, Constructors in Derived Classes, Containership.

### UNIT V POINTERS, VIRTUAL FUNCTIONS AND POLYMORPHISM

**12 Hrs**

Introduction to Memory Management, new Operator and delete Operator, Pointer to Objects, this Pointer, Pointers to Derived Classes, Polymorphism, Compile time polymorphism, Run time polymorphism, Virtual Functions, Pure Virtual Functions, Virtual Base Classes, Virtual Destructors, Operator overloading, Rules for Operator overloading, overloading of binary and unary operators

**Total Hours: 60**

### LIST OF EXPERIMENTS

1. Implementation of various Operators.
  - a. Arithmetic Operator
  - b. Logical Operators
  - c. Relational Operator
  - d. Assignment operator
2. Programs to understand Classes and Objects.
3. Programs to understand Access Specifier.
4. Implementation of function and Inline Function.
5. Implementation of Friend function



## FACULTY OF ENGINEERING AND TECHNOLOGY

6. Programs to understand different function call mechanism
  - a. Call by reference
  - b. Call by value
7. Implementation of constructor and destructor
8. Implementation of use of “this” pointer using class
9. Implementation of inheritance and function overriding
10. Implementation of Operator Overloading

### TEXT BOOK:

1. E. Balagurusamy, “Object Oriented Programming in C++”, 6<sup>th</sup>ed., Tata McGraw-Hill, 2013

### REFERENCE BOOKS:

1. K.R.Venugopal, “Mastering C++”, published by Tata McGraw- Hill. -2013, Second Edition.
2. Rohit Khurana, “Object Oriented Programming With C++”, Vikas Publishing House- 2014, Second Edition.
3. Robert Lafore, “Object-Oriented Programming in C++”, Sams Publishing-2002, Fourth Edition



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBEC22IL1</b>	Subject Name <b>DIGITAL SYSTEMS LAB</b>						Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C	
	Prerequisite: Digital Principles and System Design						Lb	0	0/0	3/0	1	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To introduce number systems and codes and its conversions</li><li>To introduce Boolean algebra and its applications in digital systems</li><li>To introduce the design of various combinational digital circuits using logic gates</li><li>To bring out the analysis for synchronous and asynchronous Sequential circuits</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
<b>Upon the completion of the course the students will be able to</b>												
CO1		Acquired knowledge about number systems and its conversions										
CO2		Acquired knowledge about boolean algebra										
CO3		Ability to identify, analyze & design combinational circuits										
CO4		Ability to identify & analyze synchronous & asynchronous circuits										
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	1	1	1	1	1	1	2	1	1
CO2	3	2	1	1	1	1	1	1	1	1	1	1
CO3	2	2	3	1	1	2	1	1	2	2	1	1
CO4	2	2	3	1	1	2	1	1	2	2	1	1
COs/ PSOs		PSO1			PSO2			PSO3			PSO4	
CO1		1			3			1			1	
CO2		1			3			1			1	
CO3		3			2			1			1	
CO4		3			2			1			1	
3/2/1 Indicates Strength Of Correlation, 3 – pHigh, 2- Medium, 1- Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
							✓					



## FACULTY OF ENGINEERING AND TECHNOLOGY

SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBEC22IL1	DIGITAL SYSTEMS LAB	Lb	0	0/0	3/0	1

### LIST OF EXPERIMENTS:

1. Verification of Truth tables of Logic Gates
2. Implementation of Boolean function
3. Implementation of Adders & Subtractors
4. Implementation of Multiplexers
5. Implementation of Demultiplexers
6. Implementation of Encoder
7. Implementation of Decoders.
8. Verification of Flip – Flops
9. Implementation of SISO, SIPO.
10. Implementation of PISO, PIPO.
11. Implementation of Johnson Counter
12. Study of Modulo – N counter.

**Total Hours :45**





## **FACULTY OF ENGINEERING AND TECHNOLOGY**

# **IV Semester**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBMA22011</b>	Subject Name <b>STATISTICS FOR COMPUTER ENGINEERS</b>						<b>Ty/ Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: First year Engineering Mathematics						Ty	3	0/1	0/0	4	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES</b> <ul style="list-style-type: none"><li>To understand the Basic concepts in Frequency distribution, Measures of Central Tendency and Relative Measures of Dispersion.</li><li>To understand the Basic concepts in Random Events, Random variable and Probability.</li><li>To understand the Basic concepts in Bi-variate data, Coefficient of Correlation and Regression.</li><li>To understand the Basic concepts in Probability distributions</li><li>To understand the Basic concepts in Null hypothesis, Alternative hypothesis and Critical points</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
<b>CO1</b>	Understand the Basic concepts in Statistics											
<b>CO2</b>	Understand the Basic concepts in Probability											
<b>CO3</b>	Understand the Basic concepts in Correlation											
<b>CO4</b>	Understand the Basic concepts in Probability distributions											
<b>CO5</b>	Understand the Basic concepts in Sampling theory											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>
<b>CO2</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>
<b>CO3</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>
<b>CO4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>
<b>CO5</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>COs / PSOs</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
<b>CO1</b>	<b>2</b>			<b>2</b>			<b>2</b>			<b>3</b>		
<b>CO2</b>	<b>2</b>			<b>3</b>			<b>1</b>			<b>3</b>		
<b>CO3</b>	<b>1</b>			<b>3</b>			<b>2</b>			<b>2</b>		
<b>CO4</b>	<b>1</b>			<b>2</b>			<b>1</b>			<b>3</b>		
<b>CO5</b>	<b>2</b>			<b>3</b>			<b>1</b>			<b>2</b>		
<b>3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
	✓											



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBMA22011	STATISTICS FOR COMPUTER ENGINEERS	Ty	3	0/1	0/0	4

### UNIT I      **BASICS OF STATISTICS** (12 hrs)

Variables – Uni-variate Data – Frequency Distribution – Measures of Central Tendency – Mean –Median – Mode – Quartiles – Measures of Dispersion – The Range – Mean deviation -Quartile Deviation –Standard Deviation – Relative Measures of Dispersion – Coefficient of Variation – Quartile Coefficient of Variation – Skewness and Kurtosis (Definition and Simple problems).

### UNIT II      **PROBABILITY AND RANDOM VARIABLE** (12 hrs)

Axioms of Probability - Independent Events – Mutually exclusive Events– Conditional probability – Total probability – Baye’s Theorem – Random variable – Probability mass function – Probability density function – Properties(Definition and simple problems).

### UNIT III **CORRELATION & REGRESSION** (12 hrs)

Bi-variate data – Applications of Correlation: Karl Pearson’s Coefficient of Correlation – Rank Correlation: Spearman’s Rank Correlation – Linear Regression.

### UNIT IV      **STANDARD DISTRIBUTIONS** (12 hrs)

Binomial – Poisson – Geometric –Uniform – Exponential –Normal distributions.

### UNIT V      **TESTING OF HYPOTHESIS** (12 hrs)

Tests of Significance – Null hypothesis – Alternative hypothesis – Critical points - Large Sample Tests – Mean proportions– Small Sample Tests – t, F, Chi-square Tests: Independence of Attributes, Goodness of Fit.

**Total Hrs: 60**

#### Reference Books:

- 1) Veerarajan T., *Probability, Statistics and, Random Processes*, Tata McGraw Hill Publishing Co., (2008).
- 2) Singaravelu, *Probability and Random Processes*, Meenakshi Agency, (2017).
- 3) Gupta S.C., Kapoor V.K., *Fundamentals of Mathematical Statistics*, S.Chand & Co., (2007).
- 4) Richard Johnson A., *Miller & Freund’s Probability and statistics for Engineers (9<sup>th</sup> ed)*, Prentice Hall of India, (2016).



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBIT22005	Subject Name DATABASE MANGEMENT SYSTEMS						Ty/ Lb / ETL	L	T/ S.Lr	P/R	C	
	Prerequisite: Data Structures and Algorithms						Ty	3	0/0	0/0	3	
L : Lecture T:Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVES: <ul style="list-style-type: none"><li>To understand the basic Database Structure and Data Models.</li><li>To study the physical and logical database designs, database modeling, relational, hierarchical, and network models</li><li>To study SQL Commands for storing and retrieving data into the database.</li><li>To understand the concept of Transactions, Concurrency Control and Recovery System.</li><li>To study the Relational database system design, database security, integrity and current trends.</li></ul>												
COURSE OUTCOMES (COs) :												
CO1		Understand the most fundamental DBMS concepts and techniques										
CO2		Normalize relational database design of an application.										
CO3		Understand techniques required for building, maintaining, and querying databases.										
CO4		Understand the strategies for transactions in database and providing security, privacy, concurrency and recovery of data.										
CO5		Apply the advanced database techniques and current trends.										
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	3	1	2	3	-	-	1	-	2
CO2	2	3	1	2	1	1	2	-	-	1	-	2
CO3	2	3	3	2	1	3	2	-	-	1	-	2
CO4	1	2	3	1	1	3	1	-	-	1	-	2
CO5	2	1	1	2	1	1	2	-	-	1	-	2
COs/PSOs	PSO 1			PSO2			PSO3			PSO4		
CO1	2			1			-			2		
CO2	2			2			-			2		
CO3	2			1			-			2		
CO4	2			1			-			2		
CO5	2			1			-			2		
3/2/1 indicates Strength of Correlation 3- High, 2- Medium,1-Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
				✓								



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22005	DATABASE MANGEMENT SYSTEMS	Ty	3	0/0	0/0	3

### UNIT I FUNDAMENTALS OF DATABASE

**9 Hrs**

Introduction to File and Database systems — Database System Structure -Data Abstraction -Data models – Instances and schemas –Data Independence – DDL – DML – Database user – ER model – Entity sets- keys – ER diagram.

### UNIT II RELATIONAL MODEL AND SQL

**9 Hrs**

Relational model – structure – relational algebra- relational calculus- views-SQL - Queries in SQL -QBE - level – Basic Structure – various operations – relational database design – problems in the relational database design – normalization – normalization using functional – Multi valued join dependence

### UNIT III DATA STORAGE AND QUERY PROCESSING

**9 Hrs**

File and system structure – overall system structure – file transaction – data dictionary – indexing and Hashing- basic concepts and B+ tree Indices - static and dynamic hash functions- Overview - Measures of Query Cost - Selection Operation – Sorting - Join Operation

### UNIT IV TRANSACTIONS AND CONCURRENCY CONTROL

**9 Hrs**

Transaction Concept- A Simple Transaction Model - Storage Structure – Transaction Processing – Need for Concurrency Control – Desirable Properties of Transaction – Schedule and Recoverability – Serializability and Schedules – Concurrency Control –Types of Locks – Two Phases Locking – Deadlock - Deadlock Handling – Time Stamp Based Concurrency Control –Recovery Techniques - Recovery and Atomicity - Recovery Algorithm– Immediate Update – Deferred Update – Shadow Paging.

### UNIT V CURRENT TRENDS

**9 Hrs**

Object Oriented Databases– Distributed Databases – Homogenous and Heterogeneous – Distributed Data Storage – XML – Structure of XML – Data – XML Document –Schema – Querying and Transformation – Data Mining and Data Warehousing-JDBC-ODBC connectivity

**Total Hours: 45**

#### TEXT BOOKS:

1. Abraham, Silberschatz. Henry, F. K..Sudharshan, S. (2013) *Database System Concepts* (6thed.) Tata McGraw Hill, New Delhi

#### REFERENCE BOOKS:

1. Ramez, E. Shamkant, B. Navathe (2008) *Fundamentals of database systems* (5th ed.), Pearson Education
2. Date, C. J, (2012) *An Introduction to Database Systems* (8th ed.), Pearson Education
3. Raghu Ramakrishnan, “*Database Management System*”, Tata McGraw-Hill, 2003.
4. Hector Garcia, Molina, Jeffrey D.Ullman and Jennifer Widom, “*Database System Implementation*”, Pearson Education, 2000.
5. Peter Rob and Corlos Coronel, “*Database System, Design, Implementation and Management*”, Fifth Edition, Thompson Learning Course Technology, 2003
- 6.Frank. P. Coyle, “*XML, Web Services and The Data Revolution*”, Pearson Education, 2002



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBIT22006	Subject Name OPERATING SYSTEM							Ty/ Lb / ETL	L	T/ S.Lr	P/R	C
	Prerequisite: NIL							Ty	3	0/0	0/0	3
L : Lecture T:Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To understand the basic concepts and functions of operating systems.</li><li>To understand Processes &amp; Threads and to analyze Scheduling algorithms.</li><li>To understand the concept of Deadlocks and analyze various memory management schemes.</li><li>To understand the implementation of file systems and directories.</li><li>To understand I/O management.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Remember and Understand functions, structures and history of operating systems.											
CO2	Analyze various functions of CPU processing algorithms.											
CO3	Understanding Memory management and Dead locks											
CO4	Explain the issues related to file system interface and implementation.											
CO5	Describe & apply various technique for the I/O management.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	-	-	-	1	-	-	-	-	2
CO2	2	3	1	-	-	-	1	-	-	-	-	2
CO3	2	3	3	-	-	-	1	-	-	-	-	2
CO4	1	2	3	-	-	-	1	-	-	-	-	2
CO5	2	1	1	-	-	-	1	-	-	-	-	2
COs/PSOs	PSO 1			PSO2			PSO3			PSO4		
CO1	2			1			1			2		
CO2	2			2			1			2		
CO3	2			1			1			2		
CO4	2			1			1			2		
CO5	2			1			1			2		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium,1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
				✓								



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22006	OPERATING SYSTEM	Ty	3	0/0	0/0	3

### UNIT I OPERATING SYSTEM AND STRUCTURES

**9 Hrs**

Introduction - operating system operations - process management, memory management, storage management, protection and security, distributed systems. Operating Systems Structures: Operating system services and systems calls - system programs - operating system structure - operating systems generations.

### UNIT II PROCESS MANAGEMENT AND SYNCHRONIZATION

**9 Hrs**

Threads-Multithreading Models. CPU Scheduling concepts-Scheduling Criteria-Scheduling Algorithms-Threads and Multiple-Processor Scheduling-Real Time Scheduling-Process Synchronization-The Critical Section Problem-Synchronization Hardware-Semaphores-Classical Problems of Synchronization.

### UNIT III DEADLOCKS AND MEMORY MANAGEMENT

**9 Hrs**

Deadlocks-Deadlock Characterization - Methods of Handling Deadlocks-Deadlock Prevention-Deadlock Avoidance - Deadlock Detection - Recovery from Deadlock - **Memory Management:** Swapping - contiguous memory allocation – paging - structure of the page table – segmentation - virtual memory - demand paging - page-replacement algorithms - allocation of frames – thrashing.

### UNIT IV FILE SYSTEM

**9 Hrs**

Concept of a file - access methods - directory structure - file system mounting - file sharing - protection. File system implementation: file system structure - file system implementation - directory implementation - allocation methods - free-space management - efficiency and performance - comparison of UNIX and windows.

### UNIT V I/O SYSTEM

**9 Hrs**

Mass storage structure - overview of mass storage structure - disk structure - disk attachment - disk scheduling algorithms - swap space management - stable storage implementation - tertiary storage structure. **I/O:** Hardware - application I/O interface - kernel I/O subsystem - transforming I/O requests to hardware operations - streams - performance.

**Total Hours: 45**

#### TEXT BOOK:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2006), Operating System Principles, 7<sup>th</sup> edition, Wiley India Private Limited, New Delhi.

#### REFERENCE BOOKS:

1. Stallings (2006), Operating Systems, Internals and Design Principles, 5th edition, Pearson Education, India.
2. Andrew S. Tanenbaum (2007), Modern Operating Systems, 2nd edition, Prentice Hall of India, India.
3. Deitel&Deitel (2008), Operating systems, 3rd edition, Pearson Education, India.





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBEC22ID2	Subject Name Microprocessor and Microcontrollers	Ty/Lb/ ETL	L	T/ S.Lr	P/R	C						
	Prerequisite: Digital Principles and System Design	TY	3	0/0	0/0	3						
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVE :												
<ul style="list-style-type: none"><li>To study the basic architectures and operational features of the processors and controllers.</li><li>To learn the assembly language and programming of 8086.</li><li>To design and understand the multiprocessor configuration.</li><li>To understand the interfacing concepts of the peripheral devices with processors.</li></ul>												
COURSE OUTCOMES (COs):												
Upon the completion of the course students will be able to												
CO1	Describe the working of 8086 Microprocessor											
CO2	Demonstrate the programming in microprocessor											
CO3	Analyze the interfacing of different peripheral devices with the microprocessors											
CO4	Explain the operation of 8051 microcontroller in real time process											
CO5	Illustrate the applications of 8051											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	3	2	1	1	2	1	2	2	2
CO2	3	3	3	3	2	1	2	2	2	2	2	2
CO3	2	3	3	3	3	2	2	2	1	3	2	2
CO4	3	3	3	3	3	1	2	2	2	2	2	3
CO5	3	3	3	3	3	1	2	2	1	1	3	3
COs /PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			3			3			1		
CO2	2			3			3			1		
CO3	3			3			3			2		
CO4	3			3			3			1		
CO5	2			3			3			3		
3/2/1 Indicates Strength of Correlation, 3 – High, 2- Medium, 1- Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
							✓					



## FACULTY OF ENGINEERING AND TECHNOLOGY

SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBEC22ID2	Microprocessor and Microcontrollers	Ty	3	0/0	0/0	3

### UNIT I THE 8086 MICROPROCESSORS

**9 Hrs**

Introduction to 8086 – Microprocessor architecture – Addressing modes - Instruction set and assembler directives – Assembly language programming.

### UNIT II 8086 SYSTEM BUS STRUCTURE

**9 Hrs**

8086 signals – Basic configurations – System bus timing –System design using 8086 – I/O programming – Introduction to Multiprogramming – System Bus Structure – Multiprocessor configurations – Coprocessor, closely coupled and loosely Coupled configurations.

### UNIT III I/O INTERFACING

**9 Hrs**

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller – DMA controller

### UNIT IV MICROCONTROLLER

**9 Hrs**

Architecture of 8051 – Special Function Registers (SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes.

### UNIT V INTERFACING MICROCONTROLLER

**9 Hrs**

Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation.

**Total Hours: 45**

### TEXT BOOKS:

1. Yu-Cheng Liu, Glenn A.Gibson, —Microcomputer Systems: The 8086 / 8088 Family - Architecture, Programming and Design, Second Edition, Prentice Hall of India, 2007.
2. Mohamed Ali Mazidi, Janice GillispieMazidi, Rolin McKinlay, —The 8051 Microcontroller and Embedded Systems: Using Assembly and C, Second Edition, Pearson education, 2011.

### REFERENCES:

1. Douglas V.Hall, —Microprocessors and Interfacing, Programming and Hardware, TMH, 2012
2. A.K.Ray, K.M.Bhurchandi, "Advanced Microprocessors and Peripherals" 3rd edition, Tata McGrawHill, 2012



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBCC22I04	Subject Name THE INDIAN CONSTITUTION						TY / LB/ ETL/IE	L	T / S.Lr	P/ R	C	
	Prerequisite: NIL						IE	2	0/0	0/0	0	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVES: <ul style="list-style-type: none"><li>To provide an over view of the history of the making of Indian Constitution</li><li>To understand the preamble and the basic structures of the Constitution.</li><li>To Know the fundamental rights, duties and the directive principles of state policy</li><li>To understand the functionality of the legislature, the executive and the judiciary</li></ul>												
COURSE OUTCOMES (COs) : After studying this course the student would be able to												
CO1		Provide an over view of the history of the making of Indian Constitution										
CO2		Understand the preamble and the basic structures of the Constitution.										
CO3		Know the fundamental rights, duties and the directive principles of state policy										
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	3	2	2	2	1	-	-
CO2	-	-	-	-	-	3	2	2	2	1	-	-
CO2	-	-	-	-	-	3	2	2	2	1	-	-
COs / PSOs		PSO1				PSO2				PSO3		
CO1		1				1				2		
CO2		1				1				2		
CO3		1				1				2		
3/2/1 indicates Strength of Correlation 3- High, 2- Medium, 1-Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
			✓									



## FACULTY OF ENGINEERING AND TECHNOLOGY

<b>Subject Code</b> <b>EBCC22I04</b>	<b>Subject Name</b> <b>THE INDIAN CONSTITUTION</b>	<b>TY / LB/ ETL/IE</b>	<b>L</b>	<b>T / S.Lr</b>	<b>P/ R</b>	<b>C</b>
	Prerequisite: NIL	IE	2	0/0	0/0	0

### UNIT 1

**6 Hrs**

The History of the Making of Indian Constitution, Preamble and the Basic Structures

### UNIT 2

**6 Hrs**

Fundamental Rights and Duties , Directive Principles of State Policy

### UNIT 3

**6 Hrs**

Legislature, Executive and Judiciary

### UNIT 4

**6 Hrs**

Emergency Powers

### UNIT 5

**6 Hrs**

Special Provisions for Jammu and Kashmir, Nagaland and Other Regions, Amendments

**Total no Hrs: 30 Hrs**

### TEXT BOOKS:

- ❖ D D Basu, Introduction of the Constitution of India, 20th Edn., Lexisnex is Butterworths, 2012.

### REFERENCE BOOKS:

- ❖ Rajeev Bhargava (ed), Ethics and Politics of the Indian Constitution, Oxford University Press, New Delhi, 2008.
- ❖ Granville Austin, The Indian Constitution: Cornerstone of a Nation, Oxford University Press, Oxford, 1966.
- ❖ Zoya Hassan, E. Sridharan and R. Sudarshan (eds), India's Living Constitution: Ideas, Practices, Controversies, Permanent Black, New Delhi, 2002.
- ❖ Subhash C. Kashyap, Our Constitution, National Book Trust, New Delhi, 2011.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBCC22105	Subject Name THE INDIAN TRADITIONAL KNOWLEDGE	TY / LB/ ETL/IE	L	T / S.Lr	P/ R	C						
	Prerequisite: NIL	IE	2	0/0	0/0	0						
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES:</b> <ul style="list-style-type: none"><li>To understand the Pre- colonial and Colonial Period, Indian Traditional Knowledge System</li><li>To understand the Traditional Medicine, Traditional Production and Construction Technology</li><li>To Know the History of Physics and Chemistry, Traditional Art and Architecture and Vastu Shashtra, Astronomy and Astrology</li><li>To understand the Origin of Mathematics, Aviation Technology in Ancient India, Crafts and Trade in Ancient India</li></ul>												
<b>COURSE OUTCOMES (COs) : After studying this course the student would be able to</b>												
CO1	Understand the Pre- colonial and Colonial Period, Indian Traditional Knowledge System											
CO2	Understand the Traditional Medicine, Traditional Production and Construction Technology											
CO3	Understand the Origin of Mathematics, Aviation Technology in Ancient India, Crafts and Trade in Ancient India											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	3	3	2	-	2	-	-	-	2	-	1
CO2	-	3	3	2	-	2	-	-	-	2	-	1
CO3	-	3	3	2	-	2	-	-	-	2	-	1
COs / PSOs		PSO1			PSO2				PSO3			
CO1		1			1				2			
CO2		1			1				2			
CO3		1			1				2			
<b>3/2/1 indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
			✓									



## FACULTY OF ENGINEERING AND TECHNOLOGY

<b>Subject Code</b> <b>EBCC22I05</b>	<b>Subject Name :</b> <b>THE INDIAN TRADITIONAL KNOWLEDGE</b>	<b>TY / LB/ ETL/IE</b>	<b>L</b>	<b>T / S.Lr</b>	<b>P/ R</b>	<b>C</b>
	Prerequisite: NIL	IE	2	0/0	0/0	0

### UNIT I

**6 Hrs**

Historical Background: TKS During the Pre- colonial and Colonial Period, Indian Traditional Knowledge System

### UNIT II

**6 Hrs**

Traditional Medicine, Traditional Production and Construction Technology

### UNIT III

**6 Hrs**

History of Physics and Chemistry, Traditional Art and Architecture and Vastu Shasta, Astronomy and Astrology

### UNIT IV

**6 Hrs**

Origin of Mathematics, Aviation Technology in Ancient India, Crafts and Trade in Ancient India

### UNIT V

**6 Hrs**

TKS and the Contemporary World, TKS and the Indian Union, TKS and IT Revolution

**Total no Hrs: 30 Hrs**

### TEXT BOOKS:

- ❖ Amit Jha (2009) , Traditional knowledge system in india, 1<sup>st</sup> Edition, Delhi University (North Campus)
- ❖ Dr.A.K.Ghosh (2011), Traditional Knowledge of Household Products



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBEC22IL2</b>	Subject Name <b>Microprocessor and Microcontrollers Lab</b>					<b>Ty/ Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>		
	Prerequisite: Microprocessors and Microcontrollers					Lb	0	0/0	3/0	1		
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To learn the assembly language programming of 8086.</li><li>To learn the assembly language programming of 8051.</li><li>To understand the interfacing concepts of the peripheral devices with processors</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1		Ability to understand the Programming of 8086 microprocessor										
CO2		Ability to understand the Programming of 8051 microcontroller										
CO3		Understand the applications of microprocessors & microcontrollers										
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	2	1	1	1	1	1	1	2
CO2	3	2	1	1	2	1	1	1	1	1	1	2
CO3	3	2	1	1	2	1	1	1	1	1	1	2
COs / PSOs		PSO1			PSO2			PSO3			PSO4	
CO1		3			2			1			1	
CO2		3			2			1			1	
CO3		3			2			1			1	
3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary		Skill component		Practical /	
							✓				✓	





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ ETL	L	T/ S.Lr	P/R	C
EBEC22IL2	Microprocessor and Microcontrollers Lab	Lb	0	0/0	3/0	1

Interdisciplinary Lab II – Microprocessor and Microcontrollers

### LIST OF EXPERIMENTS:

#### **8086 Programs using kits/ MASM**

1. Basic arithmetic and Logical operations
2. Move a data block without overlap.
3. sorting and searching.

#### **Peripherals and Interfacing experiments**

4. Traffic light controller
5. Stepper motor control
6. Key board and Display
7. Serial interface and Parallel interface
8. A/D and D/A interface and Waveform Generation.

#### **8051 Experiments using kits/ MASM**

9. Basic arithmetic and logical operations
10. Move a data block without overlap.
11. sorting and searching

#### **8086/ 8051 Programs using kits/ MASM**

12. Code conversion, decimal arithmetic and Matrix operations.

**Total Hours: 45**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name						Ty/Lb/ ETL	L	T/ S.Lr	P/R	C	
EBIT22L02	DATABASE MANAGEMENT SYSTEMS LAB											
	Prerequisite: Database Management Systems						Lb	0	0/0	3/0	1	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVES :												
<ul style="list-style-type: none"><li>To create a database and query it using SQL, design forms and generate reports.</li><li>To Understand the significance of integrity constraints, referential integrity constraints, triggers, assertions.</li></ul>												
COURSE OUTCOMES (COs) :												
CO1	Understand, analyze and apply common SQL statements including DDL, statements to perform different operations.											
CO2	Understand analyze and apply common SQL statements including DML, statements to perform different operations.											
CO3	Understand, analyze and apply common SQL statements including DCL, statements to perform different operations.											
CO4	Design different views of tables for different users and to apply embedded and nested queries.											
CO5	Design and implement a database for a given problem according to well-known design principle that balances data retrieval performance with data consistency.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	2	1	-	2	2	2	2
CO2	3	3	2	2	1	2	3	-	2	1	3	2
CO3	3	2	2	2	1	2	1	-	2	2	2	2
CO4	2	3	2	2	2	2	1	-	2	2	2	2
CO5	2	3	2	2	2	2	1	-	2	1	2	2
COs / PSOs		PSO1			PSO2			PSO3			PSO4	
CO1		3			3			2			2	
CO2		3			2			2			2	
CO3		2			2			2			3	
CO4		2			2			2			3	
CO5		2			3			2			2	
H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
									✓			



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22L02	DATABASE MANAGEMENT SYSTEMS LAB	Lb	0	0/0	3/0	1

### I. Program to learn DDL and DML commands

1. Execution of data description language commands
2. Execution of data manipulation language commands
3. Execution of data control language commands
4. Execution of transaction control language commands
5. Insert command
6. Select, from and where clause
7. Set operation [union, intersection, except]
8. String operations
9. Nested queries
10. Join operation
11. Modification of the database

### II. PL / SQL programs

1. Control statements (for loop)
2. Control statements (while loop)
3. Control statements (for reverse loop)
4. Control statements (loop end loop)
5. Sum of even numbers
6. Sum of odd numbers
7. Series generation
8. Implementation of sub-program
9. Implementation of cursor using pl/sql
10. Control statement (if-else end if)

**Total Hours: 45**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBIT22L03	Subject Name OPERATING SYSTEMS LAB						Ty/Lb/ ETL	L	T/ S.Lr	P/ R	C	
	Prerequisite: Operating System						Lb	0	0/0	3/0	1	
L: Lecture T: Tutorial S.Lr: Supervised Learning P:Project R:Research C:Credits Ty/Lb ETL: Theory /Lab/ Embedded Theory and Lab												
<b>OBJECTIVES:</b> <ul style="list-style-type: none"><li>To learn to Create processes and implement IPC</li><li>To learn use system calls through C programs</li><li>To learnt to use the file system related system calls</li><li>To gain knowledge to Analyze the performance of the various Page Replacement Algorithms</li><li>To learn to Implement File Organization and File Allocation Strategies</li></ul>												
<b>COURSEOUTCOMES(COs):</b>												
CO1	Create processes and implement IPC											
CO2	Implement Dead lock avoidance and Detection Algorithms											
CO3	Compare the performance of various CPU Scheduling Algorithms											
CO4	Analyze the performance of the various Page Replacement Algorithms											
CO5	Implement File Organization and File Allocation Strategies											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	-	-	-	-	-	-	-	-	1
CO2	3	3	2	-	-	-	-	-	-	-	-	1
CO3	3	3	2	-	-	-	-	-	-	-	-	2
CO4	3	3	2	-	-	-	-	-	-	-	-	1
CO5	3	3	2	-	-	-	-	-	-	-	-	2
COs/PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	-			2			-			1		
CO2	-			2			-			1		
CO3	-			2			-			2		
CO4	-			1			-			1		
CO5	-			1			-			1		
<b>3/2/1IndicatesStrengthofCorrelation,3–High, 2-Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
									✓			



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ ETL	L	T/ S.Lr	P/R	C
<b>EBIT22L03</b>	<b>OPERATING SYSTEMS LAB</b>	Lb	0	0/0	3/0	1

### LIST OF EXPERIMENTS:

1. Basic UNIX commands–learning and usage.
2. Shell Programming.
3. File system related system calls. (Learn to create, open, read, write, seek into, close files & open, read, write, search, close directories).
4. Process management – Fork, Exec (Learn to create a new process and to overlay an executable binary image on an existing process).
5. Inter-process communication between related processes using pipes.
6. Process synchronization using semaphores (Solutions to synchronization problems like producer consumer problem, dining philosopher's problem etc...).
7. Inter-process communication among unrelated processes using Shared memory.
8. Implementation of Threading & Synchronization
9. CPU Scheduling algorithms.
10. Continuous memory allocation strategies–best fit, first fit and worst fit strategies.
11. Page replacement algorithms.

**Total Hours: 45**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22ET2</b>	Subject Name <b>JAVA PROGRAMMING</b>						Ty/Lb/ <b>ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: None						ETL	2	0/0	2/0	3	
L : Lecture T:Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To design, create, build, and debug Java applications and applets.</li><li>To write Java programs using object-oriented programming techniques including classes, objects, methods, instance variables, composition, inheritance, and polymorphism</li><li>To write programs using graphical user interface (GUI) components and Java’s Event Handling Mode</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Understand Classes and their Objects											
CO2	Learn and implement principles and concepts of Object Orientation such as Abstraction, Data Hiding, Polymorphism											
CO3	Understand design handling threads, interfaces and applets.											
CO4	Apply graphical user interface (GUI) components and Java’s Event Handling Model.											
CO5	Design an object-oriented system, AWT components and multithreaded processes as per needs and specifications											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	-	-	-	-	-	1	1	1	2
CO2	3	2	2	-	-	-	-	-	1	1	1	2
CO3	3	2	2	-	-	-	-	-	1	1	1	2
CO4	3	2	2	1	-	-	-	-	1	1	1	2
CO5	3	2	2	1	-	-	-	-	1	1	1	2
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	2			2			-			-		
CO2	2			2			-			-		
CO3	2			2			-			-		
CO4	2			2			-			-		
CO5	2			2			-			-		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
				✓								



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22ET2	JAVA PROGRAMMING	ETL	2	0/0	2/0	3

### UNIT I OVERVIEW OF JAVA LANGUAGE

**12Hrs**

Introduction to Java, Features of Java, Comparison with C and C++, Java and World Wide Web, Java Environment, Java Development kit (JDK), Java Runtime Environment (JRE), Application Programming Interface (API), Java Virtual Machine (JVM), Primitive Data types, Declarations, Ranges, Variable Names Conventions, Numeric Literals, Character Literals, String Literals, Arrays (One dimensional, two-dimensional), Enumerated Data Types.

### UNIT II CLASSES, OBJECTS AND METHODS

**12 Hrs**

Classes and Objects, Defining a class; Defining instance variables and methods, Creating objects out of a class, Method calls via object references, Abstraction, Packages, Interfaces and Abstract classes, Abstract and non-abstract methods, Inheritance, extends and implements keywords in Java, Super class and Sub class, this keyword, super keyword in Java for inheritance, Concrete classes in Java, Polymorphism, Compile time polymorphism - Overloading of methods, Run time polymorphism - Overriding of methods, Method Overriding rules and method overloading rules, Encapsulation.

### UNIT III EXCEPTION AND MULTITHREADED PROGRAMMING

**12Hrs**

Exception handling, Need for exceptions, API hierarchy for Exceptions, Types of Exceptions, Keywords in Exception API: try, catch, finally, throw, throws, -Introduction to Threads – Creating Threads, Extending the Thread Class, Implementing the runnable interface, life cycle of a thread, priority of a thread, Multithreading, Synchronization, Dead Lock.

### UNIT IV AWT CONTROLS

**12Hrs**

The AWT class hierarchy, user interface components- Labels, Button, Text Components, Check Box, Check Box Group, Choice, List Box, Panels – Scroll Pane, Menu, Scroll Bar. Working with Frame class, Colour, Fonts and layout managers. EVENT HANDLING: Events, Event sources, Event Listeners, Event Delegation Model (EDM), Handling Mouse and Keyboard Events, Adapter classes, Inner classes.

### UNIT V SWINGS

**12 Hrs**

Introduction to Swings, Hierarchy of swing components. Containers, Top level containers - JFrame, JWindow, JDialog, JPanel, JButton, JToggleButton, JCheckBox, JRadioButton, JLabel, JTextField, JTextArea, JList, JComboBox, JScrollPane. APPLETS: Life cycle of an Applet, Differences between Applets and Applications, Developing applets, simple applet.

**Total Hours: 60**





## **FACULTY OF ENGINEERING AND TECHNOLOGY**

### **LIST OF EXPERIMENTS**

1. Simple Java Program
2. Java Program for Arithmetic Operation
3. Fibonacci Series In Java Using Recursive And Non-Recursive
4. Java Program Using Enum Data Type
5. Java Program Using Array
6. Java Program Using classes And Object
7. Interfaces Using Java
8. Creating Multiple Catch Blocks
9. A Multi-Thread Application.
10. Java Program Using Applet
11. Java Program Using AWT
12. Java Calculator Using JFrame

### **TEXT BOOK:**

1. Herbert Schildt, "The Complete Reference JAVA 2", Tata McGraw Hill publications, 7th Ed., 2007.
2. Balagurusamy, "Programming with JAVA A primer 3rd Edition", Tata McGraw-Hill, 2007.

### **REFERENCE BOOKS:**

1. Y.Daniel Liang, "An Introduction to JAVA Programming", Pearson, 2015
2. Kathy Sierra, Bert Bates, "Head First Java", Oreilly Publication, 2nd Edition, 2005

### **OBJECT ORIENTED**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
<b>EBIT22I01</b>	<b>TECHNICAL SKILL I</b>	IE	0	0/0	2/0	1

### OBJECTIVES:

- To make the students expert in domain specific knowledge.
- To develop professionals with idealistic, practical and moral values.
- To facilitate the students with emerging technology.

Students should acquire skill in the domain/inter disciplinary area from government/private training centers/industries /University for a minimum period of 15 calendar days. The training can be through off line, online or mixed mode. Students are supposed to prepare Technical skill report at the end of the training and submit the report along with the certificate in proof of the training, during the viva voce examination conducted by the examiners duly appointed by the head of the department.

**Total Hours: 30**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code: <b>EBCC22I06</b>	Subject Name <b>SOFT SKILL I - Employability skills</b>	<b>Ty/Lb/ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>						
	Prerequisite: NIL	IE	0	0/0	2/0	1						
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To create awareness in students, various top companies helping them improve their skill set matrix, leading to develop a positive frame of mind.</li><li>To help students be aware of various techniques of candidate recruitment and help them prepare CV’s and resume.</li><li>To help student how to face various types of interview, preparing for HR, technical interviews.</li><li>To help students improve their verbal reading, narration and presentation skills by performs various mock sessions.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b> Students will be able to												
CO1	Be aware of various top companies leading to improvement in skills amongst them.											
CO2	Be aware of various candidate recruitment techniques like group discussion, interviews and be able to prepare CV’s and resumes.											
CO3	Prepare for different types of interviews and be prepared for HR and technical interviews.											
CO4	Improve their verbal, written and other skills by performing mock sessions.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	1	1	1	2	2	3	2	3
CO2	1	1	1	1	1	1	1	2	2	3	2	3
CO3	1	1	1	1	1	1	1	2	2	3	2	3
CO4	1	1	1	1	1	1	1	2	2	3	2	3
COs / PSOs			PSO1			PSO2			PSO3			
CO1			1			1			3			
CO2			1			1			3			
CO3			1			1			3			
CO4			1			1			3			
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
								✓				



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBCC22I06	SOFT SKILL I - Employability skills	IE	0	0/0	2/0	1

### UNIT I

**6 Hrs**

Creation of awareness of top companies / improving skill set matrix / Development of positive frame of mind / Creation of self-awareness.

### UNIT II

**6 Hrs**

Group discussions / Do's and don'ts – handling group discussions / what evaluators look for interpersonal relationships / Preparation of Curriculum Vitae / Resume.

### UNIT III

**6 Hrs**

Interview – awareness of facing questions – Do's and don'ts of personal interview / group interview, enabling students to prepare for different procedures such as HR interviews and Technical Interviews / self-introductions.

### UNIT IV

**6 Hrs**

Verbal aptitude, Reading comprehension / narration / presentation / Mock Interviews.

### UNIT V

**6 Hrs**

Practical session on Group Discussion and written tests on vocabulary and reading comprehension

Practical component P : Include case studies / application scenarios

Research component R : Future trends / research areas / Comparative Analysis

**Total Hours: 30**



## **FACULTY OF ENGINEERING AND TECHNOLOGY**

# **V SEMESTER**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name ENTERPRISE RESOURCE PLANNING						Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C	
EBIT22007	Prerequisite: NIL						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To Know basic business functional areas and explains how they are related.</li><li>To Illustrate how uninterested information systems fail to support business decision and how integrated information systems can help a company prosper by providing business managers with accurate, consistent, and current data.</li><li>To Understand how Enterprise Resource Planning software is used to optimize business processes Acquire experience in using ERP software that can be applied in further coursework</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Able to integrate Business Enterprises, with web through Service Oriented Architecture											
CO2	Understand how technology has evolved and the reason why existing systems are the way they are.											
CO3	Can explore the synergy between information and communication systems and how this synergy can be best exploited for EAI and B2B integration											
CO4	Able to develop and design the modules used in ERP System.											
CO5	Able to understand the emerging trends of ERP System.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	1	1	2	2	2	1	1	2	2	1
CO2	1	2	1	1	2	2	2	1	1	2	2	1
CO3	1	2	1	1	2	2	2	2	2	2	2	1
CO4	1	2	1	1	2	2	2	2	2	2	2	2
CO5	1	2	2	1	2	2	2	1	2	2	2	1
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			3			2			3		
CO2	3			2			2			3		
CO3	3			3			2			2		
CO4	3			2			2			3		
CO5	3			2			2			3		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
				✓								



## FACULTY OF ENGINEERING AND TECHNOLOGY

SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22007	ENTERPRISE RESOURCE PLANNING	Ty	3	0/0	0/0	3

### UNIT I Introduction

**9 Hrs**

Overview of enterprise systems – Evolution - Risks and benefits - Fundamental technology - Issues to be consider in planning design and implementation of cross functional integrated ERP systems - Case studies.

### UNIT II ERP Solutions And Functional Modules

**9 Hrs**

Overview of ERP software solutions- Small medium and large enterprise vendor solutions, BPR, Business Engineering and best Business practices - Business process Management. Overview of ERP modules -sales and Marketing, Accounting and Finance, Materials and Production management etc. -Case studies.

### UNIT III ERP Implementation

**9 Hrs**

Planning Evaluation and selection of ERP systems-Implementation life cycle - ERP implementation, Methodology and Frame work- Training – Data Migration. People Organization in implementation-Consultants, Vendors and Employees-Case studies.

### UNIT IV Post Implementation

**9 Hrs**

Maintenance of ERP- Organizational and Industrial impact; Success and Failure factors of and ERP Implementation -case studies.

### UNIT V Emerging Trends on ERP

**9 Hrs**

Extended ERP systems and ERP bolt –on -CRM, SCM, Business analytics etc- Future trends in ERP systems- web enabled, Wireless technologies so on-Case studies.

**Total Hours: 45**

### TEXT BOOK:

1. Alexis Leon, 2006 ERP demystified, second Edition Tata McGraw-Hill.

### REFERENCE BOOKS:

1. Jagan Nathan Vaman, 2008 ERP in Practice, Tata McGraw-Hill.
2. Alexis Leon, 2008 Enterprise Resource Planning, second edition, Tata McGraw-Hill.
3. Mahadeo Jaiswal and Ganesh Vanapalli, 2006 ERP Macmillan India.
4. Vinod Kumar Grag and N.K. Venkitakrishnan, 2006, ERP- Concepts and Practice, Prentice Hall of India.
5. Summer, 2008 ERP, Pearson Education.





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22008</b>	Subject Name <b>PROFESSIONAL ETHICS</b>						<b>Ty/ Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: NIL						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To design and develop pollution Control Charts.</li><li>To understand environmental ethics and able to understand ethics in IT industry.</li></ul>												
<b>COURSE OUTCOMES (COs):</b>												
CO1	Understand the concepts of Professional ideals and virtues.											
CO2	Apply the code of ethics.											
CO3	Evaluate the consequences of safety and risk.											
CO4	Differentiate the responsibility and rights of Engineering professionals.											
CO5	Explore the issues related to global contexts with respect to engineering practice.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
CO1	-	-	-	-	-	-	-	3	-	-	-	-
CO2	-	-	-	-	-	2	-	3	-	-	-	-
CO3	-	-	-	-	-	3	-	3	-	-	-	-
CO4	-	-	-	-	-	3	2	2	-	-	-	-
CO5	-	-	-	-	-	3	2	3	-	-	-	-
<b>COs / PSOs</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
CO1	-			-			2			-		
CO2	-			-			3			-		
CO3	-			-			2			-		
CO4	-			-			2			-		
CO5	-			-			2			-		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
			✓									



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S. Lr	P/R	C
EBIT22008	PROFESSIONAL ETHICS	Ty	3	0/0	0/0	3

### UNIT I ENGINEERING ETHICS

**9 Hrs**

Senses of 'Engineering Ethics' - Variety of moral issues - Types of inquiry - Moral dilemmas – Moral autonomy - Kohlberg's theory - Gilligan's theory - Consensus and controversy - Professions and professionalism – Professional ideals and virtues - Theories about right action - Self-interest-Customs and religion - Uses of ethical theories

### UNIT II ENVIRONMENTAL ETHICS

**9 Hrs**

Environmental Preservation – Role of stakeholders – International issues – Sustainable Development – Industrial pollution – Environment Reputation – Environment performance – Engineering Management in India – Pollution control charts.

### UNIT III RESPONSIBILITIES AND RIGHTS

**9 Hrs**

Collegiality and loyalty - Respect for authority - Collective bargaining - Confidentiality – Conflicts of interest - Occupational crime - Professional rights - Employee rights - Intellectual Property Rights (IPR) - Discrimination.

### UNIT IV GLOBAL ISSUES

**9 Hrs**

Multinational corporations - Environmental ethics - Computer ethics - Weapons development - Engineers as managers - Consulting engineers - Engineers as expert witnesses and advisors - Moral leadership - Sample codes of conduct - Case study with reference to Indian scenario.

### UNIT V ETHICS IN IT INDUSTRY

**9 Hrs**

Structure of IT – ITES industry, Unique characteristics, Ethical perspective, Case studies – Credit Card Fraud, Cybercrime.

**Total Hours: 45**

#### Text Books:

1. Mike Martin and Roland Schinzinger (2009), "Introduction to Engineering Ethics", McGraw Hill
2. A.C. Fernando, "Business Ethics: An Indian Perspective", Pearson 2009 (II–V)

#### References:

1. Charles D. Fleddermann, "Engineering Ethics", (4<sup>th</sup> ed.) Prentice Hall, 2011,
2. David E. Eberman and Michael S. Shauf, (2003), "Computers, Ethics and Society", (3<sup>rd</sup> ed.) Oxford University Press.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22009</b>	Subject Name <b>COMPUTER NETWORKS</b>						<b>Ty/ Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: NIL						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To gain the knowledge of the network’s functions</li><li>To understand how communication takes place in various mediums</li><li>To learn about the protocols for data communication in the network layers</li><li>To study about the various network algorithms for smooth data communication</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Understand on functions of Network Devices & OSI Layers for Communication											
CO2	Knowledge on IP addresses and protocols.											
CO3	Explain how to avoid the error and congestion on network using algorithms											
CO4	Able to obtain theoretical understanding of data communication and computer networks.											
CO5	Evaluate the challenges in building network and solution to complex problems.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	2	2	2	1	1	1	2	2
CO2	2	1	1	1	2	1	1	1	1	1	1	1
CO3	2	1	1	2	2	1	2	1	1	2	1	1
CO4	2	1	1	2	1	1	1	1	1	2	1	1
CO5	2	1	1	2	1	2	1	2	2	1	2	1
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			3			2			2		
CO2	3			3			2			2		
CO3	3			2			2			1		
CO4	3			2			2			1		
CO5	3			2			2			2		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
				✓								



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22009	COMPUTER NETWORKS	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION

**9 Hrs**

Introduction to computer networks and uses - Network: devices, topology, types - Reference model - The physical layer - The theoretical basis for data communication - Transmission media: Guided and unguided- Public Switched Telephone Network.

### UNIT II DATA LINK LAYER

**9 Hrs**

Data link layer design issues - Error detection and correction - Sliding window protocols- HDLC –Channel access on links: SDMA – TDMA - FDMA – CDMA - ETHERNET - 802.11, 802.16 - Bridges and Switches- Bluetooth

### UNIT III NETWORK LAYER

**9 Hrs**

Network layer design issues - Circuit switching – Packet switching – Virtual circuit switching-Routing algorithms – Congestion control algorithms - Internetworking- Network layer in Internet -IPV6

### UNIT IV TRANSPORT LAYER

**9 Hrs**

Transport layer design issues - Transport protocols - Simple transport protocol - Internet transport protocols UDP, TCP - Flow Control – Congestion control - Congestion avoidance

### UNIT V APPLICATION LAYER

**9 Hrs**

Domain name system - Electronic mail – Introduction to World Wide Web: HTTP, SNMP, Telnet, FTP, RTP.

**Total Hours: 45**

#### TEXT BOOKS:

1. Peterson Davie (2012) Computer Networks - A System Approach (2nd ed.), Morgan Kauffman Harcourt Publishers.
2. James F. Kurose, Keith W. Ross Computer Networking: A Top-Down Approach / Edition 6, Pearson publication, 2012.

#### REFERENCE BOOKS:

1. Andrew S. Tanenbaum. David J. Wetherall, "Computer Networks "5<sup>th</sup> Edition PHI, 2011
2. William Stallings, " Data and computer communications", PHI, 2001
3. Douglas E. Comer, " Internetworking with TCP/IP-Volume-I", PHI, 5th edition 2006
4. Godbole, "Data communication and networking", TMH, 2004.
5. Forouzan B. A., "Data Communications and networking", TMH, 2003.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBOL22I01</b>	Subject Name <b>ONLINE COURSE (NPTEL/ SWAYAM/ Any MOOC approved by AICTE/ UGC)</b>	TY / LB/ ETL/IE	L	T / S.Lr	P/ R	C
	Prerequisite: Related papers	IE	1	0/0	1/0	1

### ONLINE COURSE

Students should register for the online course with a minimum course duration of 4 weeks through the online portals such as NPTEL/SWAYAM/Any MOOC in the beginning of the semester. A mentor will be assigned by the department for monitoring the students.

Students are expected to attend the online classes regularly and submit the weekly assignments before the due dates. Students should appear for the online examination and submit the certificate at the end of the semester. Internal Examination will be conducted by the examiners duly appointed by the head of the department.

**Total Hours: 30**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22L04</b>	Subject Name <b>ENTERPRISE RESOURCE PLANNING LAB</b>	Ty/Lb/ ETL	L	T/ S.Lr	P/R	C
	Prerequisite: Enterprise Resource Planning	<b>Lb</b>	<b>0</b>	<b>0/0</b>	<b>3/0</b>	<b>1</b>

L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits  
Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

### OBJECTIVES :

- To identify the core business process, management activities.
- To identify the automated data update, add modules to meets the need.
- To Understand the SCM and CRM.
- To implement the warehouse management.

### COURSE OUTCOMES (COs) :

<b>CO1</b>	Explain the importance of core business process
<b>CO2</b>	Describe how the management activities are processed
<b>CO3</b>	Construct various UML models (including use case diagrams, class diagrams, interaction diagrams, state chart diagrams, activity diagrams, and implementation diagrams) using the appropriate notation. .
<b>CO4</b>	Recognize the difference between various object relationships: inheritance, association, whole-part, and dependency relationships. .
<b>CO5</b>	Show the role and function of each UML model in developing object-oriented software.

### Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>3</b>
<b>CO2</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>3</b>
<b>CO3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>3</b>
<b>CO4</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>3</b>
<b>CO5</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>3</b>
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
<b>CO1</b>	<b>3</b>			<b>3</b>			<b>3</b>			<b>3</b>		
<b>CO2</b>	<b>3</b>			<b>3</b>			<b>3</b>			<b>3</b>		
<b>CO3</b>	<b>3</b>			<b>3</b>			<b>3</b>			<b>3</b>		
<b>CO4</b>	<b>3</b>			<b>3</b>			<b>3</b>			<b>3</b>		
<b>CO5</b>	<b>3</b>			<b>3</b>			<b>2</b>			<b>3</b>		

### H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project
									✓



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22L04	ENTERPRISE RESOURCE PLANNING LAB	Lb	0	0/0	3/0	1

### EXERCISES

1. Study of case in Sales Order Management
2. Case study in Marketing System
3. Business Accounting System
4. Finance Management System
5. Materials Management System
6. Production Management System
7. Vendors Management System
8. Employee Management System

### SOFTWARE REQUIRED:

Languages: .NET and ASP.NET, Java, Ruby, Python, PHP  
Any Front End (JavaScript, AngularJS, React.js)  
Any Back End (Like Postgre SQL, MSSQL, Oracle SQL)

**Total Hours: 45**





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code: <b>EBIT22L05</b>	Subject Name <b>NETWORK PROGRAMMING LAB</b>						Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C	
	Prerequisite: Computer Networks						Lb	0	0/0	3/0	1	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To get experience on designing an application using TCP and UDP sockets.</li><li>To get experience on designing an interface to transfer a file between two ends using FTP</li><li>To develop a RMI application for specific operation</li><li>To have a knowledge to work with Network Simulators</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
<b>CO1</b>		Ability to design a Socket Programming using TCP and UDP										
<b>CO2</b>		Design Client /Server Application Program										
<b>CO3</b>		Ability to create a Server based application using RMI and RPC concepts.										
<b>CO4</b>		Able to create sockets and analyze different client/server models.										
<b>CO5</b>		Able to demonstrate the installation and configuration of network simulator.										
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	3	3	1	2	1	1	3	2	2
CO2	3	3	3	3	3	1	2	1	1	3	2	2
CO3	3	3	3	3	3	1	2	2	2	2	1	1
CO4	3	3	3	3	3	1	2	1	1	1	2	1
CO5	3	3	2	1	2	3	1	1	1	2	2	1
COs / PSOs		PSO1			PSO2			PSO3			PSO4	
CO1		3			3			3			2	
CO2		3			3			3			3	
CO3		3			2			2			2	
CO4		3			3			3			3	
CO5		3			3			2			1	
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
									✓			



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
<b>EBIT22L05</b>	<b>NETWORK PROGRAMMING LAB</b>	Lb	0	0/0	3/0	1

1. Networking Commands with options. (Case Study).
2. Socket program to extent communication between two deferent ends using TCP.
3. Socket program to extent communication between two deferent ends using UDP
4. Create a Socket (TCP) between two computers and enable file transfer between them.
5. Implementation of RPC in server-client model
6. Implementation of ARP/RARP.
7. HTTP Socket program to download a web page.
8. File transfer in Client-Server architecture using following methods  
a) Using RS232C b) Using TCP/IP
9. To implement RMI (Remote Method Invocation)
10. Write a network program to broadcast/ multicast a message to a group in the same network.
11. Demonstration of Network Simulators.

**Total Hours: 45**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBIT22ET3	Subject Name <b>COMPUTER GRAPHICS AND MULTIMEDIA</b>	Ty/ Lb / ETL	L	T/ S.L r	P/R	C
	Prerequisite: Programming skills in C/C++	ETL	2	0/0	2/0	3

L : Lecture T:Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits  
T/L/ETL : Theory/Lab/Embedded Theory and Lab

### OBJECTIVES :

- To understand the output primitives, two-dimensional graphics and their transformations.
- To design three-dimensional graphics and their transformations.
- To Understand illumination and color models
- To Learn to create animations
- To become familiar with Blender Graphics

### COURSE OUTCOMES (COs) :

CO1	Design and apply two-dimensional graphics and transformations.
CO2	Design and apply three-dimensional graphics and transformations.
CO3	Understand multimedia system architecture and design
CO4	Understand Different types of Multimedia File Format
CO5	Apply hypermedia and design Basic 3D Scenes using Blender

### Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	3	2	2	2	-	1	1	-	-
CO2	2	3	2	3	2	1	2	-	1	1	1	-
CO3	2	3	2	2	2	3	2	-	1	1	1	-
CO4	1	2	2	1	2	1	1	-	1	1	1	-
CO5	2	1	1	2	1	1	2	-	1	1	1	-
COs/PSOs	PSO 1			PSO2			PSO3			PSO4		
CO1	2			1			-			2		
CO2	2			2			-			2		
CO3	2			1			-			2		
CO4	2			1			-			2		
CO5	2			1			-			2		

3/2/1 indicates Strength of Correlation 3- High, 2- Medium, 1-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project
				✓					



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22ET3	COMPUTER GRAPHICS AND MULTIMEDIA	ETL	2	0/0	2/0	3

### UNIT I OUTPUT PRIMITIVES AND TWO-DIMENSIONAL CONCEPTS

**14hrs**

Introduction – Output primitives – points and lines, Line, Curve and ellipse drawing algorithms - CASE STUDY: Implementation of Bresenham's algorithms for line, circle and ellipse drawing – Attributes – Two dimensional geometric transformations –CASE STUDY: perform 2D Transformations such as translation, rotation, scaling, reflection and shearing – Two dimensional clipping and viewing – Input techniques

### UNIT II THREE-DIMENSIONAL CONCEPTS AND COLOR MODELS

**14 Hrs**

Three-dimensional object representations – Three dimensional geometric and modeling transformations-CASES STUDY: To perform 3D Transformations such as translation, rotation and scaling. – Three dimensional viewing – OpenGL Functions for 3D Transformations and 3D Viewing. – Color models- Intuitive color concepts - RGB color model -; Color selection- CASE STUDY: To conversion between color models(YIQ color model - CMY color model - HSV color model - HLS color model).

### UNIT III MULTIMEDIA SYSTEMS DESIGN

**10 Hrs**

An introduction – Multimedia applications – Multimedia system architecture – Evolving technologies for multimedia – Defining objects for multimedia systems – Multimedia data interface standards –Multimedia databases.

### UNIT IV MULTIMEDIA FILE HANDLING

**10Hrs**

Compression and decompression – Data and file format standards – Multimedia I/O technologies –Digital voice and audio – Video image and animation -CASE STUDY: To perform animation using any Animation software – Full motion video – Storage and retrieval technologies. CASE STUDY: To perform basic operations on image using any image editing software.

### UNIT V HYPERMEDIA

**12Hrs**

Multimedia authoring and user interface – Hypermedia messaging – Mobile messaging – Hypermedia message component – Creating hypermedia message – Integrated multimedia message standards –Integrated document management – Distributed multimedia systems, CASE STUDY: BLENDER GRAPHICS Blender Fundamentals – Drawing Basic Shapes – Modelling – Shading & Textures.

**Total Hours: 60**



## **FACULTY OF ENGINEERING AND TECHNOLOGY**

### **LIST OF EXPERIMENTS**

1. Program to implement graphics comments to draw line
2. Program to implement graphics comments to draw all shapes
3. Digital Differential Analyzer Algorithm
4. Bresenham Line drawing Algorithm
5. Bresenham circle drawing algorithm
6. Midpoint Circle Generation Algorithm
7. Ellipse Generation Algorithm
8. 2D Geometric transformations - Translation Rotation Scaling
9. Composite 2D Transformations – General Rotation and Scaling
10. Simple Animations using transformations
11. Key Frame Animation

### **TEXT BOOKS**

1. Donald Hearn and Pauline Baker M, —Computer Graphics", Prentice Hall, New Delhi, 2007.
2. Andleigh, P.K. and Thakrar, K., “Multimedia Systems and Design”, Prentice Hall of India, 2003.

### **REFERENCES**

1. Foley, Vandam, Feiner and Hughes, —Computer Graphics: Principles and Practicell, 2nd Edition, Pearson Education, 2003.
2. Jeffrey McConnell, —Computer Graphics: Theory into Practicell, Jones and Bartlett Publishers,2006.
3. Francis S Hill Jr. and Stephen M Kelley, “Computer Graphics Using OpenGL”, Third Edition, Prentice Hall, 2007
4. Peter Shirley, Michael Ashikhmin, Michael Gleicher, Stephen R Marschner, Erik Reinhard, KelvinSung, and AK Peters, —Fundamentals of Computer Graphicsll, CRC Press, 2010.
5. William M. Newman and Robert F.Sproull, —Principles of Interactive Computer Graphicsll, Mc Graw Hill 1978.<https://www.blender.org/support/tutorials>



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
<b>EBIT22I02</b>	<b>TECHNICAL SKILL II</b>	IE	0	0/0	2/0	1

### OBJECTIVES:

- To make the students expert in domain specific knowledge.
- To develop professionals with idealistic, practical and moral values.
- To facilitate the students with emerging technology.

Students should acquire skill in the domain/inter disciplinary area from government/private training centers/industries /University for a minimum period of 15 calendar days. The training can be through off line, online or mixed mode. Students are supposed to prepare Technical skill report at the end of the training and submit the report along with the certificate in proof of the training, during the viva voce examination conducted by the examiners duly appointed by the head of the department.

**Total Hours : 30**



## **FACULTY OF ENGINEERING AND TECHNOLOGY**

# **VI Semester**





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22010</b>	Subject Name <b>MOBILE COMMUNICATION</b>						<b>Ty/ Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: Knowledge of analog and digital communication systems						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To understand the basic concepts of mobile computing</li><li>To familiarize with the network protocol stack, mobile services and radio interface</li><li>To know the concepts of Wireless LAN, Bluetooth and WiFi Technologies</li><li>To know about various Ad-Hoc networks</li><li>To understand the functionalities of various network layers</li></ul>												
<b>COURSE OUTCOMES (COs) : Students should be able to:</b>												
<b>CO1</b>	Understand the basics of wireless communication											
<b>CO2</b>	Remember and know telecommunication systems and protocols											
<b>CO3</b>	Understand the architecture of Wireless LAN technologies											
<b>CO4</b>	Apply principles of ad hoc networks											
<b>CO5</b>	Illustrate the functionalities of Mobile Transport and Application layers											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	-	2	-	-	-	3	3	-	-	2	-	-
<b>CO2</b>	-	2	-	-	-	3	3	-	-	2	-	-
<b>CO3</b>	-	2	-	-	-	3	3	-	-	2	-	-
<b>CO4</b>	-	2	-	-	-	3	3	-	-	2	-	-
<b>CO5</b>	-	2	-	-	-	3	3	-	-	2	-	-
<b>COs/POs</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
<b>CO1</b>	3			2			-			3		
<b>CO2</b>	3			2			-			3		
<b>CO3</b>	3			2			-			3		
<b>CO4</b>	3			2			-			3		
<b>CO5</b>	3			2			-			3		
<b>H/M/L indicates strength of correlation 3 – High, 2 – Medium, 1 – Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
				✓								



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22010	Mobile Communication	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION TO WIRELESS COMMUNICATIONS

**9 Hrs**

History of Wireless Communication - Introduction to Mobile Computing – Applications of Mobile Computing – Cellular Systems - MAC Protocols – SDMA- TDMA- FDMA- CDMA

### UNIT II MOBILE TELECOMMUNICATION SYSTEM

**9 Hrs**

GSM – Mobile Services – System Architecture – Radio Interface - Protocols – Localization and Calling – Handover - Security – DECT – UMTS and IMT-2000

### UNIT III WIRELESS NETWORKS

**9 Hrs**

Wireless LANs and PANs - Infrastructure and Ad-Hoc Networks – IEEE 802.11 Standard – Blue Tooth – WiFi – WiMAX

### UNIT IV MOBILE NETWORK LAYER

**9 Hrs**

Mobile IP – Dynamic Host Configuration Protocol – Mobile Ad-Hoc Networks – Vehicular Ad Hoc networks (VANET) - Proactive and Reactive Routing Protocols – Security

### UNIT V MOBILE TRANSPORT AND APPLICATION LAYER

**9 Hrs**

Mobile TCP- WAP – Architecture – WDP – WTLS – WTP -WSP – WAE – WTA Architecture – WML

**Total Hours: 45**

### TEXT BOOKS:

1. Jochen Schiller, Mobile Communications, PHI, Second Edition, 2003.
2. Prasant Kumar Pattnaik, Rajib Mall, Fundamentals of Mobile Computing, PHI Learning Pvt.Ltd, New Delhi – 2012

### REFERENCES:

1. Dharma Prakash Agarwal, Qing and An Zeng, “Introduction to Wireless and Mobile systems”, Thomson Asia Pvt Ltd, 2005.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, Principles of Mobile Computing, Springer, 2003.
3. William.C.Y.Lee, Mobile Cellular Telecommunications-Analog and Digital Systems, Second Edition, Tata Mc Graw Hill Edition ,2006.
4. C.K.Toth, AdHoc Mobile Wireless Networks, First Edition, Pearson Education, 2002.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22011</b>	Subject Name <b>EMBEDDED SYSTEMS &amp; IoT</b>	Ty/Lb / ETL	L	T/S. Lr	P/R	C
	Prerequisite: Digital Principles and System Design, Microprocessors and Microcontrollers	Ty	3	0/0	0/0	3

L: Lecture T :Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits  
Ty/Lb/ETL: Theory/Lab/Embedded Theory and Lab

### OBJECTIVES:

- To expose the students about the fundamentals of Embedded System.
- To educate about Firmware design and development.
- To discuss on aspects required in embedded system design techniques.
- To understand the fundamentals of Internet of Things.
- To build a embedded system using Raspberry Pi or equivalent boards and to apply the concept of IoT in the real world scenario.

### COURSEOUTCOMES(COs)

CO1	Explain the concepts of Embedded Systems.
CO2	Describe the Architecture and Programming of Embedded system.
CO3	Understand the Logical Designs of the system.
CO4	Explain the fundamental concepts of IoT
CO5	Practice the implementation of IoT in real world scenarios.

### Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	2	1	1	1	2	2	1	2
CO2	2	2	2	2	2	1	2	2	2	2	1	2
CO3	2	2	2	2	2	2	1	2	3	2	1	2
CO4	2	2	1	2	2	1	1	2	3	2	1	2
CO5	2	3	2	2	2	1	2	2	3	2	3	2

COs /PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			2			1			2		
CO2	3			2			1			2		
CO3	3			2			1			2		
CO4	3			2			1			2		
CO5	3			2			1			2		

3/2/1 indicates Strength of Correlation 3-High, 2-Medium, 1-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project
				✓					



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
<b>EBIT22011</b>	<b>EMBEDDED SYSTEMS &amp; IoT</b>	Ty	3	0/0	0/0	3

### UNIT I FUNDAMENTALS OF EMBEDDED SYSTEMS

**9 Hrs**

Embedded System Vs General Computing System - Classification of Embedded System, Purpose of Embedded system, Quality Attributes of Embedded System -Typical Embedded System- Core of Embedded System, Memory, Sensors and Actuators, Communication Interface- Onboard communication interface, External communication interface.

### UNIT II EMBEDDED FIRMWARE DESIGN AND DEVELOPMENT

**9 Hrs**

Embedded Firmware Design Approaches- Embedded Firmware Development Languages - Embedded System Development Environment - IDE, Compiler, Linker - Types of File Generated on Cross Compilation-Simulator, Emulator and Debugging- Fundamental issues in Hardware Software Co-design- Integration and Testing of Embedded Hardware and Firmware.

### UNIT III EMBEDDED DESIGN TECHNIQUES

**9 Hrs**

Introduction-Characteristics - Physical design - protocols – Logical design – Enabling technologies – IoT Levels – Domain Specific IoTs – IoT vs. M2M. IoT systems management – IoT Design Methodology – Specifications Integration and Application Development.

### UNIT IV FUNDAMENTALS OF IoT

**9 Hrs**

Physical device – Raspberry Pi Interfaces – Programming – APIs / Packages – Web services.Intel Galileo Gen2 with Arduino- Interfaces - Arduino IDE – Programming – APIs and Hacks.Various Real time applications of IoT- Connecting IoT to cloud – Cloud Storage for IoT – Data Analytics for IoT – Software & Management Tools for IoT.

### UNIT V IMPLEMENTATION OF IoT IN REAL WORLD

**9 Hrs**

IoE – Overview – Architecture-Smart objects and LLNs-Secure mobility. Home automation – Cities: Smart parking – Environment: Weather monitoring – Agriculture: Smart irrigation – Data analytics for IoT – Software & management tools for IoT cloud storage models & Communication APIs – Cloud for IoT – Amazon Web Services for IoT.

**Total Hrs: 45**

#### TEXT BOOK:

Embedded System Design, Third Edition – *Peter Marwedel*

#### REFERENCE BOOK:

Designing Embedded Systems and the Internet of Thing (IoT) with the ARM – *Perry Xiao*



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22012</b>	Subject Name <b>DATA WAREHOUSING AND DATA MINING</b>						Ty/Lb/ <b>ETL</b>	<b>L</b>	<b>T/S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: Database Management Systems						Ty	3	0/1	0/0	4	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To provide an overview of the methodologies and approaches to data mining</li><li>To gain insight into the challenges and limitations of data mining techniques and data warehousing</li><li>To applying data mining solutions using common data mining tools</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Understand the difference between Data Warehousing and general databases and understand the architecture of DW and its operations											
CO2	Understand the different steps followed in Data mining and pre-processing techniques using tools											
CO3	Apply Association Rule mining with different methods											
CO4	Understand classifications methods and evaluate their performances											
CO5	Understand cluster methods and apply in tools											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	1	1	2	-	-	1	1	3	1
CO2	3	3	-	3	3	2	-	-	2	2	3	1
CO3	3	3	-	3	3	2	-	-	2	2	3	1
CO4	3	3	-	3	3	2	-	-	3	3	3	3
CO5	3	2	2	3	3	2	2	2	2	1	3	1
COs/ PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			-			-			1		
CO2	3			-			-			3		
CO3	3			-			-			3		
CO4	3			-			-			2		
CO5	3			3			1			2		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
				✓								



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22012	DATA WAREHOUSING AND DATA MINING	Ty	3	0/1	0/0	4

### UNIT I DATA WAREHOUSING

**10 Hrs**

Introduction to Data warehouse, Difference between operational database systems and data warehouses, Data warehouse Characteristics, Data warehouse Architecture and its Components, Extraction- Transformation-Loading, Logical(Multi-Dimensional), Data Modeling, Schema Design, Star and Snow-Flake Schema, Fact Constellation, Fact Table, Fully Addictive, Semi-Addictive, Non Addictive Measures; Fact-Less-Facts, Dimension Table Characteristics; OLAP Cube, OLAP Operations, OLAP Server Architecture-ROLAP, MOLAP and HOLAP.

### UNIT II DATA MINING

**10 Hrs**

**Introduction:** Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or Data Warehouse System, Major issues in Data Mining.

**Data Preprocessing:** Need for Preprocessing the Data, Data Cleaning, Data Integration & Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

### UNIT III ASSOCIATION RULES

**12Hrs**

Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation; APRIORI Algorithm, The Partition Algorithms, FP-Growth Algorithms, Compact Representation of Frequent Item Set- Maximal Frequent Item Set, Closed Frequent Item Set.

### UNIT IV CLASSIFICATION

**14 Hrs**

Problem Definition, General Approaches to solving a classification problem, Evaluation of Classifiers , Classification techniques, Decision Trees-Decision tree Construction, Methods for Expressing attribute test conditions, Measures for Selecting the Best Split, Algorithm for Decision tree Induction ; Naive-Bayes Classifier, Bayesian Belief Networks; K- Nearest neighbor classification-Algorithm and Characteristics, prediction: Accuracy and Error measures, Evaluating the accuracy of a classifier or a predictor, Ensemble methods..

### UNIT V CLUSTERING

**14 Hrs**

Clustering Overview, A Categorization of Major Clustering Methods, partitioning methods, hierarchical methods, , partitioning clustering-k-means algorithm, pam algorithm; hierarchical clustering-agglomerative methods and divisive methods, Basic Agglomerative Hierarchical Clustering Algorithm, Key Issues in Hierarchical Clustering, Strengths and Weakness, Outlier Detection.

**Total Hours: 60**

#### TEXT BOOKS:

1. Data Mining- Concepts and -l.chniques- Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition, 2006.
2. Introduction to Data Mining, Psng-Ning Tan, Vipin Kumar, Michael Steinbach, Pearson Education.

#### REFERENCE BOOKS:

1. Data Mining Techniques, Arun K Pujari, 3rd Edition, Universities Press.
2. Data Warehousing Fundament's, PualrajPonnaiah, Wiley Student Edition.
3. The Data Warehouse Life Cycle Tool kit — Ralph Kimball, Wiley Student Edition.
4. Data Mining, Vikaram Pudi, P Radha Krishna, Oxford University Press.





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22L06</b>	Subject Name <b>EMBEDDED SYSTEMS &amp; IOT LAB</b>						<b>Ty/ Lb/ ETL</b>	<b>L</b>	<b>T/S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: Embedded System and IoT						Lb	0	0/0	3/0	1	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES:</b> <ul style="list-style-type: none"><li>To introduce IoT concepts and techniques and support their ability in designing suitable procedure for a specified scenario</li><li>To employ IoT based solutions for real-world problems.</li><li>To give students knowledge on humanoid PC software, humanoid android App, Arduino.</li><li>To provide the student hand-on experience on to implement various IoT techniques.</li></ul>												
<b>COURSEOUTCOMES(COs):(3-5)</b>												
CO1		Design and implement embedded solution using ARM (LPC2148)										
CO2		Develop applications in 8051 in Keil IDE.										
CO3		Apply solution methods on humanoid PC software, humanoid android App, Arduino										
CO4		Understand the basic concepts of IoT.										
CO5		Design and implement IoT techniques to solve the real world problems										
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	2	1	1	1	2	2	2	2
CO2	2	2	2	2	2	1	2	1	2	2	2	1
CO3	2	2	2	2	2	2	2	1	2	2	2	2
CO4	2	2	2	2	2	2	2	2	2	2	2	2
CO5	2	3	3	3	2	3	3	3	2	2	2	2
COs /PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			2			1			2		
CO2	3			2			1			2		
CO3	3			2			1			2		
CO4	2			2			2			2		
CO5	3			2			2			2		
<b>3/2/1 indicates Strength of Correlation 3-High, 2-Medium, 1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.L r	P/R	C
<b>EBIT22L06</b>	<b>EMBEDDED SYSTEMS &amp; IoT LAB</b>	Lb	0	0/0	3/0	1

### PROGRAMS/ EXPERIMENTS:

1. Programming and Simulation of 8051 in Keil IDE.
2. Alphanumeric LCD interface using 8051.
3. Study of ARM evaluation system.
4. Flashing of LEDs using ARM (LPC2148)
5. Interfacing keyboard and LCD using ARM (LPC2148).
6. Temperature sensor interface using ARM (LPC2148).
7. Study of FPGA evaluation system.
8. Design of logic gates using FPGA.
9. Design of UP/Down counter using FPGA
10. Interfacing EPROM and interrupt.
11. Interrupt performance characteristics of ARM and FPGA.
12. Control raspberry Pi using local server.
13. Raspberry Pi as Server
14. Transfer data using serial communication.

**Total Hours: 45**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22L07</b>	Subject Name <b>DATA MINING LAB</b>						Ty/Lb/ ETL	L	T/S.Lr	P/R	C	
	Prerequisite: Data Warehousing and Data Mining						Lb	0	0/0	3/0	1	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL: Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES:</b> <ul style="list-style-type: none"><li>To learn to perform data mining tasks using a data mining toolkit (such as open source WEKA).</li><li>To understand the data sets and data preprocessing.</li><li>To demonstrate the working of algorithms for data mining tasks such as association rule mining, Classification, clustering and regression.</li><li>To evaluate the data mining techniques with varied input values for different parameters.</li><li>To obtain Practical Experience Working with all real data sets.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Understand the different steps followed in Data mining and pre-processing techniques using tools											
CO2	Apply Association Rule mining and Clustering approaches in data set											
CO3	Apply classification algorithm and its methods in data set											
CO4	Evaluate the different algorithm in classification and cluster											
CO5	Case study using datasets.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO12
CO1	1	2	2	2	3	-	-	-	1	1	-	-
CO2	2	2	2	2	2	-	-	-	1	1	-	-
CO3	2	2	2	2	2	-	-	-	1	1	-	-
CO4	2	2	2	2	2	-	-	-	1	1	-	-
CO5	2	2	2	2	2	-	-	-	1	1	-	-
COs /PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	1			-			-			1		
CO2	2			-			-			2		
CO3	2			-			-			2		
CO4	2			-			-			2		
CO5	2			-			-			2		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
									✓			



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22L07	DATA MINING LAB	Lb	0	0/0	3/0	1

### EXPERIMENTS

1. Creating CSV file and convert to ARFF file
2. ARFF file to CSV file
3. Pre-Processes Techniques on Data Set
4. process a given dataset based on Handling Missing Values
5. Generate Association Rules using the Apriori Algorithm
6. Generating association rules using fp growth algorithm
7. Build a Decision Tree by using J48 algorithm
8. Naïve bayes classification on a given data set
9. Applying k-means clustering on a given data set
10. Comparison of different classification algorithm using with any data set
11. Comparison of different cluster algorithm using with any data set
12. Calculating Information gains measure OLAP Cube and its different operations
13. Case Study: Create Student. ariff file to suggest better college using Decision tree
14. Case Study: Create Placement. ariff file to identify the students who are eligible for placements using KNN

**Total Hours: 45**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBCC22I07</b>	Subject Name <b>Soft Skill II (Qualitative and Quantitative Skills)</b>					<b>Ty/ Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>
	Prerequisite: Nil					IE	0	0/0	3/0	1
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab										
<b>OBJECTIVE:</b> <ul style="list-style-type: none"><li>To understand the Basic concepts in Logical Reasoning</li><li>To understand the Basic concepts in Arithmetical Reasoning</li><li>To understand the Basic concepts in Data Interpretation</li></ul>										
<b>COURSE OUTCOMES (COs) :</b>										
CO1	Understand the basic concepts of Logical Statements and Arguments									
CO2	Understand the concept of Logical conclusions									
CO3	Understand the Basic concepts in Number system									
CO4	Understand the basic concepts of Permutations and Combinations									
CO5	Learn how to analyze the data using Pictorial representation									
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>										
<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	
<b>CO1</b>	3	2	3	3	3	2	1	2	3	
<b>CO2</b>	2	3	2	3	3	2	1	2	2	
<b>CO3</b>	3	2	3	2	3	1	2	1	3	
<b>CO4</b>	3	1	2	3	2	3	3	2	2	
<b>CO5</b>	3	2	3	2	3	2	1	2	3	
<b>COs / PSO3s</b>		<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>		
<b>CO1</b>		3			2			3		
<b>CO2</b>		2			3			3		
<b>CO3</b>		3			2			3		
<b>CO4</b>		2			3			3		
<b>CO5</b>		3			2			3		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>										
<b>Category</b>	<b>Basic Sciences</b>	<b>Engineering Sciences</b>	<b>Humanities and Social Sciences</b>	<b>Program Core</b>	<b>Program Electives</b>	<b>Open Electives</b>	<b>Interdisciplinary</b>	<b>Skill component</b>	<b>Practical / Project</b>	
								✓		



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBCC22I07	Soft Skill II (Qualitative and Quantitative Skills)	IE	0	0/0	3/0	1

### UNIT 1                      Logical Reasoning I 9 Hrs

Logical Statements – Arguments – Assumptions – Courses of Action.

### UNIT 2                      Logical Reasoning II 9 Hrs

Logical conclusions – Deriving conclusions from passages – Theme detection.

### UNIT 3                      Arithmetical Reasoning I 9 Hrs

Number system – H.C.F & L.C.M – Problem on ages – Percentage – Profit & Loss – Ratio & Proportion – Partnership.

### UNIT 4                      Arithmetical Reasoning II 9 Hrs

Time & Work – Time & Distance – Clocks – Permutations & Combinations – Heights & Distances – Odd man out and Series.

### UNIT 5                      Data Interpretation 9 Hrs

Tabulation – Bar graphs – Pie graphs – Line graphs.

**Total Hours: 45**

#### Reference Book:

- ❖ R.S.Agarwal, A modern approach to Logical Reasoning, S.Chand& Co., (2017).
- ❖ R.S.Agarwal, A modern approach to Verbal and Non verbal Reasoning, S.Chand& Co., (2017).
- ❖ R.S.Agarwal, Quantitative Aptitude for Competitive Examinations, S.Chand& Co., (2017).
- ❖ A.K.Gupta, Logical and Analytical Reasoning, Ramesh Publishing House, (2014).
- ❖ B.S.Sijwali, Indusijwali, A new approach to Reasoning (Verbal and Non verbal), Arihant Publishers,(2014).



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
<b>EBIT22I03</b>	<b>TECHNICAL SKILL III</b>	IE	0	0/0	2/0	1

### OBJECTIVES:

- To make the students expert in domain specific knowledge.
- To develop professionals with idealistic, practical and moral values.
- To facilitate the students with emerging technology.

Students should acquire skill in the domain/inter disciplinary area from government/private training centers/industries /University for a minimum period of 15 calendar days. The training can be through off line, online or mixed mode. Students are supposed to prepare Technical skill report at the end of the training and submit the report along with the certificate in proof of the training, during the viva voce examination conducted by the examiners duly appointed by the head of the department.

**Total Hours: 30**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22I04</b>	Subject Name <b>MINI PROJECT / INTERNSHIP</b>						<b>Ty/ Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite : NIL						IE	0	0/0	3/0	1	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVE :</b> To provide a short-term work experience in an Industry/ Company/ Organization												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Get an insight of an industry / organization/company pertaining to the domain of study.											
CO2	Acquire skills and knowledge for a smooth transition into the career.											
CO3	Gain field experience and get linked with the professional network.											
CO4	Apply knowledge and skill in specific problem											
CO5	Take challenges of exam work											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	1	1	1	2	2	2	2	2	2	2
CO2	-	-	1	2	-	2	2	2	2	2	2	1
CO3	-	-	1	2	2	2	2	2	2	2	2	1
CO4	-	-	-	2	1	2	2	2	2	2	2	1
CO5	-	-	-	1	1	2	2	2	2	2	2	1
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	1			2			2			2		
CO2	1			2			2			2		
CO3	1			2			2			2		
CO4	1			2			2			2		
CO5	1			2			2			2		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
								✓				





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
<b>EBIT22I04</b>	<b>MINI PROJECT / INTERNSHIP</b>	IE	0	0/0	3/0	1

### MINI PROJECT:

Students will have an opportunity to expose their knowledge and talent to make an innovative project. Students are supposed to do innovative projects useful to industries/society in the area of relevant Engineering, inter and multi-disciplinary areas, under the guidance of a staff member. They have to prepare a project report and submit to the department.

At the end of the semester Viva-Voce examination will be conducted by the internal Examiner duly appointed by the Head of the department and the students will be evaluated.

### INTERNSHIP

Students are supposed to undergo internship in related Industries for a minimum period of 30days cumulatively during the semester. They have to prepare a report on the Internship with a certificate in proof from competent authority in the industry. At the end of the semester Viva-Voce examination will be conducted by the Examiners duly appointed by the Head of the department and the students will be evaluated.

**Total Hours: 45**



## **FACULTY OF ENGINEERING AND TECHNOLOGY**

# **VII Semester**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb / ETL	L	T/ S.Lr	P/R	C						
EBIT22013	CLOUD COMPUTING											
	Prerequisite: Computer Networks, Operating	Ty	3	0/0	0/0	3						
L : Lecture T:Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES:</b> <ul style="list-style-type: none"><li>To learn Cloud computing infrastructure and services.</li><li>To acquire knowledge about cloud storage.</li><li>To understand cloud computing security and advanced applications.</li><li>To test web application in cloud platform.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Understand the characteristics and application of cloud computing											
CO2	Describe the cloud services and their software platforms											
CO3	Understand the architecture and data structure of cloud application.											
CO4	Design the efficient flexible cloud applications.											
CO5	Apply the advance cloud computing applications and recognize the importance of cloud security											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	2	-	1	2	2	2	2	2	1	2
CO2	1	1	2	-	1	2	2	2	3	2	2	2
CO3	1	1	2	-	2	2	2	2	3	2	1	2
CO4	1	2	3	-	3	3	3	3	3	2	3	2
CO5	1	2	3	-	2	2	2	2	2	2	3	2
COs/ PSOs	PSO 1			PSO2			PSO3			PSO4		
CO1	1			1			2			2		
CO2	1			2			2			2		
CO3	1			1			2			2		
CO4	1			3			3			2		
CO5	1			2			2			2		
H/M/L indicates Strength of Correlation 3- High, 2- Medium,1-Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
				✓								



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22013	CLOUD COMPUTING	Ty	3	0/0	0/0	3

### UNIT I CLOUD COMPUTING INTRODUCTION

9 Hrs

Introduction - Characteristics – cloud models – cloud services – cloud based services and applications – virtualization –Load balancing – deployment – replication – monitoring – MapReduce – Identity and Access management.

### UNIT II CLOUD SERVICES AND PLATFORMS

9 Hrs

Compute services – storage services – database services – application services – content delivery services – analysis services – Deployment & management services – identity and Access management services –open source private cloud software – Hadoop MapReduce job execution – Hadoop schedulers – Hadoopcluster setup

### UNIT III CLOUD APPLICATION DESIGN & PYTHON

9 Hrs

Design consideration for cloud applications –reference architecture for cloud applications –cloud application design methodologies - data storage approaches –Python data types & data structures –control flow –functions –modules –packages –file handling –classes

### UNIT IV CLOUD APPLICATION DEVELOPMENT

9 Hrs

Concept of a file - access methods - directory structure - file system mounting - file sharing - protection. File system implementation: file system structure - file system implementation - directory implementation - allocation methods - free-space management - efficiency and performance - comparison of UNIX and windows.

### UNIT V ADVANCED APPLICATIONS

9 Hrs

Clustering Big Data – Classification of Big Data – multimedia cloud – Streaming protocols – cloud application benchmarking and tuning – workload characteristics – application performance matrix – design consideration – benchmarking tools- deployment prototyping – CSA cloud security architecture – authentication – authorization – data security – auditing.

**Total Hours: 45**

#### TEXT BOOK:

1. ArshdeepBahga et al, “Cloud computing a hands-on approach” Universities press - 2014
2. Anthony T.Velte et al, “Cloud Computing A Practical Approach” Tata McGraw-Hill – 2013
3. Zaigham Mahmood et al, “Cloud Computing Concept Technology Architecture” Pearson,2014.

#### REFERENCE BOOKS:

1. Barrie Sosinsky, “Cloud Computing Bible” Wiley India Publication – 2011
2. Rishabh Sharma “Cloud Computing Fundamentals, Industry Approach and Trends” Wiley – 2015.
3. David Crookes “Cloud Computing in easy steps” McGraw Hill – 2012



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22014</b>	Subject Name <b>SOFTWARE TESTING</b>					<b>Ty/ Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>		
	Prerequisite: Programming Knowledge					Ty	3	0/0	0/0	3		
L : Lecture T:Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To evaluate the work products such as requirements, design , user stories, and code in software development.</li><li>To validate the test object and working status as per the expectation of the users and the stakeholders.</li><li>To evaluate and ensure confidence in the quality level of the test object.</li><li>To prevent defects in the software product.</li><li>To provide sufficient information to stakeholders to allow them to make informed decision, especially regarding the level of quality of the test object.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Understand the various defects and Test Processes											
CO2	Apply various testing technique to design a test strategy.											
CO3	Understand various levels of testing.											
CO4	Analyze the issues on the product by the results and reports											
CO5	Understand the automated testing strategies.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	-	-	1	1	1	-	-	-	-	-
CO2	3	2	-	-	1	1	1	2	-	-	-	-
CO3	2	1	-	-	1	1	1	2	-	-	-	-
CO4	3	3	1	-	1	1	1	2	-	2	-	-
CO5	2	1	-	-	1	1	1	2	-	2	-	-
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	1			1			1			-		
CO2	1			1			1			-		
CO3	1			1			1			-		
CO4	1			1			1			-		
CO5	1			1			1			-		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium,1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
				✓								



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22014	SOFTWARE TESTING	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION

9 Hrs

Testing as an Engineering Activity – Testing as a Process – Testing Maturity Model- Testing axioms – Basic definitions – Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Cost of defects – Defect Classes – The Defect Repository and Test Design –Defect Examples- Developer/Tester Support of Developing a Defect Repository

### UNIT II TEST CASE DESIGN STRATEGIES

9 Hrs

Test case Design Strategies – Using Black Box Approach to Test Case Design – Boundary Value Analysis – Equivalence Class Partitioning – State based testing – Cause-effect graphing – Compatibility testing – user documentation testing – domain testing – Random Testing – Requirements based testing – Using White Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing – Coverage and Control Flow Graphs – Covering Code Logic – Paths – code complexity testing – Additional White box testing approaches- Evaluating Test Adequacy Criteria.

### UNIT III LEVELS OF TESTING

9 Hrs

The need for Levels of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – Scenario testing – Defect bash elimination System Testing – Acceptance testing – Performance testing – Regression Testing – Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – Testing OO systems – Usability and Accessibility testing – Configuration testing –Compatibility testing – Testing the documentation – Website testing.

### UNIT IV TEST MANAGEMENT

9 Hrs

People and organizational issues in testing – Organization structures for testing teams – testing services – Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process – Reporting Test Results – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group- The Structure of Testing Group- .The Technical Training Program.

### UNIT V TEST AUTOMATION

9 Hrs

Software test automation – skills needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation – Test metrics and measurements – project, progress and productivity metrics.

**Total Hours: 45**

### TEXT BOOKS:

1. Srinivasan Desikan and Gopalaswamy Ramesh, Software Testing – Principles and Practices, Pearson Education, 2006.
2. Ron Patton, Software Testing, Second Edition, Sams Publishing, Pearson Education, 2007.
3. AU Library.com

### REFERENCES:

1. Ilene Burnstein, Practical Software Testing, Springer International Edition, 2003.
2. Edward Kit, Software Testing in the Real World – Improving the Process, Pearson Education, 1995.
3. Boris Beizer, Software Testing Techniques – 2nd Edition, Van Nostrand Reinhold, New York, 1990.
4. Aditya P. Mathur, Foundations of Software Testing \_ Fundamental Algorithms and Techniques, Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBIT22015	Subject Name CRYPTOGRAPHY AND NETWORK SECURITY							Ty/ Lb/ ETL	L	T/ S.Lr	P/ R	C
	Prerequisite: Computer Networks							Ty	3	0/0	0/0	3
L : Lecture T:Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVES: <ul style="list-style-type: none"><li>To understand the cryptography techniques, algorithms and systems</li><li>To acquire knowledge about message authentications and security.</li><li>To understand the mechanisms in order to secure computer system and computer network.</li></ul>												
COURSE OUTCOMES (COs) :												
CO1	Understand the basic cryptographic encryption and decryption techniques.											
CO2	Understand the public key and private key cryptographic algorithms and methods.											
CO3	Ensure the message security by authentication and hash functions algorithms											
CO4	Design the network security mechanisms.											
CO5	Know the firewalls mechanism for system level security.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	2	-	-	-	-	-	-	-	2
CO2	2	3	-	-	-	-	-	-	-	-	-	2
CO3	2	3	-	-	-	-	-	-	-	-	-	2
CO4	1	2	-	-	-	-	-	-	-	-	-	2
CO5	2	1	-	-	-	-	-	-	-	-	-	2
COs/PSOs	PSO 1			PSO2			PSO3			PSO4		
CO1	2			-			-			2		
CO2	2			-			-			2		
CO3	2			-			-			2		
CO4	2			-			-			2		
CO5	2			-			-			2		
H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
				✓								





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22015	CRYPTOGRAPHY AND NETWORK SECURITY	Ty	3	0/0	0/0	3

### UNIT I FUNDAMENTALS

**10 Hrs**

OSI security architecture – Classical encryption techniques – Cipher principles – Data encryption standard – Block cipher design principles and modes of operation – Evaluation criteria for AES – AES cipher – Triple DES – Placement of encryption function – Traffic confidentiality.

### UNIT II PUBLIC KEY CRYPTOGRAPHY

**10 Hrs**

Key management – Diffie-Hellman key exchange – Elliptic curve architecture and cryptography – Introduction to number theory – Confidentiality using symmetric encryption – Public key cryptography and RSA.

### UNIT III AUTHENTICATION AND HASH FUNCTION

**9 Hrs**

Authentication requirements – Authentication functions – Message authentication codes -Kerberos– Hash Functions – Security of hash functions and MACS – MD5 message digest Algorithm – Secure hash algorithm (SHA)-SHA 3 – Ripend – HMAC digital signatures – Authentication protocols – Digital signature standard.

### UNIT IV NETWORK SECURITY

**8 Hrs**

Overview-Security Methodology–Virtual Private Network Security-Wireless Network Security-Electronic mail security –DNS Security– Web Server security.

### UNIT V SYSTEM LEVEL SECURITY

**8 Hrs**

Intrusion detection Systems – Password management – Viruses and related threats – Virus counter measures – Firewalls– Trusted systems-Database Security

**Total Hours: 45**

#### TEXT BOOK:

1. William Stallings, “*Cryptography and Network Security - Principles and Practices*”, 3rd Edition, Prentice Hall of India, 2003.
2. Maiwald, “*Fundamentals of Network Security*”, Wiley Students Edition, 2006.
3. Roberta Bragg, Mark Phodes-Ousely, Keith Strassberg, “*Network Security: The Complete Reference*”, Indian Edition, McGraw Hill Education, 2016.

#### REFERENCE BOOKS:

1. Atul Kahate, “*Cryptography and Network Security*”, Tata McGraw - Hill, 2003.
2. Bruce Schneier, “*Applied Cryptography*”, John Wiley and Sons Inc, 2001.
3. Pfleeger, C.B., and Shari Lawrence Pfleeger, “*Security in Computing*”, 3rd Edition, Pearson Education, 2003.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name <b>WEB TECHNOLOGY AND WEB SERVICES</b>						Ty/Lb/ETL	L	T/ S.Lr	P/R	C	
EBIT22016	Prerequisite: Java Programming						Ty	3	0/1	0/0	4	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
<b>OBJECTIVES:</b> <ul style="list-style-type: none"><li>To understand about client-server communication and protocols used.</li><li>To gain knowledge about the HTML and CSS3</li><li>To design interactive web pages using Scripting languages.</li><li>To learn server side programming using servlets and JSP.</li><li>To develop dynamic web pages and basic applications on web pages.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b> Students completing the course were able to												
CO1	Understand website basics and client-server communication.											
CO2	Develop dynamic web pages using HTML and CSS											
CO3	Understand fundamentals of Client Side Scripting and Server Side Scripting.											
CO4	Understand the concept of Web service including SOAP.											
CO5	Design own user interactive web pages and host the website.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	2	2	-	2	-	-	3	3	-	1
CO2	-	-	2	2	-	3	-	-	3	3	-	2
CO3	-	-	2	2	-	2	-	-	3	3	-	2
CO4	-	-	2	2	-	2	-	-	3	3	-	2
CO5	-	-	2	2	-	3	-	-	3	3	-	2
COs/ POs	PSO1			PSO2			PSO3			PSO4		
CO1	-			3			-			3		
CO2	-			3			-			3		
CO3	-			3			-			3		
CO4	-			3			-			3		
CO5	-			3			-			3		
<b>H/M/L indicates strength of correlation 3 – High, 2 – Medium, 1 – Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
				✓								



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22016	WEB TECHNOLOGY AND WEB SERVICES	Ty	3	0/1	0/0	4

### UNIT I **WEB SITE BASICS AND HTML** 12 Hrs

Web Essentials: Clients, Servers, and Communication: The Internet - Basic Internet Protocols - The World Wide Web - HTTP Request message – HTTP Response message - Web Clients - Web Servers. Markup Languages: An Introduction to HTML – History and Versions - Some Fundamental HTML Elements - Relative URLs – Lists – Tables – Frames - Forms.

### UNIT II **CSS** 11 Hrs

Style Sheets: Introduction to Cascading Style Sheets - CSS Features - Core Syntax - Style Sheets and HTML - Style Rule Cascading and Inheritance - Text Properties – CSS Box Model - Normal Flow Box Layout - Beyond the Normal Flow.

### UNIT III **CLIENT SIDE SCRIPTING** 12 Hrs

Client-Side Programming: The JavaScript Language - History and Version of JavaScript - Introduction to JavaScript - JavaScript in Perspective – Literals – Functions – Objects – Arrays - Built-in Objects -JavaScript Debuggers.

### UNIT IV **SERVER SIDE SCRIPTING** 13 Hrs

Java Servlets: Servlet Architecture Overview – A “Hello World!” Servlet – Servlets Generating Dynamic Content – Servlet Life Cycle – Parameter Data – Sessions – Cookies. Introduction to Java Server Page (JSP) – JSP and Servlets – Running JSP Applications – Basic JSP - JavaBeans Classes and JSP.

### UNIT V **SOAP AND CASE STUDIES** 12 Hrs

Overview of SOAP - HTTP – XML - RPC - Introduction to SGML - COM – DCOM – CORBA.  
Case Studies: Creating web pages using HTML & CSS - Client Side Scripting for Validating Web Form Controls – Creating JSP Application - Creating a blog.

**Total Hours: 60**

#### TEXT BOOKS:

- Jeffrey. C. Jackson, “Web Technologies – A Computer Science Perspective”, Pearson Education, 2006

#### REFERENCE BOOKS

- Thomas A Powell, “The Complete Reference: HTML & CSS”, McGraw Hill, Fifth Edition.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBIT22L08	Subject Name WEB TECHNOLOGY AND WEB SERVICES LAB							Ty/Lb/ ETL	L	T/ S.Lr	P/R	C
	Prerequisite: Web Technology and Web services							Lb	0	0/0	3/0	1
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVE : <ul style="list-style-type: none"><li>To learn about to develop an own web site.</li><li>To have knowledge to design webpage using CSS.</li><li>To have knowledge to design a dynamic web site using XML and XSLT.</li><li>To learn and develop to design mail communication.</li></ul>												
COURSE OUTCOMES (COs) :												
CO1		Ability to design a basic website using HTML and CSS										
CO2		Design user interactive web pages using forms										
CO3		Develop RMI and RPC application.										
CO4		Utilize XML, Schema, and XSLT for Data Representation and Transformation										
CO5		Create Web Applications Using ASP.NET and JSP for Data Management										
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	1	3	2	1	1	3	2	3	3
CO2	2	3	2	2	3	3	2	1	3	2	3	3
CO3	2	2	2	2	3	2	2	1	3	2	3	3
COs / PSOs		PSO1			PSO2			PSO3			PSO4	
CO1		2			2			1			3	
CO2		2			3			1			3	
CO3		2			2			1			3	
H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
									✓			



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22L08	WEB TECHNOLOGY AND WEB SERVICES LAB	Lb	0	0/0	3/0	1

1. Create a web page with the following using HTML
  - i) To embed an image map in a web page
  - ii) To fix the hot spots
  - iii) Show all the related information when the hot spots are clicked.
2. Create a web page with all types of Cascading style sheets.
3. Client Side Scripts for Validating Web Form Controls using DHTML
4. Write a program in Java to create applets incorporating the following features:
  - i. Create a color palette with matrix of buttons Set background and foreground of the control text area by selecting a color from color palette.
  - ii. In order to select Foreground or background use check box control as radio buttons
  - iii. To set background images
5. Programs using XML – Schema – XSLT/XSL
6. Create a Web form for an online library. This form must be able to accept the Membership Id of the person borrowing a book, the name and ID of the book, and the name of the book's author. On submitting the form, the user (the person borrowing the book) must be thanked and informed of the date when the book is to be returned. You can enhance the look of the page by using various ASP.NET controls.
7. Create a JSP application. Send a simple E-Mail to your friends
8. Consider a case where we have a web Service- an airline service and a travel agent and the travel agent is searching for an airline. Implement this scenario using Web Services and Data base.

**Total Hours: 45**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22ET4</b>	Subject Name <b>MOBILE APPLICATION DEVELOPMENT</b>						<b>Ty/Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: Python Programming, Java Programming, Web Technology and Web services						ETL	2	0/0	2/0	3	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To Understand the limitations and challenges of working in a mobile and wireless environment</li><li>To Apply the different types of application models/architectures used to develop mobile software applications.</li><li>To describe the components and structure of mobile development frameworks.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b> Students completing the course were able to												
<b>CO1</b>	Understand the various Mobile Platforms and analyze its architectures											
<b>CO2</b>	Apply user interface concepts for application development											
<b>CO3</b>	Illustrate platform for Google Android											
<b>CO4</b>	Illustrate platform for Apple iPhone											
<b>CO5</b>	Develop own mobile application											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/ POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	2	1	2	-	-	1	1	2	1	1	-	2
<b>CO2</b>	2	1	2	-	-	1	1	2	1	1	-	2
<b>CO3</b>	2	1	2	-	-	1	1	2	1	1	-	2
<b>CO4</b>	2	1	2	-	-	1	1	2	1	1	-	2
<b>CO5</b>	3	2	3	-	-	1	2	3	2	1	-	2
<b>COs/P Os</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
<b>CO1</b>	2			2			-			3		
<b>CO2</b>	2			2			-			3		
<b>CO3</b>	2			2			-			3		
<b>CO4</b>	2			2			-			3		
<b>CO5</b>	2			2			-			3		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium,1-Low</b>												
<b>Category</b>	<b>Basic Sciences</b>	<b>Engineering Sciences</b>	<b>Humanities and Social Sciences</b>	<b>Program Core</b>	<b>Program Electives</b>	<b>Open Electives</b>	<b>Interdisciplinary</b>	<b>Skill component</b>	<b>Practical / Project</b>			
				✓								



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22ET4	MOBILE APPLICATION DEVELOPMENT	ETL	2	0/0	2/0	3

### UNIT I INTRODUCTION

**12 Hrs**

Introduction to Mobile Platforms – Exploring Android Platform – Android Studio, Java, XML – Exploring Apple iPhone Platform – XCode, Objective C, Swift – Options for development

### UNIT II USER INTERFACE (UI) DEVELOPMENT FOR MOBILE APPS

**12 Hrs**

UI Elements – User Interface Frameworks – Layouts – Gesture based interfaces – Applying Styles & Themes – Adding Settings.

### UNIT III GOOGLE ANDROID PLATFORM

**12 Hrs**

Google Application Architecture – Basic Building Blocks - The Android Emulator – Event based programming – SQLite Database Access – ADB – Location based Services

### UNIT IV APPLE IPHONE PLATFORM

**12 Hrs**

UI Kit for Interfaces - Event Handling and Graphics Services – SQLite Database Access – Application Debugging – Location Handling.

### UNIT V IMPLEMENTING SOFTWARE AS A SERVICE

**12 Hrs**

Service Oriented Computing Examples – Google Maps – Enabling Map based services in Application – Amazon Web Services – Exploring AWS S3 & AWS IoT APIs

**Total Hours: 60**

### LIST OF EXPERIMENTS

1. Develop An Application That Uses Gui Components, Font And Colours (unit 2)
2. Develop An Application That Uses Layout Managers And Event Listeners(unit 3)
3. Develop A Native Calculator Application(unit 3)
4. Write An Application That Draws Basic Graphical Primitives On The Screen In Android (unit 3)
5. Develop An Application That Makes Use Of Database (unit 3)
6. Develop A Native Application That Uses GPS Location Information (unit 5)
7. Develop A Mobile Application For Simple Needs (Mini Project)

### TEXT BOOKS:

1. Ed Burnette (2015) Hello, Android: Introducing Google's Mobile Development Platform, 4th edition, Pragmatic Bookshelf.

### REFERENCE BOOKS:

1. Richard Rodger (2012) Beginning Mobile application development in the cloud, Wrox Publication.
2. Jonathan A. Zdziarski (2008), iPhone Open Application Development, 2nd edition, O'Reilly Media Publication.





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22I05</b>		Subject Name <b>PROJECT PHASE - I</b>						Ty/Lb/ <b>ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>
		Prerequisite: NIL						IE	0	0/0	3/3	2
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES:</b> The objective of the Main Project is to culminate the academic study and provide an opportunity to explore a problem or issue, address through focused and applied research under the direction of a faculty mentor. The project demonstrates the student's ability to synthesize and apply the knowledge and skills acquired to real-world issues and problems. This project affirms the students to think critically and creatively, find an optimal solution, make ethical decisions and to present effectively.												
<b>COURSE OUTCOMES (COs):</b>												
CO1	Apply the knowledge and skills acquired in the course of study addressing a specific problem or issue.											
CO2	Encourage students to think critically and creatively about societal issues and develop user friendly and reachable solutions											
CO3	Refine research skills and demonstrate their proficiency in communication skills.											
CO4	Take on the challenges of teamwork, prepare a presentation and demonstrate the innate talents.											
CO5	Equip the students with industry knowledge and understanding of various possible technologies											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	3	3	-	3	3	1	2	2	1	1
CO2	1	1	3	3	-	3	3	2	2	2	1	1
CO3	1	1	3	3	-	3	3	2	2	2	1	1
CO4	1	1	3	3	-	3	2	3	3	2	1	1
CO5	2	2	2	2	2	2	3	2	2	2	1	2
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	2			3			2			2		
CO2	2			3			2			2		
CO3	2			3			2			2		
CO4	2			3			2			2		
CO5	3			2			3			2		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
									✓			



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
<b>EBIT22I05</b>	<b>PROJECT PHASE – I</b>	IE	0	0/0	3/3	2

Students are expected to do the Project in a group of 3 to 4 students. They should identify the area/topic of the Project and should collect the literatures related to the project. Students intending to do Industrial projects will approach the industries with the support of the university, identify the industrial problem and finalize the project. In case of Industrial projects apart from Industry guide, a guide has to be appointed by the department. At the end of the Semester the students should submit their Project Phase - I report to the Department and Viva -Voce examination will be conducted by the examiners duly appointed by the Head of the department.

**Total Hours: 45**



## **FACULTY OF ENGINEERING AND TECHNOLOGY**

# **VIII SEMESTER**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBCC22ID2</b>	Subject Name <b>PRINCIPLES OF MANAGEMENT AND BEHAVIORAL SCIENCE</b>							Ty/Lb/ ETL	L	T/ SLr	P/R	C
	Prerequisite: Nil							Ty	3	0/0	0/0	3
L:Lecture T:TutorialSLr:SupervisedLearningP:ProjectR:ResearchC:CreditsT/L/ETL: Theory/Lab./Embedded Theory and Lab.												
<b>OBJECTIVE:</b> <ul style="list-style-type: none"><li>• About the evolution, functions and principles of Management Studies</li><li>• The applications of the principles in an organization</li><li>• The system and process of effective controlling in the organization.</li></ul>												
<b>COURSEOUTCOMES(COs): The student will be able to</b>												
<b>CO1</b>	Clear understanding in planning, and have knowledge in aspect of Management Studies											
<b>CO2</b>	Understanding the planning process in the organization.											
<b>CO3</b>	Understanding the concept of organization.											
<b>CO4</b>	Demonstrate the ability to directing and coordinating.											
<b>CO5</b>	Analyze and formulate the best control methods.											
<b>Mapping of Course Outcomes (COs)with Program Outcomes ( POs) &amp;Program Specific Outcomes (PSOs)</b>												
<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	3	2	2	3	-	2	-	3	3	2	3	2
<b>CO2</b>	3	2	2	3	-	2	-	3	2	3	-	2
<b>CO3</b>	3	-	-	2	-	-	3	2	-	2	2	2
<b>CO4</b>	3	3	3	3	-	2	-	2	2	2	2	2
<b>CO5</b>	2	3	3	-	3	3	3	2	3	2	2	2
<b>COs /PSOs</b>		<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>	
<b>CO1</b>		-			2			3			3	
<b>CO2</b>		-			2			3			3	
<b>CO3</b>		-			2			3			3	
<b>CO4</b>		-			2			3			3	
<b>CO5</b>		-			2			3			3	
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
							✓					



## FACULTY OF ENGINEERING AND TECHNOLOGY

SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/S Lr	P/R	C
EBCC22ID2	PRINCIPLES OF MANAGEMENT AND BEHAVIORAL SCIENCE	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION

**9 Hrs**

Definition of Management – Science or Art – Manager Vs Entrepreneur - types of managers - managerial roles and responsibilities – Evolution of Management –need and Importance of Organizational Behavior, Leadership styles – Theories – Leaders Vs Managers.

### UNIT II PLANNING & ORGANISING

**9 Hrs**

Nature and purpose of planning – planning process – types of planning – Planning premises objectives – hierarchy of objectives, Management By Objectives (MBO)— Decision making process. Nature and purpose of Formal and informal organization structure– types – Line and staff authority– delegation of authority – centralization and decentralization.

### UNIT III STAFFING AND COORDINATING

**9 Hrs**

Human Resource Planning, Job Analysis, Recruitment, Selection, Training and Development, Performance Management, Career planning. Coordination –Nature and purpose - Coordination at various levels: Top management, Middle management, Supervisory management and workers. Techniques for effective coordination

### UNIT IV DIRECTING AND CONTROLLING

**9 Hrs**

Direction: Principles of direction – Need and Importance for directing, process of controlling – budgetary and non-budgetary control techniques – use of technology. Recent Trends in Management controlling.

### UNIT V GROUP BEHAVIOUR AND MOTIVATION

**9 Hrs**

Group Dynamics - How Groups Work, Stages of Group Development, Team building, Motivation – Theories of motivation Organizational Conflict – Causes – Types of Conflicts, Managing conflicts.

**Total Hours: 45**

#### Reference Books:

1. Stephen A. Robbins & David A. Decenzo & Mary Coulter, “Fundamentals of Management” 7th Edition, Pearson Education, 2011.
2. Robert Kreitner & Mamata Mohapatra, “Management”, Biztantra, 2008.
3. Harold Koontz & Heinz Weihrich “Essentials of management” Tata Mc Graw Hill, 1998.
4. S.S. Khanka - Organizational Behaviour - S. Chand Ltd. – 2006.
5. L.M.Prasad - Organizational Behaviour. S. Chand Company – 3<sup>rd</sup> edition – 2004.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22L09</b>		Subject Name <b>PROJECT PHASE - II</b>					<b>Ty/Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
		Prerequisite: Project Phase – 1					Lb	0	0/0	12/12	8	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES:</b> To culminate the academic study and provide an opportunity to explore a problem or issue , address through focused and applied research under the direction of a faculty mentor. The project demonstrates the student's ability to synthesize and apply the knowledge and skills acquired to real-world issues and problems. This project affirms the students to think critically and creatively, find an optimal solution, make ethical decisions and to present effectively.												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Apply the knowledge and skills acquired in the course of study addressing a specific problem or issue.											
CO2	Encourage students to think critically and creatively about societal issues and develop user friendly and reachable solutions											
CO3	Refine research skills and demonstrate their proficiency in communication skills.											
CO4	Take on the challenges of teamwork, prepare a presentation and demonstrate the innate talents.											
CO5	Validate the implementation of the software/Hardware system											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	-	2	3	2	2	2	2	2	-	1
CO2	2	2	3	1	1	2	2	2	2	2	-	1
CO3	2	1	2	1	1	2	2	2	2	3	-	1
CO4	2	1	2	1	1	2	2	2	3	3	-	1
CO5	1	2	2	2	2	2	3	2	2	2	1	2
COs /PSOs		PSO1			PSO2			PSO3			PSO4	
CO1		2			3			2			2	
CO2		3			2			2			2	
CO3		2			1			2			3	
CO4		2			2			3			3	
CO5		3			2			2			2	
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
									✓			



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22L09	PROJECT (PHASE – II)	Lb	0	0/0	12/12	8

Students are expected to do a Project work either in an Industry or at the University in the field of relevant Engineering /inter-disciplinary /multi-disciplinary area in a group of 3 or 4 students. The work to be carried out in Phase II should be continuation of Phase I. Each group will be allotted a guide based on the area of Project work. In case of industrial Project external guide has to be allotted from Industry. Inter disciplinary/multi-disciplinary project can be done with students of different disciplines as a group. Monthly reviews will be conducted during the semester to monitor the progress of the project by the project review committee. Students have to submit the Project thesis at the end of the semester and appear for the Project Viva-Voce examination conducted by the examiners duly appointed by the Controller of Examination. In case of industrial project certificate in proof has to be included in the report along with the bonafide certificate.

**Total Hours: 45**





## FACULTY OF ENGINEERING AND TECHNOLOGY

### Program Elective – I

Subject Code <b>EBIT22E01</b>	Subject Name <b>FUNDAMENTAL OF DIGITAL IMAGE PROCESSING</b>					Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C		
	Prerequisite: Signals and systems · Calculus and probability · Basic programming skills.					Ty	3	0/0	0/0	3		
L : Lecture T:Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>• To become familiar with digital image fundamentals</li><li>• To get exposed to simple image enhancement techniques in Spatial and Frequency domain.</li><li>• To learn concepts of degradation function and restoration techniques.</li><li>• To study the image segmentation and representation techniques.</li><li>• To become familiar with image compression and recognition method.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Understand the basic fundamentals of digital image processing											
CO2	Understand the basics of image enhancement techniques in spatial & frequency domains											
CO3	Understand the various kind of noise present in the image and how to restore the noisy image.											
CO4	Design and implement the various multi-resolution techniques and segmentation methods in images											
CO5	Apply various image compression and image segmentation techniques to images											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	2	-	-	-	-	-	-	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-
CO5	3	3	2	1	-	-	-	-	-	-	-	-
COs/PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	2			1			-			-		
CO2	2			1			-			-		
CO3	2			1			-			-		
CO4	2			1			-			-		
CO5	2			1			-			-		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E01	FUNDAMENTAL OF DIGITAL IMAGE PROCESSING	Ty	3	0/0	0/0	3

### UNIT I DIGITAL IMAGE FUNDAMENTALS

**8 Hrs**

Light and Electromagnetic spectrum - Components of Image processing system - Image formation and digitization concepts -Neighbours of pixel adjacency connectivity -Regions and boundaries - Distance measures - Applications.

### UNIT II IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN

**12 Hrs**

Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering, Frequency Domain: Introduction to Fourier Transform– Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters, Homomorphic filtering, Colour image enhancement.

### UNIT III IMAGE RESTORATION

**9 Hrs**

Various noise models, image restoration using spatial domain filtering, image restoration using frequency domain filtering, Estimating the degradation function, Inverse filtering.

### UNIT IV COLOUR IMAGE PROCESSING AND MULTI-RESOLUTION PROCESSING

**7 Hrs**

Colour fundamentals - Colour models - Colour transformation - Smoothing and Sharpening - Colour segmentation - Image pyramids - Multi-resolution expansion - wavelet transform.

### UNIT V IMAGE COMPRESSION AND IMAGE SEGMENTATION

**9 Hrs**

Introduction- Image compression model - Error-free compression- Lossy compression - Detection of discontinuities - Edge linking and boundary detection- Thresholding.

**Total Hours: 45**

### TEXT BOOK:

1. Rafael C. Gonzalez, Richard E. Woods, “Digital Image Processing”, Pearson, Third Edition, 2010.

### REFERENCE BOOKS:

- 1.Kenneth R. Castleman, “Digital Image Processing”, Pearson, 2006.
- 2.Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, “Digital Image Processing using MATLAB”, Pearson Education, Inc., 2011.
- 3.D,E. Dudgeon and RM. Mersereau, “Multidimensional Digital Signal Processing”, Prentice Hall Professional Technical Reference, 1990



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E02</b>	Subject Name <b>GEOGRAPHICAL INFORMATION SYSTEMS</b>						<b>Ty/Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: NIL						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To design, explore, interpolate and analyze GIS models</li><li>To create a new geo coding technique and apply the learnt GIS modeling for a real time case study.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
<b>CO1</b>	Understand the basic idea about the fundamentals of GIS											
<b>CO2</b>	Understand the types spatial of data models											
<b>CO3</b>	Gain knowledge on data analysis tool											
<b>CO4</b>	Gain knowledge on path analysis and network application											
<b>CO5</b>	Understand the GIS in the cloud											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>1</b>	<b>2</b>
<b>CO2</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>2</b>	<b>2</b>
<b>CO3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>1</b>	<b>2</b>
<b>CO4</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>1</b>	<b>2</b>
<b>CO5</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>1</b>	<b>2</b>
<b>Mapping of Course Outcomes with Program Specific Outcomes (PSOs)</b>												
<b>COs / PSOs</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
<b>CO1</b>	<b>3</b>			<b>3</b>			<b>2</b>			<b>2</b>		
<b>CO2</b>	<b>3</b>			<b>3</b>			<b>1</b>			<b>2</b>		
<b>CO3</b>	<b>3</b>			<b>2</b>			<b>2</b>			<b>2</b>		
<b>CO4</b>	<b>2</b>			<b>2</b>			<b>1</b>			<b>2</b>		
<b>CO5</b>	<b>3</b>			<b>2</b>			<b>1</b>			<b>2</b>		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	<b>Basic Sciences</b>	<b>Engineering Sciences</b>	<b>Humanities and Social Sciences</b>	<b>Program Core</b>	<b>Program Electives</b>	<b>Open Electives</b>	<b>Interdisciplinary</b>	<b>Skill component</b>	<b>Practical / Project</b>			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E02	GEOGRAPHICAL INFORMATION SYSTEMS	Ty	3	0/0	0/0	3

### UNIT I BASIC CONCEPTS

**9 Hrs**

Introduction - Coordinate Systems - Vector Data Model - Raster Data Model.

### UNIT II DATA ACQUISITION & MANIPULATION

**9 Hrs**

GIS Data Acquisition - Geometric Transformation - Spatial Data Editing - Attribute Data Input and Management - Data Display and Cartography.

### UNIT III DATA ANALYSIS

**9 Hrs**

Data Exploration - Vector Data Analysis - Raster Data Analysis - Terrain Mapping and Analysis - Viewsheds and Watersheds.

### UNIT IV INTERPOLATION & APPLICATIONS

**9 Hrs**

Spatial Interpolation - Geocoding and Dynamic Segmentation - Path Analysis and Network Applications.

### UNIT V MODELLING

**9 Hrs**

GIS Model and Modelling.

**Total Hours: 45**

### TEXT BOOK:

1. Kang-tsung Chang (2015), *Introduction to Geographic Information Systems*, (8<sup>th</sup> ed.), McGrawhill ISBN 0078095131, 9780078095139

### REFERENCE BOOKS:

1. Prithvish Nag And Smita Sengupta, *Introduction To Geographical Information Systems*, Concept Publishing Company, 2007, ISBN 8180694399, 9788180694394
2. Paul Longley, *Geographical information systems*, 2/e, Wiley, 1999, Digitised 2007, ISBN - 0471321826, 9780471321828



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code  <b>EBIT22E03</b>	Subject Name <b>DATABASE TUNING</b>						Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C	
	Prerequisite: Data Warehousing and Data Mining						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To tune the databases for different data base applications</li><li>To develop case studies in data bases, and able to troubleshoot the data bases</li><li>To identify the critical performance tuning steps</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Able to Tune the databases for different Data base Applications											
CO2	Able to Develop Case Studies in data bases.											
CO3	Able to Troubleshoot the data bases											
CO4	Understand the query optimization											
CO5	Understand the database techniques											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	3	2	3	3	2	3	3	3	2
CO2	3	3	3	3	1	3	2	3	2	3	3	2
CO3	2	3	3	2	3	2	3	3	2	3	3	3
CO4	1	2	3	1	1	3	1	-	2	1	-	2
CO5	2	1	1	2	1	1	2	-	1	2	-	2
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			2			3			3		
CO2	3			3			3			2		
CO3	3			3			2			3		
CO4	2			1			-			2		
CO5	2			1			-			2		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E03	DATABASE TUNING	Ty	3	0/0	0/0	3

### UNIT I FUNDAMENTALS OF TUNING

**9 Hrs**

Review of Relational Databases – Relational Algebra - Locking and Concurrency Control – Correctness Consideration – Lock Tuning – Logging and the Recovery Subsystem – Principles of Recovery – Tuning the Recovery Subsystem – Operating Systems Considerations – Hardware Tuning

### UNIT II INDEXING AND HASHING

**9 Hrs**

Types of Queries – Data Structures – B tree – B+ Tree - Hash Structures – Bit Map Indexes – Clustering Indexes – Non Clustering Indexes – Composite Indexes – Hot Tables – Comparison of Indexing and Hashing Techniques

### UNIT III QUERY OPTIMIZATION

**9 Hrs**

Techniques - Tuning Relational Systems – Normalization – Tuning De-normalization – Clustering Two Tables – Aggregate Maintenance – Record Layout – Query Tuning – Triggers – Client Server Mechanisms – Objects, Application Tools and Performance – Tuning the Application Interface – Bulk Loading Data – Accessing Multiple Databases

### UNIT IV TROUBLESHOOTING

**9 Hrs**

Query Plan Explainers – Performance Monitors – Event Monitors – Finding —Suspicious Queries – Analyzing a Query's Access Plan – Profiling a Query Execution – DBMS Subsystems

### UNIT V CASE STUDIES

**9Hrs**

Transaction Chopping – Time Series Databases – Understanding Access Plans – Configuration Parameters: ORACLE; SQL SERVER; DB2UDB – DISTRIBUTED DATABASE – IMPLEMENTATION.

**TOTAL HOURS: 45**

### TEXT BOOKS:

1. Dennis Shasha and Philippe Bonnet (2005) Database Tuning, Principles, Experiments, and Troubleshooting Techniques, Elsevier
2. Thomas Connolly and Carolyn Begg (2009) Database Systems, A Practical Approach to Design, Implementation and Management, (4th ed.) Pearson Education



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E04</b>	Subject Name <b>DESIGN AND ANALYSIS OF ALGORITHMS</b>						<b>Ty/ Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: Data Structures and Algorithms						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To learn the algorithm analysis techniques.</li><li>To understand the different algorithm design techniques.</li><li>To understand Iterative algorithms</li><li>To understand the limitations of Algorithm power.</li></ul>												
<b>COURSE OUTCOMES (COs):</b>												
CO1	Able to understand algorithms for various computing problems											
CO2	Analyze the time and space complexity of algorithms.											
CO3	Critically analyze the different algorithm design techniques for a given problem. Modify existing algorithms to improve efficiency.											
CO4	Analysing the structure of tree and graphs to identify the limitations in solving the problem											
CO5	Evaluate the algorithms for solving real world applications											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	1	1	1	-	-	-	-	1
CO2	2	3	3	1	2	1	2	-	-	-	-	2
CO3	2	2	2	2	3	2	1	-	-	-	-	2
CO4	2	3	3	1			1		2	2	1	2
CO5	2	3	3	1	1		1		2	2	1	3
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			3			2			1		
CO2	2			3			2			1		
CO3	2			2			1			1		
CO4	3			3			3			2		
CO5	3			3			3			3		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E04	DESIGN AND ANALYSIS OF ALGORITHMS	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION

**9 Hrs**

Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithm Efficiency – Analysis Framework – Asymptotic Notations and its properties – Mathematical analysis for Recursive and Non-recursive algorithms.

### UNIT II BRUTE FORCE AND DIVIDE-AND-CONQUER

**9 Hrs**

Brute Force – Closest-Pair and Convex Hull Problems-Exhaustive Search – Traveling Salesman Problem – Knapsack Problem – Assignment problem. Divide and conquer methodology – Merge sort – Quick sort – Binary search – Multiplication of Large Integers – Strassen's Matrix Multiplication-Closest-Pair and Convex Hull Problems.

### UNIT III DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE

**9 Hrs**

Computing a Binomial Coefficient – Warshall's and Floyd's algorithm – Optimal Binary Search Trees – Knapsack Problem and Memory functions. Greedy Technique– Prim's algorithm- Kruskal's Algorithm- Dijkstra's Algorithm-Huffman Trees.

### UNIT IV ITERATIVE IMPROVEMENT

**9 Hrs**

The Simplex Method-The Maximum-Flow Problem – Maximum Matching in Bipartite Graphs- The Stable marriage Problem.

### UNIT V COPING WITH THE LIMITATIONS OF ALGORITHM POWER

**9Hrs**

Limitations of Algorithm Power-Lower-Bound Arguments-Decision Trees-P, NP and NP-Complete Problems– Coping with the Limitations – Backtracking – n-Queens problem – Hamiltonian Circuit Problem – Subset Sum Problem-Branch and Bound – Assignment problem – Knapsack Problem – Traveling Salesman Problem- Approximation Algorithms for NP – Hard Problems – Traveling Salesman problem – Knapsack problem.

**Total Hours: 45**

### TEXT BOOK:

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson Education, 2012.

### REFERENCE BOOKS:

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, Reprint 2006.
3. Donald E. Knuth, "The Art of Computer Programming", Volumes 1& 3 Pearson Education, 2009. Steven S. Skiena, "The Algorithm Design Manual", Second Edition, Springer, 2008.  
<http://nptel.ac.in/>



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E05</b>	Subject Name <b>ARTIFICIAL INTELLIGENCE</b>						<b>Ty/Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: Mathematics						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES:</b> <ul style="list-style-type: none"><li>To solve problems using AI techniques</li><li>To develop new games using AI techniques</li><li>To guide the process of deducing information in a computational manner</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Understand different types of AI agents											
CO2	Know various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms)											
CO3	Understand the fundamentals of knowledge representation (logic-based, frame-based, semantic nets), inference and theorem proving											
CO4	Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information											
CO5	Ability to apply knowledge representation, reasoning, and machine learning techniques to real-world problems											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	3	2	2	3	3	3	3
CO2	3	3	3	3	2	3	2	2	3	3	3	3
CO3	3	3	3	3	1	3	2	2	3	2	3	3
CO4	3	3	3	3	2	3	2	2	3	3	3	3
CO5	3	3	3	3	2	3	2	2	3	2	3	3
COs / PSOs		PSO1			PSO2			PSO3			PSO4	
CO1		3			3			2			2	
CO2		3			3			3			3	
CO3		3			3			3			3	
CO4		3			3			2			3	
CO5		3			2			3			3	
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E05	ARTIFICIAL INTELLIGENCE	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION AND PROBLEM SOLVING 9 Hrs

Introduction– Intelligent agent – Types of agents – Agent Structure – Problem solving agents – Problem Formulation - Uninformed search strategies – Breadth first search – Uniform cost search – Depth first search – Depth limited search – Bidirectional search – Searching with partial Information

### UNIT II INFORMED SEARCH METHODS AND GAME PLAYING 9 Hrs

Informed search Strategies – A\* Heuristic function – Hill Climbing search – Constraint Satisfaction problem - Optimal decisions in games – Pruning –Alpha-Beta pruning - State-of-the-Art Game Programs

### UNIT III KNOWLEDGE AND REASONING 9 Hrs

Knowledge based agent – The Wumpus world environment – First-order logic –Building a Knowledge base – Properties of Good and Bad Knowledge bases – The Grocery Shopping World - Inferences in FOL – Forward and backward chaining algorithm

### UNIT IV ACTING LOGICAL 9 Hrs

Planning-Simple planning agent-Planning with state space search-Partial order planning-Practical planning – Practical planners – Planning and Acting – Conditional Planning – Fully Integrated planning and execution

### UNIT V UNCERTAIN KNOWLEDGE REASONING AND ROBOTICS 9 Hrs

Acting under Uncertainty - Knowledge Engineering for Uncertain Reasoning - Case study: The Pathfinder system – Robotics Introduction – Goods of Robots – Parts of Robots – Navigation and Motion planning.

**Total Hours: 45**

#### TEXT BOOKS:

1. Stuart R. Peter N. (2010) Artificial Intelligence A modern Approach, Prentice Hall
2. Elaine R. Kevin K. (2008) Artificial Intelligence Tata McGraw Hill

#### REFERENCE BOOKS:

1. Tim Jones M. (2008) Artificial Intelligence, A System Approach(Computer Science)
2. Ben Coppin (2004) Artificial intelligence illuminated, Jones and Bartlett Learning



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name <b>HUMAN COMPUTER INTERACTION</b>						Ty/Lb/ETL	L	T/ S.Lr	P/R	C	
<b>EBIT22E06</b>	Prerequisite: NIL						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To learn the foundations of Human Computer Interaction</li><li>To be familiar with the design technologies for individuals and persons with disabilities</li><li>To manage HCI</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Learn the basic terminologies of HCI											
CO2	Understand the design for specific domain / application											
CO3	Understand the design technologies for individuals and persons with disabilities											
CO4	Understand how to manage the emerging issues in HCI											
CO5	Design Inclusive User Interfaces for Diverse Populations											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	1	3	3	3	2	2	-	1
CO2	1	1	1	1	1	3	3	3	2	2	-	1
CO3	1	1	1	1	1	3	3	3	2	2	-	1
CO4	1	-	-	-	-	3	3	3	2	2	-	1
CO5	3	2	1	3	3	3	2	3	2	2	2	3
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	1			1			3			2		
CO2	1			1			3			2		
CO3	1			1			3			2		
CO4	1			-			3			2		
CO5	1			3			2			2		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
<b>EBIT22E06</b>	<b>HUMAN COMPUTER INTERACTION</b>	Ty	3	0/0	0/0	3

### UNIT I HUMANS IN HCI

**9 Hrs**

Introduction-implications for HCI-overview of HCI-Mentor models in HCI-emotions in HCI-cognitive architecture –task loading and stress in HCI-theoretical framework and mitigation strategies-motivating, influencing and persuading users – human error identification in HCI

### UNIT II COMPUTERS IN HCI

**9 Hrs**

Input technologies and techniques – sensor and recognition based input for interaction-visual displays-haptic interfaces-nonspeech auditory output-network based interaction-wearable computers-design of computer workstation

### UNIT III APPLICATION/DOMAIN SPECIFIC DESIGN

**9 Hrs**

HCI in health care-designing emotions for games, entertainment interfaces and interactive products-motor vehicle driver interfaces-HCI in aerospace-user centred design in games

### UNIT IV DESIGNING FOR DIVERSITY

**9 Hrs**

The digital divide-the role of gender in HCI-IT and older adults-HCI for kids-IT for cognitive support-physical disabilities and computing technologies – an analysis of impairments-computing technologies for deaf and hard of hearing users

### UNIT V MANAGING HCI AND EMERGING ISSUES

**9 Hrs**

Technology transfer-augmenting cognition in HCI-human values, ethics and design, cost justification-future trends in HCI

**Total Hours: 45**

### TEXT BOOK:

1. The Human Computer Interaction Handbook –Fundamentals evolving Technologies and emerging Applications – Andrew Sears,Julie A Jacko, CRC Press ,3<sup>rd</sup> edition,2012.

### REFERENCE BOOK:

1. Alan Dix , Janet Finlay, Gregory D.Abowd, Russell Beale, “ Human Computer Interaction”, Third Edition, Pearson Education.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E07</b>	Subject Name <b>AGILE METHODOLOGIES</b>						<b>Ty/ Lb/ ET L</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: Software Engineering						Ty	3	0/0	0/0	3	
L : Lecture T:Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory andLab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>• To provide students with a theoretical as well as practical understanding of agile software development practices and how small teams can apply them to create high-quality software.</li><li>• To provide a good understanding of software design and a set of software technologies and APIs.</li><li>• To do a detailed examination and demonstration of Agile development and testing techniques.</li><li>• To understand the benefits and pitfalls of working in an Agile team.</li><li>• To understand Agile development and testing.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Understand importance of interacting with business stakeholders in determining the requirements for a											
CO2	Understand iterative software development processes: how to plan them, how to execute them.											
CO3	Apply the impact of social aspects on software development techniques.											
CO4	Analyze Software process improvement in an ongoing task for development teams.											
CO5	Create agile approaches can be scaled up to the enterprise level.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	1	1	1	1	2	1	3	3	3	2
CO2	1	2	2	1	1	1	1	1	1	2	1	2
CO3	1	1	2	1	3	3	3	1	2	2	1	1
CO4	1	1	2	1	1	1	2	1	3	2	1	1
CO5	1	1	3	2	1	1	1	2	1	1	3	1
COs/ PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	1			1			1			1		
CO2	1			1			1			1		
CO3	1			2			1			1		
CO4	1			1			1			1		
CO5	1			1			2			2		
<b>3/2/1 indicates Strength of Correlation 3- High, 2- Medium,1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E07	AGILE METHODOLOGIES	Ty	3	0/0	0/0	3

### UNIT I                      AGILE METHODOLOGY                      9 Hrs

Theories for Agile Management – Agile Software Development – Traditional Model vs. Agile Model - Classification of Agile Methods – Agile Manifesto and Principles – Agile Project Management – Agile Team Interactions – Ethics in Agile Teams - Agility in Design, Testing – Agile Documentations – Agile Drivers, Capabilities and Values.

### UNIT II                      AGILE PROCESSES                      9 Hrs

Lean Production - SCRUM, Crystal, Feature Driven Development- Adaptive Software Development - Extreme Programming: Method Overview – Lifecycle – Work Products, Roles and Practices.

### UNIT III                      AGILITY AND KNOWLEDGE MANAGEMENT                      9 Hrs

Agile Information Systems – Agile Decision Making - Earl\_S Schools of KM – Institutional Knowledge Evolution Cycle – Development, Acquisition, Refinement, Distribution, Deployment , Leveraging – KM in Software Engineering – Managing Software Knowledge – Challenges of Migrating to Agile Methodologies – Agile Knowledge Sharing – Role of Story-Cards – Story-Card Maturity Model (SMM).

### UNIT IV                      AGILITY AND REQUIREMENTS ENGINEERING                      9 Hrs

Impact of Agile Processes in RE–Current Agile Practices – Variance – Overview of RE Using Agile – Managing Unstable Requirements – Requirements Elicitation – Agile Requirements Abstraction Model – Requirements Management in Agile Environment, Agile Requirements Prioritization – Agile Requirements Modeling and Generation – Concurrency in Agile Requirements Generation.

### UNIT V                      AGILITY AND QUALITY ASSURANCE                      9Hrs

Agile Product Development – Agile Metrics – Feature Driven Development (FDD) – Financial and Production Metrics in FDD – Agile Approach to Quality Assurance - Test Driven Development – Agile Approach in Global Software Development.

**Total Hours: 45**

#### TEXT BOOK:

1. David J. Anderson and Eli Schragenheim, —Agile Management for Software Engineering: Applying the Theory of Constraints for Business Results, Prentice Hall, 2003.
2. Hazza and Dubinsky, —Agile Software Engineering, Series: Undergraduate Topics in Computer Science, Springer, 2009.

#### REFERENCE BOOKS:

1. Craig Larman, —Agile and Iterative Development: A Manager's Guide, Addison-Wesley, 2004.
2. Kevin C. Desouza, —Agile Information Systems: Conceptualization, Construction, and Management, Butterworth-Heinemann, 2007.





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E08</b>	Subject Name <b>E-COMMERCE</b>					<b>Ty/Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>		
	Prerequisite: Nil					Ty	3	0/0	0/0	3		
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To understand the nature of e-Commerce</li><li>To recognize the business impact and potential of e-Commerce</li><li>To discuss the current drivers and inhibitors facing the business world in adopting and using eCommerce;</li><li>To Know the trends in e-Commerce and the use of the Internet.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Analyze the impact of E-commerce on business models and strategy											
CO2	Describe the infrastructure for E-commerce											
CO3	Assess electronic payment systems											
CO4	Understand the concepts of technologies used in the field of management.											
CO5	Understand the usage of multi-media systems in e-commerce.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	3	3	3	3	3	3	2	2	2
CO2	3	3	3	3	3	3	3	3	3	2	2	2
CO3	3	3	3	3	3	3	3	3	3	3	2	2
CO4	3	3	3	3	3	2	2	2	3	2	2	2
CO5	3	3	3	3	3	2	3	2	2	2	1	1
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			3			3			3		
CO2	3			3			3			3		
CO3	3			3			3			3		
CO4	3			3			3			2		
CO5	3			2			2			2		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22E08	E-COMMERCE	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION

**9 Hrs**

History of E-Commerce -E-Commerce Vs E-Business-Emergence of the Internet- Advantages-Disadvantages- Business model- E –Business Models based on the relationship of Transaction Parties- E –Business Models based on the relationship of Transaction Types- Technologies of World Wide Web- Internet Client Server Applications-Networks and Internets-Software Agents-Internet Standards and Specification-Internet Service Provider-Markup Language and the web-JavaScript-XML-Intranets and Extranets.

### UNIT II E-MARKETING

**9 Hrs**

Identifying Web Presence Goals- The Browsing Behaviour Model-Online Marketing-E-Advertising-Internet Marketing Trends-Targets Markets-E-Branding-Marketing Strategies E-Security: Security on the Internet-E-Business Risk Management Issues-E-Payment Systems: Digital Token based e-payment System-Classification of New Payment System- Electronic Cash-Risk and E-Payment System-Designing E-payment System- Digital Signature.

### UNIT III E-CUSTOMER RELATIONSHIP MANAGEMENT

**9 Hrs**

CRM-ECRM Solutions- ECRM Toolkit-Typical Business Touch point. E-Supply Chain Management-Supply Chain Management- Supply chain Management for Various Industries- E- Strategy and Knowledge management.

### UNIT IV MOBILE COMMERCE

**9 Hrs**

Information System for Mobile Commerce-Mobile Payments-Cellular Networks-Different Generations in wireless Communication- Technologies for mobile Commerce-WAP Programming Model. Portals for E-Business: Portals-Requirements of Intelligent Websites.

### UNIT V APPLICATIONS

**9 Hrs**

Plan your Business and create a web Site with word press.

**Total Hours: 45**

#### TEXT BOOK:

1. P.T. Joseph, S.J. (2015),E-Commerce Indian Perspective Fifth Edition, PHI Learning

#### REFERENCE BOOKS:

1. Zheng Qin(2009), Introduction to E-Commerce, Springer.
2. Mamta Bhusry,E-Commerce, Laxmi Publications PVT Ltd.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name						Ty/Lb/ETL	L	T/S.Lr	P/R	C	
EBIT22E09	FUNDAMENTALS OF ETHICAL HACKING											
	Prerequisite: Database Management Systems, Computer Networks, Cryptography and Network						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory /Lab /Embedded Theory and Lab												
<b>OBJECTIVE:</b> <ul style="list-style-type: none"><li>To understand how intruders escalate privileges.</li><li>To understand Intrusion Detection, Policy Creation, Social Engineering, Buffer Overflows and different types of Attacks and their protection mechanisms.</li><li>To learn about ethical laws.</li></ul>												
<b>COURSEOUTCOMES(COs):(3-5)</b>												
CO1	Understanding the fundamentals of Ethical hacking.											
CO2	Understanding the concepts of attack vectors in Social Engineering											
CO3	Testing and implementing preventive measures from being vulnerable to be hacked.											
CO4	Implementing hacking in network to deeply understand about penetration testing.											
CO5	Learning about the laws and professional ethics to understand the responsibilities.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	-	2	3	3	3	3	2	1	1	2
CO2	2	1	-	2	3	3	2	3	2	1	1	2
CO3	1	2	-	3	3	3	3	3	2	1	1	2
CO4	2	2	-	3	3	3	2	3	2	1	1	2
CO5	1	1	-	3	2	3	3	3	1	2	1	2
COs/PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	2			1			3			1		
CO2	2			1			3			1		
CO3	2			2			3			1		
CO4	2			2			3			1		
CO5	1			2			3			1		
<b>3/2/1 indicates Strength of Correlation 3-High,2-Medium,1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22E09	FUNDAMENTALS OF ETHICAL HACKING	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION TO ETHICAL HACKING

**9Hrs**

Information Security - Types of Data Stolen From the Organizations - Security Challenges - Effects of Hacking - Hacker – Types of Hacker - Ethical Hacker - Hactivism - Networking & Computer Attacks – Malicious Software (Malware) - Protection against Malware - Intruder Attacks on Networks and Computers - Addressing Physical Security – Key Loggers and Back Doors.

### UNIT II FOOTPRINTING AND SOCIAL ENGINEERING

**9Hrs**

Web Tools for Foot Printing - Conducting Competitive Intelligence - Google Hacking - Scanning Enumeration, Trojans & Backdoors - Virus & Worms - Proxy & Packet Filtering - Denial of Service – Sniffing - Social Engineering – shoulder surfing - Dumpster Diving - Piggybacking.

### UNIT III DATA SECURITY & ATTACK VECTORS

**9Hrs**

Physical Security – Attacks and Protection, Steganography – Methods, Attacks and Measures, Cryptography – Methods and Types of Attacks, Wireless Hacking, Windows Hacking, Linux Hacking – Buffer Overflow - Denial of Service Attack - Methodical Penetration Testing.

### UNIT IV NETWORK PROTECTION SYSTEM & HACKING WEB SERVERS

**9Hrs**

Routers - Firewall & Honeypots - IDS & IPS - Web Filtering – Vulnerability Assessment & Penetration Testing - Role of Security and Penetration Tester - Penetration Testing Methodology – Session Hijacking - Web Server - SQL Injection - Cross Site Scripting - Buffer Overflow - Email Hacking - Incident Handling & Response - Mobiles Phone Hacking.

### UNIT V ETHICAL HACKING LAWS

**9Hrs**

An introduction to the legal, professional and ethical issues - ethical responsibilities - professional integrity - appropriate use of the tools and techniques associated with ethical hacking - Host Reconnaissance - UNIX, LINUX, Microsoft, NOVEL Server.

**Total Hours:45**

#### TEXT BOOK:

Ethical Hacking & Network Defense – *Michael T. Simpson, Kent Backman, and James E. Corley*

#### REFERENCE BOOKS:

1. Ethical Hacking & Penetration testing Guide – Rafay Baloch
2. Hacking for Dummies, 6<sup>th</sup> Edition – Kevin Beaver



## FACULTY OF ENGINEERING AND TECHNOLOGY

### Program Elective-II

Subject Code	Subject Name						Ty/ Lb/E TL	L	T/S .Lr	P/R	C	
EBIT22E10	C# and .Net Programming											
	Prerequisite: Object Oriented Programming with C++						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits												
Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVES:												
<ul style="list-style-type: none"><li>To expose the students about the fundamentals of C#.net</li><li>To educate about object oriented aspects using c#</li><li>To developed a application using window based</li><li>To understand the fundamentals and create an application using Web based</li></ul>												
COURSEOUTCOMES(COs):(3-5)												
CO1	Understand the concepts of fundamentals of C# and .NET platform											
CO2	Understand the Object oriented concepts with C#											
CO3	Develop window based application using .NET											
CO4	Develop web based application using .NET											
CO5	Understand the concepts of building of client server application using .NET											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	2	1	2	1	-	1	1	1	2
CO2	3	2	2	2	2	2	2	-	1	1	1	2
CO3	2	3	3	1	2	3	2	-	2	2	2	1
CO4	1	3	3	2	3	3	3	-	2	2	2	1
CO5	-	1	2	2	3	3	3	-	2	2	3	1
COs /PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	2			2			-			2		
CO2	2			2			-			2		
CO3	2			2			-			2		
CO4	2			2			-			2		
CO5	1			3			-			2		
3/2/1 indicates Strength of Correlation 3-High,2-Medium,1-Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22E10	C# and .Net Programming	Ty	3	0/0	0/0	3

### UNIT I C# AND .NET PLATFORM INTRODUCTION

**9 hrs**

Introduction c# - .Net Architecture -Building blocks of the.net platform-Literals-Variable-Data types- Operators-Checked and unchecked operators-Expressions-Branching-Looping-Methods-Implicit and Explicit casting-Constant- Array-Array classes- Array list-String –String Buffer-Structure-Enumeration-Boxing and unboxing.

### UNIT II OBJECT ORIENTED ASPECTS OF C#

**7Hrs**

Introduction about class and object-Constructors and its types- Inheritance-Properties-Indexers-Index overloading-Operator overloading-Interface-Polymorphism-Delegates-Events handling-Threads

### UNIT III APPLICATION DEVELOPMENT ON .NET

**11hrs**

Building Windows Application-Creating our own window form with events and controls-Menu creation- Inheriting windows form-SDI and MDI application-dialog box (Modal and Modeless)- Accessing data with ADO.NET-SQL server with ADO.NET-Handling Exceptions-Validating Controls

### UNIT IV APPLICATION DEVELOPMENT USING WEB BASED

**8hrs**

Programming web application with web forms – ASP.NET introduction – working with XML and.NET- Creating virtual Directory and Web Application-Session management techniques-Web config-Web service – Passing dataset – Returning datasets from web services

### UNIT V CLR AND .NET FRAME WORK

**10hrs**

Assemblies – Versioning – Attributes – Reflection – Viewing metadata – Type discovery – Reflecting on a type – Marshalling- Remoting – Understanding server object types – Specifying a server with an interface – Building a server – Building the client – Using single call – Threads.

**Total Hours:45**

### TEXT BOOKS

- 1.Balagurusamy, E., “Programming in C#”, TMH, 2004.
2. Liberty, J., “Programming C#”, 2nd Edition, O’Reilly, 2002.
- 3.Herbert Schildt, “The Complete Reference –C#”, TMH, 2004
- 4.Joydip kanjilal ,Mastering of c#,4<sup>th</sup> Edition ,Tata MCGRAW-HILL 2019

### REFERENCES

1. Herbert Schildt, “The Complete Reference –C#”, TMH, 2004.
2. Robinson, “Professional C#”, 2nd Edition, Wrox Press, 2002.
3. Andrew Troelsen, “C# and the .NET Platform”, A! Press, 2003.
4. ThamaraiSelvi, S. and Murugesan, R., “A Textbook on C#”, Pearson Education, 2003.
- 5.Mark J.Price.c# 8.0 and .NET core 3.0 modern cross platform development,4 thEdition,Packt publisher, 2019



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E11</b>	Subject Name <b>SOCIAL NETWORK ANALYSIS</b>						<b>Ty/b/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite : Basic knowledge of graph						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To understand the concept of semantic web and related applications.</li><li>To learn knowledge representation using ontology.</li><li>To understand human behaviour in social web and related communities.</li><li>To learn visualization of social networks.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b> Students completing the course were able to												
<b>CO1</b>		Understands semantic web related applications.										
<b>CO2</b>		Understand knowledge using ontology.										
<b>CO3</b>		Apply appropriate tool for detecting communities.										
<b>CO4</b>		Apply in Predict human behaviour in social web and related communities.										
<b>CO5</b>		Design Visualize social networks.										
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	<b>1</b>	<b>3</b>	-	-	-	-	-	-	-	-	-	-
<b>CO2</b>	-	<b>3</b>	-	-	<b>2</b>	<b>3</b>	-	-	-	-	-	-
<b>CO3</b>	<b>1</b>	<b>3</b>	-	<b>3</b>	<b>3</b>	-	-	-	-	-	-	-
<b>CO4</b>	-	<b>3</b>	-	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	-	-	-	-	-
<b>CO5</b>	-	<b>3</b>	-	<b>3</b>	<b>3</b>	-	<b>2</b>	-	-	-	-	-
<b>COs / PSOs</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
<b>CO1</b>	<b>2</b>			<b>-</b>			<b>-</b>			<b>2</b>		
<b>CO2</b>	<b>2</b>			<b>-</b>			<b>-</b>			<b>2</b>		
<b>CO3</b>	<b>2</b>			<b>-</b>			<b>-</b>			<b>2</b>		
<b>CO4</b>	<b>2</b>			<b>-</b>			<b>-</b>			<b>2</b>		
<b>CO5</b>	<b>2</b>			<b>-</b>			<b>-</b>			<b>2</b>		
<b>H/M/L indicates strength of correlation 3 – High, 2 – Medium, 1 – Low</b>												
<b>Category</b>	<b>Basic Sciences</b>	<b>Engineering Sciences</b>	<b>Humanities and Social Sciences</b>	<b>Program Core</b>	<b>Program Electives</b>	<b>Open Electives</b>	<b>Interdisciplinary</b>	<b>Skill component</b>		<b>Practical / Project</b>		
					✓							





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22E11	SOCIAL NETWORK ANALYSIS	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION

**9 Hrs**

Introduction to Semantic Web: Limitations of current Web - Development of Semantic Web - Emergence of the Social Web - Social Network analysis: Development of Social Network Analysis - Key concepts and measures in network analysis - Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities - Web-based networks - Applications of Social Network Analysis.

### UNIT II MODELLING, AGGREGATING AND KNOWLEDGE REPRESENTATION

**9Hrs**

Ontology and their role in the Semantic Web: Ontology-based knowledge Representation - Ontology languages for the Semantic Web: Resource Description Framework - Web Ontology Language - Modelling and aggregating social network data: State-of-the-art in network data representation - Ontological representation of social individuals - Ontological representation of social relationships - Aggregating and reasoning with social network data - Advanced representations.

### UNIT III EXTRACTION AND MINING COMMUNITIES IN WEB SOCIAL NETWORKS

**9 Hrs**

Extracting evolution of Web Community from a Series of Web Archive - Detecting communities in social networks - Definition of community - Evaluating communities - Methods for community detection and mining - Applications of community mining algorithms - Tools for detecting communities social network infrastructures and communities - Decentralized online social networks - Multi-Relational characterization of dynamic social network communities.

### UNIT IV PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES

**9 Hrs**

Understanding and predicting human behaviour for social communities - User data management - Inference and Distribution - Enabling new human experiences - Reality mining - Context - Awareness - Privacy in online social networks - Trust in online environment - Trust models based on subjective logic - Trust network analysis - Trust transitivity analysis - Combining trust and reputation - Trust derivation based on trust comparisons - Attack spectrum and countermeasures.

### UNIT V VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS

**9 Hrs**

Graph theory - Centrality - Clustering - Node-Edge Diagrams - Matrix representation - Visualizing online social networks, Visualizing social networks with matrix-based representations - Matrix and Node-Link Diagrams - Hybrid representations - Applications - Cover networks - Community welfare - Collaboration networks - Co-Citation networks.

**Total Hours: 45**

#### TEXT BOOKS:

1. Peter Mika, "Social Networks and the Semantic Web", First Edition, Springer
2. Borko Furht, "Handbook of Social Network Technologies and Applications", 1st Edition, Springer, 2010.

#### REFERENCE BOOKS:

1. Guandong Xu, Yanchun Zhang and Lin Li, "Web Mining and Social Networking – Techniques and applications", First Edition, Springer, 2011.
  2. Dion Goh and Schubert Foo, "Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively", IGI Global Snippet, 2008
  3. Max Chevalier, Christine Julien and Chantal Soulé-Dupuy, "Collaborative and Social Information Retrieval and Access: Techniques for Improved user Modelling", IGI Global Snippet, 2009.
- John G. Breslin, Alexander Passant and Stefan Decker, "The Social Semantic Web", Springer, 2009.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E12</b>	Subject Name <b>GAMES DESIGNING</b>						<b>Ty/Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite : C#						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To understand the concepts of animation and colors</li><li>To familiarize with UX Design and layout balancing</li><li>To understand about game design principles and techniques</li><li>To understand and create product designs</li><li>To gain expertise in storyboarding and evaluating a prototype</li></ul>												
<b>COURSE OUTCOMES (COs) :</b> Students completing the course were able to												
<b>CO1</b>	Understand the importance of visual communication											
<b>CO2</b>	Familiarize with the basics of animation											
<b>CO3</b>	Understand the concepts of UI & UX Design											
<b>CO4</b>	Understand the principles of design, colors, lighting and shading											
<b>CO5</b>	Design products, understand strategies of UX business and evaluate prototypes											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	-	-	2	-	3	3	-	-	3	3	-	-
<b>CO2</b>	-	-	2	-	3	3	-	-	3	3	-	-
<b>CO3</b>	-	-	2	-	3	3	-	-	3	3	-	-
<b>CO4</b>	-	-	2	-	3	3	-	-	3	3	-	-
<b>CO5</b>	-	-	2	-	3	3	-	-	3	3	-	-
<b>COs/PSOs</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
<b>CO1</b>	3			-			-			3		
<b>CO2</b>	3			-			-			3		
<b>CO3</b>	3			-			-			3		
<b>CO4</b>	3			-			-			3		
<b>CO5</b>	3			-			-			3		
<b>H/M/L indicates strength of correlation 3 – High, 2 – Medium, 1 – Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E12	GAMES DESIGNING	Ty	3	0/0	0/0	3

### UNIT I COMMUNICATION

**9 Hrs**

Concept, definition and elements of human communication - Intrapersonal communication - Interpersonal communication - Group Communication - Public Communication - Verbal & Nonverbal communication - Visual Communication - Signs, Symbols & Code systems

### UNIT II ANIMATION

**9 Hrs**

History of Animation - Animation: Meaning, definition & types - Basic Principles of Animation - Anatomy & Body Language - Introduction to Animation Technologies

### UNIT III UI & UX Design

**9 Hrs**

Introduction to UX Design - Concepts UI & UX Design - Design Thinking & stages - Divergent and Convergent Thinking - Brainstorming versus Game storming & Observational Empathy

### UNIT IV DESIGN

**9Hrs**

Principles of Design - Elements of Design - Color Wheel - Primary and Secondary Colors - Black & White - Warm and Cool Colors - Understanding Lights - Lighting and Shading - Visual and Imagery Techniques - Direct & Indirect Approach - Thinking in various point of view

### UNIT V PRODUCT DESIGN

**9 Hrs**

Principles of product design - Types of Products & Solutions -Design Psychology -Strategy of UX Business - Design Thinking Life Cycle - Design thinking, 7 Keys of Design Thinking - Importance of User Research & Iteration - Ideation - Storyboarding & evaluating a prototype

**Total Hours: 45**

### TEXT BOOK:

- Paul Martin Lester (2006) *Visual Communication: Image with messages*(5<sup>th</sup> ed.), Thomson Wadsworth

### REFERENCES:

- McQuailDennis(1981) *Communication Models*, Longman, London.
- Chris Patmore, *The Complete Animation Course* – Barons Educational Series (New York)
- [John Adair](#)(2004)*The Concise Adair on Creativity and Innovation* , Thorogood Publishers



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E13</b>	Subject Name <b>RISK MANAGEMENT</b>						<b>Ty/ Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: Software Engineering						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To Identify and categories the various risks face by an organization</li><li>To Explain the various risk control measures available</li><li>To Design a risk management program for a business organization.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Demonstrate the knowledge of risk management in organizations											
CO2	Understand the approach to risk management through risk identification and risk measurement											
CO3	Understand operational risk and how to manage it.											
CO4	Planning Risk Mitigation Strategies											
CO5	Monitor Risk In Software Projects											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/P Os</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>CO2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>-</b>	<b>2</b>
<b>CO3</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>-</b>	<b>2</b>
<b>CO4</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>-</b>	<b>2</b>
<b>CO5</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>-</b>	<b>2</b>
<b>COs / PSOs</b>		<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>	
<b>CO1</b>		<b>2</b>			<b>2</b>			<b>2</b>			<b>2</b>	
<b>CO2</b>		<b>2</b>			<b>2</b>			<b>2</b>			<b>2</b>	
<b>CO3</b>		<b>1</b>			<b>2</b>			<b>3</b>			<b>2</b>	
<b>CO4</b>		<b>1</b>			<b>2</b>			<b>3</b>			<b>2</b>	
<b>CO5</b>		<b>1</b>			<b>2</b>			<b>3</b>			<b>2</b>	
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	<b>Basic Sciences</b>	<b>Engineering Sciences</b>	<b>Humanities and Social Sciences</b>	<b>Program Core</b>	<b>Program Electives</b>	<b>Open Electives</b>	<b>Interdisciplinary</b>	<b>Skill component</b>	<b>Practical / Project</b>			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

SUBJECT CODE	SUBJECT NAME	Ty/Lb / ETL	L	T/ S.Lr	P/R	C
EBIT22E13	RISK MANAGEMENT	Ty	3	0/0	0/0	3

### UNIT I THE RISK MANAGEMENT PROCESS 9 Hrs

Introduction to software risk management, why do we need to manage risk in software development, Use, Objectives, Risk Management Paradigm, Risk management and litigation. Models for Risk Management.

### UNIT II DISCOVERING RISK IN SOFTWARE DEVELOPMENT 9 Hrs

Risk attributes and Identification, Identifying software risk, Common software project risks, Risk Taxonomy, Risk Mapping, statements, reviews., Risk ownership and stakeholder management.

### UNIT III RISK ASSESSMENT 9 Hrs

Objectives and goals. Approach to assessment, Risk assessment tools and techniques, presenting the risk findings.

### UNIT IV PLANNING RISK MITIGATION STRATEGIES 9 Hrs

Risk Planning, Best practices in the risk planning, Risk management tools, Risk mitigation strategies, Formulating and Implementing risk management plans.

### UNIT V MONITORING RISK IN SOFTWARE PROJECTS 9 Hrs

Developing a process for monitoring risk, formulating a project risk database, Managing and tracking risk, Risk support tools. Software Risk Metrics, organization, estimation, development methodology.

**Total Hours: 45**

#### TEXT BOOKS:

1. Yacov Y. Haimes, (2011) Risk Modeling, Assessment, and Management, Wiley
2. John Mcmanus, (2004) Risk Management in software development projects, Elsevier Butterworth-Heinemann

#### REFERENCE BOOKS:

1. Martin Loosemore, John Raftery, (2006) Risk management in projects, Taylor & Francis Ltd
2. Ravindranath P. C, (2007) Applied Software Risk Management, Auerbach,
3. Dale Walter Karolak, (1995) Software engineering risk management, Wiley-Ieee Computer Society



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E14</b>	Subject Name <b>INFORMATION SECURITY MANAGEMENT</b>						<b>Ty/ Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: Database Management Systems						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To provide an understanding of the principles of information security management commonly used in business.</li><li>To Introduce the commonly used frameworks and methods.</li><li>To Explore critically the suitability and appropriateness of security needs.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1		Understand the Security classification and management concepts.										
CO2		Understand the Concept of Security Analysis, Design and Implementation										
CO3		Develop the security plan methodology and follow policy procedures										
CO4		Understand risk management in information security										
CO5		Using ISO to enhance security										
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>-</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>
<b>CO2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>-</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>CO3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>-</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>
<b>CO4</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>-</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>
<b>CO5</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>-</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>
<b>COs / PSOs</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
<b>CO1</b>	<b>2</b>			<b>2</b>			<b>1</b>			<b>1</b>		
<b>CO2</b>	<b>2</b>			<b>2</b>			<b>1</b>			<b>1</b>		
<b>CO3</b>	<b>2</b>			<b>2</b>			<b>3</b>			<b>1</b>		
<b>CO4</b>	<b>2</b>			<b>2</b>			<b>1</b>			<b>1</b>		
<b>CO5</b>	<b>2</b>			<b>2</b>			<b>1</b>			<b>1</b>		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	<b>Basic Sciences</b>	<b>Engineering Sciences</b>	<b>Humanities and Social Sciences</b>	<b>Program Core</b>	<b>Program Electives</b>	<b>Open Electives</b>	<b>Interdisciplinary</b>	<b>Skill component</b>	<b>Practical / Project</b>			
					✓							





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	TyLb / ETL	L	T/ S.Lr	P/R	C
EBIT22E14	INFORMATION SECURITY MANAGEMENT	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION TO INFORMATION SECURITY AND MANAGEMENT 9 Hrs

Information sensitivity classification-governance-computing environment- security of various components – Management Concepts: traditional management skills and security literacy, managerial skills, redefining Mintzberg’s Managerial roles, IS Security management activities- information security management life cycles- security management vs functional management

### UNIT II INFORMATION SECURITY LIFECYCLE 9 Hrs

Introduction-Security planning in SLC-Security analysis-security design- security implementation – design- continual security

### UNIT III SECURITY PLAN AND POLICY 9 Hrs

Security plan: Development guidelines-security plan methodologies- Policy: security policy, standards and guidelines- security policy methodologies

### UNIT IV SECURITY RISK MANAGEMENT 9 Hrs

Introduction- risk management life cycle- preparation efforts- security culture-factors affecting security risk- ALE risk methodology- operational, functional and strategic risks- ABLE methodology

### UNIT V SECURITY DESIGN AND IMPLEMENTATION 9 Hrs

ISO/IEC 27002- Using ISO/IEC 27002 to enhance security- measurement and implementation- general ISMS Framework- ISMS Model and design- integration of ISMS Subsystems-self assessment for compliance- Security solutions: security management, access control, security analysis

**TOTAL HOURS: 45**

#### TEXT BOOK:

1. “Information Security Management: Concepts and Practice “Bell G. Raggard, CRC Press 2010.

#### REFERENCE BOOKS:

1. “Information Security Management Principles” David Alexander, Amanda Finch, BCS Learning and Development Ltd, 2013
2. “Security Analysis and Portfolio Management” Ronald E Fischer, S.Kevin PHI Learning Pvt Ltd, 2015.





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name						Ty/Lb/ETL	L	T/S.Lr	P/R	C	
EBIT22E15	TCP/IP DESIGN AND IMPLEMENTATION											
	Prerequisite: Computer Networks						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVES												
<ul style="list-style-type: none"><li>To Understand the IP addressing schemes.</li><li>To Analyze the fundamentals of network design and implementation</li><li>To Understand the design and implementation of TCP/IP networks</li><li>To Understand on network management issues</li><li>To Learn to design and implement network applications.</li></ul>												
COURSE OUTCOMES (COs) :												
CO1	Understand the principles of protocol layers and OSI models											
CO2	Learn the fundamentals of network design and implementation											
CO3	Understand the router architecture IP and routing algorithm											
CO4	Developing a topology and analyze the routing											
CO5	Understand the transport layer services, TCP and UDP proper											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	1	2	2	1	-	-	2	2
CO2	3	2	2	1	2	2	2	1	-	-	2	2
CO3	3	3	3	2	2	2	2	1	-	-	2	2
CO4	3	3	3	2	2	2	2	2	-	-	2	2
CO5	3	3	2	2	1	1	2	2	-	-	2	2
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			3			1			2		
CO2	3			3			2			3		
CO3	3			3			2			3		
CO4	3			3			1			3		
CO5	3			3			2			1		
H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E15	TCP/IP DESIGN AND IMPLEMENTATION	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION

**9 Hrs**

Protocols and standards-standards organizations-internet standards-internet administration – Protocol layers- OSI model-TCP/IP Protocol suite-addressing.

### UNIT II UNDERLYING TECHNOLOGIES

**9 Hrs**

Wired LANs: IEEE Standards, frame format, addressing, Ethernet evolution, standard Ethernet, fast Ethernet Gigabyte Ethernet, Ten-Gigabyte Ethernet-Wireless LAN- Point-to-Point WANS-Switched WANS-Connecting Devices- Case study – developing simple LAN setup using ns-2 simulator

### UNIT III IP ADDRESSES AND ROUTING

**9 Hrs**

Switching-network layer services- issues- IPv4 Addresses: Classful addressing, classless addressing, special addresses-delivery-forwarding- IPv4: datagrams, fragmentation, options, checksums, IP package-ARP- RARP- ICMP-IGMP- Case study – Analyzing the trace file using awk and plot graph using xgraph.

### UNIT IV UNICAST AND MULTICAST ROUTING PROTOCOLS

**9 Hrs**

Unicast routing – intra and inter domain routing – distance vector routing :Routing Information Protocol(RIP) – link state routing: Open Shortest Path First (OSPF) – path vector routing: Border Gateway Protocol (BGP) – Multicasting and Multicast routing protocols - - Case study – Developing a topology using more than two router and analyze the routing.

### UNIT V TCP & UDP

**9 Hrs**

Introduction to Transport Layer – Services – Protocols. UDP – user datagram – UDP services – UDP package – UDP applications. TCP – segment - flow control – error control – congestion control – state transition diagram – TCP package. SCTP – services – features – Case study – Develop a network, attach various type TCP variant and analyze the trace file.

**Total Hours: 45**

#### TEXT BOOK:

1. Behrouz A. Forouzan (2010), “TCP/IP Protocol Suite”, 4th Edition, Tata McGraw Hill..

#### REFERENCE BOOKS:

1. Douglas E. Comer, David L. Stevens (2009), “Internetworking with TCP/IP Volume – II, III” 3rd Edition, PHI Learning Private Limited.
2. Richard Stevens W., (2011) “TCP/IP Illustrated, The Protocol-Volume I, II, II”, 2nd Edition Addison-Wesley Pub Co.
3. Douglas E. Comer,(2000) “Internetworking with TCP/IP–Principles, Protocols & Architecture”, 4th Edition,Pearson education.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code: <b>EBIT22E16</b>	Subject Name <b>MANAGEMENT INFORMATION SYSTEMS</b>						<b>Ty/Lb/ETL</b>	<b>L</b>	<b>T/S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: Database Management Systems, Operating System						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To evaluate the role of the major types of information systems in a business environment and their relationship to each other;</li><li>To assess the impact of the Internet and Internet technology on business electronic commerce and electronic business;</li><li>To identify the major management challenges to building and using information systems and learn how to find appropriate solutions to those challenges</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Describe the role of information technology and information systems in business											
CO2	Record the current issues of information technology and relate those issues to the firm											
CO3	Reproduce a working knowledge of concepts and terminology related to information technology											
CO4	Understand the managing global system and business processes											
CO5	Understand the advanced concept in information system											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	1	1	1	2	1	2	1	1
CO2	3	3	1	3	2	1	1	2	1	2	1	1
CO3	3	2	2	1	1	1	1	2	1	2	1	1
CO4	2	2	3	1	3	2	1	1	2	2	1	1
CO5	3	3	3	2	2	3	3	2	2	2	3	2
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			2			1			2		
CO2	3			1			1			1		
CO3	3			2			1			2		
CO4	3			2			1			1		
CO5	3			3			2			3		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22E16	MANAGEMENT INFORMATION SYSTEMS	Ty	3	0/0	0/0	3

### UNIT I ORGANIZATIONS, MANAGEMENT AND THE NETWORKED ENTERPRISE 9 Hrs

Information Systems in Global Business- Global E-Business-Information Systems-Strategy Systems- Ethical and Social issues in Information System - Analyzing Business Resource for an Enterprise System.

### UNIT II IT INFRASTRUCTURE 9 Hrs

IT infrastructure- Emerging Technology - Business Intelligence: Databases and Information Management – Telecommunication - Internet and Wireless Technology - Information Security Systems

### UNIT III KEY SYSTEM APPLICATION FOR THE DIGITAL AGE 9 Hrs

Enterprise application- Ecommerce-Digital Markets- Digital Goods- Managing knowledge- Decision Making – Enterprise portal design

### UNIT IV BUILDING AND MANAGING SYSTEMS 9 Hrs

Building Systems - Project Management- Establishing Business values - Managing Change - Managing Global System - Redesigning Business Processes- Case studies

### UNIT V ADVANCED CONCEPTS IN INFORMATION SYSTEM 9 Hrs

Enterprise Resource Planning - modules : Human Resources, Finance – Accounting - Production & Logistics - Supply Chain Management – CRM - Procurement - Management System Object Oriented modeling- case studies

**Total Hours: 45**

#### TEXT BOOKS :

1. James A, O' Brian,(2007) Management information systems ,( 7th ed.), TMH Publisher
2. Kenneth C. Laudon, Jane P.(2008) Management Information Systems: Managing the Digital Firms Pearson Education, TMH, 2008.

#### REFERENCE BOOKS:

1. James A. O'Brien, Northern Arizona University, George M. Marakas, University of Kansas, (2007) *Introduction to Information Systems*
2. Ross and Clagget (2004) *Information System for Modern Management*, Prentice-Hall of India Pvt. Ltd.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E17</b>	Subject Name <b>ADVANCED NETWORK</b>					Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C		
	Prerequisite: Computer Networks					Ty	3	0/0	0/0	3		
L : Lecture T:Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To Gain core knowledge of Network layer routing protocols and IP addressing.</li><li>To Study Session layer design issues, Transport layer services, and protocols.</li><li>To Acquire knowledge of Application layer and Presentation layer paradigms and protocols.</li><li>To Provide the mathematical background of routing protocols.</li><li>To develop some familiarity with current research problems and research methods in advance computer networks.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Understand reference models with layers, protocols and interfaces											
CO2	Explain the routing algorithms, Sub netting and addressing of IP V4and IPV6											
CO3	Analysis of basic protocols of computer networks, and how they can be used to assist in network design and implementation											
CO4	Describe the basic concept of SCTP and Quality of Services mechanisms.											
CO5	Analyses the behavior of application layer in networking											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	3	3	3	2	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			2			-			-		
CO2	3			2			-			-		
CO3	3			2			-			-		
CO4	3			2			-			-		
CO5	3			2			-			-		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium,1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	TyLb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E17	Advanced Network	Ty	3	0/0	0/0	3

### UNIT I NETWORK LAYER

**9Hrs**

Network Layer Services: Packet Switching - Implementation connectionless services – Implementation connection-oriented services - Comparison of virtual –Circuit and datagram subnets - IPV4 Address - Forwarding of IP Packets - Internet Protocol - ICMP v4 - Mobile IP

### UNIT II ROUTING ALGORITHMS

**9 Hrs**

Distance Vector routing - Link State Routing - Path Vector Routing – Uni cast Routing Protocol-Internet Structure - Routing Information Protocol - Open-Source Path First - Border Gateway Protocol V4 - Broadcast routing - Multicasting routing -Multicasting Basics- Intra domain Multicast Protocols - IGMP.

### UNIT III PV6 ADDRESSING AND TRANSPORT LAYER

**12 Hrs**

IPv6 Protocol - Transition from IPv4 to IPv6 - Transport Layer Services - Connectionless versus connection-oriented protocols - Transport Layer Protocols: Simple Protocol, Stop and Wait, Go-Back-N, Selective repeat, Piggy Backing. - UDP: User datagram, Services, Applications - TCP: TCP services, TCP features, Segment - TCP connection, Flow control, Error control, Congestion control.

### UNIT IV SCTP

**8 Hrs**

SCTP services: SCTP features, Packet format – SCTP Association: Flow control, Error control -Quality of Services: Flow characteristics, Flow control to improve QOS: Scheduling, Traffic shaping, Resource reservation, Admission control.

### UNIT V APPLICATION LAYER

**7 Hrs**

WWW and HTTP- FTP- Telnet- Domain name system- SNMP- Multimedia data- Multimedia in the Internet.

**Total Hours: 45**

#### TEXT BOOK:

- 1) Data Communication and Networking, Behrouz A. Forouzan, McGraw Hill, 5th Edition, 2012
- 2) Computer Networks, Andrew S. Tanenbaum, David J. Wetherall, Pearson Education India; 5 editions, 2013.

#### REFERENCE BOOKS:

- 1) Computer Networks: A Systems Approach, LL Peterson, BS Davie, Morgan-Kauffman, 5th Edition, 2011.
- 2) Computer Networking: A Top-Down Approach JF Kurose, KW Ross, Addison-Wesley, 5th Edition, 2009.



## FACULTY OF ENGINEERING AND TECHNOLOGY

### Program Elective - III

Subject Code	Subject Name WEB MINING	Ty/L b/ ETL	L	T/ S.Lr	P/R	C						
EBIT22E18	Prerequisite: Data Warehousing and Data Mining, Mathematics	Ty	3	0/0	0/0	3						
	L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab											
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To describe web mining and understand the need for web mining</li><li>To differentiate between Web mining and data mining</li><li>To understand the different application areas for web mining</li><li>To understand the different methods to introduce structure to web-based data</li><li>To describe Web mining, its objectives, and its benefits</li><li>To understand the methods of Web usage mining</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Understand the need for web Mining and learn association rule mining											
CO2	Know various classification method in web mining											
CO3	Compare different index method in information retrieval of web search											
CO4	Illustrate different web crawlers											
CO5	Apply the web usage mining concepts											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	2	3	2	3	-	2	3	3	3
CO2	3	-	-	1	3	3	3	-	2	2	3	3
CO3	3	3	-	-	3	3	2	-	3	3	3	3
CO4	3	3	-	1	-	3	3	-	3	3	2	2
CO5	3	2	-	2	3	3	3	-	2	1	3	3
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			3			-			3		
CO2	3			2			-			3		
CO3	2			3			-			1		
CO4	3			3			-			3		
CO5	3			2			-			3		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/S.Lr	P/R	C
EBIT22E18	WEB MINING	Ty	3	0/0	0/0	3

### UNIT – I INTRODUCTION TO WEB MINING

**9 Hrs**

Introduction to Web Data Mining and Data Mining Foundations, Introduction – World Wide Web (WWW), A Brief History of the Web and the Internet, Web Data Mining-Data Mining, Web Mining. Data Mining Foundations – Association Rules and Sequential Patterns – Basic Concepts of Association Rules, Apriori Algorithm- Frequent Itemset Generation, Association Rule Generation, Data Formats for Association Rule Mining, Mining with multiple minimum supports – Extended Model, Mining Algorithm, Rule Generation, Mining Class Association Rules, Basic Concepts of Sequential Patterns, Mining Sequential Patterns on GSP, Mining Sequential Patterns on PrefixSpan, Generating Rules from Sequential Patterns.

### UNIT – II LEARNING ALGORITHMS

**9 Hrs**

Supervised and Unsupervised Learning Supervised Learning – Basic Concepts, Decision Tree Induction – Learning Algorithm, Impurity Function, Handling of Continuous Attributes, Classifier Evaluation, Rule Induction – Sequential Covering, Rule Learning, Classification Based on Associations, Naïve Bayesian Classification, Naïve Bayesian Text Classification – Probabilistic Framework, Naïve Bayesian Model. Unsupervised Learning – Basic Concepts, K-means Clustering – K-means Algorithm, Representation of Clusters, Hierarchical Clustering – Single link method, Complete link Method, Average link method, Strength and Weakness.

### UNIT – III INFORMATION RETRIEVAL

**9 Hrs**

Information Retrieval and Web Search: Basic Concepts of Information Retrieval, Information Retrieval Methods – Boolean Model, Vector Space Model and Statistical Language Model, Relevance Feedback, Evaluation Measures, Text and Web Page Preprocessing – Stopword Removal, Stemming, Web Page Preprocessing, Duplicate, Detection, Inverted Index and Its Compression – Inverted Index, Search using Inverted Index, Index Construction, Index Compression, Latent Semantic Indexing – Singular Value Decomposition, Query and Retrieval, Web Search, Meta Search, Web Spamming.

### UNIT -IV LINK ANALYSIS AND WEB CRAWLING

**9 Hrs**

Link Analysis and Web Crawling: Link Analysis – Social Network Analysis, Co-Citation and Bibliographic Coupling, Page Rank Algorithm, HITS Algorithm, Community Discovery-Problem Definition, Bipartite Core Communities, Maximum Flow Communities, Email Communities. Web Crawling – A Basic Crawler Algorithm- Breadth First Crawlers, Preferential Crawlers, Implementation Issues – Fetching, Parsing, Stopword Removal, Link Extraction, Spider Traps, Page Repository, Universal Crawlers, Focused Crawlers, Topical Crawlers, Crawler Ethics and Conflicts.

### UNIT – V: OPINION MINING AND WEB USAGE MINING

**9 Hrs**

Opinion Mining – Sentiment Classification – Classification based on Sentiment Phrases, Classification Using Text Classification Methods, Feature based Opinion Mining and Summarization – Problem Definition, Object feature extraction, Feature Extraction from Pros and Cons of Format1, Feature Extraction from Reviews of Format 2 and 3, Comparative Sentence and Relation Mining, Opinion Search and Opinion Spam. Web Usage Mining – Data Collection and Preprocessing- Sources and Types of Data, Key Elements of Web usage Data Preprocessing, Data Modeling for Web Usage Mining, Discovery and Analysis of Web usage Patterns -Session and Visitor Analysis, Cluster Analysis and Visitor Segmentation, Association and Correlation Analysis, Analysis of Sequential and Navigation Patterns.

**Total Hours: 45**

#### TEXT BOOK:

1. Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data by Bing Liu (Springer Publications)

#### REFERENCES BOOKS:

1. Data Mining: Concepts and Techniques, Second Edition Jiawei Han, Micheline Kamber (Elsevier Publications)
2. Web Mining: Applications and Techniques by Anthony Scime
3. Mining the Web: Discovering Knowledge from Hypertext Data by Soumen Chakrabarti



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E19</b>	Subject Name <b>DATA SCIENCE AND BIG DATA ANALYTICS</b>	<b>Ty/ Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>						
	Prerequisite: Mathematics skill	Ty	3	0/0	0/0	3						
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVE :</b> <ul style="list-style-type: none"><li>To Deploying the Data Analytics Lifecycle to address big data analytics projects</li><li>To Reframing a business challenge as an analytics challenge</li><li>To Applying appropriate analytic techniques and tools to analyze big data, create statistical models, and identify insights that can lead to actionable result</li><li>To using tools such as: R and RStudio, MapReduce/Hadoop, in-database analytics, Window and MAD lib functions.</li></ul>												
<b>COURSE OUTCOMES (Cos) :</b>												
CO1	Deploying the Data Analytics Lifecycle to address big data analytics projects											
CO2	Reframing a business challenge as an analytics challenge											
CO3	Applying appropriate analytic techniques and tools to analyze big data, create statistical models, and identify insights that can lead to actionable results											
C04	Explore the next generation of big data tools and applications, and other advanced topics if time permits.											
CO5	Able to identify big data and business implications, list the components of hadoop and hadoop ecosystem											
<b>Mapping of Course Outcomes with Program Outcomes (Pos)</b>												
Cos/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	3	3	3	2	3	2	3	3
CO2	3	3	2	3	3	3	3	1	3	2	3	2
CO3	3	3	3	3	2	2	3	2	3	1	3	3
CO4	3	3	3	3	2	3	1	3	3	3	3	3
CO5	3	3	3	3	2	3	1	2	2	3	3	3
Cos / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			3			3			2		
CO2	3			3			3			2		
CO3	3			3			2			3		
CO4	3			3			3			2		
CO5	3			3			3			2		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E19	DATA SCIENCE AND BIG DATA ANALYTICS	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION

**9 Hrs**

Big data overview - State of the practice in analytics, BI vs data science, current analytical architecture, drivers of big data - Big data ecosystem - **Data analytics lifecycle** - overview – Discovery Phase - Data preparation Phase - Model Planning Phase - Model building Phase - Communicate results Phase - Operationalization Phase.

### UNIT II BASIC DATA ANALYTIC METHODS USING R

**9 Hrs**

Introduction to R , R Graphical User interfaces, Data import and export, Attribute and data types, descriptive statistics - Exploratory data analysis, visualization data analysis, dirty data, visualizing a single variable, examining multiple variables, data exploration vs presentation, - Statistical methods for evaluation, Hypothesis testing, Difference of Means, Wilcoxon Rank-sum test, Type I and II errors, power and sample size, ANOVA

### UNIT III ADVANCED ANALYTICAL THEORY & METHODS (CLUSTERING, ASSOCIATION RULES AND REGRESSION

**9Hrs**

Clustering- k-means, use cases, determining the number of clusters, diagnostics, Reasons to choose and cautions, additional algorithms - Association rules- Apriori algorithm, Evaluation of candidate rules, Application of association rules, an example- transactions in a grocery store, the groceries dataset, frequent itemset generation, rule generation and visualization, validation and testing, diagnostics - Regression- linear and logistic regression, usecases, model description, diagnostics – Additional Regression Models

### UNIT IV ADVANCED ANALYTICAL THEORY & METHODS (CLASSIFICATION, TIME SERIES ANALYSIS AND TEXT ANALYSIS)

**9 Hrs**

Classification - Decision Trees, general algorithm, evaluating a decision tree, Decision trees in R - Naive Bayes - Bayes theorem, Naive Bayes classifier, Smoothing, diagnostics, Additional Classification Methods - Time Series Analysis- Box-Jenkins Methodology, ARIMA Model, Auto correlation Function(ACF), Auto regressive models, moving average models, ARMA and ARIMA Models, building and evaluating a ARIMA Model - Text Analysis- collecting raw text, representing text, term frequency-Inverse document frequency(TFIDF), Categorizing documents by topics, determining sentiments, gaining insights

### UNIT V ADVANCED ANALYTICS-TECHNOLOGY AND TOOLS: MAPREDUCE AND HADOOP

**9Hrs**

Analytics for unstructured data, usecases, Mapreduce, Apache Hadoop - The Hadoop Ecosystem - Pig, Hive, HBase, Mahout, NoSQL - **In-database analytics** - SQL Essentials, Joins, Set operations, Grouping extensions, In-Database text analytics, Advanced SQL, Window functions, User-defined functions and aggregates, Ordered Aggregates, MADlib.

**Total Hours: 45**

#### TEXT BOOK:

1. EMC Education Services (Editor), 2015 Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, Wiley Publications, ISBN: 978-1-118-87613-8



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E20</b>	Subject Name <b>SOFTWARE QUALITY MANAGEMENT</b>	Ty/Lb/ETL	L	T/ S.Lr	P/R	C						
	Prerequisite: First year Engineering Mathematics	Ty	3	0/0	0/0	3						
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To Quality tools including CASE tools</li><li>To Quality management system models</li><li>To Complexity metrics and Customer Satisfaction</li><li>To International quality standards – ISO, CMM</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Understand the quality measurement and metrics											
CO2	Explain quality plan, implementation and documentation											
CO3	Quality control and reliability of quality process											
CO4	Understand the quality management system models											
CO5	Apply international quality standards.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	3	2	1	1	1	2	1	1	3
CO2	3	2	1	2	1	2	1	2	2	1	1	3
CO3	2	3	1	3	2	2	2	1	1	2	1	3
CO4	3	3	1	2	1	2	2	1	1	2	1	2
CO5	2	3	1	2	1	2	2	1	1	2	2	3
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	2			3			1			2		
CO2	1			2			1			3		
CO3	1			2			1			2		
CO4	2			3			1			3		
CO5	1			3			1			3		
<b>3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22E20	SOFTWARE QUALITY MANAGEMENT	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION TO SOFTWARE QUALITY

**9 hrs**

Software Quality – Hierarchical models of Boehm and McCall – Quality measurement – Metrics measurement and analysis – Gilb’s approach – GQM Model

### UNIT II SOFTWARE QUALITY ASSURANCE

**9 hrs**

Quality tasks – SQA plan – Teams – Characteristics – Implementation – Documentation – Reviews and Audits

### UNIT III QUALITY CONTROL AND RELIABILITY

**9 hrs**

Tools for Quality – Ishikawa’s basic tools – CASE tools – Defect prevention and removal – Reliability models – Rayleigh model – Reliability growth models for quality assessment

### UNIT IV QUALITY MANAGEMENT SYSTEM

**9 hrs**

Elements of QMS – Rayleigh model framework – Reliability Growth models for QMS – Complexity metrics and models – Customer satisfaction analysis.

### UNIT V QUALITY STANDARDS

**9 hrs**

Need for standards – ISO 9000 Series – ISO 9000-3 for software development – CMM and CMMI – Six Sigma concepts.

**Total Hours: 45**

### TEXT BOOKS

- Allan C. Gillies, “Software Quality: Theory and Management”, Thomson Learning, 2003. (UI : Ch 1-4 ; UV : Ch 7-8)
- Stephen H. Kan, “Metrics and Models in Software Quality Engineering”, Pearson Education (Singapore) Pte Ltd., 2002. (UI : Ch 3-4; UIII : Ch 5-8 ; UIV : Ch 9-11)

### REFERENCES

- Norman E. Fenton and Shari Lawrence Pfleeger, “Software Metrics” Thomson, 2003
- Mordechai Ben – Menachem and Garry S.Marlist, “Software Quality”, Thomson Asia Pte Ltd, 2003.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E21</b>	Subject Name <b>SOFTWARE PROJECT MANAGEMENT</b>	<b>Ty/Lb/ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>						
	Prerequisite: First year Engineering Mathematics	Ty	3	0/ 0	0/0	3						
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To define and highlight importance of software project management</li><li>To describe the software project management activities</li><li>To train software project managers and other individuals involved in software project</li><li>To planning and tracking and oversight in the implementation of the software project management process.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
<b>CO1</b>	Explain importance of project management from the perspectives of planning, tracking and completion of project											
<b>CO2</b>	Compare and differentiate organization structures and project structures											
<b>CO3</b>	Manage project schedule, expenses and resources with the application of suitable project management tools.											
<b>CO4</b>	Understand software quality assurance and testing											
<b>CO5</b>	Apply the risk management in the project.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/POs</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	3	3	2	3	2	1	1	1	2	1	1	3
<b>CO2</b>	3	2	1	2	1	2	1	2	2	1	1	3
<b>CO3</b>	2	3	1	3	2	2	2	1	1	2	1	3
<b>CO4</b>	3	3	1	2	1	2	2	1	1	2	1	2
<b>CO5</b>	2	3	1	2	1	2	2	1	1	2	2	3
<b>COs / PSOs</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
<b>CO1</b>	2			3			1			2		
<b>CO2</b>	1			2			1			3		
<b>CO3</b>	1			2			1			2		
<b>CO4</b>	2			3			1			3		
<b>CO5</b>	1			3			1			3		
<b>3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22E21	SOFTWARE PROJECT MANAGEMENT	Ty	3	0/0	0/0	3

### UNIT I: INTRODUCTION AND SOFTWARE PROJECT PLANNING

**9 Hrs**

Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives, Management Spectrum, SPM Framework, Software Project Planning, Planning Objectives, Project Plan, Types of project plan, Structure of a Software Project Management Plan, Software project estimation, Estimation methods, Estimation models, Decision process.

### UNIT II: PROJECT ORGANIZATION AND SCHEDULING

**9 Hrs**

Project Elements, Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle, Ways to Organize Personnel, Project schedule, Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques, Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts.

### UNIT III: PROJECT MONITORING AND CONTROL

**9 Hrs**

Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: 23 Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index (SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Deskchecks, Walk through, Code Reviews, Pair Programming.

### UNIT IV: SOFTWARE QUALITY ASSURANCE AND TESTING

**9 Hrs**

Testing Objectives, Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Correctness, Program Verification & validation, Testing Automation & Testing Tools, Concept of Software Quality, Software Quality Attributes, Software Quality Metrics and Indicators, The SEI Capability Maturity Model CMM), SQA Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Clean room process.

### UNIT V: PROJECT MANAGEMENT AND PROJECT MANAGEMENT TOOLS

**9 Hrs**

Software Configuration Management: Software Configuration Items and tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control, Risk Management: Risks and risk types, Risk Breakdown Structure (RBS), Risk Management Process: Risk identification, Risk analysis, Risk planning, Risk monitoring, Cost Benefit Analysis, Software Project Management Tools: CASE Tools, Planning and Scheduling Tools, MS-Project.

**Total Hours: 45**

### TEXT BOOKS

1. "Project Management: The Managerial Process with MS" – Clifford F. Gray and Erik W. Larson, Mc Graw Hill

### REFERENCE BOOKS

1. Software Project Management – M. Cotterell, Tata McGraw-Hill Publication.
2. Software Project Management – Royce, Pearson Education
3. Software Project Management – Kieron Conway, Dreamtech Press
4. Software Project Management – S. A. Kelkar, PHI Publication.





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E22</b>	Subject Name <b>MACHINE LEARNING TECHNIQUES</b>						<b>Ty/Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: Mathematics						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To understand the need for machine learning for various problem solving</li><li>To study the various supervised, semi-supervised and unsupervised learning algorithms in machine learning</li><li>To understand the latest trends in machine learning</li><li>To design appropriate machine learning algorithms for problem solving</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Differentiate between supervised, unsupervised, semi-supervised machine learning approaches.											
CO2	Solve problems associated with batch learning and online learning, and the big data characteristics such as high dimensionality, dynamically growing data and in particular scalability issues.											
CO3	Recognize and implement various ways of selecting suitable model parameters for different machine learning techniques.											
CO4	Apply the Bayesian concepts to machine learning.											
CO5	Analyze and suggest appropriate machine learning approaches for various types of problems.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/ POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
CO1	1	3	3	-	1	-	-	-	1	2	-	-
CO2	1	3	3	-	2	-	-	-	1	2	-	-
CO3	3	3	3	-	3	-	-	-	2	2	-	-
CO4	3	3	3	-	3	-	-	-	3	2	-	-
CO5	2	3	3	-	3	-	-	-	3	3	-	-
<b>COs / PSOs</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
CO1	2			3			-			2		
CO2	3			2			-			3		
CO3	2			2			-			3		
CO4	2			3			-			2		
CO5	2			2			-			3		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22E22	MACHINE LEARNING TECHNIQUES	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION

**9 Hrs**

Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

### UNIT II NEURAL NETWORKS AND GENETIC ALGORITHMS

**9 Hrs**

Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evaluation and Learning.

### UNIT III BAYESIAN AND COMPUTATIONAL LEARNING

**9Hrs**

Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

### UNIT IV INSTANT BASED LEARNING

**9 Hrs**

K- Nearest Neighbour Learning – Locally weighted Regression – Radial Basis Functions – Case Based Learning.

### UNIT V ADVANCED LEARNING

**9 Hrs**

Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning

**Total Hours: 45**

### TEXT BOOK:

- 1 Tom M. Mitchell, —Machine Learning, McGraw-Hill Education (India) Private Limited, 2013.

### REFERENCES:

- 1 EthemAlpaydin, —Introduction to Machine Learning (Adaptive Computation and Machine Learning), The MIT Press 2004.
- 2 Stephen Marsland, —Machine learning: An Algorithmic Perspective, CRC Press, 2009.



## FACULTY OF ENGINEERING AND TECHNOLOGY

<b>Subject Code</b> <b>EBIT22E23</b>	<b>Subject Name</b> <b>CYBER FORENSICS AND INTERNET SECURITY</b>						<b>Ty/Lb/ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: Cryptography and Network security						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To learn the computer forensic fundamentals</li><li>To understand various types of cyber crime activities involved in the digital world</li><li>To study various network security technologies to prevent the data from hacker or intruder</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Secure personal and official data on computers through effective data protection measures.											
CO2	Recognize digital forensics techniques											
CO3	Implement network security technologies to maintain data integrity and confidentiality.											
CO4	Describe the current cybersecurity landscape and its key elements.											
CO5	Evaluate cybersecurity measures to meet organizational needs and mitigate risks.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	1	3	3	3	1	2	2	3	3
CO2	3	3	3	2	3	3	3	3	3	2	3	3
CO3	3	3	3	3	3	3	3	2	3	2	3	3
CO4	3	3	3	2	3	3	3	3	2	2	2	3
CO5	3	3	3	3	2	3	3	3	2	3	3	2
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			3			2			3		
CO2	3			3			2			3		
CO3	3			3			2			3		
CO4	3			3			3			2		
CO5	3			3			3			2		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E23	CYBER FORENSICS AND INTERNET SECURITY	Ty	3	0/0	0/0	3

### UNIT I CYBER FORENSICS FUNDAMENTALS

**9 Hrs**

Introduction to Cyber forensics: Information Security Investigations, Corporate Cyber Forensics, Scientific method in forensic analysis, investigating large scale Data breach cases. Analyzing Malicious software.

### UNIT II COMPUTER FORENSICS TECHNOLOGY

**9 Hrs**

Types of Computer Forensics Technology, Types of Military Computer Forensic Technology, Types of Law Enforcement: Computer Forensic Technology, Types of Business Computer Forensic Technology, Specialized Forensics Techniques, Hidden Data and How to Find It, Spyware and Adware, Encryption Methods and Vulnerabilities, Protecting Data from Being Compromised Internet Tracing Methods, Security and Wireless Technologies, Avoiding Pitfalls with Firewalls Biometric Security Systems

### UNIT III COMPUTER FORENSICS SYSTEMS

**9 Hrs**

Internet Security Systems, Intrusion Detection Systems, Firewall Security Systems, Storage Area Network Security Systems, Network Disaster Recovery Systems, Public Key Infrastructure Systems, Wireless Network Security Systems, Satellite Encryption Security Systems, Instant Messaging (IM) Security Systems, Net Privacy Systems, Identity Management Security Systems, Identity Theft, Biometric Security Systems

### UNIT IV NETWORK SECURITY TECHNIQUES

**9 Hrs**

Network Security Applications, Authentication Mechanisms: Passwords, Cryptographic authentication protocol, Smart Card, Biometrics, Digital Signatures and seals, Kerberos, X.509 LDAP, Directory. Web Security: SSL Encryption, TLS, SET

### UNIT V CASE STUDY

**9 Hrs**

E-mail Security, Pretty Good Privacy (PGPs) / MIME, IP Security, Access and System Security, Intruders, Intrusion Detection and Prevention, Firewall, Hardware Firewall, Software Firewall, Application Firewall, Packet Filtering, Packet Analysis, Proxy Servers, Firewall setting in Proxy, ACL in Proxy.

**Total Hours: 45**

### TEXT BOOKS:

1. John R. Vacca, (2005) Computer Forensics: Computer Crime Scene Investigation, 2nd Edition, Charles River Media.
2. Man Young Rhee, (2003) "Internet Security Cryptographic Principles, Algorithms and Protocols", WILEY.

### REFERENCE BOOKS:

1. William Stallings, "Cryptography and Network Security: Principles and Standards", Prentice Hall India, 3rd Edition, 2003
2. Computer Forensics: Investigating Network Intrusions and Cyber Crime (Ec-Council Press Series: Computer Forensics), 2010
3. Christof Paar, Jan Pelzl, Understanding Cryptography: A Textbook for Students and Practitioners, 2nd Edition, Springer, 2010.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E24</b>	Subject Name <b>INFORMATION RETERIVAL</b>	<b>Ty/Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>						
	Prerequisite: Data Warehousing and Data Mining, Mathematics	Ty	3	0/0	0/0	3						
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES:</b> <ul style="list-style-type: none"><li>To understand the basics of information retrieval with pertinence to modeling, query operations and indexing</li><li>To get an understanding of machine learning techniques for text classification and clustering.</li><li>To understand the various applications of information retrieval giving emphasis to multimedia IR, web search</li><li>To understand the concepts of digital libraries</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Use an open source search engine framework and explore its capabilities											
CO2	Apply machine learning techniques to text classification and clustering which is used for efficient Information Retrieval.											
CO3	Design and implement innovative features in a search engine.											
CO4	Understanding web crawling and retrieval in web mining, Design an efficient search engine and analyze the Web content structure.											
CO5	Understanding the recommender system and Identify and design the various components of an Information Retrieval system.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	3	2	1	1	1	1	1	1	1
CO2	3	3	3	1	2	1	2	2	3	1	1	1
CO3	3	2	3	3	3	2	1	2	3	1	1	1
CO4	3	3	3	3	2	1	2	2	3	1	1	1
CO5	3	2	3	3	3	2	1	2	3	1	1	1
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			3			1			1		
CO2	3			3			2			1		
CO3	3			2			1			1		
CO4	3			3			1			1		
CO5	3			2			1			1		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E24	INFORMATION RETERIVAL	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION - MOTIVATION

**9 Hrs**

Basic Concepts – Practical Issues - Retrieval Process – Architecture - Boolean Retrieval – Retrieval Evaluation – Open Source IR Systems–History of Web Search – Web Characteristics– The impact of the web on IR —IR Versus Web Search–Components of a Search engine.

### UNIT II MODELING

**9 Hrs**

Taxonomy and Characterization of IR Models – Boolean Model – Vector Model - Term Weighting – Scoring and Ranking –Language Models – Set Theoretic Models - Probabilistic Models – Algebraic Models – Structured Text Retrieval Models – Models for Browsing.

### UNIT III TEXT CLASSIFICATION AND CLUSTERING

**9 Hrs**

A Characterization of Text Classification – Unsupervised Algorithms: Clustering – Naïve Text Classification – Supervised Algorithms – Decision Tree – k-NN Classifier – SVM Classifier – Feature Selection or Dimensionality Reduction – Evaluation metrics – Accuracy and Error – Organizing the classes – Indexing and Searching – Inverted Indexes – Sequential Searching – Multi-dimensional Indexing.

### UNIT IV WEB RETRIEVAL AND WEB CRAWLING

**9 Hrs**

The Web – Search Engine Architectures – Cluster based Architecture – Distributed Architectures – Search Engine Ranking – Link based Ranking – Simple Ranking Functions – Learning to Rank – Evaluations — Search Engine Ranking – Search Engine User Interaction – Browsing – Applications of a Web Crawler – Taxonomy – Architecture and Implementation – Scheduling Algorithms – Evaluation.

### UNIT V RECOMMENDER SYSTEM

**9 Hrs**

Recommender Systems Functions – Data and Knowledge Sources – Recommendation Techniques – Basics of Content-based Recommender Systems – High Level Architecture – Advantages and Drawbacks of Content-based Filtering – Collaborative Filtering – Matrix factorization models – Neighborhood models.

**TOTAL: 45 Hrs**

### TEXT BOOKS:

1. Ricardo Baeza-Yates and Berthier Ribeiro-Neto, —Modern Information Retrieval: The Concepts and Technology behind Search, Second Edition, ACM Press Books, 2011.
2. Ricci, F, Rokach, L. Shapira, B.Kantor, —Recommender Systems Handbook, First Edition, 2011.

### REFERENCES:

1. C. Manning, P. Raghavan, and H. Schütze, —Introduction to Information Retrieval, Cambridge University Press, 2008.
2. Stefan Buettcher, Charles L. A. Clarke and Gordon V. Cormack, —Information Retrieval: Implementing and Evaluating Search Engines, The MIT Press, 2010.
3. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schutze, —Introduction to Information Retrieval, Cambridge University Press, First South Asian Edition, 2008.
4. Implementing and Evaluating Search Engines, The MIT Press, Cambridge, Massachusetts London, England, 2010.
5. Ricardo Baeza – Yates, Berthier Ribeiro – Neto, —Modern Information Retrieval: The concepts and Technology behind Search (ACM Press Books), Second Edition, 2011.  
Stefan Buttcher, Charles L. A. Clarke, Gordon V. Cormack, —Information Retrieval.





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E25</b>	Subject Name <b>NATURAL LANGUAGE PROCESSING</b>							<b>Ty/ Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>
	Prerequisite: Mathematics, Python							Ty	3	0/0	0/0	3
L : Lecture T:Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES</b> <ul style="list-style-type: none"><li>To Natural language processing deals with written text.</li><li>To process written text from basic of fundamental knowledge starts with Finite automata, Regular expression and probabilistic model with n-grams.</li><li>To Recognize Speech and parsing with grammar.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Understand Natural Language Processing											
CO2	Probabilistic model of defining language and techniques.											
CO3	Applying Hidden Markov model and Speech Recognition.											
CO4	Application of context free grammar and language parsing.											
CO5	Implement probabilistic and language parsing. and Differentiation of semantic and discourse in terms of NLP.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/ POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
CO1	2	1	-	-	-	-	-	-	-	-	-	-
CO2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	3	2	1	1	-	-	-	-	-	-	-	-
CO4	3	2	1	1	-	-	-	-	-	-	-	-
CO5	3	2	1	1	-	-	-	-	-	-	-	-
<b>COs / PSOs</b>	<b>PSO1</b>				<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>	
CO1	1				1			1			1	
CO2	1				1			1			1	
CO3	1				1			1			1	
CO4	1				1			1			1	
CO5	1				1			1			1	
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium,1-Low</b>												
<b>Category</b>	<b>Basic Sciences</b>	<b>Engineering Sciences</b>	<b>Humanities and Social Sciences</b>	<b>Program Core</b>	<b>Program Electives</b>	<b>Open Electives</b>	<b>Interdisciplinary</b>	<b>Skill component</b>	<b>Practical / Project</b>			
					✓							





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E25	NATURAL LANGUAGE PROCESSING	Ty	3	0/0	0/0	3

### UNIT –I INTRODUCTION TO NLP

**6 Hrs**

What is NLP? Why NLP is Difficult? History of NLP, Advantages of NLP, Disadvantages of NLP, Components of NLP, Applications of NLP, How to build an NLP pipeline? Phases of NLP, NLP APIs, NLP Libraries.

### UNIT –II LANGUAGE MODELING AND PART OF SPEECH TAGGING

**12 Hrs**

Unigram Language Model, Bigram, Trigram, N-gram, Advanced smoothing for language modeling, Empirical Comparison of Smoothing Techniques, Applications of Language Modeling, Natural Language Generation, Parts of Speech Tagging, Morphology, Named Entity Recognition.

### UNIT –III WORDS AND WORD FORMS

**7 Hrs**

Bag of words, skip-gram, Continuous Bag-Of-Words, Embedding representations for words Lexical Semantics, Word Sense Disambiguation, Knowledge Based and Supervised Word Sense Disambiguation.

### UNIT –IV TEXT ANALYSIS, SUMMARIZATION AND EXTRACTION

**10 Hrs**

Sentiment Mining, Text Classification, Text Summarization, Information Extraction, Named Entity Recognition, Relation Extraction, Question Answering in Multilingual Setting; NLP in Information Retrieval, Cross-Lingual IR.

### UNIT –V MACHINE TRANSLATION

**10 Hrs**

Need of MT, Problems of Machine Translation, MT Approaches, Direct Machine Translations, Rule-Based Machine Translation, Knowledge Based MT System, Statistical Machine Translation (SMT), Parameter learning in SMT (IBM models) using EM, Encoder-decoder architecture, Neural Machine Translation.

**Total Hours : 45**

### REFERENCE BOOKS:

1. Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition Jurafsky, David, and James H. Martin, PEARSON
2. Foundations of Statistical Natural Language Processing, Manning, Christopher D., and Hinrich Schütze, Cambridge, MA: MIT Press .
3. Natural Language Understanding, James Allen. The Benjamin/Cummings Publishing Company Inc..
4. Natural Language Processing with Python – Analyzing Text with the Natural Language Toolkit Steven Bird, Ewan Klein, and Edward Loper



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBIT22E41	Subject Name BLOCK CHAIN TECHNOLOGIES						Ty/ Lb / ETL	L	T/ S.Lr	P/R	C	
	Prerequisite: Python Programming, Cryptography and Network security						Ty	3	0/0	0/0	3	
L : Lecture T:Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVES :												
<ul style="list-style-type: none"><li>To Understand the emerging models for Block chain Technology.</li><li>To Identify major research challenges and technical gaps existing between theory and practice in crypto currency domain.</li><li>To provides conceptual understanding of the function of Block chain as a method of securing distributed ledgers,</li><li>To Apply hyperledger Fabric and Ethereum platform to implement the Block chain Application.</li></ul>												
COURSE OUTCOMES (COs) :												
CO1	Understand emerging abstract models for Block chain Technology .											
CO2	Identify major research challenges and technical gaps .											
CO3	Understand of the function of Block chain as a method of securing distributed ledgers.											
CO4	Analyze the consensus on their contents is achieved, and the new applications that they enable.											
CO5	Apply hyper ledger Fabric and Ethereum platform to implement the Block chain Application											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	2	2	3	3	3	3	-	1	-
CO2	3	3	1	2	2	2	3	2	2	-	1	-
CO3	3	3	1	2	2	2	2	2	3	-	3	-
CO4	3	3	2	2	3	3	2	3	3	2	3	-
CO5	3	3	3	2	3	2	2	3	2	2	3	-
COs/ PSOs	PSO 1			PSO2			PSO3			PSO4		
CO1	2			2			3			2		
CO2	2			2			2			2		
CO3	2			2			3			2		
CO4	3			3			3			3		
CO5	3			3			3			3		
3/2/1 indicates Strength of Correlation 3- High, 2- Medium,1-Low												
	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E41	BLOCK CHAIN TECHNOLOGIES	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION TO BLOCKCHAIN

**9Hrs**

Blockchain- Public Ledgers, Blockchain as Public Ledgers -Bitcoin, Blockchain 2.0, Smart Contracts, Block in a Blockchain, Transactions-Distributed Consensus, The Chain and the Longest Chain - Cryptocurrency to Blockchain 2.0 - Permissioned Model of Blockchain, Cryptographic -Hash Function, Properties of a hash function-Hash pointer and Merkle tree

### UNIT II BITCOIN AND CRYPTOCURRENCY

**9Hrs**

A basic crypto currency, Creation of coins, Payments and double spending, FORTH – the precursor for Bitcoin scripting, Bitcoin Scripts, Bitcoin blocks, Bitcoin P2P Network, Transaction in Bitcoin Network, Block Mining, Block propagation and block relay, Consensus introduction, Distributed consensus in open environments-Consensus in a Bitcoin network

### UNIT III BITCOIN CONSENSUS

**9Hrs**

Bitcoin Consensus, Proof of Work (PoW)- HashcashPoW , Bitcoin PoW, Attacks on PoW ,monopoly problem- Proof of Stake- Proof of Burn - Proof of Elapsed Time - Bitcoin Miner, Mining Difficulty, Mining Pool-Permissioned model and use cases, Design issues for Permissioned Blockchains, Execute contracts- Consensus models for permissioned blockchain-Distributed consensus in closed environment Paxos.

### UNIT IV DISTRIBUTED CONSENSUS

**9Hrs**

RAFT Consensus-Byzantine general problem, Byzantine fault tolerant system-Agreement Protocol, Lamport-Shostak-Pease BFT Algorithm-BFT over Asynchronous systems, Practical Byzantine Fault Tolerance

### UNIT V HYPER LEDGER FABRIC & ETHERUM

**9Hrs**

Architecture of Hyperledger fabric v1.1-Introduction to hyperledger fabric v1.1, chain code- Ethereum: Ethereum network, EVM, Transaction fee, Mist Browser, Ether, Gas, Solidity, Smart contracts, Truffle Design and issue Crypto currency, Mining, DApps, DAO Blockchain Applications Internet of Things-Medical Record Management System-Blockchain in Government and Blockchain Security-Blockchain Use Cases –Finance

**Total Hours: 45**

### REFERENCE BOOKS:

1. Mastering Blockchain: Deeper insights into decentralization, cryptography, Bitcoin, and popular Blockchain frameworks by Bashir, Imran,2017.
2. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. Bitcoin and cryptocurrency technologies: a comprehensive introduction. Princeton University Press, 2016.
3. Joseph Bonneau et al, SoK: Research perspectives and challenges for Bitcoin and cryptocurrency, IEEE Symposium on security and Privacy, 2015



## FACULTY OF ENGINEERING AND TECHNOLOGY

### Program Elective IV & V

Subject Code EBIT22E26	Subject Name ROBOTICS						Ty/ Lb / ETL	L	T/ S.Lr	P/R	C	
	Prerequisite: Basic Engineering Knowledge						Ty	3	0/0	0/0	3	
L : Lecture T:Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVES : <ul style="list-style-type: none"><li>• To introduce the functional elements of Robotics</li><li>• To impart knowledge on the direct and inverse kinematics</li><li>• To introduce the manipulator differential motion and control</li><li>• To educate on various path planning techniques</li><li>• To introduce the dynamics and control of manipulators</li></ul>												
COURSE OUTCOMES (COs) :												
CO1	Ability to understand basic concept of robotics.											
CO2	Analyze Instrumentation systems and their applications to various.											
CO3	Understand differential motion add statics in robotics.											
CO4	Understand various path planning techniques.											
CO5	Apply dynamics and control in robotics industries.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	1	1	1	1	1	1	3	2
CO2	2	3	2	1	3	1	1	2	1	1	1	2
CO3	1	1	1	2	3	1	2	2	1	2	1	1
CO4	1	1	3	3	1	1	1	2	1	1	3	1
CO5	1	1	3	1	1	3	3	1	3	2	2	1
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	2			1			1			3		
CO2	2			2			2			3		
CO3	2			2			2			3		
CO4	2			2			2			3		
CO5	2			2			2			3		
3/2/1 indicates Strength of Correlation 3- High, 2- Medium, 1-Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E26	ROBOTICS	Ty	3	0/0	0/0	3

### UNIT I BASIC CONCEPTS

9 Hrs

Brief history- Types of Robot – Technology-Robot classifications and specifications-Design and control issues- Various manipulators – Sensors - work cell - Programming languages.

### UNIT II DIRECT AND INVERSE KINEMATICS

9 Hrs

Mathematical representation of Robots - Position and orientation – Homogeneous transformation- Various joints- Representation using the DenavitHattenberg parameters -Degrees of freedom-Direct kinematics-Inverse kinematics- SCARA robots- Solvability – Solution methods-Closed form solution.

### UNIT III MANIPULATOR DIFFERENTIAL MOTION AND STATICS

9 Hrs

Linear and angular velocities-Manipulator Jacobian-Prismatic and rotary joints–Inverse -Wrist and arm singularity - Static analysis - Force and moment Balance.

### UNIT IV PATH PLANNING

9 Hrs

Definition-Joint space technique-Use of p-degree polynomial-Cubic polynomial-Cartesian space technique - Parametric descriptions - Straight line and circular paths - Position and orientation planning.

### UNIT V DYNAMICS AND CONTROL

9 Hrs

Lagrangian mechanics-2DOF Manipulator-Lagrange Euler formulation-Dynamic model -Manipulator control problem-Linear control schemes-PID control scheme-Force control of robotic manipulator.

**Total Hours: 45**

### TEXT BOOK:

1. R.K.Mittal and I.J.Nagrath, Robotics and Control, Tata McGraw Hill, New Delhi,4th Reprint, 2005.
2. JohnJ.Craig ,Introduction to Robotics Mechanics and Control, Third edition, Pearson Education, 2009.
3. M.P.Groover, M.Weiss, R.N. Nageland N. G.Odrej, Industrial Robotics, McGraw-Hill Singapore, 1996.

### REFERENCE BOOKS:

1. Ashitava Ghoshal, Robotics-Fundamental Concepts and Analysis', Oxford University Press, Sixth impression, 2010.
2. K. K.AppuKuttan, Robotics, I K International, 2007.
3. Edwin Wise, Applied Robotics, Cengage Learning, 2003.
4. R.D.Klafter,T.A.Chimielewski and M.Negin, Robotic Engineering–An Integrated Approach, Prentice Hall of India, New Delhi, 1994.
5. B.K.Ghosh, Control in Robotics and Automation: Sensor Based Integration, Allied Publishers,Chennai, 1998.
6. S.Ghoshal, “ Embedded Systems & Robotics” – Projects using the 8051 Microcontroller”, Cengage Learning, 2009.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject code EBIT22E27	Subject Name DISTRIBUTED COMPUTING						Ty/Lb/ ETL	L	T/ S.Lr	P/R	C	
	Prerequisite : Database Management Systems, Operating System						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : <ul style="list-style-type: none"><li>To understand the foundations of distributed systems.</li><li>To learn issues related to clock Synchronization and the need for global state in distributed systems.</li><li>To learn distributed mutual exclusion and deadlock detection algorithms.</li><li>To understand the significance of agreement, fault tolerance and recovery protocols in Distributed Systems.</li><li>To learn the characteristics of peer-to-peer and distributed shared memory systems.</li></ul>												
COURSE OUTCOMES (COs) : Students completing the course were able to												
CO1	Elucidate the foundations and issues of distributed systems											
CO2	Understand the various synchronization issues and global state for distributed systems.											
CO3	Understand the Mutual Exclusion and Deadlock detection algorithms in distributed systems											
CO4	Describe the agreement protocols and fault tolerance mechanisms in distributed systems.											
CO5	Describe the features of peer-to-peer and distributed shared memory systems											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	-	-	-	-	-	-	-	-
CO5	3	3	3	-	-	-	-	-	-	-	-	-
COs/PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			-			-			-		
CO2	3			-			-			-		
CO3	3			-			-			-		
CO4	3			-			-			-		
CO5	3			-			-			-		
H/M/L indicates strength of correlation 3 – High, 2 – Medium, 1 – Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22E27	DISTRIBUTED COMPUTING	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION

**9 Hrs**

Introduction: Definition –Relation to computer system components –Motivation –Relation to parallel systems – Message-passing systems versus shared memory systems –Primitives for distributed communication –Synchronous versus asynchronous executions –Design issues and challenges. A model of distributed computations: A distributed program –A model of distributed executions –Models of communication networks –Global state – Cuts –Past and future cones of an event –Models of process communications. Logical Time: A framework for a system of logical clocks –Scalar time –Vector time – Physical clock synchronization: NTP.

### UNIT II MESSAGE ORDERING & SNAPSHOTS

**9 Hrs**

Message ordering and group communication: Message ordering paradigms –Asynchronous execution with synchronous communication –Synchronous program order on an asynchronous system –Group communication – Causal order (CO) - Total order. Global state and snapshot recording algorithms: Introduction –System model and definitions –Snapshot algorithms for FIFO channels

### UNIT III DISTRIBUTED MUTEX & DEADLOCK

**9 Hrs**

Distributed mutual exclusion algorithms: Introduction – Preliminaries – Lamport’s algorithm – Ricart-Agrawala algorithm – Maekawa’s algorithm – Suzuki–Kasami’s broadcast algorithm. Deadlock detection in distributed systems: Introduction – System model – Preliminaries – Models of deadlocks – Knapp’s classification – Algorithms for the single resource model, the AND model and the OR model.

### UNIT IV RECOVERY & CONSENSUS

**9 Hrs**

Check pointing and rollback recovery: Introduction – Background and definitions – Issues in failure recovery – Checkpoint-based recovery – Log-based rollback recovery – Coordinated checkpointing algorithm – Algorithm for asynchronous checkpointing and recovery. Consensus and agreement algorithms: Problem definition – Overview of results – Agreement in a failure – free system – Agreement in synchronous systems with failures.

### UNIT V P2P & DISTRIBUTED SHARED MEMORY

**9 Hrs**

Peer-to-peer computing and overlay graphs: Introduction – Data indexing and overlays – Chord – Content addressable networks – Tapestry. Distributed shared memory: Abstraction and advantages – Memory consistency models –Shared memory Mutual Exclusion.

**Total Hours: 45**

#### TEXT BOOKS:

1. Kshemkalyani, Ajay D., and Mukesh Singhal. Distributed computing: principles, algorithms, and systems. Cambridge University Press, 2011.

#### REFERENCE BOOKS:

1. George Coulouris, Jean Dollimore and Tim Kindberg, “Distributed Systems Concepts and Design”, Fifth Edition, Pearson Education, 2012.
2. Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, 2007.
3. Mukesh Singhal and Niranjana G. Shivaratri. Advanced concepts in operating systems. McGraw-Hill, Inc., 1994.
4. Tanenbaum A.S., Van Steen M., “Distributed Systems: Principles and Paradigms”, Pearson Education, 2007.
5. Liu M.L., “Distributed Computing, Principles and Applications”, Pearson Education, 2004.
6. Nancy A Lynch, “Distributed Algorithms”, Morgan Kaufman Publishers, USA, 2003





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E28</b>	Subject Name <b>ARTIFICIAL NEURAL NETWORKS</b>						Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C	
	Prerequisite: Mathematics						Ty	3	0/0	0/0	3	
L : Lecture T:Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To explore the architecture and learning concepts of neural networks.</li><li>To learn the performance of back propagation neural network.</li><li>To gain knowledge on adaptive resonance theory</li><li>To understand different associative memory system.</li><li>To provide adequate knowledge of application of neural networks in real time systems</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Understand the fundamental theory and concepts of neural networks											
CO2	Analyse the performance metrics of back propagation neural network.											
CO3	Apply the adaptive neural network techniques in real time applications											
CO4	Apply associative memory concepts to determine the implementation of neural network applications											
CO5	Apply the concept of neural networks in speech recognition applications											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	-	-	-	-	-	-	-	-	-
CO2	3	3	1	-	-	-	-	-	-	-	-	-
CO3	3	2	1	-	-	-	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-
CO5	3	2	1	-	-	-	-	-	-	-	-	-
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	1			1			1			-		
CO2	1			1			1			-		
CO3	1			1			1			-		
CO4	1			1			1			-		
CO5	1			1			1			-		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E28	ARTIFICIAL NEURAL NETWORKS	Ty	3	0/0	0/0	3

### UNIT I: INTRODUCTION TO NEURAL NETWORKS

**7 Hrs**

History of Neural Networks, Structure and Functions of Biological Neuron and Artificial Neuron Models, Neural Network Architectures, Characteristics of ANN, Basic Learning Laws and Methods.

### UNIT II: BACK PROPAGATION NETWORKS

**10 Hrs**

Architecture of feed forward network, single layer ANN, multilayer perceptron, back propagation learning, input - hidden and output layer computation, back propagation algorithm, applications, selection of tuning parameters in back propagation network, Numbers of hidden nodes, learning

### UNIT III: COMPETITIVE LEARNING NEURAL NETWORKS

**10 Hrs**

Components of Competitive Learning network pattern cluster structure, vector quantization, Adaptive Resonance Theory networks, Simplified ART Architecture, Features of ART models, character recognition using ART network.

### UNIT IV: ASSOCIATIVE MEMORIES

**6 Hrs**

General Concepts of Associative Memory, Auto Associative Memory, Bi-directional Associative Memory, Hopfield memory, Iterative Auto Associative Memory Networks, Temporal Associative Memory Network.

### UNIT V: APPLICATIONS OF ARTIFICIAL NEURAL NETWORKS

**12 Hrs**

Pattern classification – Recognition of Olympic games symbols, Recognition of printed Characters. Neocognitron – Recognition of handwritten characters. NET Talk: to convert English text to speech. Recognition of consonant vowel (CV) segments, texture classification and segmentation

**Total Hours :45**

### BOOKS:

1. B.Yegnanarayana” Artificial neural networks” PHI ,NewDelhi.
2. S. Raj sekaran, Vijayalakshmi Pari - Neural networks, Fuzzy logic and Genetic Algorithms
3. Kevin L. Priddy, Paul E. Keller – Artificial neural networks: An Introduction - SPIE Press, 2005
4. Mohammad H. Hassoun – Fundamentals of artificial neural networks - MIT Press ,1995
5. Nelson Morgan – Artificial neural network: Electronic Implementations – IEEE Press, 1990

### Reference Books:

1. S. Rajasekaran and G.A.V.Pai, Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI, 2003.
2. Bishop, C. M. Neural Networks for Pattern Recognition. Oxford University Press. 1995.
3. James A Freeman and Davis Skapura” Neural Networks Algorithm, applications and programming Techniques”, Pearson Education, 2002.
4. Simon Hakens “Neural Networks “ Pearson Education



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E29</b>	Subject Name <b>GREEN COMPUTING</b>						Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C	
	Prerequisite: NIL						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>• To learn the fundamentals of Green Computing.</li><li>• To understand the green assets and modeling.</li><li>• To analyze the Green computing Grid Framework.</li><li>• To understand the issues related with Green compliance.</li><li>• To study and develop various case studies.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Outline green computing practices to minimize negative impacts on the environment.											
CO2	Understand the energy saving practice skills in Business Processes.											
CO3	Evaluate technology tools that can reduce paper waste and carbon footprint by the stakeholders.											
CO4	Describe the ways to minimize equipment disposal requirements.											
CO5	Analyze the issues related with Green compliance and Apply Green IT Strategies to various sectors											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	-	-	2	3	3	-	1	1	-	2
CO2	1	2	-	-	2	3	3	-	1	2	-	2
CO3	1	1	-	-	3	3	3	-	3	3	-	3
CO4	-	2	-	-	-	3	3	-	-	-	-	2
CO5	1	3	-	-	2	3	3	-	2	2	-	3
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	1			2			-			-		
CO2	1			2			-			-		
CO3	1			2			-			-		
CO4	-			-			-			-		
CO5	1			2			-			-		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22E29	GREEN COMPUTING	Ty	3	0/0	0/0	3

### UNIT I FUNDAMENTALS

**9 Hrs**

Green IT Fundamentals: Business, IT, and the Environment – Green computing: carbon foot print, scoop on power – Green IT Strategies: Drivers, Dimensions, and Goals – Environmentally Responsible Business: Policies, Practices, and Metrics.

### UNIT II GREEN ASSETS AND MODELING

**9 Hrs**

Green Assets: Buildings, Data Centers, Networks, and Devices – Green Business Process Management: Modeling, Optimization, and Collaboration – Green Enterprise Architecture – Green Supply Chains – Green Information Systems: Design and Development Models.

### UNIT III GRID FRAMEWORK

**9 Hrs**

Virtualization of IT systems – Role of electric utilities, Telecommuting, teleconferencing and teleporting – Materials recycling – Best ways for Green PC – Green Data center – Green Grid framework.

### UNIT IV GREEN COMPLIANCE

**9 Hrs**

Socio-cultural aspects of Green IT – Green Enterprise Transformation Roadmap – Green Compliance: Protocols, Standards, and Audits – Emergent Carbon Issues: Technologies and Future.

### UNIT V CASE STUDIES

**9 Hrs**

The Environmentally Responsible Business Strategies (ERBS) – Case Study Scenarios for Trial Runs – Case Studies – Applying Green IT Strategies and Applications to a Home, Hospital.

**Total Hours : 45**

### TEXT BOOKS:

1. BhuvanUnhelkar, —Green IT Strategies and Applications-Using Environmental Intelligencel, CRC Press, June 2014.
2. Woody Leonhard, Katherine Murray, —Green Home computing for dummiesl, August 2012.

### REFERENCES

1. Dr. M. Kiruthiga Devi, Dr. M. V. Ishwarya “Green Computing” Anna University Regulation 2017 year of publication 2021, ARS Publications
2. Alin Gales, Michael Schaefer, Mike Ebberts, —Green Data Center: steps for the Journeyl, Shroff/IBM rebook, 2011.
3. John Lamb, —The Greening of ITl, Pearson Education, 2009.
4. Jason Harris, —Green Computing and Green IT- Best Practices on regulations & industryl, Lulu.com, 2008
5. Carl speshocky, —Empowering Green Initiatives with ITl, John Wiley & Sons, 2010.
6. Wu Chun Feng (editor), —Green computing: Large Scale energy efficiencyl, CRC Press



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E30</b>	Subject Name	<b>Ty/Lb / ETL</b>	<b>L</b>	<b>T/ S.L r</b>	<b>P/R</b>	<b>C</b>
	<b>Service Oriented Architecture</b>					
	Prerequisite: Computer Organization and Architecture	Ty	3	0/0	0/0	3

L : Lecture T: Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits  
T/L/ETL : Theory/Lab/Embedded Theory and Lab

### OBJECTIVES :

- To learn fundamentals of XML
- To provide an overview of Service Oriented Architecture and Web services and their importance
- To learn web services standards and technologies
- To learn service oriented analysis and design for developing SOA based applications.

### COURSE OUTCOMES (COs) :

CO1	Understand XML technologies
CO2	Understand service orientation, benefits of SOA
CO3	Illustrate web services in WS standards
CO4	Apply web services extensions to develop security solutions
CO5	Apply service modeling, service oriented analysis and design for application development

### Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	-	-	-	-	-	-	-	-	-	-
CO2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	3	2	1	-	-	-	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-
CO5	3	2	1	-	-	-	-	-	-	-	-	-

COs / PSOs	PSO1	PSO2	PSO3	PSO4
CO1	1	-	-	1
CO2	1	-	-	1
CO3	1	-	-	1
CO4	1	-	-	1
CO5	1	-	-	1

### H/M/L indicates Strength of Correlation 3- High, 2- Medium,1-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project
					✓				



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E30	Service Oriented Architecture	Ty	3	0/0	0/0	3

### UNIT I XML

**9 Hrs**

XML document structure – Well-formed and valid documents – DTD – XML Schema – Parsing XML using DOM, SAX – XPath – XML Transformation and XSL – Xquery.

### UNIT II SERVICE ORIENTED ARCHITECTURE (SOA) BASICS

**9 Hrs**

Characteristics of SOA, Benefits of SOA , Comparing SOA with Client-Server and Distributed architectures – Principles of Service Orientation – Service layers

### UNIT III WEB SERVICES (WS) AND STANDARDS

**8 Hrs**

Web Services Platform – Service descriptions – WSDL – Messaging with SOAP – Service discovery – UDDI – Service-Level Interaction Patterns – Orchestration and Choreography

### UNIT IV WEB SERVICES EXTENSIONS

**8 Hrs**

WS-Addressing – WS-Reliable Messaging – WS-Policy – WS-Coordination – WS -Transactions – WS-Security – Examples

### UNIT V SERVICE ORIENTED ANALYSIS AND DESIGN

**11 Hrs**

SOA delivery strategies – Service oriented analysis – Service Modelling – Service oriented design – Standards and composition guidelines — Service design – Business process design – Case Study

**Total Hours: 45**

### BOOKS:

1. Thomas Erl, “Service Oriented Architecture: Concepts, Technology, and Design”, Pearson education.
2. Service-Oriented Computing: Semantics, Processes, Agents, Munindar P. Singh and Michael N. Huhns, John Wiley & Sons, Ltd., 2005

### Reference Books:

- 1.SOA Using Java™ Web Services by Mark D. Hansen
2. SOA Design Pattern By Thomas Erl PHI
3. Web service contract Design & Versioning for SOA by Thomas Erl PHI
4. SOA with .NET by Rajbalasubhramaniam Prentice Hall



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code: <b>EBIT22E31</b>	Subject Name <b>INFORMATION STORAGE MANAGEMENT</b>	<b>Ty/Lb/ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>						
	Prerequisite: Database Management Systems	Ty	3	0/0	0/0	3						
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T / L/ ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To provide a comprehensive understanding of the various storage infrastructure components in data center environments.</li><li>To enable participants to make informed decisions on storage-related technologies in an increasingly complex IT environment.</li><li>To adoption of software-defined infrastructure management and third platform technologies.</li><li>To provide a strong understanding of storage technologies and prepares participants for advanced concepts, technologies, and processes.</li><li>To learn the architectures, features, and benefits of intelligent storage systems.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Evaluate storage architectures, including storage subsystems, DAS, SAN, NAS, CAS											
CO2	Define backup, recovery, disaster recovery, business continuity, and replication											
CO3	Understand logical and physical components of a storage infrastructure											
CO4	Identify components of managing and monitoring the data center											
CO5	Define information security and identify different storage virtualization technologies											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	2	3	3	3	2	3	3	3	3	3
CO3	3	3	3	3	3	3	2	2	3	2	3	2
CO4	3	3	3	3	3	2	2	2	3	3	3	3
CO5	3	3	3	3	3	3	2	2	3	2	3	2
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			3			3			3		
CO2	3			3			2			3		
CO3	3			2			2			3		
CO4	3			2			2			3		
CO5	3			3			3			3		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22E31	INFORMATION STORAGE MANAGEMENT	Ty	3	0/0	0/0	3

### UNIT I STORAGE SYSTEMS

**9Hrs**

Information Storage - Evolution of Storage Technology and Architecture – Data Centre –Infrastructure – ILM – Components of Storage System Environment – Logical Components of Host RAID: Implementation, levels & comparison – ISS components, Intelligent Storage Array.

### UNIT II STORAGE TECHNOLOGIES

**9Hrs**

Networking Technologies & Virtualization DAS – SCSI – SAN – NAS –IPSAN – CAS –Forms of Virtualization.

### UNIT III BUSINESS CONTINUITY

**9Hrs**

Information availability – BC Planning Life Cycle failure analysis – Backup & Recovery – Local Replication – Remote Replication.

### UNIT IV STORAGE SECURITY

**9Hrs**

Storage Security Framework – Risk Triad – Storage Security Domains – Security Implementation in Storage Networking.

### UNIT V MANAGING STORAGE INFRASTRUCTURE

**9Hrs**

Infrastructure – Storage Management Activities and Challenges – Developing an Ideal solution.

**Total Hours: 45**

### TEXT BOOK:

1. EMC Corporation, Information Storage and Management, Wiley India, 2<sup>nd</sup> edition 2012

### REFERENCE BOOKS:

1. Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, Osborne, 2003.
2. Marc Farley, "Building Storage Networks", Tata McGraw Hill, Osborne, 2001.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name						Ty/Lb/ETL	L	T/S.Lr	P/R	C	
EBIT22E32	FOUNDATIONS OF PARALLEL PROGRAMMING											
	Prerequisite: Operating System						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T / L/ ETL: Theory/Lab/Embedded Theory and Lab												
OBJECTIVES :												
<ul style="list-style-type: none"><li>To know Fundamental concepts of Multi threaded, Parallel and Distributed Computing paradigms of parallel programs.</li><li>To apply Systematic methods for developing parallel programs.</li><li>To apply techniques typical for parallel programming in Java.</li></ul>												
COURSE OUTCOMES (COs) :												
CO1	Understanding of Concurrent Programming Concepts											
CO2	Explain and handle Semaphores and Monitors											
CO3	Learn the Message Passing methods and RMI											
CO4	Describe the process interaction and distributed programming											
CO5	Apply the practical parallel programming scenarios and possibilities											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	1	1	1	1	2	2	1	2	1
CO2	3	3	2	1	1	1	1	2	2	1	2	1
CO3	3	2	2	1	1	1	1	2	2	1	2	1
CO4	3	2	2	1	1	1	1	1	2	2	1	1
CO5	3	2	2	2	1	1	1	1	2	2	1	1
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			3			1			2		
CO2	3			3			1			2		
CO3	3			2			1			2		
CO4	3			3			1			2		
CO5	3			2			1			2		
H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22E32	FOUNDATIONS OF PARALLEL PROGRAMMING	Ty	3	0/0	0/0	3

### UNIT I CONCURRENT PROGRAMMING CONCEPTS

9Hrs

**Concurrent programming concepts**, Techniques for parallelizing programs, Shared Variable Programming: Process and Synchronisation - Synchronization, atomic actions, and await statements, Semantics of concurrent programs; ways to avoid interference, Safety and liveness properties; Critical sections: spin locks , efficient spin locks; fair solutions , Parallel programming concepts; bag of tasks paradigm; Pthreads library , Barriers: counter, coordinator, combining tree , Symmetric barriers; data parallel algorithms , Parallel scientific computing

### UNIT II SEMAPHORES AND MONITOR

9Hrs

**Semaphores**: mutual exclusion, signaling, split binary, resource counting, dining philosophers, readers/writers, passing the baton, resource allocation and scheduling, Implementations of Semaphores in kernels, multiprocessors;

**Monitors**: basic concepts, signaling disciplines, synchronization techniques, larger examples; use in Java, Pthreads, Implementation of Monitors in Kernel

### UNIT III MESSAGE PASSING AND RMI

9Hrs

**Message passing**: basic concepts and examples , clients and servers , file servers, interacting peers, Synchronous, Message passing in MPI, and Java; **Remote operations**; RPC; Java RMI , **Rendezvous**, **distributed readers and writers**

### UNIT IV PROCESS INTERACTION AND DISTRIBUTED PROGRAMMING

9Hrs

**Process interaction Paradigms**: Managers/Workers, heartbeat algorithms; pipeline algorithms, Probe/Echo Algorithm, Broadcast Algorithm, Token Passing Algorithms - **Distributed programming**: replicated files, dining philosophers, distributed file systems

### UNIT V PARALLEL PROGRAMMING

9Hrs

Speed and Efficiency, Overhead and Challenges – **Scientific Computing** : Grid Computations, Particle Computations, Matrix Computations – **Case Study of Parallel Programming Libraries** in Pthread, MPI and OpenMP – **Parallelizing Compilers** – Other Parallel Programming Models – **Parallel Programming Tools**

**Total Hours: 45**

#### TEXT BOOK:

1. Greg Andrews ,2000, *Foundations of Multithreaded, Parallel, and Distributed Programming*. Addison-Wesley, Digitized in 16 Nov 2007, ISBN 0201357526, 9780201357523

#### REFERENCE BOOK:

1. Zbigniew J. Czech, 2016, *Introduction to Parallel Computing*, Cambridge University Press, ISBN 1316802787, 9781316802786



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBIT22E33	Subject Name HADOOP AND BIG DATA TECHNOLOGY					TyLb/ ETL	L	T/ S.Lr	P/R	C		
	Prerequisite: Cloud Computing					Ty	3	0/0	0/0	3		
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To understand the concepts of Distributed file system</li><li>To acquire knowledge about Hbase, YARN, PIG and OOZIE</li><li>To understand MapReduce types and formats</li><li>To examine Hadoop Usage</li><li>To understand the concepts of NoSQL, Flume and Sqoop</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1		Understand simple application using java language										
CO2		Apply map reduce concept for desired application										
CO3		Implement programs by making use of Hadoop I/O										
CO4		Inspect the big data using programming tools like Pig and Hive										
CO5		Analyze file system such as GFS and HDFS										
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	1	1	2	-	-	-	1	1	3
CO2	2	3	2	1	3	1	-	-	-	1	1	3
CO3	2	3	2	1	3	1	-	-	-	1	1	3
CO4	2	3	3	1	3	2	-	-	-	1	1	3
CO5	2	3	2	1	1	1	-	-	-	1	1	3
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			3			2			3		
CO2	2			2			3			2		
CO3	3			3			3			2		
CO4	1			2			2			1		
CO5	1			2			2			1		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22E33	HADOOP AND BIG DATA TECHNOLOGY	Ty	3	0/0	0/0	3

### UNIT I HADOOP INTRODUCTION

9Hrs

Distributed and parallel computing - HDFS and MapReduce – Hadoop function – cloud deployment and delivery model – In memory computing technology – Hadoop ecosystem – Hadoop distributed file system – HDFS architecture – HDFS files – HDFS high availability – Hadoop YARN – Hbase and HDFS – Hive – Pig – Sqoop – ZooKeeper – Flume – Oozie.

### UNIT II MAPREDUCE, HBASE AND BIG DATA TECHNOLOGY

9Hrs

MapReduce framework – optimize MapReduce job – roles of HBase in Big Data Processing. Big Data stack – Virtualization and Big Data – Virtualization Approaches – CAP Theorem – non-relational database – polyglot persistence – Big Data analytics and Data warehouse – simple MapReduce application – designing MapReduce.

### UNIT III YARN AND HIVE

9hrs

Background of YARN – Advantages – Architecture – schedulers – configurations – commands – YARN containers – Registry – Hive Services – data types – built in functions – Hive DDL – data manipulation in Hive – Data retrieval Queries – using JOINS in Hive.

### UNIT IV PIG AND OOZIE

9Hrs

Pig architecture – running Pig – Pig Latin – working with operators in Pig – Debugging Pig – functions in pig – Error Handling in Pig – Oozie – benefits – configuration – Oozie workflow – Oozie coordinator – Oozie bundle – Oozie parameterization – Oozie job execution model – Oozie SLA.

### UNIT V NOSQL, FLUME AND SQOOP

9Hrs

Characteristics of NoSQL – Types of NoSQL data Models – Schema less databases – materialized view – distribution models – sharding – Flume – Flume Architecture – Sqoop – importing data – Mahout – machine learning – collaborative filtering – clustering – classification – Mahout algorithms – Environment for Mahout

**Total Hours: 45**

#### TEXT BOOKS:

1. DT Editorial Services, 2016 “Big Data Black Book” dreamteckpress .
2. Alex Holmes, 2015 “Hadoop in Practice” dreamteck press.

#### REFERENCE BOOKS:

1. Tom White, 2015 “Hadoop – The Definitive Guide 4<sup>th</sup> edition Oreilly.
2. Shiva Achari 2015 “Hadoop Essentials” Packt Publishing.
3. Henry H Liu, 2014 “Hadoop 2 Essential” Creative Independent Publishing.
4. Jeffrey Aren, 2017 “Sams Teach Yourself Hadoop in 24 hours” Pearson.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E34</b>	Subject Name <b>DIGITAL MARKETING TECHNIQUES</b>						<b>Ty/Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite : Web Technology and Web						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To understand the importance of digital marketing and the fundamental principles of Digital marketing.</li><li>To provide students with the knowledge about business and to develop a digital marketing plan.</li><li>To identify the role of e-marketing in the present context and develop appropriate e-marketing strategies.</li><li>To identify and manage digital channels and build better customer relationships through those channels.</li><li>To integrate different digital media and create marketing content.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b> Students completing the course were able to												
<b>CO1</b>	Understand the business models and the importance of digital marketing.											
<b>CO2</b>	Develop a digital marketing plan.											
<b>CO3</b>	Identify issues in global market and develop appropriate marketing strategies.											
<b>CO4</b>	Evaluate digital channels to build better customer relationships.											
<b>CO5</b>	Create appropriate marketing content by integrating different digital media											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	-	-	2	-	-	3	2	-	-	2	-	-
<b>CO2</b>	-	-	2	2	-	3	2	-	-	-	-	-
<b>CO3</b>	-	-	2	-	-	3	2	-	-	2	-	-
<b>CO4</b>	-	-	2	-	-	3	2	-	-	2	-	-
<b>CO5</b>	-	-	2	-	-	3	2	-	-	2	-	-
<b>COs/POs</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
<b>CO1</b>	-			3			-			2		
<b>CO2</b>	-			3			-			2		
<b>CO3</b>	-			3			-			2		
<b>CO4</b>	-			3			-			2		
<b>CO5</b>	-			3			-			2		
<b>H/M/L indicates strength of correlation 3– High, 2– Medium, 1– Low</b>												
<b>Category</b>	<b>Basic Sciences</b>	<b>Engineering Sciences</b>	<b>Humanities and Social Sciences</b>	<b>Program Core</b>	<b>Program Electives</b>	<b>Open Electives</b>	<b>Interdisciplinary</b>	<b>Skill component</b>	<b>Practical / Project</b>			
					✓							





## FACULTY OF ENGINEERING AND TECHNOLOGY

SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E34	DIGITAL MARKETING TECHNIQUES	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION

**9 Hrs**

Digital-Marketing Past, Present & Future – Digital-Marketing Landscape, Digital-marketing's Past - Web 1.0, Digital Marketing Present - Web 2.0, Future -Web 3.0, Strategic Digital-Marketing and Performance Metrics – E-Business Models, Performance Metrics Inform Strategy, Balanced Scorecard, Social Media Performance Metrics.

### UNIT II DIGITAL MARKETING PLAN

**9 Hrs**

Process, Creating a Digital-Marketing Plan, Seven Steps – Situation Analysis, Strategic Planning, Objectives, Digital-Marketing Strategies, Implementation plan, Budget, Evaluation.

### UNIT III GLOBAL E-MARKETS

**9 Hrs**

Overview of Global Digital-Marketing Issues, Country and Market Opportunity Analysis, Technological Tipping Points, Wireless Internet Access: Mobile Phones, The Digital divide, Building Inclusive Digital markets, Social Networking, Ethical and Legal Issues: Overview, Privacy, Digital Property, Online Expression, Emerging issues.

### UNIT IV DIGITAL-MARKETING MANAGEMENT

**9 Hrs**

Product: The Online Offer – Creating customer value online, Product Benefits, Digital Marketing enhanced product development, Price: Buyer and Seller Perspectives, Payment options, Pricing Strategies; Internet for Distribution: Distribution Channel Overview, Online Channel Intermediaries, Distribution Channel Metrics, Digital Marketing Communication – Owned Media, Paid media, Earned Media.

### UNIT V DIGITAL MARKETING COMMUNICATION

**9 Hrs**

Digital marketing communication: Owned Media, Content Marketing, Sales Promotion Offers, Paid Media, Social Media Advertising, Mobile Advertising, Earned Media: Engaging Individuals to Produce Earned Media, Techniques for Engaging Users, Customer Relationship Management, Three Pillars of Relationship Marketing, CRM Benefits, CRM Building Blocks.

**Total Hours: 45**

#### TEXT BOOK:

1. Strauss Judy, Frost Raymond (2013), E-Marketing, 7/e; New Delhi: Prentice Hall.

#### REFERENCE BOOKS:

1. Chaffey Dave and Smith PR (2013), Emarketing Excellence: Planning and Optimizing your Digital Marketing; 4/e; Routledge.
2. Ryan Damian, (2014), Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation, 3/e; Kogan Page Limited.





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E35</b>	Subject Name <b>PERVASIVE COMPUTING</b>						Ty/ Lb/ ETL	L	T/ S.L r	P/R	C	
	Prerequisite: Computer Networks, Embedded System and IoT						Ty	3	0/0	0/0	3	
L : Lecture T:Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To introduce the broad perspective of pervasive concepts and management</li><li>To explore the HCI in Pervasive environment</li><li>To apply the pervasive concepts in mobile environment</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Understand the fundamental theoretical concepts in pervasive computing											
CO2	Explain the aspects of context awareness.											
CO3	Study the methods for efficient resource allocation and task migration											
CO4	Learn and Analyze the HCI Service Selection and HCI migration framework											
CO5	Design and implement pervasive application systems											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	-
CO4	3	3	3	2	-	-	-	-	-	-	-	-
CO5	3	3	2	2	-	-	-	-	-	-	-	-
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	2			2			-			-		
CO2	2			2			-			-		
CO3	2			2			-			-		
CO4	2			2			-			-		
CO5	2			2			1			1		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium,1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E35	PERVASIVE COMPUTING	Ty	3	0/0	0/0	3

### UNIT I PERVASIVE COMPUTING CONCEPTS

**9Hrs**

Perspectives of Pervasive Computing, Challenges, Technology; The Structure and Elements of Pervasive Computing Systems: Infrastructure and Devices, Middleware for Pervasive Computing Systems, Pervasive Computing Environments.

### UNIT II RESOURCE MANAGEMENT IN PERVASIVE COMPUTING

**9 Hrs**

Context Collection, User Tracking, and Context Reasoning; Resource Management in Pervasive Computing: Efficient Resource Allocation in Pervasive Environments, Transparent Task Migration, Implementation and Illustrations.

### UNIT III HCI INTERFACE IN PERVASIVE ENVIRONMENTS

**9 Hrs**

HCI Service and Interaction Migration, Context- Driven HCI Service Selection, Scenario Study: Video Calls at a Smart Office, A Web Service– Based HCI Migration Framework.

### UNIT IV PERVASIVE MOBILE TRANSACTIONS:

**9Hrs**

Mobile Transaction Framework, Context-Aware Pervasive Transaction Model, Dynamic Transaction Management, Formal Transaction Verification, Evaluations.

### UNIT V CASE STUDIES

**9Hrs**

Case Studies: iCampus Prototype, IPSpace: An IPv6-Enabled Intelligent Space.

**Total Hours: 45**

### TEXT BOOK:

1. Minyi Guo, Jingyu Zhou, Feilong Tang, Yao Shen ,”Pervasive Computing: Concepts, Technologies and Applications”,CRC Press, 2016.
2. Obaidat, Mohammad S., Mieso Denko, and Isaac Woungang, eds. Pervasive computing and networking. John Wiley & Sons, 2011.

### REFERENCE BOOKS:

1. Laurence T. Yang, Handbook On Mobile And Ubiquitous Computing Status And Perspective, 2012, CRC Press.
2. Alan Colman, Jun Han, and Muhammad Ashad Kabir, Pervasive Social Computing Socially-Aware Pervasive Systems and Mobile Applications, Springer, 2016.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Cod: <b>EBIT22E36</b>	Subject Name <b>WEARABLE COMPUTING</b>					<b>Ty/Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>		
	Prerequisite: First year Engineering Mathematics, Embedded System and IoT					Ty	3	0/0	0/0	3		
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To Describe and discuss constraints unique to wearable and ubiquitous computing platforms and applications,</li><li>To Design, develop and evaluate a wearable computing application,</li><li>To Apply state-of-the-art hardware and software development tools to computer system design, and</li><li>To Communicate both orally and in writing with other members of a team.</li></ul>												
<b>COURSE OUTCOMES (COs):</b>												
<b>CO1</b>	Understand advanced and emerging technologies											
<b>CO2</b>	Extend the knowledge achieved and apply it to solve real world problems											
<b>CO3</b>	Understanding of different methodologies for search on wearable technology											
<b>CO4</b>	Ability to analyses ethical issues related to the Wearable devices.											
<b>CO5</b>	For contributing innovative thinking and innovation processes and Ability to integrate several domains through wearable technology.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>-</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>CO2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>-</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>CO3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>
<b>CO4</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>-</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>
<b>CO5</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>-</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>
<b>COs / PSOs</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
<b>CO1</b>	<b>2</b>			<b>2</b>			<b>1</b>			<b>1</b>		
<b>CO2</b>	<b>2</b>			<b>2</b>			<b>2</b>			<b>1</b>		
<b>CO3</b>	<b>2</b>			<b>2</b>			<b>1</b>			<b>1</b>		
<b>CO4</b>	<b>2</b>			<b>2</b>			<b>1</b>			<b>1</b>		
<b>CO5</b>	<b>2</b>			<b>2</b>			<b>1</b>			<b>2</b>		
<b>3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low</b>												
<b>Category</b>	<b>Basic Sciences</b>	<b>Engineering Sciences</b>	<b>Humanities and Social Sciences</b>	<b>Program Core</b>	<b>Program Electives</b>	<b>Open Electives</b>	<b>Interdisciplinary</b>	<b>Skill component</b>	<b>Practical / Project</b>			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22E36	WEARABLE COMPUTING	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION TO WEARABLE TECHNOLOGIES 9Hrs.

Fundamentals of Wearable Technologies - History of wearable Technologies -User Experience Design for Internet of Things - Social Aspects of Wearability - Internet of Things – Applications - Wearable Chemical and Biochemical Sensors - Technology of Connected Devices – Device Types, Sensors, Actuators.

### UNIT II WEARABLE COMPUTING APPLICATIONS 9Hrs.

Medical Applications of Wearable Technologies - Wearable Technologies - Energy Expenditure and Energy Harvesting - Technology of Connected Devices – Energy Considerations - Flexible Electronics and Textiles for Wearable Technologies.

### UNIT III WEARABLE COMPUTING ARCHITECTURE 9Hrs.

Wearable Algorithms - Web of Things – Architecture Standardization- Data Mining for Body Sensor Network - Internet of Things – Embedded Device UX Design

### UNIT IV COMMUNICATION TECHNOLOGIES 9Hrs.

Physical Activity Modeling and Behavior Change - Internet of Things – Interface and Interaction Design - Human Body Communication for a Data Rate Sensor Network. Internet of Things – Networking. - Wireless Body Area Networks - Wearable computing as a form of urban design

### UNIT V WEARABLE COMPUTING CASE STUDIES 9Hrs.

Wearable Sensors for Monitoring of Physical and Physiological Changes and for Early Detection of Diseases - Wearable and Non-Invasive Assistive Technologies.

**Total Hours: 45**

#### TEXT BOOKS:

1. “Practical Electronics for Inventors, Third Edition,” by Paul Scherz and Simon Monk. 2016
2. Intel Galileo and Intel Galileo Gen 2 API Features and Arduino Projects for Linux Programmers, Ramon, Manoel 2014 (Open Access)

#### REFERENCE BOOKS:

1. Fundamentals of Wearable Computers and Augmented Reality, Second Edition by Woodrow Barfield 2015
2. Making Sense of Sensors: End-to-End Algorithms and Infrastructure Design by Omesh Tickoo, Ravi Iyer 2016
3. Programming Interactivity, Second Edition By Josha Noble, 2012
4. Programming the Raspberry Pi: Getting Started with Python 2E, 2016



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E37</b>	Subject Name <b>WIRELESS ADHOC AND MESH NETWORKS</b>						Ty/Lb/ ETL	L	T/ S.Lr	P/R	C	
	Prerequisite : Computer Networks, Embedded System and IoT						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To learn about the issues and challenges in the design of wireless ad hoc networks.</li><li>To understand the working of MAC and Routing Protocols for ad hoc and sensor networks</li><li>To learn about the Transport Layer protocols and their QoS for ad hoc and sensor networks</li><li>To understand various security issues in ad hoc and sensor networks and the corresponding solutions.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b> Students completing the course were able to												
CO1	Identify different challenges in designing MAC protocol in wireless ad hoc and sensor networks.											
CO2	Identify different issues in designing routing protocol in ad hoc networks.											
CO3	Analyze Transport Layer protocols developed for ad hoc and sensor networks .											
CO4	Apply QOS for ad hoc wireless networks											
CO5	Understand security issues in ad hoc and sensor networks.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	1	2	2	2	2	2	2	3
CO2	3	3	3	2	1	2	2	2	2	2	2	3
CO3	3	3	3	2	1	2	2	2	2	2	2	3
CO4	3	3	3	2	1	2	2	2	2	2	2	3
CO5	3	3	3	2	1	2	2	2	2	2	2	3
COs/PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			2			2			2		
CO2	3			2			2			2		
CO3	3			2			2			2		
CO4	3			2			2			2		
CO5	3			2			2			2		
<b>H/M/L indicates strength of correlation 3 – High, 2 – Medium, 1 – Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component		Practical / Project		
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22E37	WIRELESS ADHOC AND MESH NETWORKS	Ty	3	0/0	0/0	3

### UNIT I            MAC IN ADHOC NETWORKS

**9 Hrs**

Introduction – Issues and challenges in ad hoc networks – Design Goals of a MAC Protocol for Ad Hoc Wireless Networks- Classifications of MAC protocols– Contention-Based MAC protocols – MAC Protocols Using Directional Antennas – Multiple-Channel MAC Protocols.

### UNIT II            ROUTING IN ADHOC NETWORKS

**9 Hrs**

Introduction – Issues in designing a routing protocol in ad hoc networks –Classifications of routing protocols– Table-Driven Routing Protocols– Hybrid Routing Protocols – Hierarchical Routing Protocols-Power-Aware Routing Protocols.

### UNIT III            TRANSPORT LAYER IN ADHOC WIRELESS NETWORKS

**9 Hrs**

Issues in designing a Transport layer protocol in AD HOC wireless networks-design goals of a transport layer protocol in ad hoc wireless networks-classification of Transport layer solutions-TCP over ad hoc wireless networks.

### UNIT IV            QOS IN WIRELESS SENSOR NETWORKS

**9 Hrs**

Introduction – issues and challenges in providing QOS in ad hoc wireless networks-classifications of QOS solutions - network layer solutions- QOS frameworks for ad hoc wireless networks.

### UNIT V            SECURITY IN ADHOC AND SENSOR NETWORKS

**9 Hrs**

Network security requirements- Security Attacks – Key Distribution and Management – Intrusion Detection – Software based Anti-tamper techniques – Water marking techniques – Defense against routing attacks - Secure Ad hoc routing protocols – Broadcast authentication WSN protocols – TESLA – Biba – Sensor Network Security Protocols – SPINS.

**Total Hours: 45**

#### TEXT BOOKS:

1. C.Siva Ram Murthy and B.S.Manoj, “Ad Hoc Wireless Networks – Architectures and Protocols”, Pearson Education, 2006.
2. Holger Karl, Andreas Willing, “Protocols and Architectures for Wireless Sensor Networks”, John Wiley & Sons, Inc., 2005.

#### REFERENCE BOOKS:

1. Subir Kumar Sarkar, T G Basavaraju, C Puttamadappa, “Ad Hoc Mobile Wireless Networks”,Auerbach Publications, 2008.
2. Carlos De Morais Cordeiro, Dharma Prakash Agrawal, “Ad Hoc and Sensor Networks: Theory and Applications (2nd Edition)”, World Scientific Publishing,2011.
3. WaltenegusDargie, Christian Poellabauer, “Fundamentals of Wireless Sensor Networks Theory and Practice”, John Wiley and Sons, 2010
4. Xiang-Yang Li , “Wireless Ad Hoc and Sensor Networks: Theory and Applications”, 1227 th edition, Cambridge university Press,2008.





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E38</b>	Subject Name <b>NEXT GENERATION NET WORKS</b>						<b>Ty/Lb/ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: First year Engineering Mathematics						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To learn the fundamentals of 5G internet.</li><li>To understand the concept of small cells in 5G mobile networks.</li><li>To learn the mobile clouds in 5G network context.</li><li>To understand the role of cognitive radios in 5G networks.</li><li>To learn the security issues in 5G networks.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
<b>CO1</b>	Compare the 5G network with older generations of networks.											
<b>CO2</b>	Identify suitable small cells for different applications in 5G networks.											
<b>CO3</b>	Simulate 5G network scenarios.											
<b>CO4</b>	Connect applications to mobile cloud.											
<b>CO5</b>	Design applications with 5G network support and analyze the security risks in 5G networks											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	2	2	2	-	2	-	-	-	-	-	-	-
<b>CO2</b>	2	2	2	-	2	-	-	-	-	-	-	-
<b>CO3</b>	2	2	2	1	2	-	-	-	-	-	-	-
<b>CO4</b>	2	2	2	1	2	-	-	-	-	-	1	-
<b>CO5</b>	2	2	2	1	2	-	-	-	1	-	-	-
<b>COs / PSOs</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
<b>CO1</b>	2			2			-			-		
<b>CO2</b>	2			2			-			-		
<b>CO3</b>	2			1			-			-		
<b>CO4</b>	2			1			-			1		
<b>CO5</b>	2			1			-			1		
<b>3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low</b>												
<b>Category</b>	<b>Basic Sciences</b>	<b>Engineering Sciences</b>	<b>Humanities and Social Sciences</b>	<b>Program Core</b>	<b>Program Electives</b>	<b>Open Electives</b>	<b>Interdisciplinary</b>	<b>Skill component</b>	<b>Practical / Project</b>			
					✓							





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22E38	NEXT GENERATION NETWORKS	Ty	3	0/0	0/0	3

### UNIT I PERVASIVE CONNECTED WORLD AND 5G INTERNET

**9 hrs**

Historical Trend of Wireless Communications–Evolution of LTE Technology to Beyond 4G,5G Road map– Ten Pillars of 5G–Internet of Things and Context Awareness–Networking Reconfiguration and Virtualization Support– Mobility– Quality of Service Control –Emerging Approach for Resource over Provisioning.

### UNIT II SMALL CELLS FOR 5G MOBILE NETWORKS

**9 hrs**

Introduction to Small Cells–Capacity Limits and Achievable Gains with  
Densification –Mobile Data Demand–Demands. Capacity–Small Cell Challenges.

### UNIT III COOPERATION FOR NEXT GENERATION WIRELESS NETWORKS

**9 hrs**

Introduction – Cooperative Diversity and Relaying Strategies: Cooperation and Network Coding, Cooperative ARQ MAC Protocols – PHY Layer Impact on MAC Protocol Analysis: Impact of Fast Fading and Shadowing on Packet Reception for QoS Guarantee, Impact of Shadowing Spatial Correlation–Study: NCCARQ, PHY Layer Impact.

### UNIT IV MOBILE CLOUDS AND COGNITIVE RADIO

**9 hrs**

Introduction–The Mobile Cloud–Mobile Cloud Enablers–Network Coding–Overview of Cognitive Radio Technology in 5G Wireless–Spectrum Optimization using Cognitive Radio –Relevant Spectrum Optimization Literature in 5G–Cognitive Radio and Carrier Aggregation–Energy Efficient Cognitive Radio Technology.

### UNIT V SECURITY AND SELF ORGANIZING NETWORKS

**9hrs**

Overview of Potential 5G Communications System Architecture–Security Issues and Challenges in 5G Communications Systems – Self Organising Networks: Introduction, Self Organising Networks in UMTS and LTE, The Need for Self Organising Networks in 5G, Evolution towards Small Cell Dominant HetNets.

**Total Hours 45**

#### TEXTBOOK:

- 1.Jonathan Rodriguez, “Fundamentals of 5G Mobile Networks”, Wiley, 2015.

#### REFERENCES:

1. Yin Zhang, Min Chen, “Cloud Based 5G Wireless Networks – Springer Briefs in Computer Science”, Springer, 2016.
2. Athanasios G.Kanatas, Konstantina S.Nikita, Panagiotis (Takis) Mathiopoulos, “New Directions in Wireless Communications Systems: From Mobile to 5G”, CRC Press,2017.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBIT22E39	Subject Name WEB ENGINEERING						Ty/Lb/ ETL	L	T/ S.Lr	P/R	C	
	Prerequisite: Web Technology and Web services						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVES :												
<ul style="list-style-type: none"><li>To be able to analyze and design comprehensive systems for the creation, dissemination, storage, retrieval, and use of electronic records and documents</li><li>To learn and use some of the client-side and server-side languages used to manipulate information on the World Wide Web – i.e. ASP.NET, and Javascript.</li><li>To learn techniques and evaluation metrics for ensuring the proper operability, maintenance and security of a web application.</li></ul>												
COURSE OUTCOMES (COs) :												
CO1	Apply the web engineering methodologies for Web application development											
CO2	Develop a component based web solution and use UML diagrams to describe such a solution.											
CO3	Identify and discuss the security risk of a Web application.											
CO4	Plan and Organize Web Development Projects											
CO5	Implement Modelling Techniques for Web Application Design											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	3	2	2	3	2	2	1	1	2	2
CO2	1	2	2	3	2	2	2	2	3	2	2	2
CO3	1	1	2	3	3	1	1	1	2	3	1	1
CO4	1	1	2	3	3	1	1	1	2	3	1	1
CO5	1	2	2	3	2	2	2	2	3	2	2	2
COs / PSOs		PSO1			PSO2			PSO3			PSO4	
CO1		2			2			2			2	
CO2		2			2			2			2	
CO3		1			2			2			2	
CO4		1			2			1			2	
CO5		2			2			2			2	
H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component		Practical / Project		
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22E39	WEB ENGINEERING	Ty	3	0/0	0/0	3

### UNIT I      **WEB-BASED SYSTEMS** 9 Hrs

The Web-Web Applications-Web Engineering-The Components of Web Engineering

### UNIT II      **A WEB ENGINEERING PROCESS** 9 Hrs

Defining the Framework-Incremental Process Flow- Generic Actions and Tasks for the Web Framework-Umbrella Activities

### UNIT III      **COMMUNICATION** 9 Hrs

The Communication Activity – Formulation – Elicitation- Identifying Web App Increments- Negotiation

### UNIT IV      **PLANNING** 9 Hrs

Refining Framework Activities-Building a Web Team - Managing Risk - Developing a Schedule

### UNIT V      **THE MODELLING ACTIVITY** 9 Hrs

Modelling as a Concept - Modelling Frameworks - Modelling Languages - Existing Modelling Approaches

**Total Hours: 45**

#### TEXT BOOK:

1. Web Engineering: A Practitioner's Approach by Roger Pressman and David Lowe, McGraw-Hill, 2009.

#### REFERENCE BOOKS:

1. Denise M. Woods and William J. Dorin 2012 *HTML and CSS: Comprehensive 7th edition*,. Publisher: Cengage Learning; ISBN-10: 1133526144
2. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, 2012 *Internet & World Wide Web How to Program*, 5/e Pearson Education.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBIT22E40	Subject Name							Ty/Lb / ETL	L	T/ S.Lr	P/R	C
	R-PROGRAMMING											
	Prerequisite: Mathematics							Ty	3	0/0	0/0	3
L : Lecture T:Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVES :												
<ul style="list-style-type: none"><li>To understand and establish an efficient scientific computing environment</li><li>To Identify and use available R packages and associated Open Source software</li><li>To design and write efficient programs using R (and similar high-level languages) to perform routine and specialized data manipulation/management and analysis tasks</li><li>To understand document, share, and collaborate on code development using a suite of Open Source standards and tools</li></ul>												
COURSE OUTCOMES (COs) :												
CO1		Understand the R-programming environment and setups.										
CO2		Design and write R-programs by R commands and structures										
CO3		Apply R packages and associated Open Source software.										
CO4		Apply the data visualization techniques on various file format data										
CO5		Understand the statistics data and techniques and their data analytics with R										
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	3	2	-	-	-	-	-	-
CO2	3	3	3	2	3	2	-	-	-	-	-	-
CO3	3	3	3	3	3	2	-	-	-	-	-	-
CO4	3	3	3	3	3	2	-	-	-	1	-	-
CO5	3	3	3	3	3	2	-	-	-	1	-	-
COs/PSOs	PSO 1			PSO2			PSO3			PSO4		
CO1	3			2			-			1		
CO2	3			2			-			1		
CO3	3			2			-			2		
CO4	3			2			-			3		
CO5	3			2			-			3		
3/2/1 indicates Strength of Correlation 3- High, 2- Medium,1-Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
					✓							



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22E40</b>	Subject Name <b>R-PROGRAMMING</b>	Ty/ Lb / ETL	L	T/ S.Lr	P/R	C
	Prerequisite: Mathematics	Ty	3	0/0	0/0	3

### UNIT I INTRODUCTION

**9 Hrs**

History and overview of R programming . Environment setup with R Studio, Installing R and R studio, The Ruser Interface, Objects, Functions, Arguments, Scripts

### UNIT II R OBJECTS

**9 Hrs**

R Commands, Atomic Vectors-Variables and Data Types, Attributes-Control Structures, Array, Matrices, Class, Factors, Coercion, Lists, Data Frames.

### UNIT III R PACKAGES AND ENVIRONMENTS

**9 Hrs**

Packages, Install packages, Updating R and Its Packages, Library, Environments, working with environments, Scoping Rules, Assignment, Evaluation, Closures.

### UNIT IV DATA VISUALIZATION USING R

**9 Hrs**

Loading data ,Saving Data in R. (External Data): Using CSV files, XML files, Web Data, JSON files, Databases, Excel files Working with R Charts and Graphs: Histograms, Boxplots, Bar Charts, Line Graphs, Scatterplots, Pie Charts, Debugging R Code

### UNIT V STATISTICS AND DATA ANALYTICS WITH R

**9 Hrs**

Random Forest, Decision Tree, Normal and Binomial distributions, Time Series Analysis, Linear and Multiple Regression, Logistic Regression, Creating data for analytics through designed experiments, Creating data for analytics through active learning, Creating data for analytics through reinforcement learning,case study Statistical simulation using Jamovi

**Total Hours: 45**

### TEXT BOOKS:

- 1.Garrett Grolemond,"Hands-On Programming with R",O'REILLY-1<sup>st</sup> Edition,2020
- 2.An Introduction to R, Notes on R: A Programming Environment for Data Analysis and Graphics.W. N. Venables, D.M. Smith and the R Development Core Team. Version 3.0.1 (2013-05-16). URL: <https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf>

### REFERENCE BOOKS:

1. Jared P Lander, R for everyone: advanced analytics and graphics, Pearson Education,2013
2. Dunlop, Dorothy D., and Ajit C. Tamhane. Statistics and data analysis: from elementary to intermediate. Prentice Hall, 2000.
3. G Casella and R.L. Berger, Statistical Inference, Thomson Learning 2002.
4. P. Dalgaard. Introductory Statistics with R, 2nd Edition. (Springer 2008)
5. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer
6. Hastie, Trevor, et al.The elements of statistical learning.Vol. 2. No. 1. New York:springer, 2009.
7. Montgomery, Douglas C., and George C. Runger.Appliedstatistics and probability for engineers. John Wiley & Sons, 2010
8. Joseph F Hair, William C Black etal , "Multivariate Data Analysis" , Pearson Education,



## FACULTY OF ENGINEERING AND TECHNOLOGY

### FOREIGN LANGUAGES

Subject Code	Subject Name <b>FRENCH</b>					Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C		
<b>EBFL22I01</b>	Prerequisite : Nil					<b>IE</b>	<b>1</b>	<b>0/0</b>	<b>1/0</b>	<b>1</b>		
<b>C:</b> Credits, <b>L:</b> Lecture, <b>T:</b> Tutorial, <b>SLr:</b> Supervised Learning, <b>P:</b> Problem / Practical <b>R:</b> Research, <b>Ty/Lb/ETL/IE:</b> Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
<b>OBJECTIVES</b>												
To understand the main idea and some detailed aspects of complex and unfamiliar texts.Know emerging awareness of aesthetic properties of language and literary style. Recognize the role of cultural knowledge in understanding written texts.												
<b>COURSE OUTCOMES (Cos) :</b> Students completing this course were able to												
<b>CO1</b>	Learn to write numbers, alphabets, regular and irregular verbs											
<b>CO2</b>	Practice preposition and articles.											
<b>CO3</b>	Comprehend model verbs and speak in future											
<b>CO4</b>	Familiarize colours, places and create phrases											
<b>CO5</b>	Master conjugation and speaking the language											
<b>Mapping of Course Outcome with Program Outcome (POs)</b>												
Cos/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		2
CO2										3		2
CO3										3		2
CO4										3		2
CO5										3		2
3/2/1 Indicates Strength of Correlation, 3 – High, 2- Medium, 1- Low												
Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/ Project		Internships/ Technical Skills		Soft Skills	
			✓									



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name <b>FRENCH</b>	Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C
<b>EBFL22I01</b>	Prerequisite : Nil	<b>IE</b>	<b>1</b>	<b>0/0</b>	<b>1/0</b>	<b>1</b>

### UNIT I

**6 Periods**

Les Salutations, Les Nombres (1-20), Les alphabets, Les Pronoms Sujets, Les Langues, Les Nationalités, Les Verbes : Parler, être, avoir,

### UNIT II

**6 Periods**

Les Nombres (21-100), L'heure, Les Pays, Les propositions des pays, Les articles définis, Les articles indéfinis, Les Verbes : s'appeler, Aimer et habiter.

### UNIT III

**6 Periods**

Les verbes : Aller, Venir, Les Articles Contractés, La Négation, Les Adjectifs Démonstratifs, Futur Proche, Model Verbs, Adjectifs Possessifs.

### UNIT IV

**6 Periods**

Les articles partitifs, Les Verbes : Faire, Jouer. La Famille, Les Couleurs, Les lieux dans la ville,

### UNIT V

**6 Periods**

Les Verbes: Lire, Écrire, Regarder, Voir, Écouter, Entendre

**Total periods: 30**

### TEXT BOOKS:

1. Écho A1, J.Girardet & J.Pecheur, CLE International, 2<sup>nd</sup> Edition
2. Saison A1, Jean Giraudoux, Goyal publisher, 1<sup>st</sup> Edition

### REFERENCE BOOKS:

1. Alter Ego A1, Veronique M Kizirian & Annie Berthet, Hachette, 1<sup>st</sup> Edition
2. Cosmopolite A1, Nathalie Hirschsprung & Tony Tricot, Goyal Publisher 1<sup>st</sup> edition





## FACULTY OF ENGINEERING AND TECHNOLOGY

### EBFL22I01 FRENCH - Details in English for contents of each unit

#### Unit- I

Introduction to French words through the greetings and simple vocabulary like numbers, languages, nationalities are taught. Concept of conjugation of regular and irregular verbs.

#### Unit-II

More focus on grammatical elements like prepositions and articles. Various scenarios inclusive of the parts of speech learnt are to be discussed and practiced. Complete vocabulary for numbers and therefore practices how to say time.

#### Unit-III

Comprehension of demonstrative and possessive adjectives and the concept of model verbs is introduced. Simple understanding of 'Futurprôche' which enables the student to speak in future tense. Building negative sentences with different verbs.

#### Unit-IV

Learning vocabulary in most common categories like colours, places etc. and picking up on creating French phrases of right construct. Focus primarily on speaking and writing.

#### Unit-V

Learning essential verbs of regular actions in French that are more frequent in our daily life and thus mastering conjugations and speaking from the top of our heads. More familiarity towards language is therefore attained.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name <b>GERMAN</b>	Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C						
<b>EBFL22I02</b>	Prerequisite : Nil	<b>IE</b>	<b>1</b>	<b>0/0</b>	<b>1/0</b>	<b>1</b>						
C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
<b>OBJECTIVES</b>												
To understand the main idea and some detailed aspects of complex and unfamiliar texts.Know emerging awareness of aesthetic properties of language and literary style. Recognize the role of cultural knowledge in understanding written texts.												
<b>COURSE OUTCOMES (Cos):</b> Students completing this course were able to												
<b>CO1</b>	Learn to write numbers, alphabets, regular and irregular verbs											
<b>CO2</b>	Practice preposition and articles.											
<b>CO3</b>	Comprehend model verbs and speak in future											
<b>CO4</b>	Familiarize colours, places and create phrases											
<b>CO5</b>	Master conjugation and speaking the language											
<b>Mapping of Course Outcome with Program Outcome (POs)</b>												
Cos/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		2
CO2										3		2
CO3										3		2
CO4										3		2
CO5										3		2
3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low												
Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/ Project	Internships/ Technical Skills	Soft Skills			
			✓									



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name <b>GERMAN</b>	Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C
<b>EBFL22I02</b>	Prerequisite : Nil	<b>IE</b>	<b>1</b>	<b>0/0</b>	<b>1/0</b>	<b>1</b>

### UNIT I

**6 Periods**

Das Alphabet, Die Zahlen von ein -hundert, Begrüßung, Verabschiedung, Sich Vortstellen, W – Fragen.  
Grammatik :- W- Frage, Aussagesatz, Verban und Personnelpronomen

### UNIT II

**6 Periods**

Genders in Deutsch,,Die Personelpronomen, Definite /Indefinite / Negative Articles, Jemanden kennenlernen, Landkarte. Grammatik – bestimmter Artikel : der, die, das, Nomen: Singular und Plural, aussagesatz, negationartikel

### UNIT III

**6 Periods**

Possessivpronomen, Verbkonjugation, Ja/Nein Fragen, Satzstruktur Grammatik : Regelmäßige, Unregelmäßige, hilfsverben- Sein/haben, Unbestimmer Artikel

### UNIT IV

**6 Periods**

Wie spät ist es, Tageszeiten, Die, Wochentage, Die Monate, das Wetter, Die Himmelsrichtungen, Die familie, Klassenzimmer – Substantive, Countries and Languages, Negation, Like /Dislike. Grammatik : Akkusative, Verben mit accusative, wörterorden und lernen, artikelimdativ, Präposition mit +Dativ

### UNIT V

**6 Periods**

Nominativ, Dativ, Accusative, Einkaufen, Im Flugzeug, Im kaufhaus, Jobsuche. Grammatik : Personalpronomen im Akkusativ mich, dich, modelverban müssen, können, wollen

**Total periods: 30**

### TEXT BOOKS & REFERENCE BOOKS:

1. Schritte International, Daniela Niebisch, Fraz Speeche, Angela Pude, Daniela Niebisch, Fraz Speeche, Angela Pude
  2. Netzwerk A1, Stefanie Dengler, Paul Rusch, Helen Schmitz, Tanja Sieber
- I Year B.Tech Full Time 2022 Regulation Curriculum & Syllabus



## FACULTY OF ENGINEERING AND TECHNOLOGY

### EBFL22I02 GERMAN - Details in English for contents of each unit

#### Unit I

Alphabet- Numbers from 1 to 100 - Greetings and Goodbye - Self Introduction W questions - Grammar

#### Unit II

Genders in German - Personal Pronoun (For Conjugation) - Definite /Indefinite / Negative Articles - Ask about others - (MAP and Possition of Land) – Grammar

#### Unit III

Possessive Pronoun- Verb Conjugation - Yes /No Question - Sentence making in German – Grammar

#### Unit IV

what time is it ?, Times of the day - The Week days and Months) - The Weather, Directions - The Family - Substantive , Countries and Languages - Class Room – Substantive Countries and its Languages - Negation , Like /Dislike – Grammar

#### Unit V

Accusative - Shopping - In Flight - In departmental store - Job search Grammar



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name JAPANESE	Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C						
EBFL22I03	Prerequisite : Nil	IE	1	0/0	1/0	1						
C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
OBJECTIVES												
To understand the main idea and some detailed aspects of complex and unfamiliar texts.Know emerging awareness of aesthetic properties of language and literary style.Recognize the role of cultural knowledge in understanding written texts.												
COURSE OUTCOMES (Cos) : Students completing this course were able to												
CO1	Learn to write Roumaji script, Able to self intro duce themselves, Will have knowledge of Hiragana and also able to speak about their Family members. Count up to 100.											
CO2	Able to count up tp 10,000, Will have knowledge of Katakana Alphabets, Will be able identify the body parts. Able to understand pronouns.											
CO3	Analyze Varied particles and also the existential verbs. Will be able to count using the concept of Counters.											
CO4	Will get knowledge of the two different types of adjectives both I ending and Na ending adjectives and frame different sentences with these two.											
CO5	Master the conjugation of 24 forms of the verbs.											
Mapping of Course Outcome with Program Outcome (POs)												
Cos/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		2
CO2										3		2
CO3										3		2
CO4										3		2
CO5										3		2
3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low												
Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/ Project	Internships/ Technical Skills	Soft Skills			
			✓									



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name <b>JAPANESE</b>	Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C
<b>EBFL22I03</b>	Prerequisite : Nil	<b>IE</b>	<b>1</b>	<b>0/0</b>	<b>1/0</b>	<b>1</b>

### UNIT I 5 Periods

Introduction, Romaji, Hiragana, Self Introduction, Family relations, Numbers (1-100)

### UNIT II 5 Periods

Numbers (101-1000), Numbers (1001-10,000), Katakana, Body parts, and Pronouns

### UNIT III 8 Periods

Introduction to particles (wa, mo, ka, desu, ni, ga, de), Imasu, Arimasu, Couters

### UNIT IV 5 Periods

Adjective i-ending, and Na Ending

### UNIT V 7 Periods

Verbs (24 forms)

**Total periods: 30**

#### TEXT BOOKS:

1. Genki, Eri Bnno, Yoka Ikeda, Yutaka Ohno, Chikkao Shinogawa, Kyoko Tokoshiki, The Japanese Publishing Company

#### REFERENCE BOOKS:

1. Minna No Nihongo, 3A Corporation, Goyal Publication
- I Year B.Tech Full Time 2022 Regulation Curriculum & Syllabus



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name <b>ARABIC</b>	Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C						
<b>EBFL22I04</b>	Prerequisite : Nil	<b>IE</b>	<b>1</b>	<b>0/0</b>	<b>1/0</b>	<b>1</b>						
C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
<b>OBJECTIVES</b>												
To learn, speak, write and do basic conversation in Arabic Language												
<b>COURSE OUTCOMES (Cos)</b> Students completing this course were able to												
CO1	Learn alphabets, vowels and gender											
CO2	Ask questions, numbers and counting											
CO3	Converse in a public place in Arabic											
CO4	Identify and speak about food, weather etc											
CO5	Analyze verbs, tenses, singular and plural											
<b>Mapping of Course Outcome with Program Outcome (POs)</b>												
Cos/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		2
CO2										3		2
CO3										3		2
CO4										3		2
CO5										3		2
3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low												
Category	Basic Sciences	Engg.Science	Humanities & Science Social	Program Core	Program Elective	Open Elective	Practical/ Project	Internships/ Technical Skills	Soft Skills			
			✓									





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name <b>ARABIC</b>	Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C
<b>EBFL22I04</b>	Prerequisite : Nil	<b>IE</b>	<b>1</b>	<b>0/0</b>	<b>1/0</b>	<b>1</b>

### UNIT I

**6 periods**

Alphabets – Greetings – question words – meeting people first time – introduction – introducing family members

Grammar – Present simple, long and short vowels, masculine and feminine distinctions

### UNIT II

**6 periods**

Asking questions -describing city, capital cities, towns countries – numbers and counting – how many – how much – buying and selling

Grammar – negation to present form – moon letters – genitive case – spelling rules for Hamza, Idafa

### UNIT III

**6 periods**

Eating and drinking – talking about ethnic foods and favourite cuisines – communicative phrases at public places – questions with what

Grammar – Group words – past tense – plural and joint cases

### UNIT IV

**6 periods**

Describing weather – trips and adventures -camping – school trips

Grammar – future tense, verbs in plural

### UNIT V

**6 periods**

Time and everyday routine – making comparison – days of week – comparing past and present

Grammar – Negative statements – pronouns - superlatives

**Total periods: 30**

### Text books & Reference books

1. The Essentials Arabic., Rafiel Imad Faynan., Arabic Edition Publisher
2. Gateway to Arabic, Imran.H.Alawiye, Paperback publisher



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name <b>CHINESE</b>	Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C						
<b>EBFL22I05</b>	Prerequisite : Nil	<b>IE</b>	<b>1</b>	<b>0/0</b>	<b>1/0</b>	<b>1</b>						
C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
<b>OBJECTIVES</b>												
This is a beginning level course in Chinese Mandarin, including introduction of phonetics and daily expressions. It is aimed at students with no prior knowledge of Chinese.												
<b>COURSE OUTCOMES (Cos):</b> Students completing this course were able to												
<b>CO1</b>	Basic understanding of Chinese Mandarin											
<b>CO2</b>	Do conversations of daily living such as greetings											
<b>CO3</b>	Acquaint exchange personal information, making an inquiry on time, etc											
<b>CO4</b>	Acquire listening, speaking, and reading skills in Chinese Mandarin.											
<b>CO5</b>	Use the language in real life scenarios and for everyday conversational communications.											
<b>Mapping of Course Outcome with Program Outcome (POs)</b>												
Cos/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		2
CO2										3		2
CO3										3		2
CO4										3		2
CO5										3		2
3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low												
Category	Basic Sciences	Engg.Science	Humanities & Science Social	Program Core	Program Elective	Open Elective	Practical/ Project	Internships/ Technical Skills	Soft Skills			
			✓									



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name <b>CHINESE</b>	Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C
<b>EBFL22I05</b>	Prerequisite : Nil	<b>IE</b>	<b>1</b>	<b>0/0</b>	<b>1/0</b>	<b>1</b>

### UNIT I

**6 periods**

Introduction of Chinese language Initials and finals, read initials: b, p, m, f, d, t, n, l, g, k, h Be able to read finals: a, o, e, i, u, ü, ai, ei, ao, ou, an, en, ang, new words combined with tones greet people using: How do you do?

### UNIT II

**6 periods**

Initials: j, q, x, z, c, s, zhi, chi, shi, r finals: eng, ong, ia, iao, ie, -iu, ian, in, iang, ing, iong, er new words combined with tones greet people using: How are you?

### UNIT III

**6 periods**

Finals: ua, uo, uai, ui, uan, uen, un, uang, ueng, üe, üan, ün

New words combined with tones o count numbers count date, month and year greet people using: Are you busy with your work?

### UNIT IV

**6 periods**

New words questions with “吗” questions with interrogative pronouns adjectival predicate acquaintance using: May I know your name?

### UNIT V

**6 periods**

Sentences with a verbal predicate attributive genitive use the “是” sentence acquaintance using: Let me introduce..

**Total periods: 30**

### TEXTBOOKS AND REFERENCE BOOKS

1. The first 100 Chinese Characters, Laurence Mathews, Tuttle Publishers
2. Learning Mandarin Chinese, Version2, Yi Ren, Tuttle Publishers



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name RUSSIAN	Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C						
EBFL22I06	Prerequisite : Nil	IE	1	0/0	1/0	1						
C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
OBJECTIVES												
This is a beginning level course in Chinese Mandarin, including introduction of phonetics and daily expressions. It is aimed at students with no prior knowledge of Chinese.												
COURSE OUTCOMES (Cos) : Students completing this course were able to												
CO1	Acquaint Phonetics – Alphabets and sounds											
CO2	Use different types of nouns and self introduce.											
CO3	Identify general vocabulary and greet in the language											
CO4	Identify and apply sounds with different stems and word construction											
CO5	Construct and speak sentences in the language											
Mapping of Course Outcome with Program Outcome (POs)												
Cos/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		2
CO2										3		2
CO3										3		2
CO4										3		2
CO5										3		2
3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low												
Category	Basic Sciences	Engg.Science	Humanities & Science Social	Program Core	Program Elective	Open Elective	Practical/ Project	Internships/ Technical Skills	Soft Skills			
			✓									



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name <b>RUSSIAN</b>	Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C
<b>EBFL22I06</b>	Prerequisite : Nil	<b>IE</b>	<b>1</b>	<b>0/0</b>	<b>1/0</b>	<b>1</b>

### UNIT I

**6 periods**

Phonetics: Alphabets and Sounds, Voice and vowels, Voice and Voiceless – Consonants - Self Intro, Self Name in Russian Language

### UNIT II

**6 periods**

Etho construction, Shtho Etho, Kmo Etho - Animates and Inanimate nouns

### UNIT III

**6 periods**

General Vocabulary, Answering the objects with Etho on interrogatives Shtho Etho and Kmotho? - Greetings of the Day on various timings

### UNIT IV

**6 periods**

Alphabets , sounds with Hard stems - Gender of Nouns, Demonstrative Pronouns using vocabulary and simple word constructions - General words on regular us: Excuse me, May I Come in, Excuse me, Thank you and see you again

### UNIT V

**6 periods**

Revision of Vocabulary, New Words, Greetings and other Day to day usage of sentences

**Total periods: 30**

### TEXTBOOKS & REFERENCE BOOKS

1. Russian for beginners, Gateway Guides, Kindle Edition
2. Learn to speak & Write Russian, Vasuda Bhaskar, Chatter Singh Publishers.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name SPANISH	Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C						
EBFL22I07	Prerequisite : Nil	IE	1	0/0	1/0	1						
C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation												
OBJECTIVES												
To understand the main idea and some detailed aspects of complex and unfamiliar texts.Know emerging awareness of aesthetic properties of language and literary style. Recognize the role of cultural knowledge in understanding written texts.												
COURSE OUTCOMES (Cos): Students completing this course were able to												
CO1	Learn to write numbers, alphabets, regular and irregular verbs											
CO2	Practice preposition and articles.											
CO3	Comprehend model verbs and speak in future											
CO4	Familiarize colours, places and create phrases											
CO5	Master conjugation and speaking the language											
Mapping of Course Outcome with Program Outcome (POs)												
Cos/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		2
CO2										3		2
CO3										3		2
CO4										3		2
CO5										3		2
3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low												
Category	Basic Sciences	Engg.Science	Humanities & Science Social	Program Core	Program Elective	Open Elective	Practical/ Project	Internships/ Technical Skills	Soft Skills			
			✓									



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name <b>SPANISH</b>	Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C
<b>EBFL22I07</b>	Prerequisite : Nil	<b>IE</b>	<b>1</b>	<b>0/0</b>	<b>1/0</b>	<b>1</b>

### UNIT I

**5 periods**

Los Saludos y Despedidas, Los Alfabetos, Los Numeros (1-20), Sonidos y Letras: H, C/Qa, G/J, B/V, C/Z, R, R/rr, Ch, G/Gu, Ll, N, Aficiones.

### UNIT II

**5 periods**

Los Numeros (21-100), Pronombres Personales: Yo, Tu, El, Eyya, Nosotros, Vosotros, Ustedes, Usted. Ser verbos: Soy, Eres, Es, Somos, Sois, Son. Nacionalidad, Profesiones.

### UNIT III

**5 periods**

Singular y Plural, Conversion de Singular a Plural. Masculino y Femenino, conversion de masculino a femenino. Tener verbos: Tengo, Tienes, Tiene, Tenemos, Teneis, Tienen. Llevar verbos.

### UNIT IV

**10 periods**

Vocabulario de Colores, Casa, Bebidas, Ciudad, Clima, Colegio, Comida, Medios, Saludos, Verduras. Articulos definidos, Articulos indefinidos.

### UNIT V

**5 periods**

Estar verbos: Estoy, Estas, Esta, Estamos, Estais, Estan. Reflexive verbos: Me, Te, Se, Nos, Os, Se. Cuantificadores, Preguntar y Responder.

**Total periods: 30**

### TEXT BOOK:

1. Aula internacional 1, Jaime Corpas & Eva Garcia, diffusion, Nueva edicion

### REFERENCE BOOK:

1. Grammatica de uso A1-B2, Luis Aragonés, Ramon Palencia, smeLe, Nueva edicion





## FACULTY OF ENGINEERING AND TECHNOLOGY

### OPEN ELECTIVE

Subject Code <b>EBIT22OE1</b>	Subject Name <b>WEB DESIGN</b>	<b>Ty/Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>						
	Prerequisite: Nil	Ty	3	0/0	0/0	3						
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>• The students will learn the Network and Internet works.</li><li>• To learn the HTML program structure, elements and Tags.</li><li>• To have knowledge to design basic website for their own.</li><li>• To learn how to design an effective website using CSS.</li><li>• To learn and develop a dynamic web sites using scripting languages.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Basics of Network and Internet works.											
CO2	Able to evaluate a web site											
CO3	Ability to make a well interactive online applications.											
CO4	Have knowledge to analysis and evaluate on web site and design a quality web site.											
CO5	Understand the Scripting language and design a simple web page.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	1	1	3	1	1	3	2	1	1
CO2	3	2	1	3	1	1	1	1	1	1	1	3
CO3	2	2	3	1	3	2	3	1	2	2	1	1
CO4	2	2	3	1	1	2	1	1	2	2	1	1
CO5	2	3	3	2	-	3	-	-	3	3	-	2
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	1			3			1			1		
CO2	1			3			1			1		
CO3	3			2			1			1		
CO4	3			2			1			1		
CO5	-			3			-			3		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
						✓						



## FACULTY OF ENGINEERING AND TECHNOLOGY

Course Code	Course Title	Ty/Lb/ETL	L	T/S.Lr	P/R	C
EBIT22OE1	WEB DESIGN	Ty	3	0/0	0/0	3

### UNIT I: Introduction to Network

**9 Hrs**

Introduction to computer networks and uses - Network: devices, topology and types – Communication media. Introduction to OSI layers, Port and Protocols, Network applications. Client / Server architecture. Internet server provider, DNS and Hosting.

### UNIT II: Web Design Principles

**9 Hrs**

Brief History of Internet - What is World Wide Web - Why create a web site - Web Standards - Audience requirement. Basic principles involved in developing a web site - Planning process - Five Golden rules of web designing - Designing navigation bar - Page design - Home Page Layout - Design Concept.

### UNIT III: HTML

**9 Hrs**

Introduction to HTML- HTML version- Basic structure of an HTML document – Creating HTML document – HTML Elements - HTML Tags - Working with Text - Working with Lists, Tables and Frames - Working with Hyperlinks, Images and Multimedia - Working with Forms and controls .

### UNIT IV: Cascading Style Sheet

**9 Hrs**

Concept of CSS - Creating Style Sheet - CSS Properties – CSSSS tyling (Background, Text Format, Controlling Fonts) - Working with block elements and objects - Working with Lists and Tables - CSS Id and Class - Box Model(Introduction, Border properties, Padding Properties, Margin properties) - CSS Advanced(Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector) - CSS Color - Creating page Layout and Site Designs.

### UNIT V: Scripting Languages

**9 Hrs**

JavaScript introduction – control structures – functions – arrays – objects – simple web applications. Web hosting and maintenance.

**Total Hours: 45**

### Text Books:

1. Computer Networks by A Tanenbaum - 5th edition , Pearson Education
2. Mastering HTML, CSS & JavaScript Web Publishing by Laura Lemay, Rafe Coburn, Jennifer Kyrnin , Pearson Education.
3. HTML & CSS: The Complete Reference, Fifth Edition by Thomas A. Powell, McGraw-Hill publication.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code <b>EBIT22OE2</b>	Subject Name <b>DIGITAL MARKETING</b>						<b>Ty/ Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>	
	Prerequisite: Nil						Ty	3	0/0	0/0	3	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To understand the fundamental principles of Digital marketing, the past, present and future potential of Digital marketing.</li><li>To identify the role of e-marketing in the present context and develop an e-marketing plan with appropriate e-marketing strategies.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1		Understand the concepts and uses of Digital Marketing										
CO2		Develop Strategic Planning for the Market										
CO3		Evaluate the Ethical and Legal Values										
CO4		Predict the Marketing Trends										
CO5		Able to analyze confluence of Marketing operations										
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	1	1	1	1	3	1	2	1	1
CO2	3	2	1	1	1	1	3	1	1	1	1	3
CO3	2	2	3	1	3	2	1	1	2	2	1	1
CO4	2	2	3	1	1	2	1	1	2	2	3	1
CO5	2	2	3	1	1	2	1	1	2	2	3	3
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	1			3			1			1		
CO2	1			3			1			1		
CO3	3			2			1			1		
CO4	3			2			1			1		
CO5	3			2			1			1		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
						✓						



## FACULTY OF ENGINEERING AND TECHNOLOGY

Course Code	Course Title	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22OE2	DIGITAL MARKETING	Ty	3	0/0	0/0	3

### UNIT I: INTRODUCTION

**9 Hrs**

Digital-Marketing Past, Present & Future – Digital-Marketing Landscape, Digital-marketing's Past - Web 1.0, Digital Marketing Present - Web 2.0, Future -Web 3.0, Strategic Digital-Marketing, and Digital -Business Models – Online Revenue Models, Value Models, and Strategic Digital-Business Models.

### UNIT II: DIGITAL MARKETING PLAN

**9 Hrs**

Process, Creating a Digital-Marketing Plan, Seven Steps –Situation Analysis, Strategic Planning, Objectives, Digital-Marketing Strategies – Product, Price, Distribution, Communication, Relationship Management; Implementation plan, Budget, Evaluation.

### UNIT III: DIGITAL -MARKETING ENVIRONMENT

**9 Hrs**

Overview of Digital-Marketing Environment, Global Digital -Markets, Wireless Internet Access, Digital divide, Building inclusive Digital markets, social networking, Ethical and Legal Issues – Overview, Digital Property, Emerging issues.

### UNIT IV: DIGITAL-MARKETING MANAGEMENT

**9 Hrs**

Online offer – Creating customer value online, Product Benefits, Digital Marketing enhanced product development, Payment options, Pricing Strategies; Internet as distribution, Digital Marketing Communication – Owned Media, Paid media, Earned Media.

### UNIT V: EMERGING TRENDS

**9 Hrs**

Emerging trends in Digital-marketing, Content Marketing, Social Media Marketing, Email Marketing, Affiliate Marketing, Video Marketing, Mobile Marketing, Interactive advertising, International Online Marketing, Search Engine Marketing, Online Partnership, Viral Marketing, E-CRM, E-Business, E-Tailing.

**Total Hours: 45**

#### TEXT BOOK:

1. Strauss Judy, Frost Raymond (2013), E-Marketing, 7/e; New Delhi: Prentice Hall.

#### REFERENCE BOOKS:

1. Chaffey Dave and Smith PR (2013), E marketing Excellence: Planning and Optimizing your Digital Marketing; 4/e; Routledge.
2. Ryan Damian, (2014), Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation, 3/e; Kogan Page Limited.



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBIT22OE3	Subject Name CYBER SECURITY ESSENTIALS						T / L/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: NIL						Ty	3	0/0	0/0	3	
L : Lecture T:Tutorial SLr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To learn the Security standards</li><li>To identify the techniques of cyber security attacks</li><li>To learn the concept of basic computer networks</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Understand the process design to protect computers, networks											
CO2	Familiarize data from unauthorized access, vulnerabilities and attacks delivered via Internet by cyber criminals											
CO3	Recognize the importance of cyber security application											
CO4	Able to analyze and resolve security issues in networks.											
CO5	Able to use cyber security, information assurance, cyber/computer forensic software and tools.											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	3	1	2	1	2	3	2	1
CO2	2	3	3	3	3	2	2	1	2	2	3	1
CO3	3	3	3	3	3	2	2	2	3	2	3	2
CO4	2	3	3	2	2	1	2	1	2	2	2	2
CO5	3	2	3	2	2	2	2	1	2	1	2	1
COs / PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			3			2			3		
CO2	3			3			2			3		
CO3	3			3			2			2		
CO4	3			3			2			2		
CO5	3			3			2			2		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
						✓						



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22OE3	CYBER SECURITY ESSENTIALS	Ty	3	0/0	0/0	3

### UNIT I CYBER SECURITY FUNDAMENTALS

**9 Hrs**

Network And Security Concepts: Information Assurance Fundamentals-Basic Cryptography-  
Public Key Encryption- The Domain Name System(DNS)-Firewalls

### UNIT II ATTACKERS TECHNIQUE AND MOTIVATIONS

**9 Hrs**

Trackers Cover Their Tracks (Antiforensics), How And Why Attackers Use Proxies-Tunnelling  
Technique- Fraud Technique: Phishing, Smishing, Vishing And Mobile Malicious Code- Rogue  
Antivirus- Threat Infrastructure: Botnets-Fast Flux.

### UNIT III EXPLOITATION

**9 Hrs**

Techniques To Gain A Foothold: Shellcode- Integer Overflow Vulnerabilities- Stack Based  
Buffer Overflows- SQL Injections – Malicious PDF Files.

### UNIT IV MALICIOUS CODE

**9 Hrs**

Self-Replicating Malicious Code Worms-Viruses Persistent S/W Techniques: Basic I/P-O/P  
System- Legacy Text Files- Autostart Registry Entries Root Kits- Spyware- Attacks Against  
Privileged User Accounts- Virtual Machine Detection.

### UNIT V DEFENCE AND ANALYSIS TECHNIQUE

**9 Hrs**

Memory Forensics- Honeypots- Malicious Code Naming- Automated Malicious Code  
Analysis System-Intrusion Detection System. Case study :Defence Special File Investigation  
Tools.

**Total Hours: 45**

#### Text Book:

James Graham, Ryan Olson, 2016 -Rick Howard, Cyber Security Essentials



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code: <b>EBIT22OE4</b>	Subject Name <b>INTRODUCTION TO MULTIMEDIA</b>					<b>Ty/ Lb/ ETL</b>	<b>L</b>	<b>T/ S.Lr</b>	<b>P/R</b>	<b>C</b>		
	Prerequisite: Nil					Ty	3	0/0	0/0	3		
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To learn about Basics of Computer Graphics.</li><li>To understand the difference between normal, 2D and 3D Dimensional Graphics</li><li>To understand the conversion of 2D to 3D Pictures.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1		Understand the various types of Display										
CO2		Transform geometrical structures, perform clipping on geometrical objects										
CO3		Understand the types of transformation										
CO4		Concept of Various Clipping Operations										
CO5		Analyze a 3D structure										
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>
<b>CO2</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>
<b>CO3</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>-</b>
<b>CO4</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>
<b>CO5</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>
<b>COs /PSOs</b>	<b>PSO1</b>			<b>PSO2</b>			<b>PSO3</b>			<b>PSO4</b>		
<b>CO1</b>	<b>1</b>			<b>3</b>			<b>1</b>			<b>1</b>		
<b>CO2</b>	<b>1</b>			<b>3</b>			<b>3</b>			<b>1</b>		
<b>CO3</b>	<b>2</b>			<b>1</b>			<b>-</b>			<b>2</b>		
<b>CO4</b>	<b>3</b>			<b>2</b>			<b>1</b>			<b>3</b>		
<b>CO5</b>	<b>3</b>			<b>2</b>			<b>1</b>			<b>1</b>		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
<b>Category</b>	<b>Basic Sciences</b>	<b>Engineering Sciences</b>	<b>Humanities and Social Sciences</b>	<b>Program Core</b>	<b>Program Electives</b>	<b>Open Electives</b>	<b>Interdisciplinary</b>	<b>Skill component</b>	<b>Practical / Project</b>			
						✓						





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
EBIT22OE4	INTRODUCTION TO MULTIMEDIA	Ty	3	0/0	0/0	3

### UNIT I TYPES OF DISPLAY

**9 Hrs**

Video display device: Cathode ray tube, Raster scan displays, Random scan displays. Raster scan systems, Random scan systems, Input devices, Graphics software.

### UNIT II BASIC ALGORITHM OF DRAWINGS

**9 Hrs**

Output Primitives: Points & Lines, Line drawing Algorithms, Loading the frame buffer, Circle & Ellipse generating Algorithms, Pixel addressing & Object geometry, Fill area primitives, Character generation

### UNIT -III TYPES OF TRANSFORMATION

**9 Hrs**

2-D Geometric Transformations: Basic Transformations, Matrix representation & Homogeneous Coordinates, Composite Transformations, Other Transformations, Transformations between Coordinate Systems, Raster methods for Transformations

### UNIT IV CLIPPINGS OPERATION

**9 Hrs**

2- Dimensional Viewing: Viewing pipeline, Viewing Coordinate reference frame, Window-to-view port coordinate transformation, Line clipping, Polygon Clipping, Curve Clipping.

### UNIT V 3D EFFECTS

**9 Hrs**

3 -D Concepts: 3 -D display methods. 3-D Geometric & Modeling Transformations: Translation, Rotation, Scaling, Other Transformations, Composite Transformations, Modeling & Coordinate.

**Total Hours: 45**

#### Text Book:

1. D.Hearn &M.P.Becker , “Computer graphics”; 2 nd Ed., Prentice Hall India- 1995

#### References:

1. Foley Vandam & Hughes, “ Computer Graphics”; Addison Wesley.
2. Angel Edward., “Interactive Computer Graphics – A Top-down Approach with OpenGL” ,Addison-Wesley 1996.
3. Newmann W and Sproull R.F., Principles of Interactive Computer Graphics, McGraw-Hill, 1980



## FACULTY OF ENGINEERING AND TECHNOLOGY

### OPEN LAB

Subject Code EBIT22OL1	Subject Name VISUAL PROGRAMMING LAB						T / L/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: Nil						Lb	0	0/0	3/0	1	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits												
T/L/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVE :												
<ul style="list-style-type: none"><li>To review the basics of Visual programming.</li><li>To understand the concepts of Visual Basic programming.</li><li>To learn about windows programming.</li></ul>												
COURSE OUTCOMES (COs) :												
CO1	Understand concept of Visual Programming.											
CO2	Will be able to understand the problem and will have the creativity for writing program.											
CO3	Will have a basic knowledge on intercommunication of windows programming.											
CO4	Will be able to build, design, create and debug visual basic applications.											
CO5	Able to code visual programs by using Visual Basic work environment.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	1	1	1	2	1	2	1	1
CO2	3	3	1	3	2	1	1	2	1	2	1	1
CO3	3	2	2	1	1	1	1	2	1	2	1	1
CO4	3	2	1	3	2	1	1	2	1	2	1	1
CO5	3	2	2	1	2	1	1	2	1	2	1	1
COs / PSOs		PSO1			PSO2			PSO3			PSO4	
CO1		3			2			1			2	
CO2		3			1			1			1	
CO3		3			2			1			2	
CO4		3			1			1			2	
CO5		3			2			1			1	
H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
						✓						



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	T / L / ETL	L	T / S.Lr	P/ R	C
EBIT22OL1	VISUAL PROGRAMMING LAB	Lb	0	0/0	3/0	1

### 1. VISUAL BASIC

1. Adding menus to forms
2. Creating dialog boxes with various options
3. MDI applications
4. Writing code for various keyboard and mouse events
5. OLE container control
6. Data access through Data control and DAO.
7. Active X control
8. Active X Document
9. Active X DLL 2.

### 2. VISUAL C++

1. Creating applications with App wizard
2. Working with MFC
3. Exception handling
4. Loading - Editing and - Adding resources - Linking resources to applications
5. Drawing bitmaps
6. Threads
7. OLE
8. Graph Applications

**LEARNING OUTCOMES:** Upon completion of this course, the student will be able to:

- a. Design, create, build, and debug Visual Basic applications.
- b. Explore Visual Basic's Integrated Development Environment (IDE).

**Total Hours : 45**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBIT22OL2	Subject Name WEB DESIGN LAB						T / L/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: NIL						Lb	0	0/0	3/0	1	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To overview Object Web Technologies</li><li>To Know Basic Concept of Web Technologies</li><li>To learn Advance Programming.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Design and implement internet system for enhancing education and engineering design											
CO2	Understand functionality of internet system											
CO3	Design a system according to customer needs using the available internet technologies											
CO4	Design and develop interactive C/S side executable web applications											
CO5	Build better web application more quickly and with less code											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	1	1	1	2	1	2	1	1
CO2	3	3	1	3	2	1	1	2	1	2	1	1
CO3	2	2	3	2	2	1	3	1	-	-	1	-
CO4	2	1	3	2	3	2	3	1	-	-	1	-
CO5	2	3	1	1	1	2	1	2	-	-	1	-
COs /PSOs	PSO1			PSO2			PSO3			PSO4		
CO1	3			2			1			2		
CO2	3			1			1			1		
CO3	2			2			1			1		
CO4	2			3			2			2		
CO5	2			3			2			2		
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
						✓						



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	T / L/ ETL	L	T / S.Lr	P/ R	C
EBIT22OL2	WEB DESIGN LAB	Lb	0	0/0	3/0	1

1. Practice Internet applications.
2. Explore Web browsers, search engines
3. Familiarize with web portals, e-commerce sites, blogs etc
4. Basic Html Tags
5. Hyper Links, Tables & Multimedia
6. Frames & iFrames
7. Inline, Internal and External Style sheets
8. Design a web page to display your full bio-data.
9. Simple Validating Form (a) HTML forms, (b) JavaScript
10. Registration Form with Multi-Validating
11. Design a web page to select the elective subject through online with registration form.

**Total Hours : 45**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBIT22OL3	Subject Name DIGITAL CONTENT CREATION LAB						T / L/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: Nil						Lb	0	0/0	3/0	1	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits												
T/L/ETL : Theory/Lab/Embedded Theory and Lab												
<b>OBJECTIVES :</b> <ul style="list-style-type: none"><li>To overview Object Digital content creation.</li><li>To know Basic Concept of Digital content creation.</li><li>To apply Advance Programming.</li></ul>												
<b>COURSE OUTCOMES (COs) :</b>												
CO1	Design and implement internet system for enhancing education and engineering design											
CO2	Understand functionality of internet system											
CO3	Design a system according to customer needs using the available internet technologies											
CO4	Design and develop interactive C/S side executable web applications											
CO5	Build better web application more quickly and with less code											
<b>Mapping of Course Outcomes with Program Outcomes (POs)</b>												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	1	1	1	2	1	2	1	1
CO2	3	3	1	3	2	1	1	2	1	2	1	1
CO3	2	2	3	2	2	1	3	1	-	-	1	-
CO4	2	1	3	2	3	2	3	1	-	-	1	-
CO5	2	3	1	1	1	2	1	2	-	-	1	-
COs / PSOs		PSO1			PSO2			PSO3			PSO4	
CO1		3			2			1			2	
CO2		3			1			1			1	
CO3		2			2			1			1	
CO4		2			3			2			2	
CO5		2			3			2			2	
<b>H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low</b>												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
						✓						



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	T / L / ETL	L	T / S.Lr	P/ R	C
EBIT22OL3	DIGITAL CONTENT CREATION LAB	Lb	0	3/0	0/0	1

1. Content Creator based on medium of writing,
2. Content Creator based on medium of video-creation
3. Content Creator based on business models of monetizing brand
4. Content Creator based on business models of skills
5. Content Creator based on platform: YouTube
6. Content Creator based on platform: Instagram
7. Content Creator based on platform: Twitter
8. Content Creator based on level of expertise: Expert
9. Content Creator based on level of expertise: Newbie
10. Content Creator based on level of expertise: Novice

**Total Hours : 45**





## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBIT22OL4	Subject Name COMPUTER NETWORK LAB							T / L/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: Nil							Lb	0	0/0	3/0	1
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits												
T/L/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVES :												
<ul style="list-style-type: none"><li>To understand the working difference between straight cable and cross over cable.</li><li>To use the packet tracer to simulate various networks.</li></ul>												
COURSE OUTCOMES (COs) :												
CO1	Understand concept and working of different cables.											
CO2	Use stimulator and can stimulate various networks.											
CO3	Design a firewall											
CO4	Compare and analyze different existing protocols											
CO5	Understand the concept of new topology											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	1	1	1	2	1	2	1	1
CO2	3	3	1	3	2	1	1	2	1	2	1	1
CO3	3	2	2	2	-	1	-	-	1	2	1	1
CO4	3	2	2	2	-	1	-	-	1	2	1	-
CO5	3	2	2	2	-	1	-	-	1	2	1	-
COs / PSOs	PSO1			PSO2				PSO3			PSO4	
CO1	3			2				1			2	
CO2	3			1				1			1	
CO3	3			3				1			3	
CO4	3			3				1			3	
CO5	3			2				-			3	
H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
						✓						



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	T / L/ ETL	L	T / S.Lr	P/ R	C
EBIT22OL4	COMPUTER NETWORK LAB	Lb	0	0/0	3/0	1

1. Study of different types of Network cables and Practically implement the cross-wired cable
2. Study of Network Devices in Detail.
  - 2a. Study of Network Devices in layer1( HUB, REPEATER)
  - 2b.Study of Network Devices in layer2(Swith)
  - 2c.Study of Network Devices in layer3( Router)
3. Study of FIREWALL
4. Connect the computers in Local Area Network.
5. Study of Network IP.
  - 5a. IPV4
  - 5b. IPV6
6. Study of Network Topologies
  - 6a. Bus Topology
  - 6b. Ring Toplogy
  - 6c. Star Topology
7. Study of MAC address and port numbers.

**Total Hours : 45**



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code EBIT22OL5	Subject Name PHP / MySQL PROGRAMMING LAB						T / L/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: Nil						Lb	0	0/0	3/0	1	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits												
T/L/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVES :												
<ul style="list-style-type: none"><li>To Become a Web Site developer / Programmer</li><li>To Enable the Students to become expert in MySQL.</li></ul>												
COURSE OUTCOMES (COs) :												
CO1	Understand the requirement and develop the website.											
CO2	Establish a back-end connectivity for data storage and utilization.											
CO3	Able to list major elements of PHP and MYSQL											
CO4	Learn to create dynamic Web Pages and interactive websites based on user interaction.											
CO5	Learn how to handle data upon multiple conditions.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	2	1	1	1	1	1	1	2
CO2	3	2	1	1	2	1	1	1	1	1	1	2
CO3	3	2	1	2	1	1	2	1	1	1	1	2
CO4	3	2	1	1	2	1	2	1	1	1	1	2
CO5	3	2	1	2	2	1	1	1	2	1	1	2
COs / PSOs		PSO1			PSO2			PSO3			PSO4	
CO1		3			2			1			1	
CO2		3			2			1			1	
CO3		3			2			2			2	
CO4		3			2			2			2	
CO5		3			2			2			2	
H/M/L indicates Strength of Correlation 3- High, 2- Medium, 1-Low												
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Interdisciplinary	Skill component	Practical / Project			
						✓						



## FACULTY OF ENGINEERING AND TECHNOLOGY

Subject Code	Subject Name	T / L / ETL	L	T / S.Lr	P/ R	C
EBIT22OL5	PHP / MySQL PROGRAMMING LAB	Lb	0	0/0	3/0	1

1. Use of select statements for queries
2. Nested queries using SQL
3. Built in functions in SQL
4. Update operations using SQL.
5. Use of index, creating views and querying in views
6. Create a php program to find odd or even number from given number
7. Write a php program to find maximum of three numbers.
8. Write a PHP program to swap two numbers.
9. Write a PHP Program to demonstrate the variable function: Gettype():
10. Write a PHP program to drop table using MySQL.
11. Create a student Registration in PHP and Save and Display the student Records
12. Write a program to Develop student registration form and display all the submitted data on another page.

**Total Hours : 45**