



Dr.M.G.R. Educational and Research Institute

(Deemed to be University U/S 3 of the UGC Act 1956)

An ISO 9001:2008 Certified Institution

Maduravoyal, Chennai - 95



Department of Information Technology

DECLARATION

I, **Dr. V. N. RAJAVARMAN**, Head of Information Technology, hereby declare that this copy of the syllabus (B. Tech – Information Technology - Full Time 2017 Regulation) is the final version which is being taught in the class and uploaded in our University website. I assure that the Syllabi available in our University website is verified and found correct. The Curriculum and Syllabi have been ratified by our Academic Council / Vice Chancellor.

**Department of Information Technology****SEMESTER – I**

Course Code	Course Title	C	L	T/SLr	P/R	Ty/Lb/ETL
BEN17001	Technical English – I	2	1	0/0	2/0	Ty
BMA17001 BMA17002	Mathematics – I / Bio Mathematics (For Biotech)	4	3	1/0	0/0	Ty
BPH17001	Engineering Physics	3	2	0/1	0/0	Ty
BCH17001	Engineering Chemistry – I	3	2	0/1	0/0	Ty
BES17001	Basic Electrical & Electronics Engineering	3	2	0/1	0/0	Ty
BES17002	Basic Mechanical & Civil Engineering	3	2	0/1	0/0	Ty
ANNUAL PATTERN (PRACTICALS)*						
BES17ET1	Basic Engineering Graphics	2	1	0/0	2/0	ETL
BPH17L01	Engineering Physics Lab	1	0	0/0	2/0	Lb
BCH17L01	Engineering Chemistry Lab	1	0	0/0	2/0	Lb
BES17L01	Basic Engineering Workshop	1	0	0/0	2/0	Lb
BES17ET2	C Programming And Lab	2	1	0/0	2/0	ETL
BES17ET3	Entrepreneurial Skill Development & Project Lab	1	0	0/0	2/0	ETL

Credits Sub Total:26**SEMESTER – II**

Course Code	Course Title	C	L	T/SLr	P/R	Ty/Lb/ETL
BEN17002	Technical English – II	2	1	0/0	2/0	Ty
BMA17003 BMA17004	Mathematics – II / Bio Statistics (For Biotech)	4	3	1/0	0/0	Ty
BPH17002	Material Science	3	2	0/1	0/0	Ty
BCH17002	Engineering Chemistry – II	3	2	0/1	0/0	Ty
BES17003	Environmental Science	3	3	0/0	0/0	Ty

Credits SubTotal:15**C: Credits L: Lecture T: Tutorial S.Lr: Supervised Learning P: Problem/Practical****R: Research Ty/Lb/ETL: Theory /Lab/Embeddded Theory and Lab***** Internal Evaluation**

**Department of Information Technology****Semester : III****Theory:**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/S Lr	P/R	Ty/ Lb/ ETL/ EVL
BMA17008	BMA17003	Discrete Mathematics	M-3	4	3	1/0	0/0	Ty
BIT17001	NIL	Data Structures and Algorithms	PC	4	3	0/1	0/0	Ty
BCS17002	BES17ET2	Object Oriented Programming with C++	PC	4	3	0/1	0/0	Ty
BEC17I01	NIL	Fundamentals of Communication Systems	BES	3	3	0/0	0/0	Ty
BEC17I02	BES17001	Digital Systems	IDT-1	3	3	0/0	0/0	Ty

Practical:

BCS17ET1	BES17ET2	Computer Graphics	PC	3	1	0/1	2/0	ETL
BIT17L01	BES17ET2	Data structures and Algorithms Lab	PCL	1	0	0/0	3/0	Lb
BCS17L02	BES17ET2	Object Oriented Programming Lab with C++	PCL	1	0	0/0	3/0	Lb
BEC17IL1	BES17001	Digital Systems Lab	IDL-1	1	0	0/0	3/0	Lb

Credits Sub Total: 24**Semester: IV****Theory:**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SLr	P/R	Ty/ Lb/ ETL/ EVL
BMA17013	BMA17008	Numerical Methods for Computer Engineers	M-4	4	3	1/0	0/0	Ty
BIT17002	NIL	Software Engineering	PC	4	3	0/1	0/0	Ty
BCS17004	BIT17001	Database Management Systems	PC	4	3	0/1	0/0	Ty
BIT17003	NIL	System Software and Operating System	PC	3	3	0/0	0/0	Ty
BEC17I03	BES17I02	Micro Processors and Micro Controllers	IDT-2	3	3	0/0	0/0	Ty

Practical:

BSK17ET1	NIL	Soft Skills I	SS	2	1	0/1	1/0	ETL
BCS17ET2	BCS17002	Java Programming	PC	3	1	0/2	0/0	ETL
BCS17L03	BCS17L01	Database Management Systems Lab	PCL	1	0	0/0	3/0	Lb
BIT17L02	NIL	System Software and Operating System Lab	PCL	1	0	0/0	3/0	Lb
BEC17IL2	BEC17IL1	Micro Processors and Micro Controllers Lab	IDL-2	1	0	0/0	3/0	Lb
BIT17TS1	NIL	Technical Skill I (Evaluation)	TS	1	0	0/0	0	EVL

Credits Sub Total: 27

**Department of Information Technology****Semester: V****Theory:**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SLr	P/R	Ty/ Lb/ ETL/ EVL
BMA17016	BMA17013	Statistics for Computer Engineers	M-5	4	3	1/0	0/0	Ty
BCS17I01	NIL	Computer Networks	IDT-3	3	3	0/0	0/0	Ty
BIT17004	BCS17002	Object Oriented System Analysis and Design	PC	3	3	0/0	0/0	Ty
BEC17I04	NIL	Information Theory and Coding	IDT-4	4	3	1/0	0/0	Ty
BCS17007	BEC17I02	Computer Organization and Architecture	PC	4	3	1/0	0/0	Ty

Practical:

BCS17ET3	BCS17L03	PHP / MySQL	PC	3	1	0/2	0/0	ETL
BIT17L03	BCS17L02	Object Oriented System Analysis and Design using UML	PCL	1	0	0/0	3/0	Lb
BIT17L04	NIL	Mobile Application Development Lab	PCL	1	0	0/0	3/0	Lb
BCS17IL01	BCS17ET2	Network Programming Lab	IDL-3	1	0	0/0	3/0	Lb
BIT17TS2	BIT17TS1	Technical Skill II (Evaluation)*	TS	1	0	0/0	0/0	EVL
BIT17L05	NIL	Implant Training (Evaluation)*+	IPT	1	0	0/0	0/0	EVL

Credits Sub Total : 26+ To be undertaken after IVth Semester

* Internal evaluation (Departmental level Refer Annexure for evaluation methodology)

Semester: VI**Theory:**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SLr	P/R	Ty/ Lb/ ETL/ EVL
BCS17011	BCS17004	Data Warehousing and Data Mining	PC	4	3	0/0	0/2	Ty
BCS17010	BCS17ET3	Open Source Scripting Languages	PC	3	3	0/0	0/0	Ty
BIT17EXX	NIL	Elective I	PE	3	3	0/0	0/0	Ty
BIT17005	BEC17I01	Wireless Communication	PC	4	3	0/0	0/2	Ty
BIT17OEX	NIL	Open Elective (Interdisciplinary) E II	OE	3	3	0/0	0/0	Ty

Practical:

BSK17ET2	BSK17ET1	Soft Skills II	SS	2	1	0/1	1/0	ETL
BCS17L11	BCS17ET3	Data Mining Lab	PCL	1	0	0/0	3/0	Lb
BCS17L09	BCS17ET3	Scripting Languages Lab	PCL	1	0	0/0	3/0	Lb
BIT17L06	BCS17IL01	Wireless Lab	PCL	1	0	0/0	3/0	Lb
BIT17L07	NIL	Mini Project (Evaluation)	MP	1	0	0/0	0/0	EVL
BIT17TS3	BIT17TS2	Technical Skill III (Evaluation)	TS	1	0	0/0	3/0	EVL

Credits Sub Total: 24

**Department of Information Technology****Semester: VII****Theory:**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SLr	P/R	Ty/ Lb/ ETL/ EVL
BIT17006	BCS17I01	Cloud Technology	PC	3	3	0/0	0/0	Ty
BIT17007	BCS17I01	Web Technology and Web Services	PC	3	3	0/0	0/0	Ty
BIT17EXX	NIL	Elective III	PE	3	3	0/0	0/0	Ty
BIT17EXX	NIL	Elective IV	PE	3	3	0/0	0/0	Ty
BMG17002	BES17ET3	Management Concepts and Organizational Behavior	MGMT-1	3	3	0/0	0/0	Ty

Practical:

BIT17SEX	NIL	Elective (Special - Based On Current Technology) * E V	SE	3	1	0/2	0/0	ETL
BIT17L08	BCS17IL01	Web Technology and Web Services Lab	PCL	1	0	0/0	3/0	Lb
BIT17L09	BCS17ET2	Cloud Application Development Lab	PCL	1	0	0/0	3/0	Lb
BIT17L10	NIL	Project Phase – I	PP1	2	0	0/0	6/0	Lb
BFL17001	NIL	Foreign Language (Evaluation)	FL	2	1	0/1	0/0	EVL

Credits Sub Total: 24**Semester: VIII****Theory:**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SLr	P/R	Ty/ Lb/ ETL/ EVL
BIT17SEX	NIL	IT Specific Elective VI	PE	3	3	0/0	0/0	Ty
BIT17SEX	NIL	IT Specific Elective VII	PE	3	3	0/0	0/0	Ty
BMG17003	BMG17002	Total Quality Management	MGMT-2	3	3	0/0	0/0	Ty

Practical:

BIT17L11	BIT17L10	Project (Phase – II)	PP2	10	0	0/0	20/0	Lb
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Credits Sub Total: 19

* Internal evaluation (Departmental level Refer Annexure for evaluation methodology)

4 Credit papers should compulsorily have either P/R component.

Credit Summary**Semester 1 : 18****Semester 2 : 23****Semester 3 : 24****Semester 4 : 27****Semester 5 : 26****Semester 6 : 24****Semester 7 : 24****Semester 8 : 19****Total Credits : 185**

**Department of Information Technology**

Open Electives E- I OE (6th Sem)								
Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/S Lr	P/R	Ty / Lb/ ETL
BCS17OE1	NIL	Web Design	OE	3	3	0/0	0/0	Ty
BCS17OE2	NIL	Cyber Security Essentials	OE	3	3	0/0	0/0	Ty
BCS17OE3	NIL	Electronic Waste Management	OE	3	3	0/0	0/0	Ty
BCS17OE4	NIL	Software Testing	OE	3	3	0/0	0/0	Ty
BCS17OE5	NIL	Information Security Management	OE	3	3	0/0	0/0	Ty

6 th sem Electives E- II (Common to CSE&IT)								
Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/S Lr	P/R	Ty / Lb/ ETL
BCS17006	BCS17001	Design and Analysis of Algorithms (Only for IT)	PE	3	3	0/0	0/0	Ty
BCS17E01	BCS17ET1	Image Processing	PE	3	3	0/0	0/0	Ty
BCS17E02	NIL	Geographical Information Systems	PE	3	3	0/0	0/0	Ty
BCS17E03	BCS17004	Database Tuning	PE	3	3	0/0	0/0	Ty
BCS17E04	BCS17ET2 BCS17012	Component Based Technology	PE	3	3	0/0	0/0	Ty
BCS17E05	BCS17I02	E-Commerce	PE	3	3	0/0	0/0	Ty
BCS17E06	NIL	Artificial Intelligence	PE	3	3	0/0	0/0	Ty
BCS17E07	NIL	Human Computer Interaction	PE	3	3	0/0	0/0	Ty
BCS17E08 / BIS15005	BCS17I01	Wireless and Mobile Networking	PE	3	3	0/0	0/0	Ty

**Department of Information Technology**

7th Sem Electives – E- III and E-IV (Common to CSE&IT)								
Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/S Lr	P/R	Ty / Lb/ ETL
BCS17E09	BCS17011	Web Mining	PE	3	3	0/0	0/0	Ty
BCS17E10	BIT17I02	Web Data Design and Management	PE	3	3	0/0	0/0	Ty
BCS17E11	NIL	Risk Management	PE	3	3	0/0	0/0	Ty
BCS17E12	BIT17I02	M-Commerce	PE	3	3	0/0	0/0	Ty
BCS17E13	BCS17I01	Cryptography and Network Security	PE	3	3	0/0	0/0	Ty
BCS17E14	BCS17I01	Mobile Adhoc Networks	PE	3	3	0/0	0/0	Ty
BCS17E15	BCS17I01	TCP/IP Design and Implementation	PE	3	3	0/0	0/0	Ty
BCS17E16	BCS17OE5	Cyber Forensics and Internet Security	PE	3	3	0/0	0/0	Ty
BCS17E17	BCS17004	Database Security	PE	3	3	0/0	0/0	Ty
BCS17E18	BCS17006	Real Time Systems	PE	3	3	0/0	0/0	Ty
BCS17E19	BCS17I01 BCS17006	Distributed Computing	PE	3	3	0/0	0/0	Ty
BCS17E20	NIL	Optimization Techniques	PE	3	3	0/0	0/0	Ty
BCS17E21	BCS17004	Management Information Systems	PE	3	3	0/0	0/0	Ty

7th Semester – Special Elective –Technology Based (ES - EV) (Common to CSE&IT)								
Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/S Lr	P/R	Ty / Lb/ ETL
BCS17E22	BCS17ET2	Mobile Application Development	SE	3	3	0/0	0/0	Ty
BCS17E23	BCS17004	Data Science and Big Data Analytics	SE	3	3	0/0	0/0	Ty
BIT17007	NIL	Cloud Technology (only for CSE)	SE	3	3	0/0	0/0	Ty
BCS17E24	BIT17I01	Network Forensics	SE	3	3	0/0	0/0	Ty
BCS17E25	NIL	Internet of Things	SE	3	3	0/0	0/0	Ty
BCS17E26	NIL	Social Computing	SE	3	3	0/0	0/0	Ty
BCS17E27	NIL	Enterprise Architecture	SE	3	3	0/0	0/0	Ty
BCS17EXX	NIL	Any other that is important time to time based on Industry Demand	SE	3	3	0/0	0/0	Ty



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8th Sem Electives E-VI and E-VII (CSE & IT)								
Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/S Lr	P/R	Ty / Lb/ ETL
BCS17E28	BCS17004	Information Storage Management	PE	3	3	0/0	0/0	Ty
BCS17E29	BCS17I01	Network Infrastructure Management	PE	3	3	0/0	0/0	Ty
BCS17E30	BCS17007	Foundations of Parallel Programming	PE	3	3	0/0	0/0	Ty
BCS17E31	BIT17007	Virtualization	PE	3	3	0/0	0/0	Ty
BCS17E32	BCS17006	Hadoop Distributed File System	PE	3	3	0/0	0/0	Ty
BCS17E33	BCS17004	Mobile Databases	PE	3	3	0/0	0/0	Ty
BCS17E34	BIT17I02	Web Engineering	PE	3	3	0/0	0/0	Ty
BCS17E35	BCS17I01	4G Networks	PE	3	3	0/0	0/0	Ty
BCS17E36	NIL	Enterprise Resource Planning	PE	3	3	0/0	0/0	Ty
BCS17E37	NIL	Supply Chain Management	PE	3	3	0/0	0/0	Ty
BCS17E38	BCS17004	Mainframe Computing	PE	c	3	0/0	0/0	Ty
BCS17E39	BCS17E06	Neuro Fuzzy Computing	PE	3	3	0/0	0/0	Ty
BCS17E40	BCS17E09	Web Content Management	PE	3	3	0/0	0/0	Ty
BCS17E41	BCS17E06	Machine Learning	PE	3	3	0/0	0/0	Ty

C: Credits L : Lecture T : Tutorial S.Lr : Supervised Learning P : Problem / Practical R : Research

Ty/Lb/ETL/EVL : Theory/Lab/Embedded Theory and Lab/Evaluation

**Department of Information Technology****I SEMESTER****DEPARTMENT OF ENGLISH**

Subject Code : BEN17001		Subject Name : TECHNICAL ENGLISH - I					C	L	T/SLr		P/R	
		Prerequisite : None					2	1	0/0		2/0	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : 1. Strengthen their vocabulary in both technical and business situations 2. Get practice in functional grammar 3. Learn the effective way of corresponding with officials 4. Learn to give instructions, suggestions, recommendations and comprehend and infer the information from the given passages. 5. Strain learners in organized academic and professional writing in LSRW skills												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1		Strengthen their active and technical vocabulary										
CO2		Understand functional grammar and gain proficiency in technical writing										
CO3		Learn the appropriate technique of writing formal and business letters and prepare oneself to read the advertisement and prepare the resume relevantly										
CO4		Learn to give instructions, suggestions, recommendations and comprehend and infer the information from the given passages										
CO5		Focus on academic and technical writing										
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1				H						H		H
CO2				H						H		H
CO3				H		M			H	H		H
CO4				H					H	H		H
CO5				H					H	H		H
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			
			√									
Approval												



Department of Information Technology

BEN17001

TECHNICAL ENGLISH I

2 1 0/0 2/0

1. Vocabulary, Grammar and Usage - I

(6)

Meanings of words and phrases, synonyms and antonyms – affixes: prefixes and suffixes and word formation – nominal compounds, expanding using numbers and approximation – Verb: tense, auxiliary and modal –Voice: active, passive and impersonal passive

2. Vocabulary, Grammar and Usage – II

(6)

Infinitives and Gerunds – preposition, prepositional phrases, preposition + relative pronoun-‘If’ clause, sentences expressing ‘cause and effect’, ‘purpose’,

Instructions, suggestions and recommendations

3. Reading

(6)

Questions: Wh-pattern, Yes/no questions, tag questions

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, comprehending the passage and answering questions - Précis writing

4. Writing

(6)

Adjectives: degrees of comparison

Concord: subject-verb agreement

Interpretation of tables and flowcharts: writing a paragraph based on information provided in a table using comparison and contrast, classifying the data and flowchart, describing logical steps involved in specific functions, note - making from a given passage- letter writing, formal: seeking permission to undergo practical training, letter to an editor of a newspaper complaining about civic problems and suggesting suitable solutions

5. Functional English and Practical Components

(6)

Listening : Listening to stories, conversation, dialogue, speeches of famous people, and identifying the grammar components

Speaking : Scripting and enacting role plays/ narrating incidents

Reading : Review of books, articles, fiction- Extensive reading/ user manuals, pamphlets, brochures

Writing : paragraph and essay writing using academic vocabulary

Total No of Periods : 30

Text Book

1. Pushkala. R, PadmasaniKannan.S, Anuradha. V, Chandrasena Rajeswaran. M: **Quest:A** Textbook of Communication Skills, Vijay Nicole

References

1. Pushkala R, P.A.Sarada, El Dorado: A Textbook of Communication Skills, Orient Blackswan, 2014
2. PadmasaniKannan.S., Pushkala.R. : Functional English
3. Hancock, Mark, English Pronunciation in Use; Cambridge Univ. Press, 2013
4. McCarthy, Michael et.al., English Vocabulary in Use, Advanced, Cambridge Univ. Press, 2011
5. Wren and Martin: Grammar and Composition, Chand & Co, 2006

Web Resources

1. <https://learnenglish.britishcouncil.org>
2. www.englishpage.com
3. www.writingcentre.uottawa.ca/hypergrammar/preposit.html
4. www.better-english.com/grammar/preposition.html
5. <http://www.e-grammar.org/infinitive-gerund/>
6. www.idiomsite.com/



Department of Information Technology

DEPARTMENT OF MATHEMATICS

Subject Code : BMA17001	Subject Name : MATHEMATICS – I					C	L	T/SLr		P/R		
	Prerequisite : None					4	3	1/0		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 : 1. Apply the Basic concepts in Algebra 2. Use the Basic concepts in Matrices 3. Identify and solve problems in Trigonometry 4. Understand the Basic concepts in Differentiation 5. Apply the Basic concepts in Functions of Several variables												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	Find the summation of the given series of binomial, exponential & logarithmic											
CO2	Transform a non – diagonal matrix into an equivalent diagonal matrix using orthogonal transformation.											
CO3	Find expansion of trigonometric function into an infinite series and to separate a complex function into real and imaginary parts.											
CO4	Apply knowledge and concepts in finding the derivative of given function and to find the maxima / minima of the given function.											
CO5	Evaluate the partial / total differentiation and maxima / minima of a function of several variables.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H			M	M			H	H		H
CO2	H	H			H	L						H
CO3	H	H			M				M	H		L
CO4	H	H			L				M	H		M
CO5	H	H				M			M	M		H
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			
	√											
Approval												



Department of Information Technology

MATHEMATICS – I

BMA17002

4 3 1/0 0/0

1. ALGEBRA

(12)

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

2. MATRICES

(12)

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.

3. TRIGONOMETRY

(12)

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 θ – Hyperbolic functions – Separation into real and imaginary parts.

4. DIFFERENTIATION

(12)

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

5. FUNCTIONS OF SEVERAL VARIABLES

(12)

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

Total no. of Periods : 60

Text Books

1. Kreyszig E., *Advanced Engineering Mathematics (10th ed.)*, John Wiley & Sons, (2011).
2. Veerarajan T., *Engineering Mathematics (for first year)*, Tata McGraw Hill Publishing Co., (2008).

References

1. Grewal B.S., *Higher Engineering Mathematics*, Khanna Publishers, (2012).
2. John Bird, *Basic Engineering Mathematics (5th ed.)*, Elsevier Ltd, (2010).
3. P.Kandasamy, K.Thilagavathy and K. Gunavathy, *Engineering Mathematics Vol. I (4th Revised ed.)*, S.Chand & Co., Publishers, New Delhi (2000).
4. John Bird, *Higher Engineering Mathematics (5th ed.)*, Elsevier Ltd, (2006).



Department of Information Technology
DEPARTMENT OF MATHEMATICS

Subject Code : BMA17002	Subject Name : BIO MATHEMATICS	C	L	T/SLr	P/R
	Prerequisite : None	4	3	1/0	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 :

- 1. Use the Basic concepts in Matrices**
- 2. Understand the Basic concepts in Differentiation**
- 3. Understand the Basic concepts in Integration**
- 4. Apply the Basic concepts in Interpolation**
- 5. Analyze the Basic concepts in Numerical Differentiation and Integration**

COURSE OUTCOMES (Cos) : (3 – 5)

Students completing the course were able to

CO1	Find the sum, difference, product and inverse of matrixes
CO2	Find the derivative of the given function and to find the maxima / minima of the given function.
CO3	Integrate the given function by using the methods of integration and to find area under the given curve and the volume of the solid by revolution.
CO4	Evaluate the value of function at the given point and to find the polynomial expressions of the given function.
CO5	Find the differentiation of a function at the given point and to find the integration of the given function at the given point

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H			M	M			H	H		H
CO2	H	H			H	L						H
CO3	H	H			M				M	H		L
CO4	H	H			L	M			M	H		H
CO5	H	H				M			M	M		H

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
	√								

Approval



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Department of Information Technology

BIO MATHEMATICS

BMA17002

4 3 1/0 0/0

1. MATRICES

(12)

Elementary operations on Matrices – Inverse of a Matrix – Solving simultaneous equations (atmost three equations with three unknowns) using Cramer's rule.

2. DIFFERENTIATION

(12)

Basic concepts of Differentiation – Elementary differentiation methods – Parametric functions – Implicit function – Maxima and Minima (simple problems).

3. INTEGRATION

(12)

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

4. INTERPOLATION

(12)

Interpolation: Newton's forward, Newton's backward formulae – Newton's divided differences – Lagrange's polynomial (simple problems).

5. NUMERICAL DIFFERENTIATION AND INTEGRATION

(12)

Numerical differentiation with interpolation polynomials (Newton's forward and backward only) – Numerical integration by Trapezoidal and Simpson's (both $1/3^{\text{rd}}$ & $3/8^{\text{th}}$) rules (simple problems).

Total no. of Periods : 60

Text Books

1. Veerarajan T., *Engineering Mathematics (for first year)*, Tata McGraw Hill Publishing Co., (2008).
2. H.K.Das, *Engineering Mathematics*, S.Chand Publishers
3. Veerarajan T., *Numerical Methods*, Tata McGraw Hill Publishing Co., (2007).

References

1. Shanti Narayanan, *Differential Calculus*, S.Chand& Co., New Delhi, (2005).
2. Shanti Narayanan, *Integral Calculus*, S.Chand& Co., New Delhi, (2005).
3. John Bird, *Basic Engineering Mathematics (5th ed.)*, Elsevier Ltd, (2010).



Department of Information Technology
DEPARTMENT OF PHYSICS

Subject Code : BPH17001		Subject Name : ENGINEERING PHYSICS					C	L	T/SLr		P/R	
		Prerequisite : None					3	2	0/1		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 : 1. Outline the relation between Science, Engineering & Technology. 2. Demonstrate competency in understanding basic concepts. 3. Apply fundamental laws of Physics in Engineering & Technology. 4. To identify & solve applied Physics problems. 5. Produce and present activities associated with the course through effective technical communication												
COURSE OUTCOMES (Cos) : (3 – 5) 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 Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H			M	M		L		M		
CO2	H	H	M		M	M		L		M		L
CO3	H	H	H	M		M				M		L
CO4	H	H	M		M			M				M
CO5	H	M	L	H								
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			
	√											
Approval												



Department of Information Technology

ENGINEERING PHYSICS

BPH17001

3 2 0/1 0/0.

1. PROPERTIES OF MATTER & ACOUSTICS

(9)

Elasticity – Twisting couple on a Wire (derivation) – Shafts – Comparison of Solid and Hollow Shaft – Bending moment – Depression of a Cantilever – Determination of Young's modulus by Depression of a Cantilever – Uniform and non uniform bending (Experiment) – I form of Girders. Viscosity – Definitions – Lubrication – Properties & Types of Lubricant. Acoustics of Buildings – Reverberation – Reverberation time – Sabine's formula for Reverberation Time – Absorption Coefficient and its Determination – Factors affecting Acoustics of Buildings and its Remedial Measures.

2. THERMAL PHYSICS

(9)

Thermal conduction – Thermal Expansion – Expansion joints – Bimetallic strips – Thermal conductivity (k) – Lee's Disc method (theory and experiment) – Radial flow of heat – Thermal conductivity of Glass – Thermal conductivity of Rubber Tube – Flow of heat through Compound Media – Thermal Insulation of buildings – Thermal radiation – Concept of Black body radiation – Fundamentals of Low Temperature Physics.

3. ULTRASONICS AND ITS APPLICATIONS

(9)

Properties & Production of Ultrasonics – Piezoelectric method – Magnetostriction method – Acoustic Grating – Industrial Applications – Ultrasonic flaw detection (Block Diagram) – Medical Application: Velocity Blood Flow Meter – PhonoCardiography – Ultrasound imaging – Hazards and safety of Ultrasound – NDT of Materials using Ultrasonics.

4. LASER & ITS APPLICATIONS

(9)

Nature of Light – Laser Principle & Characteristics – Ruby laser – Nd- YAG Laser – He-Ne Laser – CO₂ Laser – Semiconductor laser – Homo junction & Hetero Junction Laser – Engineering applications – Holography, Surveying – Industrial applications – Cutting, Welding – Medical applications – Surgery

5. FIBER OPTIC COMMUNICATION

(9)

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

Total No. of Periods: 45

Text Books:

1. M. Arumugam, "Engineering Physics", Anuradha Publication (2004)
2. Dr. Senthil Kumar "Engineering Physics I" VRB Publishers (2016)
3. N.S.Shubhashree & R.Murugesan., "Engineering Physics", Sreelakshmi Publishers (2008)

References

1. K. Gaur & S.L. Gupta, "Engineering. Physics", Dhanpat Raj & Sons, VI Edition, (1988)
2. Palanisamy, P.K., "Engineering Physics", Scitech Publications (P) Ltd., (2006)

**Department of Information Technology
DEPARTMENT OF CHEMISTRY**

Subject Code : BCH17001	Subject Name : ENGINEERING CHEMISTRY – I	C	L	T/SLr	P/R
	Prerequisite : None	3	2	0/1	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 :

- 1. Providing an insight into basic concepts of chemical thermodynamics.**
- 2. To create awareness about the water quality parameters, water analysis and softening of water from industrial perspective.**
- 3. Imparting fundamentals of emf, storage and fuel cells.**
- 4. Creating awareness about corrosion and its control methods.**
- 5. Introducing modern materials such as composites along with basic concepts of polymer chemistry and plastics.**

COURSE OUTCOMES (Cos) : (3 – 5)

CO1	Gain a clear understanding of the basics of chemical thermodynamics which include concepts such as Enthalpy, Entropy and Free energy.
CO2	Obtain an overall idea of Water quality parameters, Boiler requirements, problems, Water softening and Domestic Water treatment.
CO3	Improving the basic knowledge in electrical conductance and emf and also understand the chemical principles of storage devices.
CO4	Observe the information about corrosion and understand the mechanisms of corrosion and the methods of corrosion control.
CO5	Articulate the science of polymers and composites.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	M										M
CO2	M	L	M	L		L	H					M
CO3	L	M	L				L					L
CO4	M		L	L								L
CO5	M		L									M

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
	√								
Approval									



Department of Information Technology

BCH17001

ENGINEERING CHEMISTRY – I

3 2 0/1 0/0

1. CHEMICAL THERMODYNAMICS

(8)

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), Van't Hoff equations.

2. TECHNOLOGY OF WATER

(9)

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 and external conditioning – Lime soda, Zeolite, Demineralisation methods. Desalination processes-RO and Electrodialysis .Domestic water treatment.

3. ELECTROCHEMISTRY AND ENERGY STORAGE DEVICES

(10)

Conductance – Types of conductance and its Measurement. Electrochemical cells – Electrodes and electrode potential, Nernst equation – EMF measurement and its applications. Types of electrodes-Reference electrodes-Standard hydrogen electrode- Saturated calomel electrode-Quinhydrone electrode – Determination of pH using these electrodes.

Reversible and irreversible cells– Fuel cells- H_2 – O_2 fuel cell, Batteries-Lead storage battery, Nickel-Cadmium and Lithium-Battery.

4. CORROSION AND PROTECTIVE COATING

(9)

Introduction–Causes of Corrosion–Consequences- Factors affecting corrosion. Theories of corrosion-Chemical corrosion and Electrochemical corrosion. Methods of corrosion control – corrosion inhibitors, Sacrificial anode and Impressed current cathodic protection. Protective coatings- Metallic coatings- Chemical conversion coatings-paints-Constituents and functions.

5. POLYMERS AND COMPOSITES

(9)

Monomers – Functionality – Degree of polymerization-Tacticity. Polymers – Classification, Conducting Polymers, Biodegradable polymers- Properties and applications. Plastics – Thermoplastics and thermosetting plastics, Compounding of plastics – Compression moulding, injection moulding and extrusion processes.

Polymer composites-introduction-Types of composites-particle reinforced-fiber reinforced-structural composites-examples. Matrix materials, reinforcement materials-Kevlar, Polyamides, fibers, glass, carbon fibers, ceramics and metals.

Total number of periods : 45

Textbooks

1. S.Nanjundan & C.SreekuttanUnnithan, “Applied Chemistry”, Sreelakshmi Publications, (2007)
2. Dr.R.Sivakumar and Dr.N.Sivakumar” Engineering Chemistry” Tata McGraw Hill Publishing Company Ltd, Reprint 2013.

References

1. P.C. Jain & Monika Jain, “Engineering Chemistry”, Dhanpat Rai publishing Co., (Ltd.) (2013).
2. J. C. Kuriacose & J. Rajaram, “Chemistry in Engineering & Technology”, Tata McGraw Hill (1996).
3. B.R.Puri, L.R.Sharma & M.S.Pathania, “Principles of Physical Chemistry”, Vishal publishing co., (2013).



Department of Information Technology
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Subject Code : BES17001		Subject Name : BASIC ELECTRICAL & ELECTRONICS ENGINEERING					C	L	T/SLr	P/R		
		Prerequisite : None					3	2	0/1	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 :												
1. Understand the concepts of circuit elements, circuit laws and coupled circuits.												
2. Acquire knowledge on conventional &non conventional energy production.												
3. Gain information on measurement of electrical parameters.												
4. Identify basic theoretical principles behind the working of modern electronic gadgets.												
5. Demonstrate digital electronic circuits and assemble simple devices.												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	Students understand Fundamental laws and theorems and their practical applications											
CO2	Predict the behavior of different electric and magnetic Circuits.											
CO3	Identify conventional and Non-conventional Electrical power Generation, Transmission and Distribution.											
CO4	Identify & Apply schematic symbols and understand the working principles of electronic devices											
CO5	Analyze basics of digital electronics and solving problems and design combinational circuits											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/P Os	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO12
CO1	H	H	H	H							M	L
CO2	H	H	H	M	M		M				M	
CO3	H	M	H	M	H		M		M			L
CO4	H	M		M			M				M	L
CO5	H	M	H	M	H				M		M	L
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Categor y	Basic Scien ces	Engg Scien ces	Humani ties & Social Science s	Progr am core	Progra m Electiv es	Open Electiv es	Practic al / Project	Internshi ps / Technic al Skills	Soft Skills			
		√										
Approval												



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Department of Information Technology

BES17001 BASIC ELECTRICAL & ELECTRONICS ENGINEERING 3 2 0/1 0/0

1. ELECTRIC CIRCUITS

(9)

Electrical Quantities – Ohms Law – Kirchhoff's Law – Series and Parallel Connections – Current Division and Voltage Division Rule - Source Transformation – Wye (Y) – Delta (Δ) , Delta (Δ) – Wye (Y) Transformation – Rectangular to Polar and Polar to Rectangular.

2. MACHINES & MEASURING INSTRUMENTS

(9)

Construction & Principle of Operation of DC motor & DC Generator – EMF equation of Generator – Torque Equation of Motor – Construction & Principle of operation of a Transformer – PMMC – Moving Iron types of meter – Single Phase Induction Type Energy Meter.

3. BASICS OF POWER SYSTEM

(9)

Generation of Electric Power (Thermal, Hydro, Wind and Solar) – Transmission & Distribution of Electric Power – Types of Transmission & Distribution Schemes – Representation of Substation.

4. ELECTRON DEVICES

(9)

Passive Circuit Components-Classification of Semiconductor-PN Junction Diode-Zener diode-Construction and Working Principle –Applications--BJT-Types of configuration-JFET.

5. DIGITAL SYSTEM

(9)

Number System – Binary, Decimal, Octal, Hexadecimal – Binary Addition Subtraction, Multiplication & Division– Boolean Algebra – Reduction of Boolean Expressions – Logic Gates - De-Morgan's Theorem , Adder – Subtractor.

Total no of Periods : 45

Text Books

1. D P Kothari, I J Nagrath, Basic Electrical Engineering, Second Edition, , Tata McGraw-Hill Publisher
2. A Course In Electrical And Electronic Measurements And Instrumentation,A.K. Sawhney, publisher DHANPAT RAI&CO
3. Text Book of Electrical Technology: Volume 3: Transmission, Distribution and Utilization,B.L.Theraja, A.K.Theraja, publisher S.CHAND
4. Morris Mano, M. (2002) Digital Logic and Computer Design. Prentice Hall of India
5. Millman and Halkias1991, Electronic Devices and Circuits , Tata McGraw Hill,

References

1. R.Muthusubramanian, S.Salivahanan, K A Muraleedharan, Basic Electrical, Electronics And Computer Engineering, Second Edition, ,Tata McGraw-Hill publisher.



Department of Information Technology
DEPARTMENT OF MECHANICAL ENGINEERING

Subject Code : BES17002	Subject Name : BASIC MECHANICAL & CIVIL ENGINEERING						C	L	T/SLr	P/R		
	Prerequisite : None						3	2	0/1	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 : 1. Learn Basics of Internal Combustion Engines, power plants and boilers 2. Demonstrate How metals are formed, joined, using machining operations Lathe, Milling and Drilling machines 3. To identify & solve problems in Engineering Mechanics 4. Learn basics of Building materials and construction 5. Know the basic process of concrete, types of masonry Construction of Roads , Railways, Bridges and Dams												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	Demonstrate the working principles of power plants, IC Engines and boilers..											
CO2	Utilize the concept of metals forming, joining process and apply in suitable machining process											
CO3	Identify and provide solutions for problems in engineering mechanics											
CO4	Utilize the concept of Building materials and construction able to perform concrete mix and masonry types											
CO5	Demonstrate how Roads, Railways, dams, Bridges have been constructed											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H					M		H	H	H		H
CO2	H				L	M		M	M	M		M
CO3	H	H			L	L		M	M	M		M
CO4	H				L	L			M	M		M
CO5	H				L	L		M	M	M		M
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Categ ory	Basic Scienc es	Engg Scienc es	Humani ties & Social Science s	Progra m core	Progra m Electiv es	Open Electiv es	Practic al / Project	Internshi ps / Technica l Skills	Soft Skills			
		√										
Approval												



**BES17002 Department of Information Technology
BASIC MECHANICAL & CIVIL ENGINEERING**

3 2 0/1 0/0

UNIT- I : THERMAL ENGINEERING

(9)

Classification of internal combustion engine – 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.

UNIT- II : MANUFACTURING PROCESS

(13)

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.

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

UNIT- III : MECHANICS

(9)

Stresses and Strains – Definition – Relationship – Elastic modulus – Centre of gravity – Moment of Inertia – Problems. (Simple Problems Only).

UNIT- IV : BUILDING MATERIALS AND CONSTRUCTION

(7)

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)

UNIT- V : ROADS, RAILWAYS, BRIDGES & DAMS

(7)

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 No. of Periods : 45

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 Publisher



Department of Information Technology

DEPARTMENT OF MECHANICAL ENGINEERING

Subject Code : BES17ET1		Subject Name : BASIC ENGINEERING GRAPHICS					C	L	T/SLr		P/R	
		Prerequisite : None					2	1	0/0		2/0	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : <div><div>1. Learn to know what kind of pencils to be used to sketch lines, numbers, Letters and Dimensioning in drawing sheet.</div><div>2. Draw Projection of points, line, planes and solids using Drafters</div><div>3. To identify the angle of projection and development of surfaces, isometric projection and Orthographic projection</div><div>4. Know the basics of elevation and plan of building.</div><div>5. Learn the basics of Drafting using AutoCAD Software</div></div>												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	Utilize the concept of Engineering Graphics Techniques to draft letters, Numbers, Dimensioning in Indian Standards											
CO2	Demonstrate the drafting practice visualization and projection skills useful for conveying ideas in engineering applications.											
CO3	Identify basic sketching techniques of engineering equipments											
CO4	Demonstrate the projections of Points, Lines, Planes and Solids.											
CO5	Draw the sectional view of simple buildings and utilize Auto CAD Software.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	M	M	M			H	H		H
CO2	H	H	H	M	M	M			H	H		H
CO3	H	H	H	L		M			M	M		M
CO4	H	H	M	M		H		M	H	H		H
CO5	H	H	H	M	H	L		M	H	H		H
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			
							√					
Approval												



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BES17ET1

BASIC ENGINEERING GRAPHICS

2 1 0/0 2/0

CONCEPTS AND CONVENTIONS (Not for examination) (3)

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 (6)

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 (6)

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 one reference plane and perpendicular to the other.

UNIT-III : DEVELOPMENT OF SURFACES AND ISOMETRIC PROJECTION (6)

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

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

UNIT- IV : ORTHOGRAPHIC PROJECTIONS (6)

Orthographic projection of simple machine parts – missing views

BUILDING DRAWING

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

UNIT- V : COMPUTER AIDED DRAFTING (3)

Introduction to CAD – Advantages of CAD – Practice of basic commands – Creation of simple components drawing using CAD software.

Total No. of periods:30

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.

References

1. Natarajan, K.V (2014) A Text Book of Engineering Graphics, DhanalakshmiPublishers, Chennai
2. Venugopal, K and Prabhu Raja, V. (2010) Engineering Graphics, New Age International (P) Limited



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Special Points applicable to University examinations on Engineering Graphics

1. There will be five questions, each of either or type covering all UNIT-s of the syllabus



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2. All questions will carry equal marks of 20 each making a total of 100
3. The answer paper shall consists of drawing sheets of A2 size only. The students will be permitted to use appropriate scale to fit solution within A2 size.



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DEPARTMENT OF PHYSICS

Subject Code : BPH17L01		Subject Name : ENGINEERING PHYSICS LAB					C	L	T/SLr	P/R		
		Prerequisite : None					1	0	0/0	2/0		
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : <div><div>1. Demonstrate an ability to make physical measurements & understand the limits of precision in measurements.</div><div>2. Display the ability to measure properties of variety of electrical, mechanical, optical systems.</div></div>												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	Recognize the correctness and precision in the results of measurements.											
CO2	Construct and compare the properties of variety of electrical, mechanical, electronic and optical systems.											
CO3	Practice the handling of Electrical, Electronic, Optical & Mechanical Equipments											
CO4	Identify and compare the theoretical and practical usage of various instruments											
CO5												
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/P Os	PO1	PO2	PO 3	PO 4	PO5	PO6	PO 7	PO 8	PO9	PO10	PO1 1	PO12
CO1	H	H	M	H	M							
CO2	H	M	M	H						M		
CO3	H	M	M	H	M				M	M		M
CO4	H	H	M	M	H				M			L
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Categ ory	Basic Scienc es	Engg Scien ces	Humani ties & Social Science s	Progr am core	Progra m Electiv es	Open Electiv es	Practic al / Project	Internshi ps / Technica l Skills	Soft Skills			
							√					
Approval												



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Department of Information Technology

BPH17L01

ENGINEERING PHYSICS LAB

1 0 0/0 2/0

LIST OF EXPERIMENTS (Any Seven)

1. Torsional Pendulum Without Masses–Determination of Rigidity Modulus and Moment of Inertia
2. Torsional Pendulum With Masses–Determination of Rigidity Modulus and Moment of Inertia
3. Non Uniform Bending – Determination of Young`s Modulus
4. Uniform Bending – Determination of Young`s Modulus
5. Poiseuille`s Method - Determination of Coefficient of Viscosity of a given liquid
6. Lee`s Disc – Determination of Thermal Conductivity of Bad Conductor
7. Spectrometer – Determination of Refractive Index of a Prism
8. Laser Grating – Determination of Wavelength of a given Source
9. Spectrometer –Determination of Wavelength of Mercury Spectrum using Grating
10. Transistor Characteristics.



Department of Information Technology

DEPARTMENT OF CHEMISTRY

Subject Code : BCH17L01		Subject Name : ENGINEERING CHEMISTRY LAB					C	L	T/SLr	P/R		
		Prerequisite : None					1	0	0/0	2/0		
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : <div><div>1. To familiarize the students in the determination of water quality parameters</div><div>2. To help learners measure conductivity and EMF using electrical equipment.</div><div>3. To create awareness about corrosion.</div><div>4. To determine the essential parameters of polymers</div></div>												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1		Awareness of water quality parameters and its determination.										
CO2		Familiarizing the conductometric titration method.										
CO3		Ability to measure EMF and perform potentiometric titrations.										
CO4		Measuring the Molecular weight of macromolecules										
CO5		Gaining awareness about corrosion.										
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	H	H	M	M							L
CO2	M	H		L	M				L			
CO3	L	M		L					L			
CO4	M	M		L					L			
CO5	L	M	L	L								M
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			
							√					
Approval												



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BCH17L01

**Department of Information Technology
ENGINEERING CHEMISTRY LAB**

1 0 0/0 2/0

LIST OF EXPERIMENTS (Any Seven)

- (1) Estimation of temporary, permanent and total hardness of water.
- (2) Determination of type and extent of alkalinity in water.
- (3) Estimation of dissolved oxygen in a water sample.
- (4) Conductometric titration of strong acid vs. strong base
- (5) Conductometric precipitation titration using barium chloride and sodium sulphate.
- (6) Determination of Equivalent conductance of strong electrolyte at infinite dilution.
- (7) Determination of single electrode potential.
- (8) Estimation of Fe^{2+} ion by potentiometry.
- (9) Determination of Molecular Weight and Degree of Polymerisation of Polymer by viscometry.
- (10) Determination of rate of corrosion by weight loss method.



Department of Information Technology

DEPARTMENT OF ENGINEERING SCIENCES

Subject Code : BES17L01	Subject Name : BASIC ENGINEERING WORKSHOP	C	L	T/SLr	P/R
	Prerequisite : None	1	0	0/0	2/0

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

OBJECTIVES :

- 1. Familiarize the plumbing tools, fittings, carpentry tools, etc.**
- 2. Identify basic electrical wiring and measurement of electrical quantities.**
- 3. Identify Electronic components ,logic gates and soldering process**
- 4. Display simple fabrication techniques**
- 5. Execute a project independently and make a working model**

COURSE OUTCOMES (Cos) : (3 – 5)

Students completing the course were able to

CO1	Demonstrate fitting tools and carpentry tools, & Perform the process of Filing, Chipping, Cutting.
CO2	Perform the process of fabrication of tray, cones and funnels, Tee Halving Cross, Lap Joint Martise& Joints
CO3	Demonstrate various types of wirings and other equipments.
CO4	Measure fundamental parameters using the electronic instruments

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	M	M			L	M			L
CO2	H		H	L	M			L	L			
CO3	H		M	L				L	L			
CO4	H	H	M	L				L	L			M
CO5												

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
							√		
Approval									



BES17L01

**Department of Information Technology
BASIC ENGINEERING WORKSHOP**

1 0 0/0 2/0.

MEP PRACTICE

1. FITTING :

Study of fitting tools and Equipments – Practicing, filing, chipping and cutting – making V-joints, half round joint, square cutting and dovetail joints.

2. CARPENTRY:

Introduction – Types of wood – Tools – Carpentry processes – Joints – Planning practice – Tee Halving Joint – Cross Lap Joint – Maritse and Tenon Joint – Dovetail Joint

3. SHEET METAL:

Study of tools and equipments – Fabrication of tray, cones and funnels.

CIVIL ENGINEERING PRACTICE

1. Study of Surveying and its equipments
2. Preparation of plumbing line sketches for water supply and sewage lines
3. Basic pipe connection using valves, laps, couplings, unions, reduces and elbows in house hold fittings

ELECTRICAL ENGINEERING PRACTICE

1. Study of Electronic components and equipments – Resistor, colour coding measurement of AC signal parameter (peak-peak, rms period, frequency) using CR
2. Soldering practice – Components Devices and Circuits – Using general purpose PCB
3. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
4. Fluorescent lamp wiring.
5. Stair case wiring

ELECTRONIC ENGINEERING PRACTICE

1. Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.
2. Measurement of energy using single phase energy meter.
3. Measurement of resistance to earth of an electrical equipment.



Department of Information Technology
DEPARTMENT OF COMPUTER SCIENCE

Subject Code : BES17ET2	Subject Name : C PROGRAMMING AND LAB						C	L	T/SLr	P/R		
	Prerequisite : None						2	1	0/0	2/0		
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : ➤ Outline the basics of C Language. ➤ Apply fundamentals in C programming. ➤ Produce and present activities associated with the course.												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	Acquire knowledge how to write and execute c programs											
CO2	Understand the fundamental expression and statements of C Language.											
CO3	Work with arrays, functions, pointers, structures, Strings and Files in C.											
CO4	Identify and provide solutions for engineering problems in C programming											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H			M	M		H	M			H
CO2	H	M			H	M		M	H			M
CO3	H			H		M		M	H			M
CO4	H			M		M		H	M			M
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Categ ory	Basic Scienc es	Engg Scienc es	Humani ties & Social Science s	Progra m core	Progra m Electiv es	Open Electiv es	Practic al / Project	Internshi ps / Technica l Skills	Soft Skills			
							√					
Approval												



Department of Information Technology

BES17ET2

C PROGRAMMING AND LAB

2 1 0/0 2/0

1. INTRODUCTION

(6)

Fundamentals, C Character set, Identifiers and Keywords, Data Types, Variables and Constants, Structure of a C Program, Executing a C Program.

2.EXPRESSION AND STATEMENT

(6)

Operators, Types-Complex and Imaginary, Looping Statement-For, While, Do, Break, continue, Decision Statement-If, If else, Nested if, Switching Statement, Conditional Operator.

3.ARRAYS AND FUNCTIONS

(6)

Defining an Array, Using Array elements as counters, Generate Fibonacci number, Generate Prime Numbers, Initializing Arrays, Multidimensional Arrays, Defining a Function, Function call -types of Function calls -Function pass by value -Function pass by reference, Write a Program in Recursive Function.

4. STRUCTURES AND POINTERS

(6)

Working with Structures -Introduction -Syntax of structures -Declaration and initialization - Declaration of structure variable -Accessing structure variables, Understanding Pointers - Introduction -Syntax of Pointer.

5. STRINGS AND FILE HANDLING

(6)

Strings -Syntax for declaring a string -Syntax for initializing a string -To read a string from keyboard,

Files in C -File handling functions -Opening a File closing a file --example: fopen, fclose -Reading data from a File- Problem solving in C

Total No of Periods: 30

1. www.spoken-tutorials.org
2. <http://www.learn-c.org/>

Reference :

1. Stephen G. Kochen“ Programming in C- A complete introduction to the C Programming Language. Third Edition, Sams Publishing -2004
2. Ajay Mital, “ Programming in C: A Practical Approach”, Pearson Publication-2010

List of Programs

1. Write a program to check 'a' is greater than 'b' or less than 'b' Hint: use if statement.
2. Write another program to check which value is greater 'a', 'b' or 'c'. Hint: use else-if statement. (Take values of a, b, c as user inputs)
3. Write a Program to find the sum of the series : $x + X^3/3! + X^5/5! + \dots + X^n/n!$
4. Write a C Program to solve a Quadratic Equation by taking input from Keyboard
5. Write a C Program to arrange 20 numbers in ascending and descending Order. Input the Numbers from Keyboard
6. Write a C Program to Multiply a 3 x 3 Matrix with input of members from Keyboard
7. Write a program that takes marks of three students as input. Compare the marks to see which student has scored the highest. Check also if two or more students have scored equal marks.
8. Write a program to display records of an employee. Like name, address, designation, salary.
9. Write a C program, declare a variable and a pointer. Store the address of the variable in the pointer. Print the value of the pointer.
10. Write a C program to concatenate String 'best' and String 'bus'. Hint: strcat(char str1, char str2);
11. Explore the other functions in string library.
12. Write a program to create a file TEST. Write your name and address in the file TEST. Then display it on the console using C program.



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DEPARTMENT OF ENGINEERING SCIENCES

Subject Code : BES17ET3	Subject Name : ENTREPRENEURIAL SKILL DEVELOPMENT & PROJECT LAB	C	L	T/SLr	P/R
	Prerequisite : None	1	0	0/0	2/0

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

T/L/ETL : Theory / Lab / Embedded Theory and Lab

OBJECTIVES :

1. Understand how entrepreneurship Education transforms individuals into successful leaders.
2. Identify individual potential & Shape career dreams
3. Understand difference between ideas & opportunities
4. Understand the “flow” & create Entrepreneurial CV.
5. Identify components & create action plan.
6. Use brainstorming in a group to generate ideas.

COURSE OUTCOMES (Cos) : (3 – 5)

Students completing the course were able to

CO1	Develop a Business plan & improve ability to recognize business opportunity
CO2	Do a self analysis to build a entrepreneurial career.
CO3	Articulate an effective elevator pitch.
CO4	Analyze the local market environment & demonstrate the ability to find an attractive market
CO5	Apply an ethical understanding & perspective to change opportunities to business situations

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		M	M	H	M	M	M		M	M	M	L
CO2	H	M		H	M	H	M	H	H	H	M	M
CO3		M	M	M		H		H	H	H		
CO4		H	M	M	M	M		H	M	M	H	
CO5		M	M	H	M	M	H	H	M	M	H	L

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
							√		
Approval									



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BES17ET3 ENTREPRENEURIAL SKILL DEVELOPMENT & PROJECT LAB

1 0 0/0 2/0

1. CHARACTERISTICS OF A SUCCESSFUL ENTREPRENEUR

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

2. DESIGN THINKING & RISK MANAGEMENT

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 - 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 ?

3. IDEA GENERATION & EVALUATION

Introduction – Finding your flow – Entrepreneurial CV – your draft action plan - D.I.S.R.U.P.T - A model for ideation – Let's ID8 – Mind mapping for ideas – build your own idea bank – Concept of Decision matrix & paired comparison analysis – 5Q framework.

4. ENTREPRENEURIAL OUTLOOK & CUSTOMER DISCOVERY

Effectuation – Start with your means – Segmentation & targeting – Niche marketing – Find your Niche – Drawing & mapping the consumption chain - outcome driven innovation – This is my customer

5. VALUE PROPOSITION& CAP STONE PROJECT PRESENTATION

Introduction – Value proposition design – customer segment – validation exercise – value propositions & assessing fit – Refine your value proposition – Blue ocean strategy - What is prototyping – Design your experiment – Design your MVP – Learning cards & Capstone Presentation.



Department of Information Technology
II SEMESTER

DEPARTMENT OF ENGLISH

Subject Code : BEN17002		Subject Name : TECHNICAL ENGLISH - II					C	L	T/SLr		P/R	
		Prerequisite : None					2	1	0/0		2/0	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : 1. strengthen the academic and interpersonal advanced vocabulary 2. strengthen their writing skill such as summarizing, describing and report writing 3. learn to keep the simple conversations in day to day life 4. get to know certain life skills such as marketing, advertising and do presentation 5 improve the reading skill with comprehension												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	strengthen their active vocabulary and appropriate language usage through reading poems, stories, texts, newspapers, magazines and research articles											
CO2	use appropriate technical vocabulary in interpreting data											
CO3	engage effectively in role-play, dialogue, conversation and interviews											
CO4	equip them for effective interaction with people in all situations both academic and professional											
CO5	learn English language as a ‘life skill’ and prepare for placement interviews											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1				H						H		H
CO2				H						H		H
CO3				H		M			H	H		H
CO4				H					H	H		H
CO5				H					H	H		H
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			
			√									
Approval												



Department of Information Technology

BEN17002

TECHNICAL ENGLISH II

2 1 0/0 2/0

Unit I Vocabulary, Grammar and Usage – I

(6)

Verbal analogy – picking out the odd one from a series –finding one word substitute – paragraph writing: using discourse markers, defining / describing an object / device / instrument / machine using topic sentence and its role, unity, coherence and use of cohesive expressions Essay writing with due emphasis on features such as topical sentence, unity, coherence and cohesive devices

Unit II Vocabulary, Grammar and Usage – II

(6)

Cloze – completion of sentences suitably, phrases and idioms, homophones – collocation - Techniques of formatting and drafting reports: writing newspaper reports on accidents, thefts and festivals

Unit III Reading

(6)

Correcting errors in sentences Editing a passage (correcting the mistakes in grammar, spelling and punctuation) -interpreting pie and bar charts

Unit IV Writing

(6)

Register: formal and informal – using ellipses in dialogues- framing dialogues-Email: Job Application, Resume

Unit V Functional English and Practical Components

(6)

Listening: Media Advertisement

Speaking: oral practice- activities related to professional skills (e.g. Marketing, advertising etc.), role play activities using different speech functions (persuasion, negotiation, giving directions and guidance), conversational etiquette (politeness, strategies, turn-taking, body language).

Reading: reading newspaper/ magazine articles for gathering information

Writing: Note-making from newspaper and magazine articles- follow BEC method

Writing and speaking dialogue writing followed by role play in different situations such as asking permission, requesting and instructing, introducing oneself – activities based on BEC

Total No of Periods :30

Text Book

1. Pushkala. R, Padmasani Kannan.S ,Anuradha. V,Chandrasena Rajeswaran.M Quest : A Textbook of Communication Skills, Vijay Nicole,

References

1. Pushkala R, P.A.Sarada, El Dorado: A Textbook of Communication Skills, Orient Blackswan, 2014
2. Padmasani Kannan.S., Pushkala.R. : Functional English
3. Hancock, Mark, English Pronunciation in Use; Cambridge Univ. Press, 2013
4. McCarthy, Michael et.al., English Vocabulary in Use, Advanced, Cambridge Univ. Press, 2011
5. Wren and Martin: Grammar and Composition, Chand & Co, 2006

Web Sources

1. <https://learnenglish.britishcouncil.org>
2. www.englishpage.com
3. www.writingcentre.uottawa.ca/hypergrammar/preposit.html
4. www.better-english.com/grammar/preposition.html
5. <http://www.e-grammar.org/infinitive-gerund/>



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6. www.idiomsite.com/

DEPARTMENT OF MATHEMATICS

Subject Code : BMA17003		Subject Name : MATHEMATICS – II					C	L	T/SLr		P/R	
		Prerequisite : None					4	3	1/0		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 : 1. Understand the Basic concepts in Integration 2. Identify the Basic concepts in Multiple integrals 3. Use the Basic concepts in Ordinary Differential equations 4. Apply the Basic concepts of Analytical Geometry 5. Analyze the Basic concepts of Vector Calculus												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	Integrate given function by using methods of integration and to find the area under curve and the volume of a solid by revaluation.											
CO2	Evaluate the multiple integrals / area /volume and to change the order of integration.											
CO3	Solve the ordinary differential equation and to solve Eulers differential equation.											
CO4	Find the equation of planes, lines and sphere and to find the shortest distance between to skew lines.											
CO5	Find the gradient, maximum directional derivative and work done by a force and to verify Green/ Stokes/ Gauss divergence theorem											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H			M	M			M	M		H
CO2	H	H			M	H			H	H		M
CO3	H	H			M	H			H	H		M
CO4	H	H			L	M			M	H		M
CO5	H	H			M	M			M	H		M
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			
	√											
Approval												



Department of Information Technology

BMA17003

MATHEMATICS – II

4 3 1/0 0/0

1. INTEGRATION

(12)

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).

2. MULTIPLE INTEGRALS

(12)

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).

3.ORDINARY DIFFERENTIAL EQUATIONS

(12)

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).

4.THREE DIMENSIONAL ANALYTICAL GEOMETRY

(12)

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.

5. VECTOR CALCULUS

(12)

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 no. of periods : 60

Textbooks

1. Kreyszig E., *Advanced Engineering Mathematics (10th ed.)*, John Wiley & Sons, (2011).
2. Veerarajan T., *Engineering Mathematics (for first year)*, Tata McGraw Hill Publishing Co., (2008).

References

1. Grewal B.S., *Higher Engineering Mathematics*, Khanna Publishers, (2012).
2. John Bird, *Basic Engineering Mathematics (5th ed.)*, Elsevier Ltd, (2010).
3. P.Kandasamy, K.Thilagavathy and K. Gunavathy, *Engineering Mathematics Vol. I (4th Revised ed.)*, S.Chand& Co., Publishers, New Delhi (2000).
4. John Bird, *Higher Engineering Mathematics (5th ed.)*, Elsevier Ltd, (2006).



Department of Information Technology
DEPARTMENT OF MATHEMATICS

Subject Code : BMA17004	Subject Name : BIO STATISTICS						C	L	T/SLr		P/R	
	Prerequisite : None						4	3	1/0		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 : 1. Understand the Basic concepts in Statistics 2. Use the Basic concepts in Correlation 3. Understand the Basic concepts in Probability theory 4. Apply the Basic concepts in Testing of Hypothesis 5. Analyze the Basic concepts in Design of Experiments												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	Find the measures of central tendency and to find the measures of dispersion.											
CO2	Evaluate the moments measures of skewness and kurtorsls and to evaluate correlation and regression.											
CO3	Apply knowledge and concepts in finding the probability of a random variable and use addition and multiplication laws of Probability											
CO4	Have ability to test and to give conclusion in testing of hypothesis.											
CO5	Analyze and interpret results through one way and two way ANOVA											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO 4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	H	H				H			M		M	M
CO2	H	H				H			L			H
CO3	H	H	L		L	M			L		L	H
CO4	H	H	L		L	M			M			H
CO5	H	H	H	M					M			H
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Catego ry	Basic Scienc es	Engg Scienc es	Humanit ies & Social Sciences	Progra m core	Progra m Elective s	Open Elective s	Practica l / Project	Internship s / Technical Skills	Soft Skill s			
	√											
Approval												



Department of Information Technology

BMA17004

BIO STATISTICS

4 3 1/0 0/0

1. BASICS OF STATISTICS

(12)

Variables – Uni-variate Data – Frequency Distribution – Measures of Central Tendency – Mean – Median – Mode – Quartiles – Measures of Dispersion – The Range – Quartile Deviation – Standard Deviation.

2. CORRELATION

(12)

Measures of Skewness & Kurtosis – Bi-variate data – Correlation & Regression.

3. PROBABILITY AND RANDOM VARIABLE

(12)

Definition of Random Experiment - Sample Space – Events: Mutually exclusive events - Exhaustive events - Dependent events and Independent events - Mathematical and Statistical definition of probability - Theorems of addition and multiplication laws of Probability (Without proof) - Conditional probability (Simple problems).

4. SAMPLING

(12)

Tests of Significance – Large Sample Tests – Mean – Proportions – Small Sample Tests – t, F & Chi-square Tests – Independence of Attributes – Goodness of Fit.

5. DESIGN OF EXPERIMENTS

(12)

Analysis of Variance: One Way & Two-Way Classification – Design of Experiments – Randomized Block Design – Completely Randomized Block Design – Latin Square Design.

Total no. of Periods : 60

Text books

1. Gupta S.C, Kapoor V.K, *Fundamentals of Mathematical Statistics*, S.Chand & Co, New Delhi (2003).
2. Veerarajan T., *Probability, Statistics and, Random Processes*, Tata McGraw Hill Publishing Co., (2008).

References

1. Gupta S.P, *Statistical Methods*, S.Chand & Co., New Delhi (2003).
2. Singaravelu, *Probability and Random Processes*, Meenakshi Agency, (2017).
3. Richard Johnson A., *Miller & Freund's Probability and statistics for Engineers (9th ed)*, Prentice Hall of India, (2016).



Department of Information Technology
DEPARTMENT OF PHYSICS

Subject Code : BPH17002	Subject Name : MATERIAL SCIENCE						C	L	T/SLr		P/R	
	Prerequisite : None						3	2	0/1		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 : 1. Design, conduct experiment and analyze data. 2. Develop a Scientific attitude at micro and nano scale of materials 3. Understand the concepts of Modern Physics 4. Apply the science of materials to Engineering & Technology												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	Demonstrate skills necessary for conducting research related to content knowledge and laboratory skills.											
CO2	Apply knowledge and concepts in advanced materials and devices.											
CO3	Acquired Analytical, Mathematical skills for solving engineering problems.											
CO4	Ability to design and conduct experiments as well as function in a multi disciplinary teams.											
CO5	Generate analytical thought to interpret results & place them within a broader context											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	M	M	M	L				M		L
CO2	H	H		M	M							L
CO3	H	H	H	H	M					M		
CO4	H	H	H	H	M				H	M		L
CO5	H	M	M	M	M	L			M	M		L
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			
	√											
Approval												



Department of Information Technology

BPH17002

MATERIAL SCIENCE

3 2 0/1 0/0

1. CRYSTAL PHYSICS

(9)

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)

2. CONDUCTING & SUPERCONDUCTING MATERIALS

(9)

Introduction - Classical Free electron theory of Metals – Derivation of Electrical conductivity – Thermal Conductivity – Deduction of Wiedemann Franz law – Fermi Energy & Fermi Function – Density of Energy States – Qualitative Analysis of Conductors, Semiconductors and Insulators – Some Examples of Important Electrical Materials
Superconducting Materials: Transition temperature – BCS Theory – Properties of Superconductors – Type I & Type II Superconductors – Superconducting materials - Low & High Temperatures Superconductors – AC & DC Josephson Effects – Applications of Superconductors – Basic Concepts of SQUID, Magnetic Levitation.

3. SEMICONDUCTING MATERIALS

(9)

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 – Schottky diodes.

4. MAGNETIC & DIELECTRIC MATERIALS

(9)

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.

5. OPTICAL, OPTOELECTRONIC AND NEW MATERIALS

(9)

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 No. of Periods : 45

Text Books

1. V. Rajendran & Mariakani "Materials Science", Tata McGraw Hill (2004).
2. P.K. Palanisamy, "Materials science", Scitech Publication (2002).

Reference Books

1. Dr. Senthil Kumar, "Engineering Physics II" VRB Publishers (2016).
2. V. Arumugam, "Materials Science", Anuradha Agencies, (2003 Edition).
3. Pillai S.O., "Solid State Physics", New Age International, (2005).



Department of Information Technology

DEPARTMENT OF CHEMISTRY

Subject Code : BCH17002	Subject Name : ENGINEERING CHEMISTRY – II	C	L	T/SLr	P/R
	Prerequisite : None	3	2	0/1	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 :

- 1. Imparting the basic concepts of phase rule and apply the same to one and two component systems.**
- 2. Introducing the chemistry of engineering materials such as cement, lubricants, abrasives, refractories, alloys and nano materials.**
- 3. To impart a sound knowledge on the principles of chemistry involving different application oriented topics**
- 4. Introducing salient features of fuels and combustion.**
- 5. To give an overview on modern analytical techniques**

COURSE OUTCOMES (Cos) : (3 – 5)

Students completing the course were able to

CO1	1. Understand the science of phase equilibria and apply the phase rule to different systems.
CO2	2. Gain an overview of Engineering Materials such as Lime, Cement, Lubricants, Abrasives, Refractories, Alloys and Nanomaterials.
CO3	3. Recognize the essential information about consumer products such as Soaps and Detergents, also gaining the basic knowledge about Explosives and Propellants.
CO4	4. Discover the fuel Chemistry and Combustion process.
CO5	5. Inferring few important Analytical Techniques and their applications.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L											L
CO2	M		L			L	M					L
CO3	M					L						L
CO4	M	M	L	L			M					M
CO5	M				M							H

H/M/L indicates strength of correlation H – High, M – Medium, L – Low

Catego ry	Basic Scienc es	Engg Scienc es	Humanit ies & Social Sciences	Progra m core	Progra m Elective s	Open Elective s	Practical / Project	Interns hips / Techni cal Skills	Soft Skill s
	√								
Approval									



Department of Information Technology

BCH17002

ENGINEERING CHEMISTRY – II

3 2 0/1 0/0

1. PHASE EQUILIBRIA

(8)

Introduction – Definition of terms involved in phase rule. Derivation of Gibbs phase rule – Applications to one component system – water system. Binary system – Eutectic system – Pb – Ag system, Bi – Cd system. Thermal analysis – Cooling curves.

2. MATERIAL CHEMISTRY

(10)

Cement – Manufacture, Chemistry of setting and hardening. Lubricants – Requirements of good lubricants, Mechanism, Properties of lubricants, Classification – Examples. Abrasives – Classification – Moh's scale – Hard and soft abrasives, Preparation of artificial abrasives (silicon carbide, boron carbide), Applications of abrasives. Refractories – Classification, Properties – Refractoriness, RUL, Porosity, Thermal spalling. Alloys Classification of alloys – Purpose of making alloys – Ferrous and non-Ferrous alloys – Heat treatment. Nano materials – properties, carbon nano tubes – properties, fabrication – carbon arc method, laser vapourization method.

3. APPLIED CHEMISTRY

(9)

Soaps and detergents : Soaps – Saponification of oils and fats, manufacture of soaps, classification of soap – soft soap, medicated soap, herbal soap, shaving soap and creams.

Detergents – Anionic detergents – manufacture and applications, Comparison of soaps and detergents.

Rocket propellants and explosives: Rocket propellants – characteristics, solid and liquid propellants – examples. Explosives- Introduction, characteristics, classification, Oxygen balance, preparation, properties and uses of detonators, low explosives and high explosives, Dynamites, Gun cotton, Cordite.

Food adulterants- Common adulterants in different foods – milk and milk products, vegetable oils, and fats, spices and condiments, cereals, pulses, sweetening agents and beverages, Contamination with toxic chemicals – pesticides and insecticides.

4. FUELS & COMBUSTION

(9)

Introduction to Fuels – classification – Calorific value – GCV, LCV. Solid Fuels – Coal – Proximate Analysis, Metallurgical Coke – Manufacture of Metallurgical Coke – Liquid Fuel – Refining of Petrol, Synthetic Petrol – Manufacturing Process – Hydrogenation of Coal, Polymerization, Cracking – Knocking – Octane Number – Leaded Petrol (or) Anti-knocking – Cetane Number – Ignition Lag – Gaseous fuels – CNG – LPG – Water Gas, Producer gas – Biogas – Combustion – Flue Gas analysis – Orsat's method.

5. ANALYTICAL AND CHARACTERIZATION TECHNIQUES

(9)

Electron microscopes: Scanning electron microscope & Transmission electron microscope, instrumentation and applications. Absorption and Emission Spectrum – Beer – Lambert's law.

Visible and UV Spectroscopy – instrumentation – Block diagram – working. IR Spectroscopy – instrumentation – Block diagram – molecular vibrations – stretching and bending – H₂O, CO₂. – Characterization of some important organic functional groups. Chromatographic techniques – column, thin layer and paper.

Total number of periods : 45

Textbooks

1. C. S. Unnithan, T. Jayachandran & P. Udhayakala, "Industrial Chemistry", Sreelakshmi Publications (2009).
2. Dr. R. Sivakumar and Dr. N. Sivakumar, "Engineering Chemistry" Tata McGraw Hill Publishing Company Ltd, Reprint 2013.

References

1. P. C. Jain & Monika Jain, "Engineering Chemistry", Dhanpat Rai publishing Co., (Ltd.) (2013).
2. B. R. Puri, L. R. Sharma & M. S. Pathania, "Principles of Physical Chemistry", Vishal publishing co., (2013).



Department of Information Technology

DEPARTMENT OF ENGINEERING SCIENCES

Subject Code : BES17003	Subject Name : ENVIRONMENTAL SCIENCE					C	L	T/SLr	P/R			
	Prerequisite : None					3	3	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 : 1. To acquire knowledge of the Environment and Ecosystem & Biodiversity 2. To acquire knowledge of the different types of Environmental pollution 3. To know more about Natural Resources 4. To gain understanding of social issues and the Environment 5. To attain familiarity of human population and Environment												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	To known about Environment and Ecosystem & Biodiversity											
CO2	To clearly 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											
CO3	To discover water conservation and watershed management											
CO4	To identify its problems and concerns climate change, global warming, acid rain, ozone layer depletion etc.,											
CO5	To explain family welfare programmes and role of information technology in human health and environment											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						M	H	M				M
CO2						M	H			M		M
CO3						M	H	M				M
CO4						M	H	M		M		M
CO5						M	H			M		M
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			
			√									
Approval												



Department of Information Technology

BES17003

ENVIRONMENTAL SCIENCE

3 3 0 0/0

Unit I Environment and Ecosystem

(9)

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

(9)

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

(9)

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

(9)

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

(9)

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

Total Number of Periods : 45

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, 5th Edition, July, 2013.
2. Ifthikarudeen, Etal, **Environmental Studies**, Sooraj Publications, 2005.
3. R.Murugesan, **Environmental Studies**, Millennium Publishers and Distributors, 2nd Edition, July, 2009.



Department of Information Technology

Subject Code:	Subject Name :	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
BMA17008	DISCRETE MATHEMATICS					
	Prerequisite: BES17ET2	Ty	3	0/1	0/0	4

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

Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE :

- To understand the Basic concepts in Logic and Predicate calculus
- To understand the Basic concepts in Combinatorics
- To understand the Basic concepts in Group theory
- To understand the Basic concepts in Lattices
- To understand the Basic concepts in Graph theory

COURSE OUTCOMES (COs) : (3- 5)

CO1	
CO2	
CO3	
CO4	
CO5	

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H			M	M			H	H		H
CO2	H	H			H	L						H
CO3	H	H			M				M	H		L
CO4	H	H			L				M	H		M
CO5	H	M				M			M	M		H

COs / PSOs	PSO1	PSO2	PSO3	PSO4
CO1	M		L	
CO2	M	L	L	
CO3	M			
CO4	M			
CO5	M	L	L	

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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								

Approval

27th meeting of Academic council, June2017

**Department of Information Technology****SEMESTER III**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/S Lr	P/R	Ty/ Lb/ ETL/ EVL
BMA17008	BMA17003	DISCRETE MATHEMATICS	M-3	4	3	1/0	0/0	Ty

(Common to II yr. / III Sem. B.Tech (Full Time), I yr. / I Sem. B.Tech (Part Time) - CSE,IT)

Course Outcomes:

To understand the Basic concepts in Logic and Predicate calculus

To understand the Basic concepts in Combinatorics

To understand the Basic concepts in Group theory

To understand the Basic concepts in Lattices

To understand the Basic concepts in Graph theory

UNIT I LOGIC (12 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 (simple theorems and problems).

UNIT IV LATTICES (12 hrs)

Partial ordering – Posets – Hasse Diagram – Lattices – Properties of lattices – Sub lattices – Special lattices – Boolean Algebra(Definition & simple problems).

UNIT V GRAPHS (12 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 no. of hrs: 60**Text 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).

Reference Books:

1. Kolman, Busby, Ross, *Discrete Mathematical Structures*, Pearson, (2014).
2. Kenneth Rosen, *Discrete Mathematics and its applications (SIE)*, Tata McGraw Hill Publishing Co., (2007).



Department of Information Technology

Subject Code: BIT17001	Subject Name : DATA STRUCTURES AND ALGORITHMS	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: NIL	Ty	3	0/1	0/0	4

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

Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE :

- Master the implementation of linked data structures such as linked lists and binary trees
- Be familiar with advanced data structures such as AVL trees and hash tables.
- Be familiar with several sub-quadratic sorting algorithms including quicksort, mergesort and heapsort
- Be familiar with some graph algorithms such as shortest path and minimum spanning tree
- Be familiar with various algorithm design methods and its application

COURSE OUTCOMES (COs) : (3- 5)

CO1	Student will be able to choose appropriate data structure as applied to specified problem definition
CO2	Student will be able to handle operations like searching, insertion, deletion, traversing mechanism on various data structures.
CO3	Students will be able to apply concepts learned in various domains like DBMS, compiler construction etc.
CO4	Students will be able to use linear and non-linear data structures like stacks, queues , linked list etc
CO5	Students will be aware of various Algorithmic design methods used in problem solving.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	L	H	M	L	L	L	L	L	M	M
CO2	H	H	H	L	M	L	M	M	H	L	M	M
CO3	H	M	H	H	H	M	L	M	H	L	M	M
CO4	H	H	H	H	M	L	M	M	H	L	M	M
CO5	H	M	H	H	H	M	L	M	H	L	M	M

COs / PSOs	PSO1	PSO2	PSO3	PSO4
CO1	H	H	L	L
CO2	H	H	M	L
CO3	H	M	L	L
CO4	H	H	L	L
CO5	H	M	L	L

H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/S Lr	P/R	Ty/ Lb/ ETL/ EVL
BIT17001	NIL	DATA STRUCTURES AND ALGORITHMS	PC	4	3	0/1	0/0	Ty

OBJECTIVES:

- Master the implementation of linked data structures such as linked lists and binary trees
- Be familiar with advanced data structures such as AVL trees and hash tables.
- Be familiar with several sub-quadratic sorting algorithms including quicksort, mergesort and heapsort
- Be familiar with some graph algorithms such as shortest path and minimum spanning tree
- Be familiar with various algorithm design methods and its application

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&SanguthevarRajasekaran.(2007) Fundamentals of Computer Algorithms, Galgotia Publications



Department of Information Technology

Subject Code:	Subject Name :	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
BCS17002	Object Oriented Programming with C++					
	Prerequisite: BES17ET2	Ty	3	0/1	0/0	4

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

OBJECTIVE :

- The students will be able to distinguish OOP features with procedural Oriented and analyze these features to a real world object,
- To analyze generic data type for the data type independent programming which relate it to reusability.
- To understand the concepts of Java programs and develop basic networking programs using Java

COURSE OUTCOMES (COs) : (3- 5)

CO1	Object Oriented Programming and to analyze characteristics of OOP
CO2	To implement OOP in various applications
CO3	Files & I/O
CO4	Exception Handling
CO5	To 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	H	H	H	M	H	M	H	H	M	H	H	H
CO2	H		M	L	H	H	H	H	M	M	H	H
CO3	H	H	M		H	H	M	M	H	H	H	H
CO4	H	H	M	L		H	H	M	H	H	M	M
CO5	H	M	L	M	H	H	H	H	M	L	H	H

COs / PSOs	PSO1	PSO2	PSO3	PSO4
CO1	H	H	M	H
CO2	H	M	H	H
CO3	M	H	M	L
CO4	H	H	M	H
CO5	H	M	M	H

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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								

Approval

27th meeting of Academic council, June 2017

**Department of Information Technology**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/S Lr	P/R	Ty/ Lb/ ETL/ EVL
BCS17002	BES17ET2	OBJECT ORIENTED PROGRAMMING WITH C++	PC	4	3	0/1	0/0	Ty

Objectives:

- The students will be able to distinguish OOP features with procedural oriented and analyze these features to a real world object,
- To analyze generic data type for the data type independent programming which relate it to reusability.

UNIT-I

12 Hrs

Basics, Tokens, Expressions: 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

12 Hrs

Functions, Classes and Objects: 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

12 Hrs

Constructors and Destructors : 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

12 Hrs

Inheritance: Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi Level Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Abstract Classes, Constructors in Derived Classes, Containership, Operator overloading, Rules for Operator overloading, overloading of binary and unary operators .

UNIT-V

12 Hrs

Pointers, Virtual Functions and Polymorphism: 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.

Total Hours: 60



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Maduravoyal, Chennai - 95



Department of Information Technology

Text Book:

1. E.Balagurusamy, “Object Oriented Programming in C++”, 6th 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



Department of Information Technology

Subject Code:	Subject Name :	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
BEC17I01	Fundamentals of Communication Systems					
	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

OBJECTIVE :

- To introduce the relevance of this course to the existing technology through Lectures, demonstrations & case studies.
- To introduce the concepts of various modulations.
- To understand noise impact on modulations
- To introduce some of the essential baseband & Band pass signals.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Analyze the functioning of Analog communication systems.
CO2	Understand the various modulations techniques.
CO3	Evaluate fundamental communication system parameters, such as bandwidth, power, signal to noise ratio.
CO4	Understand differences between analog and digital signals and transmission of information

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	L	L	L	M	M	M	L	H	L	L
CO2	H	M	L	H	M	M	L	L	L	L	L	L
CO3	M	L	M	H	M	H	L	L	H	H	L	L
CO4	H	L	M	L	L	L	M	L	L	M	L	L

COs /PSOs	PSO1	PSO2	PSO3	PSO4
CO1	H	H	L	M
CO2	H	M	L	L
CO3	M	H	L	M
CO4	M	H	L	L

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	Practical / Project	Internships / Technical	Soft Skills			
		✓										
Approval	27 th meeting of Academic council, June2017											

**Department of Information Technology**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/S/Lr	P/R	Ty/ Lb/ ETL/ EVL
BEC17I01	NIL	FUNDAMENTALS OF COMMUNICATION SYSTEMS	BES	3	3	0/0	0/0	Typ

OBJECTIVES:

- To introduce different types of noises.
- To introduce the concepts of various modulations.
- To understand pulse modulation.
- To introduce some of the essential Digital Modulation Techniques.

UNIT I SIGNALS & NOISE 9 Hrs

Periodic signals and Aperiodic signals – Band pass signals – Random signals – Noise – Thermal Noise – Shot Noise – Signal to Noise ratio

UNIT II INTRODUCTION TO COMMUNICATION 9 Hrs

Need for Modulation – AM Modulation – Double Side Band with Carrier - Double Side Band Suppressed Carrier - Single Side Band Modulation – AM transmitter

UNIT III ANGLE MODULATION & RECEIVERS 9 Hrs

Frequency Modulation – Phase Modulation – Envelope Detector - Super Heterodyne Receiver – FM Demodulation – FM Receiver

UNIT IV PULSE MODULATION 9 Hrs

Pulse Modulation – PAM – PWM – PPM – Sample and Hold – Quantization - PCM – Delta Modulation - Pre-emphasis – De-emphasis

UNIT V DIGITAL MODULATION 9 Hrs

Introduction to Digital Modulation - Shift Keying ASK – FSK – PSK - Bit Rate – Baud Rate– Multiplexing TDM – FDM – Channel coding – Introduction to Spread Spectrum Modulation – Auto correlation function of PN Sequence

Total Hours: 45**Text Books:**

1. Samuel & Matthew (2017), *Principles of Modern Communication Systems*, Cambridge University Press .
2. Simon Haykin (2008) *Communication Systems* (3rd ed.) Wiley India

Reference Books:

1. Taub, Schilling and Saha (2008) *Principles of communication* (3rd ed.) Tata McGraw Hill Publishing Company Limited
2. B.P Lathi (2010), “Modern Digital and Analog Communication Systems”, Oxford University Press.



Department of Information Technology

Subject Code: BEC17I02	Subject Name : Digital Systems	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BES17001	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

OBJECTIVE :

- To introduce number systems and codes and its conversions
- To introduce Boolean algebra and its applications in digital systems
- To introduce the design of various combinational digital circuits using logic gates
- To bring out the analysis for synchronous and asynchronous Sequential circuits

COURSE OUTCOMES (COs) : (3- 5)

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

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	L	M	L	L	L	L	L	L	M	L	L
CO2	H	M	L	L	L	L	L	L	L	L	L	L
CO3	M	M	H	L	L	M	L	L	M	M	L	L
CO4	M	M	H	L	L	M	L	L	M	M	L	L
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	L		H		L		L					
CO2	L		H		L		L					
CO3	H		M		L		L					
CO4	H		M		L		L					

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	Practical / Project	Internships / Technical Skill	Soft Skills				
		✓											
Approval	27 th meeting of Academic council, June2017												

**Department of Information Technology**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/S Lr	P/R	Ty/ Lb/ ETL/ EVL
BEC17I02	BES17001	DIGITAL SYSTEMS	IDT-1	3	3	0/0	0/0	Ty

OBJECTIVES

- To introduce number systems and codes and its conversions
- To introduce Boolean algebra and its applications in digital systems
- To introduce the design of various combinational digital circuits using logic gates
- To bring out the analysis for synchronous and asynchronous Sequential circuits

UNIT I: NUMBER SYSTEMS**9 Hrs**

Review of Decimal, Binary, Octal And Hexadecimal Number Systems –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 – 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 – Code converters - PAL- PLA.

UNIT IV: SYNCHRONOUS SEQUENTIAL LOG IC**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.

UNIT-V: ASYNCHRONOUS SEQUENTIAL LOGIC**9 Hrs**

Asynchronous counters –Decade counters - State diagram - State Table – State Reduction – State Assignment- Excitation Table-Analysis of Asynchronous sequential circuits - Design of ASynchronous Sequential Circuits.

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*", 10th Edition Pearson Education

Reference Books:

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



Department of Information Technology

Subject Code: BCS17ET1	Subject Name : Computer Graphics						T y/ Lb/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: BES17ET2						ETL	1	0/1	2/0	3	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVE : The student should be made to: <ul style="list-style-type: none">Understand the output primitives, two dimensional graphics and their transformations.Understand the three dimensional graphics and their transformations.Understand illumination and color modelsLearn to create animations												
COURSE OUTCOMES (COs) : (3- 5)												
CO1		Transform geometrical structures, perform clipping on geometrical objects										
CO2		Analyze a 3D structure										
CO3		Create and evaluate graphic projects										
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	H	M	M	M	L	M	M	L	L	L
CO2	H	M	H	L	H	M	L	M	M	L	L	L
CO3	H	M	H	M	H	M	L	M	M	L	L	L
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		H		L		L					
CO2	H		H		L		L					
CO3	H		H		L		M					
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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic council, June2017											

**Department of Information Technology**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/S Lr	P/R	Ty/ Lb/ ETL/ EVL
BCS17ET1	BES17ET2	COMPUTER GRAPHICS	PC	3	1	0/1	2/0	ETL

OBJECTIVES:

The student should be made to:

- Understand the output primitives, two dimensional graphics and their transformations.
- Understand the three dimensional graphics and their transformations.
- Understand illumination and color models
- Learn to create animations

UNIT I : OUTPUT PRIMITIVES**9 Hrs**

Output primitives-Line drawing algorithms-Loading the frame buffer-Line function-Circle generation algorithms –Ellipse generation algorithms- Attributes of output primitives-Numerical problem solving and programs on line, circle and ellipse drawing algorithms

UNIT II : TWO DIMENSIONAL TRANSFORMATION & VIEWING**9 Hrs**

Two dimensional transformations- Matrix representations and homogeneous coordinates - Composite transformations – two dimensional viewing -Window to view port transformation - Clipping operations - Point clipping - Line clipping (Cohen - Sutherland line Clipping) - Polygon clipping(Sutherland - Hodgeman algorithm) –Numerical problem solving and programming on two dimensional transformation ,viewing and clipping

UNIT III : THREE DIMENSIONAL GRAPHICS**9 Hrs**

Three dimensional concepts - Three dimensional object representation -Three Dimensional Transformations - Visible surface detection methods (Back Face Detection - Depth Buffer Method - Scan Line Method) - Numerical problem solving and programming on three dimensional transformations

UNIT IV : POLYGON RENDERING METHODS AND COLOUR MODELS**9 Hrs**

Constant-Intensity Shading – Gouraud Shading- Phong Shading- chromaticity diagram - RGB colour model - YIQ colour model - CMY colour model - Colour selection

UNIT V ANIMATIONS**9 Hrs**

ANIMATION GRAPHICS: Design of Animation sequences – animation function – raster animation – key frame systems – motion specification –morphing - create Interactive animation for gaming

Total Hours: 45



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Text Books

1. Donald, D. Hearn. Pauline, Baker, M. Warren, Carithers. (2010) *Computer graphics with Open GL*, (4th ed.)
2. Computer Graphics (Special Indian Edition) (Schaum's Outline Series) 2nd Edition, 2006 (English, Paperback, Xiang, Plastock, Avadhani), McGraw Hill Education (India) Private Limited

Reference Books:

1. John F. Hughes, Andries Van Dam, Morgan Mc Guire ,David F. Sklar , James D. Foley, Steven K. Feiner and Kurt Akeley ,”Computer Graphics: Principles and Practice”, 3rd Edition, Addison- Wesley Professional,2013.
2. Peter Shirley, Michael Ashikhmin, Michael Gleicher, Stephen R Marschner, Erik Reinhard, Kelvin Sung, and AK Peters, Fundamental of Computer Graphics, CRC Press, 2010.



Department of Information Technology

Subject Code:	Subject Name :							T / L/ ETL	L	T / S.Lr	P/ R	C
BIT17L01	DATA STRUCTURES AND ALGORITHMS LAB											
	Prerequisite: BES17ET2							Lb	0	0/0	3/0	1
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVE : 1.To strengthen their problem solving ability by applying the characteristics of an object-oriented approach. 2. To introduce object oriented concepts in C++ and Java.												
COURSE OUTCOMES (COs) : (3- 5)												
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											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	L	M	L	M	L	L	M	M	M	M
CO2	H	H	L	M	L	M	H	L	M	L	H	M
CO3	H	M	L	M	L	M	L	L	M	M	M	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		H		L		L					
CO2	H		L		M		L					
CO3	M		M		L		H					
H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low												
Categor y	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic council, June2017											



Department of Information Technology

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/S Lr	P/R	Ty/ Lb/ ETL/ EVL
BIT17L01	BES17ET2	DATA STRUCTURES AND ALGORITHMS LAB	PCL	1	0	0/0	3/0	Lb

OBJECTIVES:

1. To strengthen their problem solving ability by applying the characteristics of an object-oriented approach.
2. To introduce object oriented concepts in C++ and Java.

EXERCISES:

- 1) Operation on arrays – insertion and deletion
- 2) Linked lists-creation, insertion, deletion of single, double and circular lists.
- 3) Stack- operations using arrays and linked lists.
- 4) Infix to postfix conversion
- 5) Evaluation to postfix expression.
- 6) Queue- operations using arrays and linked lists.
- 7) Dequeue, circular-operations
- 8) Binary tree traversals- In order, pre order, post order using recursion
- 9) Binary tree traversals- In order, pre order, post order using non recursion
- 10) Linear and binary search
- 11) Sorting – Selection Sort, Quick sort, Heap Sort and Merge Sort.
- 12) Addition, multiplication of sparse matrices
- 13) Polynomial addition and multiplication
- 14) Depth first search of a graph



Department of Information Technology

Subject Code: BCS17L02	Subject Name : Object Oriented Programming Lab with C++	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BES17ET2	Lb	0	0/0	3/0	1

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

Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE :

- 1.To develop skills to design and analyze simple linear and non linear data structures
- 2.To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
3. To Gain knowledge in practical applications of data structures

COURSE OUTCOMES (COs) : (3- 5)

CO1	Be able to design and analyze the time and space efficiency of the data structure
CO2	Be capable to identify the appropriate data structure for given problem
CO3	Have practical knowledge on the application of data structures

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	M	H	H	M	H	H	H	H	H	H
CO2	H	M	H	H		H	M	H	H	H	M	H
CO3	M	H	H	H	H	L	M	H	H	H	H	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		H		H		H					
CO2	H		M		H		M					
CO3	H		H		M		H					

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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic council, June2017											

**Department of Information Technology**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/S Lr	P/R	Ty/ Lb/ ETL/ EVL
BCS17L02	BES17ET2	OBJECT ORIENTED PROGRAMMING LAB WITH C++	PCL	1	0	0/0	3/0	Lb

OBJECTIVES:

- To develop skills to design and analyze simple linear and non linear data structures
- To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
- To Gain knowledge in practical applications of data structures

1. Simple C++ Programs to Implement Various Control Structures.

- If statement
- Switch case statement and do while loop
- For loop
- While loop

2. Programs to Understand Structure & Unions.

- Structure
- union

3. Programs to Understand Pointer Arithmetic.**4. Functions & Recursion.**

- Function
- . Recursion

5. Inline Functions.**6. Programs to Understand Different Function Call Mechanism.**

- Call by reference & Call by Value

7. Programs to Understand Storage Specifiers.**8. Constructors & Destructors.****9. Use of “this” Pointer. Using class****10. Programs to Implement Inheritance and Function Overriding.**

- Multiple inheritances –Access Specifiers
- Hierarchical inheritance – Function Overriding /Virtual Function

11. Programs to Overload Unary & Binary Operators as Member Function & Non Member Function.

- Unary operator as member function
- Binary operator as non member function

12. Programs to Understand Friend Function & Friend Class.

- Friend Function
- Friend class

13. Programs on Class Template



Department of Information Technology

Subject Code: BEC17IL1	Subject Name : DIGITAL SYSTEMS LAB	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BES17001	Lb	0	0/0	3/0	1

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

Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE :

- To introduce number systems and codes and its conversions
- To introduce Boolean algebra and its applications in digital systems
- To introduce the design of various combinational digital circuits using logic gates
- To bring out the analysis for synchronous and asynchronous Sequential circuits

COURSE OUTCOMES (COs) : (3- 5)

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

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	L	M	L	L	L	L	L	L	M	L	L
CO2	H	M	L	L	L	L	L	L	L	L	L	L
CO3	M	M	H	L	L	M	L	L	M	M	L	L
CO4	M	M	H	L	L	M	L	L	M	M	L	L
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	L		H		L		L					
CO2	L		H		L		L					
CO3	H		M		L		L					
CO4	H		M		L		L					

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	Practical / Project	Internships / Technical Skill	Soft Skills				
		✓											
Approval	27 th meeting of Academic council, June2017												



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Department of Information Technology

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/S Lr	P/R	Ty/ Lb/ ETL/ EVL
BEC17IL1	BES17001	DIGITAL SYSTEMS LAB	IDL-1	1	0	0/0	3/0	Lb

OBJECTIVES:

- To introduce Boolean algebra and its applications in digital systems
- To introduce the design of various combinational digital circuits using logic gates
- To bring out the analysis for synchronous and asynchronous Sequential circuits

1. Verification of Truth tables of Logic Gates
2. Implementation of Boolean function
3. Implementation of Half and full Adders
4. Implementation of Half and full Subtractors
5. Implementation of Multiplexers
6. Implementation of Demultiplexers
7. Implementation of Encoder
8. Implementation of Decoders
9. Verification of Flip – Flops
10. Implementation of Shift Registers
11. Implementation of Counters
12. Study of A to D Converters



Department of Information Technology

Subject Code:	Subject Name :	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
BMA17013	NUMERICAL METHODS FOR COMPUTER ENGINEERS					
	Prerequisite: BES17001	Lb	0	0/0	3/0	1

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

Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE :

- To understand the Basic concepts in Numerical Methods
- To understand the Basic concepts in Solution of Algebraic and Transcendental equations
- To understand the Basic concepts in Interpolation
- To understand the Basic concepts in Numerical Differentiation and Integration
- To understand the Basic concepts in Applications of Numerical Methods in Differential Equations

COURSE OUTCOMES (COs) : (3- 5)

CO1	
CO2	
CO3	
CO4	
CO5	

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	M									L
CO2	H	M	M									L
CO3	H	M	M									L
CO4	H	M	M									L
CO5	H	M	M									L

COs / PSOs	PSO1	PSO2	PSO3	PSO4
CO1	L	L		
CO2	L	L		
CO3	L	L		
CO4	L	L		
CO5	L	L		

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	Practical / Project	Internships / Technical Skill	Soft Skills			

Approval	27 th meeting of Academic council, June2017											
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**Department of Information Technology**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BMA17013	BMA17008	NUMERICAL METHODS FOR COMPUTER ENGINEERS	M-4	4	3	1/0	0/0	Ty

(Common to II yr. / IV Sem. B.Tech (Full Time) – IT)

Course Outcomes:

To understand the Basic concepts in Numerical Methods

To understand the Basic concepts in Solution of Algebraic and Transcendental equations

To understand the Basic concepts in Interpolation

To understand the Basic concepts in Numerical Differentiation and Integration

To understand the Basic concepts in Applications of Numerical Methods in Differential Equations

UNIT I BASICS OF NUMERICAL METHODS**(12 hrs)**

Curve fitting-Method of group averages-Principle of least square-Method of moments-Finite differences-Operators (Forward, Backward & Shifting) -Relationship between the operators.

UNIT II SOLUTION OF EQUATIONS**(12 hrs)**

Solution of Algebraic and Transcendental equations – Method of false position – Iteration method – Newton-Raphson method – Solution of Linear system of equations – Gauss Elimination method – Gauss-Jordan method – Iterative methods – Gauss-Jacobi method – Gauss-Seidel method – Matrix Inversion by Gauss-Jordan method.

UNIT III INTERPOLATION**(12 hrs)**

Newton forward and backward differences – Central differences – Stirling's and Bessel's formulae – Interpolation with Newton's divided differences – Lagrange's method.

UNIT IV NUMERICAL DIFFERENTIATION AND INTEGRATION**(12 hrs)**

Numerical differentiation with interpolation polynomials – Numerical integration by Trapezoidal and Simpson's (both $1/3^{rd}$ & $3/8^{th}$) rules – Two and three point Gaussian Quadrature formulae – Double integrals using Trapezoidal and Simpson's rules.

UNIT V APPLICATIONS OF NUMERICAL METHODS TO DIFFERENTIAL EQUATIONS**(12 hrs)**

Taylor's series – Euler's & Modified Euler's method – Runge Kutta method of fourth order for first & second order differential equations – Milne's predictor-corrector method – Adam-Bashforth's predictor-corrector method.

Total no. of hrs: 60**Text Books:**

- 1) Veerarajan T., *Numerical Methods*, Tata McGraw Hill Publishing Co., (2005).
- 2) Sastry S.S., *Introductory Methods of Numerical Analysis*, Prentice Hall of India, (2003).

Reference Books:

1. Kandasamy P., Thilagavathy, Gunavathy K., *Numerical Methods (Vol.IV)*, S.Chand & Co., (2008).
2. Grewal B.S., *Higher Engineering Mathematics*, Khanna Publishers, (2012).



Department of Information Technology

Subject Code: BIT17002	Subject Name : Software Engineering						T / L/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: NIL						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												
OBJECTIVE :												
<ul style="list-style-type: none">Understand the phases in a software developmentUnderstand fundamental concepts of requirements engineering and Analysis Modeling.Understand the different approach for Object Oriented DesignLearn various testing and maintenance measures												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Identify the key activities in managing a software Development.											
CO2	Compare different process models.											
CO3	Concepts of requirements engineering and Analysis Modeling.											
CO4	Apply systematic procedure for software design and deployment.											
CO5	Compare and contrast the various testing and maintenance											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	M	H	M	L	L	H	H	H	M	H
CO2	H	H	H	H	H	M	M	H	H	M	L	M
CO3	H	H	H	M	M	M	M	M	H	M	L	M
CO4	H	H	H	H	H	M	M	H	H	H	M	H
CO5	H	H	H	H	H	M	M	H	H	H	M	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		H		H		H					
CO2	H		M		M		M					
CO3	H		H		H		H					
CO4	H		H		H		H					
CO5	H		H		M		H					
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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BIT17002	NIL	SOFTWARE ENGINEERING	PC	4	3	0/1	0/0	Ty

OBJECTIVES:

- Understand the phases in a software project
- Understand fundamental concepts of requirements engineering and Analysis Modelling.
- Understand the major considerations for enterprise integration and deployment.
- Learn various testing and maintenance measures

UNIT I: IMPORTANCE OF SOFTWARE ENGINEERING**12 Hrs**

Introduction - Software processes- Software process models: The waterfall model, Incremental development, Reuse-oriented software engineering - Process activities: Software specification – Software design and implementation – Software validation – Software evolution- Process iteration: Prototyping, Incremental delivery, Boehm's spiral model - Agile methodology

UNIT II: SOFTWARE REQUIREMENTS**12 Hrs**

Requirements engineering: Functional and non-functional requirements – The software requirements document – Requirements specification - Requirements engineering Processes – Requirements elicitation and analysis – Requirements validation – Requirements management – System Modeling: Context models – Interaction models - Structural models - Behavioral models

UNIT III: SOFTWARE DESIGN & TESTING**12 Hrs**

Architectural design: Architectural design decisions - Architectural views - Architectural patterns - Application architectures - Design and implementation: Object-oriented design using the UML - Design patterns - Implementation issues - Software testing: Development testing - Test-driven development - Release testing - User testing

UNIT IV: SOFTWARE QUALITY & MANAGEMENT**12 Hrs**

Project management: Risk management- Managing people – Teamwork - Project planning: Software pricing - Plan-driven development - Project scheduling - Agile planning - Estimation techniques Quality management: Software quality - Software standards - Reviews and inspections - Software measurement and metrics - Configuration management: Change management - Version management - System building - Release management

UNIT V: APPLICATIONS**12 Hrs**

1. SRS in IEEE format for any case study 2. Use project management tool to schedule project plan 3. RMMM plan for case study. 4. Develop test cases for white box testing 5. Change specifications and make different versions using any SCM tool.

Total Hours: 60**Text Books**

1. Ian Sommerville (2008) *Software Engineering* (9th ed.) Pearson Education Asia

Reference Books

1. Roger S. Pressman (2010) *Software Engineering: A Practitioner Approach* (8th ed.) McGraw hill Publications
2. Fairley (2001) *Software Engineering Concepts*, McGraw-Hill



Department of Information Technology

Subject Code: BCS17004	Subject Name : DATABASE MANAGEMENT SYSTEMS	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BIT17001	Ty	3	0/1	0/0	4

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

OBJECTIVE :

- To understand the different issues involved in the design and implementation of a database system.
- To study the physical and logical database designs, database modeling, relational, hierarchical, and network models.
- To develop an understanding of essential DBMS concepts such as: database security, integrity, and concurrency.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Understand the most fundamental DBMS concepts and techniques
CO2	Learn techniques required for building, maintaining, and querying databases.
CO3	Design Databases for applications

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	M	L	M	H	M	M	M	M	M	H
CO2	M	H	M	M	H	M	M	M	H	L	L	M
CO3	H	M	H	H	M	M	L	L	M	L	M	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		H		H		M					
CO2	M		M		H		L					
CO3	M		H		M		M					

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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic council, June2017											

**Department of Information Technology**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BCS17004	BIT17001	DATABASE MANAGEMENT SYSTEMS	PC	4	3	0/1	0/0	Ty

OBJECTIVES:

- To understand the different issues involved in the design and implementation of a database system.
- To study the physical and logical database designs, database modeling, relational, hierarchical, and network models.
- To develop an understanding of essential DBMS concepts such as: database security, integrity, and concurrency.

UNIT I : FUNDAMENTALS OF DATABASE**12 Hrs**

Introduction - Purpose of database systems – Data Abstraction -Data models – Instances and schemas – Data Independence – DDL – DML – Database user – ER model – Entity sets- keys – ER diagram – relational model – structure – relational algebra- relational calculus- views

UNIT II : SQL**12Hrs**

SQL - QBE - level – Basic Structure – various operations – relational database design – problems in the relational data base design – normalization – normalization using functional – Multivalued join dependence

UNIT III : FILE STRUCTURE, INDEXING & HASHING**12 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

UNIT IV : QUERY PROCESSING AND TRANSACTIONS**12 Hrs**

Overview - Measures of Query Cost - Selection Operation – Sorting - Join Operation- Transaction Concept - A Simple Transaction Model - Storage Structure – Serializability

UNIT V : CONCURRENCY CONTROL AND RECOVERY SYSTEM**12 Hrs**

Lock-Based Protocols - Deadlock Handling - Timestamp-Based Protocols - Validation-Based Protocols - Failures Classification – Storage - Recovery and Atomicity - Recovery Algorithm - Buffer Management

Total Hours: 60**Text Books**

1. Abraham, Silberschatz. Henry, F. K.. Sudharshan, S. (2013) *Database System Concepts* (6th ed.) 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

**Department of Information Technology**

Subject Code: BIT17003	Subject Name : System Software and Operating System						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												
T/L/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVE : <ul style="list-style-type: none">➤ To view some of the major tasks of the system software of a computer system such as Assemblers, Compilers, Loaders and Linkers.➤ To study and apply concepts relating to operating systems, such as System calls, Inter process Communication and process management.➤ To study and apply Deadlocks, Memory management, Processor and Disk scheduling,Storage management and applications on Unix.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Understanding design issues associated with system software and operating systems											
CO2	To know various process management concepts including scheduling, synchronization											
C03	To familiar with Multithreading, Memory management and Dead locks											
C04	Understanding issues related to file system interface and implementation, disk Management and I/O Management.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	M	M	L	L	L	L	L	L	L	L
CO2	H	H	H	M	M	M	H	L	L	M	M	M
C03	H	M	M	M	L	L	M	M	L	L	L	M
C04	M	M	L	L	H	M	M	L	L	L	M	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		H		M		M					
CO2	M		M		L		L					
C03	L		L		M		M					
C04	H		M		M		M					
H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low												
Categor y	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic Council, June 2017											



Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BIT17003	NIL	SYSTEM SOFTWARE AND OPERATING SYSTEM	PC	3	3	0/0	0/0	Ty

OBJECTIVES:

- To view some of the major tasks of the system software of a computer system such as Assemblers, Compilers, Loaders and Linkers.
- To study and apply concepts relating to operating systems, such as System calls, Inter process Communication and process management.
- To study and apply Deadlocks, Memory management, Processor and Disk scheduling, Storage management and Applications on Unix.

UNIT I : ASSEMBLERS COMPILERS LOADERS AND LINKERS**9 Hrs**

Assemblers : Functions – Features – Machine dependent – Machine independent - Design options – One Pass – Multipass – Compilers: Function -Phases of a Compiler –Loader: Functions – Features – Relocation – Program Linking – Linking Loader Implementation Dynamic linking –Bootstrap loaders.

UNIT II: OS CONCEPTS AND PROCESS MANAGEMENT**9 Hrs**

OS CONCEPTS Introduction- Operating System Structure- Operating System Operations- Operating System Services- System Calls-Process concept-Process Scheduling-Operation on Process-Cooperating Processes- Inter Process Communication-Threads-Overview-Multithreading Models.-CPU Scheduling-Scheduling Criteria-Scheduling Algorithms.

UNIT III: SYNCHRONIZATION AND DEADLOCKS**9 Hrs**

Process Synchronization-The Critical Section Problem-Synchronization Hardware-Semaphores-Classical Problems of Synchronization-Deadlocks-System Model-Deadlock Characterization-Methods of Handling Deadlocks- Deadlock Prevention-Deadlock Avoidance-Deadlock Detection-Recovery from Deadlock

UNIT IV: MEMORY MANAGEMENT I/O MANAGEMENT**9 Hrs**

Background-Swapping-Contiguous Memory Allocation - Address Translation - Paging - Segmentation - Segmentation with Paging - Paging Algorithms- Thrashing-Virtual Memory management- File Access methods- File system structure -Disk Scheduling

UNIT V: APPLICATION**9 Hrs**

Case study on UNIX Operating System – Design principles – Process management –Scheduling – Memory Management - Inter process Communication.

Total Hours: 45**Text Books**

1. Beck L. (2008) *System Software, An Introduction to System Programming* (3rd ed.), Pearson
2. Silberschatz, Galvin, Gagne (2012) *Operating System Concepts*, (9th ed.), John Wiley & Sons (Asia) Pt. Ltd, Singapore,.

Reference Books

1. Andrew S. Tanenbaum, Albert S, Wood Hull(2015) *Modern Operating System*, Pearson publication
2. D.M.Dhamdhare (2012) *Operating Systems Concepts*, (3rd ed.), Tata McGraw-Hill Publishing Company Ltd.
3. William Stallings (2015) *Operating Systems* (8th ed.) Prentice Hall of India



Department of CSE&IT

Subject Code: BEC17I03	Subject Name : Micro Processors and Micro Controllers	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BES17I02	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

OBJECTIVE :

- To study the basic architectures and operational features of the processors and controllers.
- To learn the assembly language programming of 8086.
- To design and understand the multiprocessor configurations.
- To understand the interfacing concepts of the peripheral devices with processors.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Ability to understand the architecture of 8086 microprocessor
CO2	Ability to understand the architecture of 8051 microcontroller
CO3	Ability to understand the interfacing of different peripheral devices with the microprocessors
CO4	Understand the applications of microprocessors & microcontrollers

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	L	L	L	M	L	L	M	L	L	M
CO2	H	M	L	L	L	M	L	L	M	L	L	M
CO3	H	M	L	L	M	L	L	L	L	L	L	M
CO4	H	M	L	L	M	L	L	L	L	L	L	M
COs / SOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		L		L		M					
CO2	H		L		L		M					
CO3	H		L		L		M					
CO4	H		M		M		L					

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	Practical / Project	Internships / Technical Skill	Soft Skills			
		✓										
Approval	27 th meeting of Academic council, June 2017											

**Department of Information Technology**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BEC17I03	BES17I02	MICRO PROCESSORS AND MICRO CONTROLLERS	IDT-2	3	3	0/0	0/0	Ty

OBJECTIVES:

- To study the basic architectures and operational features of the processors and controllers.
- To learn the assembly language programming of 8086.
- To design and understand the multiprocessor configurations.
- To understand the interfacing concepts of the peripheral devices.

UNIT I 16 BIT MICROPROCESSOR**9 Hrs**

Evolution of processors – 8086 Architecture – Functional Diagram – Register organization – Memory Addresses – Minimum mode – Maximum mode – Interrupts of 8086

UNIT II INSTRUCTION SET AND ALP**9 Hrs**

Instruction Formats – Addressing modes – Instruction set – Simple programs involving logical, branch and call instructions – sorting – string manipulations

UNIT III INTERFACING**9 Hrs**

Memory Interfacing – I/O Interfacing – Programmable Peripheral Interface 8255 – USART – DMA controller – Programmable Interval Timer 8253

UNIT IV MICROCONTROLLER**9 Hrs**

Introduction – 8051 Architecture – I/O Ports – Memory Organization – Addressing modes – Interrupts

UNIT V APPLICATIONS**9 Hrs**

Instruction set of 8051 – Applications – Simple programs – Interfacing with ADC - Interfacing with DAC - Stepper Motor –Traffic Light Controller

Total Hours: 45**Text Books:**

1. Ray A.K. & Bhurchandi K.M. (2013) *Advanced Microprocessors and Peripherals*, Tata McGraw Hill Education pvt Ltd
2. Douglas v Hall. (2006) *Microprocessors and Interfacing* (2nd ed.), Tata McGraw Hill Publishing company Limited

Reference Books:

1. Badri Ram. (2006) *Advanced Microprocessors and Interfacing*, Tata McGraw Hill Publishing company limited
2. Kenneth J. Ayala (2008) “The 8051 Micro Controller”, 3rd Edition, Thomas Delmar Learning.

**Department of Information Technology**

Subject Code: BSK17ET1	Subject Name : SOFT SKILLS I	T / L/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: NIL	ETL	1	0/1	1/0	2

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

T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE :

- To create awareness in students, various top companies helping them improve their skill set matrix, leading to develop a positive frame of mind.
- To help students be aware of various techniques of candidate recruitment and help them prepare CV's and resume.
- To help student how to face various types of interview, preparing for HR, technical interviews.
- To help students improve their verbal reading, narration and presentation skills by performs various mock sessions.

COURSE OUTCOMES (COs) : (3- 5)

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.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	L	L	L	L	M	M	H	M	H	M	H
CO2	L	L	L	L	L	M	M	H	M	H	M	H
CO3	L	L	L	L	L	M	M	H	M	H	M	H
CO4	L	L	L	L	L	M	M	H	M	H	M	H
COs / PSOs	PSO1		PSO2		PSO3							
CO1	L		L		H							
CO2	L		L		H							
CO3	L		L		H							
CO4	L		L		H							

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	Practical / Project	Internships / Technical Skill	Soft Skills			
			✓						✓			
Approval												



Department of Information Technology

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BSK17ET1	NIL	SOFT SKILLS I	SS	2	1	0/1	1/0	ETL

OBJECTIVES

- 1) To bring behavioural patterns of students.
- 2) To train them for corporate culture.
- 3) To create self awareness.
- 4) To build confidence.
- 5) To train the students for facing the interviews and develop interpersonal relationship.

UNIT 1

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

UNIT 2

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

UNIT 3

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 4

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

UNIT 5

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



Department of Information technology

Subject Code:	Subject Name :	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
BCS17ET2	Java Programming					
	Prerequisite: BCS17002	ETL	1	0/2	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

OBJECTIVE : To teach the basic concepts and techniques which form the object oriented programming paradigm.

COURSE OUTCOMES (COs) : (3- 5)

CO1	To design, create, build, and debug Java applications and applets.
CO2	To write Java programs using object-oriented programming techniques including classes, objects, methods, instance variables, composition, inheritance, and polymorphism.
CO3	To write programs using graphical user interface (GUI) components and Java's Event Handling Model.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	L	L	H	M	H	H	H	H
CO2	H	H	H	H	L	L	H	M	H	H	H	H
CO3	H	H	H	H	H	H	H	M	H	H	L	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		H		L		H					
CO2	H		H		L		H					
CO3	H		H		L		H					

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	Practical / Project	Internships / Technical Skill	Soft Skills				
				✓									
Approval	27 th meeting of Academic council, June 2017												



Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SLr	P/R	Ty/ Lb/ ETL/ EVL
BCS17ET2	BCS17002	JAVA PROGRAMMING	PC	3	1	0/2	0/0	ETL

OBJECTIVES:

- To learn the basics of Java Language
- To understand the concepts of object oriented programming paradigm
- To get Knowledge on Standalone Programs and Web application

UNIT-I Overview of Java Language**9 Hrs**

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 Datatypes, 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:**9 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:**9 Hrs**

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 Streams and Object Serialization**9 Hrs**

Overview of Streams, Bytes vs. Characters, Overview of the entire Java IO API, Reading a file; writing to a file using various APIs, Reading User input from console, PrintWriter Class, Object Serialization, Serializable Interface, Serialization API, ObjectInputStream and ObjectOutputStream, Transient Fields, readObject and writeObject.

UNIT-V Graphics Programming:**9 Hrs**

Introduction, Abstract Window Toolkit (AWT), Applets-Life Cycle- Basics of event handling – event handlers – adapter classes – actions – mouse events – AWT event hierarchy – introduction to Swing – buttons – Layout Management – Swing Components.

Total Hours: 45**Text Books:**

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



Department of Information Technology

Subject Code: BCS17L03	Subject Name : Database Management Systems Lab	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BCS17L01	Lb	0	0/0	3/0	1

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

Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE :

To create a database and query it using SQL, design forms and generate reports.

Understand the significance of integrity constraints, referential integrity constraints, triggers, assertions.

COURSE OUTCOMES (COs) : (3- 5)

CO1	<ul style="list-style-type: none"> Understand, analyze and apply common SQL statements including DDL, DML and DCL statements to perform different operations.
CO2	<ul style="list-style-type: none"> Design different views of tables for different users and to apply embedded and nested queries.
CO3	<ul style="list-style-type: none"> Design and implement a database for a given problem according to well known design principles that balance 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	H	M	H	M	M	M	M	L	H	M	H	M
CO2	M	M	M	H	M	H	M	H	M	M	M	H
CO3	M	L	H	M	M	L	M	M	M	H	L	M
COs / PSOs	PSO1	PSO2	PSO3	PSO4								
CO1	M	M	H	M								
CO2	M	H	M	M								
CO3	H	M	H	M								

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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic council, June2017											



Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BCS17L03	BCS17L01	DATABASE MANAGEMENT T SYSTEMS LAB	PCL	1	0	0/0	3/0	Lb

OBJECTIVES:

- To create a database and query it using SQL, design forms and generate reports.
- Understand the significance of integrity constraints, referential integrity constraints, triggers, assertions.

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)



Department of Information Technology

Subject Code: BIT17L02	Subject Name : System Software and Operating System 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 : ➤ Basic Unix Commands. ➤ Programs on process creation and Synchronization, and Scheduling. ➤ Inter process communication including shared memory, pipes and messages												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Understanding of Symbol table, Assembler, Loader and Linker											
CO2	Demonstrate understanding of how to starting a new process, waiting for a Process, Scheduling algorithms, System calls.											
C03	Demonstrate understanding of how to send signals											
C04	Demonstrate understanding of how to synchronize processes											
C05	Demonstrate understanding of Inter-process communication and page Replacement algorithms.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	M	M	L	M	M	H	M	L	L	L
CO2	M	M	M	H	L	L	L	M	M	M	M	M
C03	H	H	M	M	L	L	M	M	M	M	M	M
C04	M	M	M	H	H	L	L	L	L	M	L	L
C05	H	M	M	L	L	L	M	M	L	H	M	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		H		M		L					
CO2	M		M		H		L					
C03	H		H		M		M					
C04	M		M		H		H					
C05	H		M		M		L					
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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic Council, June 2017											



Course Code	Prerequisite Course Code	Course Title Department of IT	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BIT17L02	NIL	SYSTEM SOFTWARE AND OPERATING SYSTEM LAB	PCL	1	0	0/0	3/0	Lb

OBJECTIVES:

To implement the following list of Programs.

- Basic Unix Commands.
- Programs on process creation and Synchronization, and Scheduling.
- Inter process communication including shared memory, pipes and messages

SYSTEM SOFTWARE

- 1) Implementation of a Symbol Table
- 2) Implement Pass 1 of Two pass Assembler
- 3) Implement Pass 2 of Two pass Assembler
- 4) Implementation of Absolute Loader
- 5) Implementation of Relocation Loader

OPERATING SYSTEMS

- 1) Basic Unix commands
- 2) Shell Programming
- 3) System Calls using Fork, Exec
- 4) Inter Process Communication (IPC).
- 5) Implementation of Scheduling Algorithms
- 6) Dining Philosophers Problem
- 7) Bankers Algorithm
- 8) Implementation of File Allocation Strategies
- 9) Simulate Page Replacement Algorithms



Department of Information Technology

Subject Code:	Subject Name :	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
BEC17IL2	Micro Processors and Micro Controllers Lab					
	Prerequisite: BEC17IL1	Lb	0	0/0	3/0	1

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

Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE :

To learn the assembly language programming of 8086.

To learn the assembly language programming of 8051.

To understand the interfacing concepts of the peripheral devices with processors

COURSE OUTCOMES (COs) : (3- 5)

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

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	L	L	M	L	L	L	L	L	L	M
CO2	H	M	L	L	M	L	L	L	L	L	L	M
CO3	H	M	L	L	M	L	L	L	L	L	L	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		M		L		L					
CO2	H		M		L		L					
CO3	H		M		L		L					

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	Practical / Project	Internships / Technical Skill	Soft Skills				
		✓											
Approval	27 th meeting of Academic council, June2017												



Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BEC17IL2	BEC17IL1	Department of IT MICRO PROCESSORS AND MICRO CONTROLLERS LAB	IDL-2	1	0	0/0	3/0	Lb

OBJECTIVES:

- To learn the assembly language programming of 8086.
- To learn the assembly language programming of 8051.
- To understand the interfacing concepts of the peripheral devices.

8086 Microprocessor:

1. Arithmetic operations
2. Block Movement of Data
3. Square and square root
4. Searching and sorting

8051 Microcontroller:

1. Arithmetic operations
2. Block Movement of Data
3. Square and square root
4. Searching and sorting

Interfacing:

1. Traffic light Controller
2. Stepper Motor Controller
3. Waveform Generation
4. Matrix Display



Course Code	Prerequisite Course Code	Course Title Department of IT	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BIT17TS1	NIL	TECHNICAL SKILL I (EVALUATION)	TS	1	0	0/0	0/0	EVL

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.

From the list of skill development courses declared by the department, the students are expected to acquire the skill and get certified. This will be evaluated at the end of the semester by the faculty.



Department of Information Technology

Subject Code:	Subject Name :	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
BMA17016	STATISTICS FOR COMPUTER ENGINEERS					
	Prerequisite:	Lb	0	0/0	3/0	1

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

Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE :

- To understand the Basic concepts in Statistics
- To understand the Basic concepts in Probability
- To understand the Basic concepts in Correlation
- To understand the Basic concepts in Probability distributions
- To understand the Basic concepts in Sampling theory

COURSE OUTCOMES (COs) : (3- 5)

CO1	
CO2	
CO3	
CO4	
CO5	

Mapping of Course Outcomes with Program Outcomes (POs)

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

COs /PSOs	PSO1	PSO2	PSO3	PSO4
CO1	L	L	L	
CO2	L	L	L	
CO3	L	L	L	
CO4	L	L	L	
CO5	L	L	L	

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	Practical / Project	Internships / Technical Skill	Soft Skills			
Approval	27 th meeting of Academic council, June2017											

**Department of Information Technology****SEMESTER V**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BMA17016	BMA17013	STATISTICS FOR COMPUTER ENGINEERS	M-5	4	3	1/0	0/0	Ty

(Common to III yr. / V Sem. B.Tech (Full Time), I yr. / II Sem. B.Tech (Part Time) – IT)

Course Outcomes:

To understand the Basic concepts in Statistics

To understand the Basic concepts in Probability

To understand the Basic concepts in Correlation

To understand the Basic concepts in Probability distributions

To understand the Basic concepts in Sampling theory

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 – Quartile Deviation – Standard Deviation – Relative Measures of Dispersion – Coefficient of Variation – Quartile Coefficient of Variation.

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

Axioms of Probability – Conditional probability – Total probability – Baye's Theorem – Random variable – Probability mass function – Probability density function – Properties – Moments (Definition and simple problems).

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

Measures of Skewness & Kurtosis – 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 – Large Sample Tests – Mean – Proportions – Small Sample Tests – t, F, Chi-square Tests: Independence of Attributes, Goodness of Fit.

Total no. of hrs: 60**Text Books:**

- 1) Veerarajan T., *Probability, Statistics and, Random Processes*, Tata McGraw Hill Publishing Co., (2008).
- 2) Gupta S.C., Kapoor V.K., *Fundamentals of Mathematical Statistics*, S.Chand & Co., (2007).

Reference Books:

1. Singaravelu, *Probability and Random Processes*, Meenakshi Agency, (2017).
2. Richard Johnson A., *Miller & Freund's Probability and statistics for Engineers (9th ed)*, Prentice Hall of India, (2016).



Department of Information Technology

Subject Code: BCS17I01	Subject Name : COMPUTER NETWORKS	Ty / Lb/ 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

OBJECTIVE :

- The students will be have knowledge of the networks functions
- To understand how communication takes place in various mediums
- To learn about the protocols for data communication in the network layers
- To study about the various network algorithms for smooth data communication

COURSE OUTCOMES (COs) : (3- 5)

CO1	Have knowledge on functions of Network Devices & OSI Layers for Communication
CO2	Knowledge on IP addresses and protocols.
CO3	Have knowledge on how to avoid the error and congestion on network using algorithms

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	M	L	H	M	L	L	H	M	H	H
CO2	H	H	H	M	H	H	M	L	H	M	H	H
CO3	H	H	H	H	H	M	M	L	H	M	H	H
COs / PSOs	PSO1	PSO2	PSO3	PSO4								
CO1	H	H	L	H								
CO2	H	H	L	H								
CO3	H	H	L	H								

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	Practical / Project	Internships / Technical Skill	Soft Skills			
Approval	27th meeting of Academic council, June2017											

**Department of Information Technology**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BCS17I01	NIL	COMPUTER NETWORKS	IDT-3	3	3	0/0	0/0	Ty

OBJECTIVES:

The students will be able to:

1. Build an understanding of the fundamental concepts of computer networking.
2. Familiarize the student with the basic taxonomy and terminology of the computer networking area.

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 : DATALINK 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 “5th 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.



Department of Information Technology

Subject Code: BIT17004	Subject Name : Object Oriented System Analysis and Design						T / L / ETL	L	T / S.Lr	P / R	C	
	Prerequisite: BCS17002						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												
OBJECTIVE : Students will <ul style="list-style-type: none">Understand the basics of OO analysis and designLearn the UML design diagramsstudy how to map design to code.understand the various testing techniques												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	To develop the skills to determine which processes and OOAD techniques should be applied to a given project											
CO2	To build use case diagrams by identifying use cases, actors and their relationships for a given application, differentiate Sequence & Collaboration diagrams											
CO3	To generate interaction overview diagrams working out the exact time constraints for behavior of the system											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	M	M	M	M	M	M	L	L	L
CO2	H	M	H	M	H	M	M	M	M	L	L	L
CO3	H	H	H	M	H	M	M	M	M	L	L	L
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		L		M		M					
CO2	H		L		M		M					
CO3	H		L		M		M					
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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic Council, June 2017											



Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
		Department of IT						
BIT17004	BCS17002	OBJECT ORIENTED SYSTEM ANALYSIS AND DESIGN	PC	3	3	0/0	0/0	Ty

OBJECTIVES:

- The students can develop the skills to determine which processes and OOAD techniques should be applied to a given project
- To build use case diagrams by identifying use cases, actors and their relationships for a given application, differentiate Sequence & Collaboration diagrams
- To generate interaction overview diagrams working out the exact time constraints for behavior of the system.

UNIT I: OBJECT ORIENTED CONCEPTS AND METHODOLOGIES**9 Hrs**

Over view of Object Oriented System Development-OOSD Life Cycle : Process – Analysis – Design –Prototyping – implementation – Testing –Reusability -OMT – Booch Methodology – Jacobson methodology – patterns – unified approach

UNIT II: MODELING and UML**9 Hrs**

UML: Static and Dynamic Models–Introduction to UML -Use case Diagram – Class diagrams – Dynamic modeling–Packages and Model Organization-UML Extensibility-Developing effective documentation-Case Study: Analyzing the ViaNet Bank ATM

UNIT III: OBJECT ORIENTED ANALYSIS**9 Hrs**

Use case model – Creation of Classes: Noun Phrase Approach – Common Class patterns Approach - Use-Case Driven Approach –CRC Approach -Identifying Object Relationships, Attributes and Methods

UNIT IV: OBJECT ORIENTED DESIGN**9 Hrs**

OO Design Axioms – Corollaries-Design Patterns- Designing Classes: Class Visibility – refining Attributes – Designing Methods – Access layer: Object Store and Persistence- OODBMS – Table Class mapping –Designing Access layer classes - View layer: Designing Interface Objects

UNIT V: TESTING AND APPLICATION**9 Hrs**

Testing: Software Quality Assurance - System Usability and Measuring User Satisfaction- Application: System Architecture: Satellite - Based Navigation - Control System: Traffic Management - Artificial Intelligence - Cryptanalysis - Web Application: Vacation Tracking System.

Total Hours: 45**Text Books**

1. Ali Bahrami (2008) *Object Oriented System Development* McGraw Hill international
2. Grady Booch, "Object Oriented Analysis and Design with Applications", 3rd Edition, Pearson, 2010.

Reference Books

1. Grady Booch (2009) *Object oriented Analysis & design*, Pearson Education India
2. Rambaugh J. Blaha M. P. W., Eddy F. Lorezen W.(1997) *Object Oriented Modeling & design*, PHI
3. Joey F. G. Dinesh B. J. Valacich S. Jeffrey A. H. (2006) *OOSAD* (2nd ed.), Pearson



Department of IT

Subject Code: BEC17I04	Subject Name : INFORMATION THEORY AND CODING							T / L/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: NIL							Ty	3	1/0	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												
OBJECTIVE : <ul style="list-style-type: none">➤ Derive equations for entropy & mutual information➤ Derive source coding & channel coding for shannon’s.➤ Explain various codes like linear block codes, Cyclic codes & Convolution Codes.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1		Understand the basic concepts of information theory, source coding, channel coding and channel capacity, and relation among them										
CO2		Understand the encoding concepts of various codes										
CO3		Implement the encoder and decoder of block code or convolutional code										
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	M	L	M	L	L	L	M	L	L	L
CO2	H	H	H	L	L	M	L	L	M	M	L	M
CO3	H	M	H	L	M	L	L	L	H	M	L	M
COs / PSOs	PSO1		PSO2		PSO3				PSO4			
CO1	H		M		L				H			
CO2	H		H		L				M			
CO3	H		H		L				L			
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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic Council, June 2017											



Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SLr	P/R	Ty/ Lb/ ETL/ EVL
		Department of IT						
BEC17I04	NIL	INFORMATION THEORY AND CODING	PC	4	3	1/0	0/0	Ty

OBJECTIVES:

- Derive equations for entropy & mutual information
- Derive source coding & channel coding for shannon's.
- Explain various codes like linear block codes, Cyclic codes & Convolution Codes.

UNIT I : INTRODUCTION TO INFORMATION THEORY 12 Hrs

Definition of information -Information Measure and Entropy –properties of Entropy- Differential Entropy- Mutual Information-Information source- Markov source.

UNIT II : SOURCE CODING 12 Hrs

Introduction to Lossless coding-kraft McMillan Equality-shannon's source coding theorem - shannon fano coding- Huffman coding- Arithmetic coding – Lempel ziv coding.

UNIT III : CHANNEL CAPACITY AND CODING 12 Hrs

Introduction to channel capacity- channel capacity of a Binary Symmetric Channel- channel capacity of a Binary Erasure Channel- shannon's channel coding theorem – bandwidth - signal to noise trade off- channel capacity theorem.

UNIT IV : LINEAR BLOCK AND CYCLIC CODES 12 Hrs

Binary block code- Linear block code- Systematic LBC- Encoder for LBC-Syndrome Decoding of LBC – Hamming Codes - cyclic codes- Systematic cyclic codes - generator polynomial of cyclic code- parity check polynomial of cyclic codes- encoder for cyclic codes- decoder for cyclic code.

UNIT V : CONVOLUTION CODES 12 Hrs

Time domain and frequency domain- code tree, trellis and state diagram- decoding of convolution codes- viterbi decoding algorithm- trellis coded modulation- encoder for TCM- decoder for TCM

Total Hours: 60**Text Books**

1. J.S.Chitode (2009) "*Information Theory and Coding*", Technical publications
2. R. Avudaiammal (2010) "*Information Coding Techniques*", Tata McGraw Hill Education pvt Ltd

Reference Books

1. Ranjan Bose (2008) "*Information theory, coding and cryptography*", Tata McGraw Hill Publishing Company Limited
2. Roberto Togneri and Christopher J.S. desilva (2003) "*Fundamentals of Information Theory and Coding Design*", Chapman and Hall/CRC



Subject Code:	Subject Name :	Ty/Lb/ETL	L	T / S.Lr	P/ R	C
BCS17007	COMPUTER ORGANIZATION AND ARCHITECTURE					
	Prerequisite: BEC17I02	Ty	3	1/0	0/0	4

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

Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVES :

- To understand the major components of a computer including CPU, memory, I/O and storage, understand the uses for cache memory,
- To understand a wide variety of memory technologies both internal and external,
- To understand the role of the operating system in interfacing with the computer hardware

COURSE OUTCOMES (COs) : (3- 5)

CO1	Students will understand how computer hardware has evolved to meet the needs of multi-processing systems.
CO2	Students will understand the basic structure and operation of digital computer
CO3	Students will understand a wide variety of memory technologies both internal and external.
CO4	Students will understand the different ways of communicating with I/O devices and standard I/O interfaces

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	L	H	L	M	L	M	L	M	M	M	L
CO2	H	M	H	H	M	L	L	L	M	M	H	L
CO3	H	H	H	M	M	M	M	M	H	M	H	M
CO4	H	H	H	H	H	M	L	L	H	M	H	H
COs / SOs	PSO1	PSO2	PSO3	PSO4								
CO1	H	H	M	H								
CO2	H	H	L	H								
CO3	M	H	M	M								
CO4	M	H	L	M								

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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic council, June2017											

**Department of Information Technology**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BCS17007	BEC17I02	COMPUTER ORGANIZATION AND ARCHITECTURE	PC	4	3	1/0	0/0	Ty

OBJECTIVES:

The students will be able

- To understand the major components of a computer including CPU, memory, I/O and storage, understand the uses for cache memory,
- To understand a wide variety of memory technologies both internal and external,
- To understand the role of the operating system in interfacing with the computer hardware

UNIT I : BASIC STRUCTURE OF COMPUTERS

12 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

12 Hrs

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

UNIT III : PROCESSOR UNIT

12 Hrs

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

UNIT IV : MEMORY SYSTEM

12 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

12 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: 60**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.



Department of Information Technology

Subject Code: BCS17ET3	Subject Name : PHP / MYSQL	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BCS17L03	ETL	1	0/2	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

OBJECTIVE :

- The students will learn the technology about scripting languages basics.
- To learn install PHP and work on that.
- To learn the basic and advance concepts of PHP language.
- To understand install the MySQL and work with MySQL database in admin level and client to store and retrieve the data in application with PHP.
- To learn design basic and advance applications using PHP and MySQL.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Learn the fundamentals of HTML, CSS and PHP
CO2	Learn the fundamentals database concept and MySQL
CO3	Able to develop the Application using PHP and MySQL

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	H	L	H	M	L	L	H	H	H	H
CO2	H	H	H	M	H	H	M	L	H	M	H	H
CO3	H	H	H	H	H	M	M	L	H	M	H	H

COs / PSOs	PSO1	PSO2	PSO3	PSO4
CO1	H	H	L	H
CO2	H	H	L	H
CO3	H	H	L	H

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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic council, June2017											



Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
		Department of IT						
BCS17ET3	BCS17L03	PHP / MySQL	PC	3	1	0/2	0/0	ETL

OBJECTIVES:

- The students will learn the technology about scripting languages basics.
- To understand installation of PHP and MySQL and work with MySQL database in admin level and client to store and retrieve the data in application with PHP.
- To learn design basic and advance applications using PHP and MySQL.

UNIT I: Introduction**9 Hrs**

Introduction to Web server and Web browser - Introduction to PHP - Lexical structure - Language basics - Function and String - Default parameters - Variable function, Anonymous function Printing functions - Manipulating and searching strings - Regular expressions.

UNIT II: Arrays**9 Hrs**

Identifying elements of an array - Indexed Vs Associative arrays - Storing data in arrays - Multidimensional arrays - Extracting multiple values - Converting between arrays and variables - Traversing arrays - Sorting - Action on entire arrays - Using arrays.

UNIT III: Objects and Web Techniques**9 Hrs**

OOP – Class – Objects – Introspection – Serialization – Inheritance - Interfaces - Encapsulation HTTP Basics – Variables – Server information – Processing Form, Setting Response headers – maintain state – SSL.

UNIT IV: Databases and Graphics**9 Hrs**

Using PHP to access Database – Relational Databases and SQL – MySQLi Object interface – SQLite- Direct file level manipulation – mongoDB. Embedding an image in a page – Basic Graphic concepts – Creating and drawing images.

UNIT V: Files and Directories**9 Hrs**

Filter input – cross-site scripting – Escape output – Session fixation – file uploads – file access – PHP code – Shell commands – Core libraries – Templating systems – Handling output – Error Handling – Performance Tuning.

Total Hours: 45**Text Books:**

13. www.spoken-tutorials.org
14. Kevin Tatro, Peter MacIntyre, et al “ Programming PHP” O REILLY 3rd Edition – 2013
15. Luke Welling, Laura Thomson “ PHP and MySQL Web Development” Person Education 5th Edition – 2016.

Reference Books:

1. Robin Nixon “Learning PHP, MySQL & JavaScript” O REILLY – 5th Edition - 2015.
2. Elizabeth Naramore, Jason Gerner, et al “Beginning PHP5, Apache, MySQL web development” Wrox Publishing – 2005.



Department of Information Technology

Subject Code:	Subject Name :	Ty /	L	T /	P/	C
BIT17L03	OBJECT ORIENTED SYSTEM ANALYSIS AND DESIGN USING UML LAB	Lb/ ETL		S.Lr	R	
	Prerequisite: BCS17L02	Lb	0	0/0	3/0	1

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

OBJECTIVE :

- Identify Use Cases and develop the Use Case model.
- Identify the business activities and develop an UML Activity diagram.
- Identity the conceptual classes and develop a domain model with UML Class diagram.
- Using the identified scenarios find the interaction between objects and represent them using UML Interaction diagrams.
- Draw the State Chart diagram.
- Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
- Implement the Technical services layer. * Implement the Domain objects layer.
- Implement the User Interface layer.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Show the importance of systems analysis and design in solving complex problems.
CO2	Show how the object-oriented approach differs from the traditional approach to systems analysis and design.
CO3	Construct various UML models (including use case diagrams, class diagrams, interaction diagrams, state chart diagrams, activity diagrams, and implementation diagrams) using the appropriate notation. .
CO4	Recognize the difference between various object relationships: inheritance, association, whole-part, and dependency relationships. .
CO5	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
CO1	H	H	H	H	H	L	L	H	H	H	M	H
CO2	H	H	H	H	H	L	L	H	H	M	L	H
CO3	H	H	H	H	H	L	L	H	H	M	L	H
CO4	H	H	H	H	H	L	L	H	H	H	M	H
CO5	H	H	H	H	H	L	L	H	H	H	M	H

COs / PSOs	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	H
CO2	H	H	H	H
CO3	H	H	H	H
CO4	H	H	H	H
CO5	H	H	M	H

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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								

Approval 27th meeting of Academic council, June 2017



Department of Information Technology

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BIT17L03	BCS17L02	OBJECT ORIENTED SYSTEM ANALYSIS AND DESIGN USING UML LAB	PCL	1	0	0/0	3/0	Lb

OBJECTIVES:

- Identify Use Cases and develop the Use Case model.
- Identify the business activities and develop an UML Activity diagram.
- Identify the conceptual classes and develop a domain model with UML Class diagram.
- Using the identified scenarios find the interaction between objects and represent them using UML Interaction diagrams.
- Draw the State Chart diagram.
- Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
- Implement the Technical services layer.
- Implement the Domain objects layer.
- Implement the User Interface layer.

EXERCISES

1. Study of case tools such as rational rose or equivalent tools
2. Railway reservation system
3. Student Mark Analysis system
4. Payroll processing application
5. Inventory system
6. Automating the Banking process
7. Library management system

SOFTWARE REQUIRED:

Languages: C/C++/JDK 1.3, JSDK, WEB BROWSER & UML

Any Front End (Like PHP, JAVA, VB, VC++, Developer 2000)

Any Back End (Like Oracle, MS-Access, SQL, DB2)

Modelling and Design: Rational Rose



Department of IT

Subject Code: BIT17L04	Subject Name : Mobile Application Development 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 : To design and develop mobile applications for Android and Apple iOS

COURSE OUTCOMES (COs) : (3- 5)

CO1	Able to design and develop various Mobile Applications for Android and Apple
CO2	Able to develop mobile application related to real world problems.
CO3	Able to implement Database and Web Services in Mobile Application

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	L	M	M	M	L	M	H	H	H	L	M
CO2	M	H	H	M	H	L	L	M	M	M	M	H
CO3	M	H	H	M	H	L	L	M	H	M	H	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	M		M		H		L					
CO2	M		H		L		M					
CO3	H		H		L		H					

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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								

Approval	27 th meeting of Academic Council, June 2017											
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Course Code	Prerequisite Course Code	Course Title Department of IT	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BIT17L04	NIL	MOBILE APPLICATION DEVELOPMENT LAB	PCL	1	0	0	3/0	Lb

OBJECTIVES:

- Able to develop mobile applications for Mobile Operating Systems such as Android and iOS.

PROGRAMS:

1. Write a program :
 - a. To create simple Hello World Application using Android.
 - b. To create simple Hello World Application using iOS.
2. Create an Android Application to handle Touch Events
3. Write a program:
 - a. To store and access data from SQLite Database using Android
 - b. To store and access data from SQLite Database using iOS
4. Create an iOS Application to create Media Player
5. Develop a mobile application to implement map based services
6. Develop a mobile application to implement GPS
7. Develop a mobile application to send SMS
8. Develop a mobile application to send Email
9. Develop a mobile application to implement Broadcast Receivers
10. Develop a Mobile Application for Calculator



Department of Information Technology

Subject Code: BCS17IL01	Subject Name : NETWORK PROGRAMMING LAB	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: : BCS17ET2	Lb	0	0/0	3/0	1

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

Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE :

- Hands on Experience to design an application using TCP and UDP sockets.
- Hands on Experience to design an interface to transfer a file between two ends using FTP
- Hands on Experience to develop a RMI application for specific operation
- To have a knowledge to work with Network Simulators

COURSE OUTCOMES (COs) : (3- 5)

CO1	Ability to design a Socket Programing using TCP and UDP
CO2	To design Client /Server Application Program
CO3	Ability to create a Server based application using RMI and RPC concepts.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	M	L	L	H	M	H	H
CO2	H	H	H	M	H	H	L	L	H	M	H	H
CO3	H	H	H	H	M	M	M	L	H	M	H	H

COs /	PSO1	PSO2	PSO3	PSO4
PSOs				
CO1	H	H	L	H
CO2	H	H	L	H
CO3	H	H	L	H

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	Practical / Project	Internships / Technical Skill	Soft Skills			
Approval	27th meeting of Academic council, June2017											



Department of Information Technology

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BCS17IL01	BCS17ET2	NETWORK PROGRAMMING LAB	IDL-3	1	0	0/0	3/0	Lb

OBJECTIVES:

- Hands on Experience to design an application using TCP and UDP sockets.
- Hands on Experience to design an interface to transfer a file between two ends using FTP
- Hands on Experience to develop a RMI application for specific operation
- To have a knowledge to work with Network Simulators

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.



Department of IT

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SLr	P/R	Ty/ Lb/ ETL/ EVL
BIT17TS2	BIT17TS1	TECHNICAL SKILL II (EVALUATION)*	TS	1	0	0/0	0/0	EVL

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.

From the list of skill development courses declared by the department, the students are expected to acquire the skill and get certified. This will be evaluated at the end of the semester by the faculty.



Department of IT

Subject Code: BIT17L05	Subject Name : In-Plant Training	T / L / ETL	L	T / S.Lr	P/ R	C
	Prerequisite : NIL	0	0	0/0	0/0	1

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

T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE : The main objective of the Inplant training is to provide a short-term work experience in an Industry/ Company/ Organization

COURSE OUTCOMES (COs) : (3- 5)

CO1	To get an insight of an industry / organization/company pertaining to the domain of study.
CO2	To acquire skills and knowledge for a smooth transition into the career.
CO3	To gain field experience and get linked with the professional network.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	L	L	L	L	H	H	H	H	H	H	H
CO2	H	M	H	H	M	H	H	H	H	H	H	M
CO3	H	H	H	H	M	H	H	H	H	H	H	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	M		M		M		M					
CO2	M		M		M		M					
CO3	M		M		M		M					

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	Practical / Project	Internships / Technical Skill	Soft Skills			
								✓				
Approval												



Department of IT

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BIT17L05	NIL	INPLANT TRAINING (EVALUATION)*+	IPT	1	0	0/0	0/0	EVL

OBJECTIVE :

- The main objective of the In-plant training is to provide a short-term work experience in an Industry/ Company/ Organization



Department of Information Technology

SEMESTER VI

Subject Code:	Subject Name :	Ty / Lb / ETL	L	T / S.Lr	P/ R	C
BCS17011	Data Warehousing and Data Mining					
	Prerequisite: BCS17004	Ty	3	0/0	0/2	4

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

OBJECTIVE : The objective of the course is

- Provide an overview of the methodologies and approaches to data mining
- Gain insight into the challenges and limitations of data mining techniques and data warehousing
- Applying data mining solutions using common data mining tools

COURSE OUTCOMES (COs) : (3- 5)

CO1	Understand the difference between Data Warehousing and general databases
CO2	Understand the different steps followed in Data mining and pre-processing techniques using tools
CO3	Able to apply Association Rule mining and Clustering approaches
CO4	Familiarize with multi-dimensional data cubes and related analysis

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	L	L	L	M	M	L	L	L	H	L
CO2	H	H	M	H	H	M	M	M	M	M	H	L
CO3	H	H	H	H	H	M	M	L	M	M	H	L
CO4	H	H	H	H	H	M	M	M	H	H	H	H

COs /PSOs

COs /PSOs	PSO1	PSO2	PSO3	PSO4
CO1	H	H	L	L
CO2	H	H	L	H
CO3	H	H	L	H
CO4	H	H	M	M

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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								

Approval

27th meeting of Academic council, June2017



Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BCS17011	BCS17004	DATA WAREHOUSING AND DATA MINING	PC	4	3	0/0	0/2	Ty

OBJECTIVE:

The objective of the course is

- Provide an overview of the methodologies and approaches to data mining
- Gain insight into the challenges and limitations of data mining techniques and data warehousing
- Applying data mining solutions using common data mining tools

UNIT I : DATA WAREHOUSING

12 Hrs

Introduction to Data Warehousing- Advantages- What makes Data Warehousing a reality- Data warehousing Components-Building a Data Warehouse-mapping Data Warehouse to a Multiprocessor-Architecture-DBMS Schemas for Design Support

UNIT II : ETL AND BUSINESS TOOLS

12 Hrs

Data Extraction-Cleaning and Transformation tools- Meta data. Reporting and Query tools and Application-OLAP Patterns and Models- Statistics

UNIT III : DATA MINING

12 Hrs

Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues –Data Preprocessing.- Data Cleaning –Missing Values-Noisy Data-Inconsistent Data-Data Integration and Transformation-Data Reduction - Dimensionality Reduction – Evaluation criteria of Various Mining Techniques

UNIT IV : ASSOCIATION RULE MINING AND CLASSIFICATION

12 Hrs

Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining Various Kinds of Association Rules – Constraint Based Association Mining – Classification and Prediction - Decision Tree Induction - Entropy and Classification Algorithms -Bayesian Classification – Rule Based Classification

UNIT V : CLUSTERING TECHNIQUES

12 Hrs

Cluster Analysis - Types of Data – Categorization of Major Clustering Methods - Kmeans – Partitioning Methods – Hierarchical Methods - Density-Based Methods –Grid Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data - Constraint – Based Cluster Analysis – Outlier Analysis –Genetic Algorithm For Mining - Data Mining Applications.

Total Hours: 60



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Text Books

1. Alex Berson and Stephen J.Smith, “Data Warehousing, Data Mining and OLAP”, Tata McGraw – Hill Edition, Thirteenth Reprint 2008.
2. Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques”, Third Edition, Elsevier, 2012.

Reference Books

1. Arun K Pujari (2017) Data Mining Techniques 4th edition, Universities Press (India) Ltd.
2. Sam Anahory, Dennis Murry (2004) Data Warehousing in the real world, Pearson Education
3. Margaret H. Dunham (2006) Data Mining: Introductory and Advanced Topics, Pearson



Department of Information Technology

Subject Code: BCS17010	Subject Name : Open Source Scripting Languages						Ty / Lb/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: BCS17ET3						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												
OBJECTIVE :												
<div>➤ The students will have knowledge about the scripting languages</div> <div>➤ To learn the JavaScript language and ability to write program on it.</div> <div>➤ To learn the PERL language and ability to write program on it.</div> <div>➤ To study about the Python language and understand to write basic level program and advance program on networking, web scripting on web pages.</div> <div>➤ To study about RUBY language and have knowledge to write programs.</div>												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Ability to understood scripting languages concepts and technology for web site design											
CO2	Students have knowledge to develop an interactive web site using scripting languages											
CO3	Have the knowledge have to design secured web pages											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	H	L	H	M	L	L	H	M	H	H
CO2	H	H	H	M	M	H	M	L	H	M	H	H
CO3	H	M	H	M	H	M	M	L	H	M	H	H
COs /PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		H		L		H					
CO2	H		H		L		H					
CO3	H		H		L		H					
H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low												
Categor y	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic council, June2017											



Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BCS17010	BCS17ET3	Open source Scripting Languages	PC	3	3	0/0	0/0	Ty

OBJECTIVES:

- The students will have knowledge about the scripting languages
- To study about the PERL & Python language and understand to write basic level program and advance program on networking, web scripting on web pages.
- To study about RUBY language and have knowledge to write programs.

Unit - I Introduction to Scripting languages 8 Hrs

Introduction to Scripting: Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages.

Unit – II JavaScript 9 Hrs

JavaScript introduction – control structures – functions – arrays – document objects model – Event handling – object oriented in JavaScript - simple web applications

Unit – III PERL 9 Hrs

PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.Finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

Unit – IV PYTHON 10 Hrs

Python: Installing Python,Introduction to Python language, Basic syntax, interactive shell, editing, saving, and running a script. The concept of data types; variables, assignments; immutable variables-operators and expressions - Conditions and Control statements – String handling, files and directories - functions and its types.Simple Graphics and Image Processing, Python with OOP - Exception handling

Unit – V RUBY 9 Hrs

Introduction to RUBY : Basics, Comments, Variables Strings, Operators, Conditional Statements,Arrays and Hashes, Methods Files,classes, Exception Handling Introduction to Ruby on Rail .

Total Hours: 45**Text Books:**

1. David Barron, “The World of Scripting Languages” , Wiley Publications,2002
2. Kenneth A. Lambert, Martin Osborne, “Fundamentals ofPython: First Programs”, Contributing Author published by Course Technology, Cengage Learning Publications.2010.
3. Michael Fitzgerald, “Learning Ruby”, O’Reilly Publications, 2007.

Reference Books:

1. Richard Clark, Oli Studholme, Christopher Murphy and Divya Manian,”Beginning HTML5 and CSS 3” @ Apress.
2. Jennifer Campbell , Paul Gries, Jason Montojo , Greg Wilson , “Practical Programming An Introduction to Computer Science Using Python” , The Pragmatic Bookshelf Raleigh, North Carolina Dallas, Texas , 2009
3. Tom Christiansen, brian d foy & Larry Wall, with Jon Orwant, “Programming Perl, Fourth Edition “, O’Reilly, 2012.



Department of Information Technology

Subject Code: BIT17005	Subject Name : Wireless Communication							T / L/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BEC17I01							Ty	3	0/0	0/2	4
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits												
T/L/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVE : To learn Wireless transmission, to acquire knowledge about mobile network layer and to perform wireless telephony applications.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Understand the application of mobile communication											
CO2	Recognize the Telecommunication and satellite systems											
CO3	Design the Wireless LAN and Mobile network layer											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	M	H	H	M	M	M	H	M	H	H
CO2	H	H	M	H	M	M	M	H	H	H	M	H
CO3	H	H	M	H	H	M	H	M	H	M	H	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		H		M		H					
CO2	M		M		H		M					
CO3	H		H		H		H					
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	Practical / Project	Internships / Technical Skill	Soft Skills			
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BIT17005	BEC17I01	WIRELESS COMMUNICATION	IDT-4	4	3	0/0	0/2	Ty

OBJECTIVE:

- To learn Wireless transmission
- To acquire knowledge about mobile network layer
- To test and exploit support of mobility
- To perform wireless telephony applications

UNIT I: INTRODUCTION & WIRELESS TRANSMISSION**12 Hrs**

Introduction – Applications – vehicles – emergencies – replacement of wired networks – history of wireless communications – market for mobile communication – simplified reference model – wireless transmission – frequencies for radio transmission – signals – antennas – signal propagation – multiplexing – modulation – spread spectrum – cellular system.

UNIT II: MAC AND TELECOMMUNICATION SYSTEM**12 Hrs**

Motivation of specialized MAC – SDMA – FDMA – TDMA – Classical Aloha – PRMA packet reservation multiple access – polling – CDMA – comparison – Telecommunication – GSM – Mobile services – protocols - DECT – TETRA – UMTS and IMT2000 – UMTS system architecture – UMTS radio interface – UTRAN – core network – handover.

UNIT III: SATELLITE SYSTEM AND BROADCAST SYSTEMS**12 Hrs**

Satellite system history – application – basics – GEO – LEO – MEO – Routing - localization - handover – broadcast systems – cyclical repetition of data – digital audio broadcasting – digital video broadcasting – convergence of broadcasting and mobile communications.

UNIT IV: WIRELESS LAN AND MOBILE NETWORK LAYER**12 Hrs**

Intra red Vs radio transmission – Infrastructure and ad-hoc network – IEEE 802.11 – HIPERLAN – Bluetooth – radio layer – Ling manager protocol - L2CAP – security – SDP – profiles - IEEE 802.15 – mobile IP – IP packet delivery – Agent discovery – registration – tunnelling and encapsulation – optimization – IPv6 – DHCP – mobile ad-hoc networks – ad-hoc routing protocols.

UNIT V: MOBILE TRANSPORT LAYER AND SUPPORT FOR MOBILITY**12 Hrs**

Traditional TCP – congestion control – classical TCP improvements – TCP over 2.5/3G wireless networks – performance enhancing proxies – Support for mobility – file systems – world wide web – wireless application protocols – WML Script – Hnode – SyncML – architecture of future networks.

Total Hours: 60**Text Books**

1. Jochen Schiller Mobile communications” 2nd Edition – Pearson - 2011
2. Rappaport “ Wireless communications principle and practice” 2nd Edition - 2010

Reference Books

1. Rajkamal “Mobile computing” – Oxford – 2011
2. Prasant kumar pattnaik “ Fundamentals of Mobile computing” 2nd Edition – PHI – 2015



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Department of Information Technology

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BIT17OEX	NIL	OPEN ELECTIVE (OE) - E-II (INTERDISCIPLINARY)	OE	3	3	0/0	0/0	Ty



Department of Information Technology

Subject Code: BSK17ET2	Subject Name : Soft Skills – II							T / L/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BSK17ET1							ETL	1	0/1	1/0	2
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVE : The main objective is to strengthen the logical and arithmetic reasoning skills of the students.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Recognize and apply arithmetic knowledge in a variety of contexts.											
CO2	Ability to identify and critically evaluate philosophical arguments and defend them from criticism.											
CO3	Define data and interpret information from graphs.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	H	L	L	H	M	H	H
CO2	M	M	M	H	L	H	L	H	H	H	H	L
CO3	H	H	H	H	H	H	M	M	H	H	H	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1												
CO2												
CO3												
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	Practical / Project	Internships / Technical Skill	Soft Skills			
									✓			
Approval												



Department of Information Technology

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SLr	P/R	Ty/ Lb/ ETL/ EVL
BSK17ET2	BSK17ET1	SOFT SKILLS II	SS	2	1	0/1	1/0	ETL

OBJECTIVES

- 1) To bring behavioural patterns of students.
- 2) To train them for corporate culture.
- 3) To create self awareness.
- 4) To build confidence.
- 5) To train the students for facing the interviews and develop interpersonal relationship.

UNIT 1

Reasoning – logical, diagrammatic, abstract.

UNIT 2

Spatial ability / Logical ability / Probability.

UNIT 3

Verbal Critical Reasoning / Verbal Comprehension.

UNIT 4

Practice tests.

UNIT 5

Top Ten Websites for online Aptitude Training.

- 1) <https://www.elitmus.com/>
- 2) <https://www.IPAT.com/>
- 3) <https://www.nactech.nasscom.com/>
- 4) <https://www.mymcat.com/>
- 5) <https://indiabix.com/>
- 6) <https://www.cocubes.com/>
- 7) <https://www.apptitude-test.com/>
- 8) <https://www.practiceaptitudetests.com/>
- 9) <https://www.wiziq.com/>
- 10) <https://www.pskills.com/>



Department of Information Technology

Subject Code: BCS17L11	Subject Name : DATA MINING LAB	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BCS17ET3	Lb	0	0/0	3/0	1

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

Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE :

- Identify and categories the various risks face by an organization;
- Explain the various risk control measures available
- Design a risk management program for a business organization.

COURSE OUTCOMES (COs) : (3- 5)

CO1	demonstrate knowledge of the range of financial and financial related risks facing organizations
CO2	understand the approach to risk management through risk identification, risk measurement and risk management (or mitigation)
CO3	understand operational risk and how to manage it.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	L	M	M	H	M	L	M	M	M	H	H
CO2	L	H	M	H	H	M	M	L	L	M	M	M
CO3	H	M	L	H	M	L	H	M	L	L	M	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		M		M		M					
CO2	M		M		M		L					
CO3	H		L		L		M					

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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic council, June2017											



Department of Information Technology

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BCS17L11	BCS17ET3	DATA MINING LAB	PCL	1	0	0/0	3/0	Lb

OBJECTIVES:

1. Able to write simple programs using Rattle an open source Tool(R)
2. Able to write simple programs using Weka machine learning toolkit
3. To learn how process Clustering and association can be done using Weka.

LIST OF EXPERIMENTS

1. Introduction to the Weka machine learning toolkit
2. Classification Introduction to exploratory data analysis using Rattle an open source Tool(R)
3. Introduction to regression using Rattle an open source Tool. (R)
4. using the Weka toolkit – Part 1
5. Classification using the Weka toolkit – Part 2
6. Performing data preprocessing for data mining in Weka
7. Performing clustering in Weka
8. Association rule analysis in Weka
9. Data mining case study using the CRISP-DM standard
10. Data mining case study using the CRISP-DM standard



Department of Information Technology

Subject Code: BCS17L09	Subject Name : Scripting Languages Lab	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BCS17ET3	Lb	0	0/0	3/0	1

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

Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE :

- To learn the basic of JavaScript , Perl & Python
- To develop web application using JavaScript & Perl
- To learn and get the server information and visitor page information using Perl
- To learn error and exception handling in Python
- To have knowledge get system information using Python
- To learn and develop web application using Python and MySQL

COURSE OUTCOMES (COs) : (3- 5)

CO1	Able to design web application using JavaScript , Perl & Python
CO2	Design the web sites using database and scripting languages based upon recent technology
CO3	Using Python Scripting languages they will get system details

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	H	L	H	M	L	L	H	M	H	H
CO2	H	H	H	M	M	H	M	L	H	M	H	H
CO3	H	M	H	M	H	M	M	L	H	M	H	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		H		L		H					
CO2	H		H		L		H					
CO3	H		H		L		H					

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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic council, June2017											



Department of Information Technology

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
		Department of CSE&IT						
BCS17L09	BCS17ET3	SCRIPTING LANGUAGES LAB	PCL	1	0	0/0	3/0	Lb

OBJECTIVES:

- To learn the basic of JavaScript, Perl & Python
- To develop web application using JavaScript & Perl
- To learn and get the server information and visitor page information using Perl
- To learn error and exception handling in Python
- To have knowledge get system information using Python
- To learn and develop web application using Python and MySQL

JavaScript

1. JavaScript program to Perform all Arithmetic Operation
2. JavaScript to search an element in an array of size “n”.
3. JavaScript to compute the GCD of 2 numbers using function.
4. JavaScript to illustrate different in-built String Functions.

Perl

1. a) Write a Perl program to display various Server Information like Server Name, Server Software, Server protocol, and CGI Revision etc.
b) Write a Perl program to accept UNIX command from a HTML form and to display the output of the command executed.
2. a) Write a Perl program to accept the User Name and display a greeting message randomly chosen from a list of 4 greeting messages.
b) Write a Perl program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.
3. Write a Perl program to display a digital clock which displays the current time of the server.
4. Write a Perl program to insert name and age information entered by the user into a table created using MySQL and to display the current contents of this table.

Python

1. Write Simple python program with function and it types
2. Write a python program to read and write operation with a file.
3. Exception handling in python
4. Write a Python script with MySQL to create a customer account balance database in a banking process.
5. Write a program that displays the following system information from /proc files. a). CPU information, b). Memory Usage Information, c). Interrupt information.
6. Write a simple image viewer application using python.



Department of Information Technology

Subject Code: BIT17L06	Subject Name : WIRELESS LAB						Ty / Lb/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: BCS17IL01						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 : Working of wireless network technologies Operation of TCP/IP; and Design and implement various mobile applications and mobile network protocols.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Learn to model radio signal propagation issues and analyze their impact on communication system performance											
CO2	Understand how the various signal processing and coding techniques combat channel uncertainties											
CO3	Understand the techniques of radio spectrum allocation in multi-user systems and their impact on networks capacity											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	L	L	M	L	L	L	L	L	L	M
CO2	H	M	L	L	M	L	L	L	L	L	L	M
CO3	H	M	L	L	M	L	L	L	L	L	L	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		M		L		L					
CO2	H		M		L		L					
CO3	H		M		L		L					
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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic Council, June 2017											



Department of Information Technology

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BIT17L06	BCS17IL01	WIRELESS LAB	PCL	1	0	0/0	3/0	Lb

OBJECTIVES:

After this lab session the students will have hands on knowledge on

1. Working of wireless network technologies
2. Operation of TCP/IP; and
3. Design and implement various mobile applications and mobile network protocols.

Sessions:

1. Understanding the characteristics and operation of contemporary wireless network technologies such as the IEEE 802.11 wireless local area network
2. Bluetooth wireless personal area network;
3. Operation of the TCP/IP protocol suite in a mobile environment, including the operation of Mobile IP and a mobile ad hoc routing protocol
4. Describe security issues and current solutions for wireless networks and mobile systems;
5. Design, implement, and test a prototype mobile application
6. Design, implement, and test a wireless access service
7. Mobile routing protocol, and mobile application
8. Monitor the operation of mobile network protocols and applications using standard tools.



Course Code	Prerequisite Course Code	Course Title Department of IT	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BIT17L07	NIL	MINI PROJECT (EVALUATION)	MP	1	0	0/0	0/0	EVL

OBJECTIVE:

- The students are expected to take up an application project for any real life scenario.

Having acquired the core competency in the Computer science domain over the last 6 semesters, the students are expected to take up an application project for any real life scenario and provide a solution for the same. The implementation is expected to be based on a 3 tier architecture design.

For the award of the 1 credit the students are expected to demonstrate the project. The evaluation for this credit will be carried out in the 7th Semester.



Course Code	Prerequisite Course Code	Course Title Department of IT	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BIT17TS3	NIL	TECHNICAL SKILL III (EVALUATION)	TS	1	0	0/0	3/0	EVL

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.

From the list of skill development courses declared by the department, the students are expected to acquire the skill and get certified. This will be evaluated at the end of the semester by the faculty.



Department of Information Technology

SEMESTER VII

Subject Code: BIT17006	Subject Name : Cloud Technology						Ty / Lb/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: BCS17I01						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												
OBJECTIVE : To learn Cloud computing infrastructure and services, to acquire knowledge about cloud storage. to understand cloud computing security and to test web application in cloud platform.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Understand the application of cloud computing											
CO2	Recognize the importance cloud security.											
CO3	Design the efficient flexible cloud applications											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	M	H	M	M	M	H	M	H	H
CO2	H	M	H	M	H	M	M	H	M	H	M	M
CO3	H	H	M	M	H	M	M	M	H	M	H	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		H		M		H					
CO2	H		M		H		M					
CO3	H		M		H		M					
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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic Council, June 2017											



Course Code	Prerequisite Course Code	Course Title Department of IT	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BIT17006	BCS17I01	CLOUD TECHNOLOGY	PC	3	3	0/0	0/0	Ty

OBJECTIVE:

- To learn Cloud computing infrastructure and services.
- To acquire knowledge about cloud storage.
- To understand cloud computing security.
- To test web application in cloud platform.

UNIT I: CLOUD COMPUTING INTRODUCTION**9Hrs**

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**9Hrs**

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 – Hadoop cluster setup

UNIT III: CLOUD APPLICATION DESIGN & PYTHON**9Hrs**

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**9Hrs**

Python for Amazon web services – Google cloud platform – windows Azure – packages of Internet – JSON – XML – HTTPLib and URLLib – Web application framework – Django – design approaches – image processing App – document storage app – MapReduce app.

UNIT V: ADVANCED APPLICATIONS**9Hrs**

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 Books:**

1. Arshdeep Bahga 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



Department of IT

Subject Code: BIT17007	Subject Name : Web Technology and Web Services	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BCS17I01	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

OBJECTIVE :

- The students will have knowledge about the HTML5 and CSS3
- To learn the concepts of XML and SOAP.
- To study about the JSP and understand to develop basic level application and advance application on web pages.
- To study about the concept of Web services .

COURSE OUTCOMES (COs) : (3- 5)

CO1	Able to design the web page using HTML5 and CSS3
CO2	Learn the fundamentals of XML , JSP and implement in the web service
CO3	Understand the concept of Web service including SOAP, UDDI and WSDL

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	H	L	H	M	L	L	H	M	H	H
CO2	H	H	H	M	H	H	M	L	H	M	H	H
CO3	H	H	H	H	H	M	M	L	H	M	H	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		H		L		H					
CO2	H		H		L		H					
CO3	H		H		L		H					

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	Practical / Project	Internships / Technical Skill	Soft Skills			
		✓										
Approval	27 th meeting of Academic council, June2017											



Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
		Department of IT						
BIT17007	BCS17I01	WEB TECHNOLOGY AND WEB SERVICES	PC	3	3	0/0	0/0	Ty

OBJECTIVES:

- The students will have knowledge about the HTML5 and CSS3
- To learn the concepts of XML and SOAP.
- To study about the JSP and understand to develop basic level application and advance application on web pages.
- To study about the concept of Web services.

UNIT – I HTML 5 & CSS 3**9 Hrs**

HTML – forms – frames – tables – web page design – Dynamic HTML – introduction – cascading style sheets – object model and collections –event model – filters and transition – data binding – data control – ActiveX control – handling of multimedia data

Unit – II XML**9 Hrs**

Role of XML - XML and The Web - XML Language Basics - Revolutions of XML - Service Oriented Architecture (SOA). XML - Name Spaces - Structuring With Schemas and DTD - Presentation Techniques - Transformation - XML Infrastructure.

Unit – III SOAP**9 Hrs**

Overview of SOAP - HTTP - XML-RPC - SOAP: Protocol - Message Structure - Intermediaries - Actors - Design Patterns and Faults - SOAP With Attachments. Introduction to SGML - COM – DCOM – CORBA.

UNIT – IV SERVERSIDE PROGRAMMING**9 Hrs**

Introduction to Servlets and Java Server Page (JSP), Servlets lifecycle, Servlet Classes and Sessions. JSP Application Design, JSP objects, sharing data between JSP pages, Sharing Session and Application Data, Database Programming using JDBC, development of java beans in JSP.

Unit – V WEB SERVICES**9 Hrs**

Overview - Architecture - Technologies - UDDI - WSDL - ebXML - SOAP and Web Services in E-Com, Rest full in Web service.

Total Hours: 45**Text Books:**

1. Richard Clark, Oli Studholme, Christopher Murphy and Divya Manian, "Beginning HTML5 and CSS 3" @ Apress , 2012.
2. Frank. P. Coyle, "XML, Web Services and The Data Revolution", Pearson Education, 2002.
3. Phil Hanna, "JSP: The Complete Reference", McGraw-Hill, 2001

Reference Books:

1. Laura Lemay, Rafe Coburn, Jennifer Kyrnin, "Mastering HTML, CSS & JavaScript Web Publishing", Pearson Education.2015
2. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.



Department of Information Technology

Subject Code: BMG17002	Subject Name : Management Concepts and Organizational Behavior	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BES17ET3	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

OBJECTIVE : * To know the principles of management and peculiarities of their implementation

- To know the management concepts to analyze and solve the problems of organization
- To study the Individual behavior & Group behavior

COURSE OUTCOMES (COs) : (3- 5)

CO1	Understand the nature of management, the functions of management
CO2	Understand the levels of management understand the skills required at each levels of management and appreciate the roles played by managers.
CO3	Understand the concept of social responsibilities of Individual behavior & Group behavior.
CO4	Understand the principles and purpose of Management concepts.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	M	L	H	M	L	L	M	L	M	H	L
CO2	L	M	L	M	H	L	L	M	L	M	H	L
CO3	L	M	L	L	H	L	L	M	L	M	H	L
CO4	L	M	L	L	H	L	L	M	L	M	H	L
COs / SOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		L		M		M					
CO2	M		L		H		M					
CO3	L		L		H		M					
CO4	L		L		H		M					

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	Practical / Project	Internships / Technical Skill	Soft Skills			
	✓											
Approval	27 th meeting of Academic council, June2017											

**Department of Information Technology**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SLr	P/R	Ty/ Lb/ ETL/ EVL
BMG17002	BES17ET3	MANAGEMENT CONCEPTS AND ORGANIZATIONAL BEHAVIOR	MGMT-1	3	3	0/0	0/0	Ty

OBJECTIVES:

- To understand the roles and skills of manager
- To understand the concept of Planning and Organizing the management
- To understand the qualities of Leadership control
- To understand the difference between Individual and Group behavior in running a management

UNIT I INTRODUCTION TO MANAGEMENT**9 Hrs**

Definition of Management – Science or Art or Profession – Manager vs Entrepreneur vs Leader – Types of Managers – Managerial roles and skills – Evolution of Management – Scientific, Human relations and system approaches

UNIT II PLANNING AND ORGANIZING**9 Hrs**

Nature and purpose of planning – planning process – types of planning – planning premises – Nature and purpose of organizing – Formal and Informal organization – organization chart – organization structure – types - Line and staff authority

UNIT III DIRECTING AND CONTROLLING**9 Hrs**

Leadership – Types and theories of leadership – communication – process of communication – barriers in communication – System and process of controlling – Budgetary and non budgetary control techniques – Direct and preventive control – reporting

UNIT IV INDIVIDUAL BEHAVIOR**9 Hrs**

Diversity - Attitudes and Job satisfaction – Emotions and Moods – personality and values – perception – Decision making – Motivation concepts – Motivation Applications

UNIT V GROUP BEHAVIOR**9 Hrs**

Foundations of Group Behavior – Understanding Teams – power and politics – Conflict and Negotiation – Stress Management

Total Hours: 45**Text Books:**

1. Harold Koontz and Heinz Weihrich “*Essentials of Management*” Tata McGraw Hill Education 2015
2. Stephen. P. Robbins, Timothy A. Judge and Seema Sanghi “*Essentials of Organizational Behavior*” Pearson 10th Edition 2010

Reference Books:

1. Tripathi PC & Reddy PN “*Principles of Management*” Tata McGraw Hill 2012
2. Stephen P. Robbins, David A.De.Cenzo, Mary Coulter “*Fundamentals of Management*” Pearson Education 2016



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Department of Information Technology

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BIT17SEX	NIL	ELECTIVE (SPECIAL - BASED ON CURRENT TECHNOLOGY) * EV	SE	3	1	0/2	0/0	ETL



Department of Information Technology

Subject Code: BIT17L08	Subject Name Web Technology and Web Services Lab	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite BCS17IL01	Lb	0	0/0	3/0	1

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

Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE :

- To learn about to develop an own web site.
- To have knowledge to design webpage using CSS.
- To have knowledge to design a dynamic web site using XML and XSLT.
- To learn and develop to design mail communication.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Ability to design a basic website using HTML and CSS
CO2	To design user interactive web pages using forms
CO3	To develop RMI and RPC application.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	H	L	H	M	L	L	H	M	H	H
CO2	H	H	H	M	H	H	M	L	H	M	H	H
CO3	H	M	H	M	H	M	M	L	H	M	H	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		H		L		H					
CO2	H		H		L		H					
CO3	H		H		L		H					

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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic council, June2017											



Course Code	Prerequisite Course Code	Course Title Department of IT	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BIT17L08	BCS17IL01	WEB TECHNOLOGY AND WEB SERVICES LAB	PCL	1	0	0/0	3/0	Lb

OBJECTIVES:

- To learn about to develop an own web site.
- To have knowledge to design webpage using CSS.
- To have knowledge to design a dynamic web site using XML and XSLT.
- To learn and develop to design mail communication.

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.



Department of IT

Subject Code: BIT17L09	Subject Name : Cloud Application Development Lab							Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BCS17ET2							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">To learn and implement various cloud Technology												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Create the application of cloud Technology											
CO2	Implement security in cloud applications											
CO3	Deploy and perform cloud applications											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	H	H	M	H	M	M	M	H	M	H	H
CO2	H	M	H	H	H	M	H	H	M	H	M	H
CO3	H	H	M	M	H	M	M	M	H	M	H	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	H		H		M		H					
CO2	M		M		H		M					
CO3	H		M		H		M					
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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic Council, June 2017											



Course Code	Prerequisite Course Code	Course Title Department of IT	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BIT17L09	BCS17ET2	CLOUD APPLICATION DEVELOPMENT LAB	PCL	1	0	0/0	3/0	Lb

OBJECTIVE:

- To learn and implement various cloud Technology

LIST OF EXPERIMENTS:

- 1) Creating an application using Hadoop Map/Reduce (Ex: Word Count)
- 2) Creating an application on Amazon EC2
- 3) Creating an application on Windows Azure
- 4) Creating an application on Hadoop
- 5) Creating an application on Google App Engine
- 6) Creating an application on Google Apps Business solutions
- 7) Creating an application on control panel software manager and hypervisor
- 8) Creating a Warehouse Application in SalesForce.com
- 9) Case Study: PAAS(Facebook, Google App Engine)
- 10) Case Study: Amazon Web Services.



Department of Information Technology

Subject Code: BIT17L10	Subject Name : Project Phase - 1	T / L/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: NIL	Lb	0	0/0	6/0	2

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

T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE : 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.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Apply the knowledge and skills acquired in the course of study addressing a specific problem or issue.
CO2	To encourage students to think critically and creatively about societal issues and develop user friendly and reachable solutions
CO3	To refine research skills and demonstrate their proficiency in communication skills.
CO4	To take on the challenges of teamwork, prepare a presentation and demonstrate the innate talents.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	M	H	H	L	M	M	H	H
CO2	H	H	H	H	H	H	H	M	M	M	H	H
CO3	H	H	H	H	H	H	H	M	M	H	H	M
CO4	H	M	H	H	H	H	M	H	H	H	H	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	M		M		M		M					
CO2	M		M		M		M					
CO3	M		M		M		M					
CO4	M		M		M		M					

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	Practical / Project	Internships / Technical Skill	Soft Skills				
							✓						

Approval



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Department of Information Technology

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BIT17L10	NIL	PROJECT PHASE – 1	PP1	2	0	0	6/0	Lb

OBJECTIVES:

- Able to do main projects in their respective domain

B.Tech CSE Project carries 12 credits of which , Phase I carries 2 credit. In Phase I ,Students are expected to

- Identify a Problem.
- Have the feasibility explored.
- Freeze the Requirement specification (both user and system).
- Construct the architectural model (as many as required).
- Design the solution.
- If possible publish the Feasibility study as a survey paper



Department of Information Technology

Subject Code: BFL17001	Subject Name : Foreign Language	T / L/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: NIL	EVL	1	0/1	0/0	2

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

T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE : To recognize the cultural values, practices, and heritage of the foreign country, communicate effectively in a foreign language and interact in a culturally appropriate manner with native speakers of that language.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Achieve functional proficiency in listening, speaking, reading, and writing.
CO2	Develop an insight into the nature of language itself, the process of language and culture acquisition.
CO3	Decode, analyze, and interpret authentic texts of different genres.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	L	L	L	L	H	L	H	M	H	H	L
CO2	M	L	L	L	L	H	L	H	H	H	H	L
CO3	L	L	M	M	L	H	M	H	M	H	H	L

COs / PSOs	PSO1	PSO2	
CO1	L	L	
CO2	L	L	
CO3	L	L	

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	Practical / Project	Internships / Technical Skill	Soft Skills			
			✓									
Approval												



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Department of Information Technology

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BFL17001	NIL	FOREIGN LANGUAGE (EVALUATION)	FL	2	1	0/1	0/0	EVL



Department of Information Technology

SEMESTER VIII

Subject Code: BMG17003	Subject Name : TOTAL QUALITY MANAGEMENT						Ty / Lb/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: BMG17002						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												
OBJECTIVE : <ul style="list-style-type: none">To know business excellence models and ISO standardsTo study the principles & theories of total quality management.To know the various management methods for different kinds of problems of an organization.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Understand TQM concepts and achieving excellence through TQM.											
CO2	Understand the Quality Control tools.											
CO3	Understand the contributions made by Management Gurus.											
CO4	Understand the Six sigma, ISO 9000, ISO 14000, QS 9000 and Quality audit.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	L	H	M	L	L	L	M	L	L	L
CO2	M	M	M	H	M	L	L	L	M	L	L	L
CO3	M	L	L	H	M	L	L	L	M	L	L	L
CO4	M	L	M	H	H	L	L	L	M	L	M	L
COs / PSOs	PSO1		PSO2		PSO3		PSO4					
CO1	L		H		L		M					
CO2	H		H		L		M					
CO3	H		L		L		M					
CO4	L		L		L		H					
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	Practical / Project	Internships / Technical Skill	Soft Skills			
						✓						
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BMG17003	BMG17002	TOTAL QUALITY MANAGEMENT	Category	C	L	T/SLr	P/R	Ty /Lb /ETL/ EVL
			MGMT-2	3	3	0/0	0/0	Ty

OBJECTIVES:

- To know business excellence models and ISO standards
- To study the principles & theories of total quality management.
- To know the various management methods for different kinds of problems of an organization.

UNIT I: Introduction**9 Hrs**

Need for quality – Definitions of quality - Dimensions of quality, Basic concepts of TQM - Definitions of TQM – TQM Framework - Contributions of Deming, Juran and Crosby – Barriers to TQM

UNIT II: TQM Principles**9 Hrs**

Leadership – Strategic quality planning - Employee Involvement – Motivation, Empowerment, Teamwork, Performance appraisal, Recognition and Reward - Continuous process improvement – PDCA cycle, 5S, Kaizen.

UNIT III: Quality Tools**9 Hrs**

7 QC tools, 7 new management tools – Six Sigma – Quality circle – Cost of Quality - Quality Function Deployment (QFD) - Failure Mode and Effect Analysis (FMEA) – Bench Marking

UNIT IV: Customer and Quality Standards**9 Hrs**

Customer focus – Customer Orientation – Customer satisfaction – Customer complaints – Customer retention - ISO : 9000, ISO : 14000, QS : 9000 – Quality Auditing

UNIT V: TQM Strategies**9 Hrs**

Strategic planning – Strategic Formation– Strategic Management – The TQM element approach – The guru approach – The Organization model approach – The Japanese total quality approach.

Total Hours: 45**Text Books:**

1. D.R.Kiran (2016) Total Quality Management, BSP.
2. Dale H. Besterfield (2011) Total Quality Management, Pearson Education r3e

Reference Books:

1. Suganthi.L and Anand A Samuel (2011) Total Quality Management, Prentice Hall of India
2. Janakiraman. B and Gopal. R.K. (2006) Total Quality Management, Text & Cases, Prentice Hall of India.



Department of Information Technology

Subject Code: BIT17L11	Subject Name : Project Phase - II	T / L / ETL	L	T / S.Lr	P / R	C
	Prerequisite: BIT17L10	Lb	0	0/0	20/0	10

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

T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE : 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.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Apply the knowledge and skills acquired in the course of study addressing a specific problem or issue.
CO2	To encourage students to think critically and creatively about societal issues and develop user friendly and reachable solutions
CO3	To refine research skills and demonstrate their proficiency in communication skills.
CO4	To take on the challenges of teamwork, prepare a presentation and demonstrate the innate talents.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	M	H	H	M	M	M	H	H	H	H
CO2	H	H	M	H	H	M	M	M	H	H	H	H
CO3	H	H	M	H	H	M	M	M	H	H	H	H
CO4	H	H	M	H	H	M	M	M	H	H	H	H

COs / PSOs	PSO1	PSO2	PSO3	PSO4
CO1	H	H	H	H
CO2	H	H	H	H
CO3	H	H	H	H
CO4	H	H	H	H

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	Practical / Project	Internships / Technical Skill	Soft Skills			
							✓					
Approval												



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Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SL r	P/R	Ty/ Lb/ ETL/ EVL
BIT17L11	BIT17L10	PROJECT (PHASE – II)	PP2	10	0	0	20/0	Lb

OBJECTIVES:

- Able to do main projects in their respective domain

Students are expected to carry out the following :

- Implement the Design using suitable technologies.
- Generate the test cases.
- Demonstrate the solution with suitable user interface.
- Prepare a project report consolidating the phase-I and II activities.



Department of Information Technology

OPEN ELECTIVES E-I OE (6TH SEM)

Subject Code: BCS17OE1	Subject Name : Web Design							Ty / Lb/ 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												
OBJECTIVE : <ul style="list-style-type: none">➤ The students will learn the Network and Internet works.➤ To learn the HTML program structure, elements and Tags.➤ To have knowledge to design basic website for their own.➤ To learn how to design an effective website using CSS.➤ To learn and develop a dynamic web sites using scripting languages												
COURSE OUTCOMES (COs) : (3- 5)												
CO1		The students have knowledge on networks										
CO2		Able to design their own basic website and host the web site										
CO3		Ability to design user interactive web pages										
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	H	L	H	M	L	L	M	M	H	H
CO2	H	M	H	M	H	H	M	L	H	M	H	H
CO3	H	H	H	H	H	M	M	L	H	M	H	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		L		H		H		H	
CO2	H		H		L		H		H		H	
CO3	H		H		L		H		H		H	
H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low												
Categor y	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
						✓						
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17OE1	NIL	WEB DESIGN	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- The students will learn the Network and Internet works.
- To learn the HTML program structure, elements and Tags.
- To have knowledge to design basic website for their own.
- To learn how to design an effective website using CSS.
- To learn and develop a dynamic web sites using scripting languages.

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 - CSS Styling (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 selector) - CSS Color - Creating page Layout and Site Designs.

UNIT IV: 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.



Department of Information Technology

Subject Code: BCS17OE2	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												
OBJECTIVES : <ul style="list-style-type: none">• Learn the Security standards• Lear the techniques of cyber security attacks• Learn the concept of basic computer networks												
COURSE OUTCOMES (COs) : (3- 5)												
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											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	L	M	L	M	H	M	L
CO2	M	H	H	H	H	M	M	L	M	M	H	L
CO3	H	H	H	H	H	M	M	M	H	M	H	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		M		H		L		H	
CO2	H		H		M		H		M		H	
CO3	H		H		M		M		M		H	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
						✓						
Approval	27 th meeting of Academic council, June2017											



Department of Information Technology

BCS17OE2	NIL	CYBER SECURITY ESSENTIALS	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

The student should be able to:

- Learn the Security standards
- Learn the techniques of cyber security attacks
- Learn the concept of basic computer networks

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 (Antiforensis), 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:

1. James Graham, Ryan Olson, 2016 -Rick Howard, Cyber Security Essentials.



Department of Information Technology

Subject Code: BCS17OE3	Subject Name : Electronic Waste Management						Ty / Lb/ 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												
OBJECTIVE : <ul style="list-style-type: none">• The e-waste Rules is to regulate generation, collection, storage, transport, import, export, recycling, treatment and disposal of e-wastes.• Defining necessary steps to protect health and environment against hazardous substances contained in such wastes.• Ensure that each and every one involved in the generation of e-waste contributes to the objective of environmentally sound recycling treatment and disposal of e-waste.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	To achieve great knowledge about E-Waste Management											
CO2	Concern over the environmental harm in nature economies creates an economic disincentive.											
CO3	To learn about E-Waste Rules and Regulations adapted in many Countries											
CO4	Efficient way of Recycling and Recovery											
CO5	Reuse and refurbishing offer a more environmentally friendly and socially conscious alternative to down cycling processes.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	L	L	L	L	H	H	M	M	M	M	H
CO2	M	H	M	L	L	H	H	H	M	H	M	M
CO3	L	M	L	L	L	H	H	H	H	H	M	M
CO4	H	H	H	H	H	H	H	H	H	H	M	H
CO5	M	H	H	H	M	H	H	H	H	H	M	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	M		M		M		M		M		H	
CO2	M		M		H		M		M		M	
CO3	M		M		H		H		M		H	
CO4	H		H		H		H		M		H	
CO5	H		H		H		H		M		H	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
						✓						
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17OE3	NIL	ELECTRONIC WASTE MANAGEMENT	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- The e-waste Rules is to regulate generation, collection, storage, transport, import, export, recycling, treatment and disposal of e-wastes.
- Defining necessary steps to protect health and environment against hazardous substances contained in such wastes.
- Ensure that each and every one involved in the generation of e-waste contributes to the objective of environmentally sound recycling treatment and disposal of e-waste.

Unit I: Introduction**9 Hrs**

E-Waste: Definition and major sources - why is e-waste harmful? - Classification of e-waste – components of e-waste - composition of e-waste – future perspective on electronic scarp.

Unit II: Environmental and Health Impacts**9 Hrs**

WEEE (Waste Electrical and Electronic Equipment)--toxicity and health perspective - Hazardous substances in waste electrical and electronic equipment--toxicity and release - Occupational and environmental health perspectives of e-waste.

Unit III: E-waste Regulation**9 Hrs**

Regulating e-waste - International and national legal framework on e-waste - Extended producer responsibility - a key tool for international rules and regulations on e-waste - Optimal planning for computer waste - Guidelines for environmentally sound management of e-waste.

Unit IV: Recycling & Recovery**9 Hrs**

Recycling of e-scrap in a global environment - opportunities and challenges - European Recycling platform (ERP) - Technologies for recovery – Rapid assessment of Electronics Enclosure Plastics – Reuse – A bridge from unsustainable E-Waste to sustainable E- Resources.

Unit V: Case Studies**9 Hrs**

1. Overview of the International WEEE Directive 2. E- Waste Estimation in a particular country 3. Possible structure to establish a road-map for the implementation of an e-waste management strategy 4. Innovative idea in recycling the E-Waste.

Total Hours: 45**Text / Reference Books:**

1. Ramzy Kahhat, Klaus Hieronymi, Eric Williams, 2013, E-waste Management: From Waste to Resource, Routledge.
2. Ronald E. Hester, Roy M. Harrison, 2009, Electronic Waste Management Design, Analysis and Application, REC Publishing.
3. Rakesh Johri, 2008, E-waste: implications, regulations, and management in India and current global best practices, TERI Press.



Department of Information Technology

Subject Code:	Subject Name : SOFTWARE TESTING						Ty / Lb/ ETL	L	T / S.Lr	P/ R	C	
BCS17OE4	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												
OBJECTIVE : ➤ Expose the criteria for test cases. ➤ Learn the design of test cases. have familiar with test management and test automation techniques. ➤ Be exposed to test metrics and measurements												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Understand the importance of software quality/software testing and apply software testing techniques for information systems software testing techniques in commercial environments development.											
CO2	Generate test cases from software requirements using various test processes for continuous quality improvement											
CO3	Apply and assess the adequacy of test suites using control flow, data flow, and program mutation											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	M	M	M	L	L	M	M	M	M	M
CO2	H	H	M	M	L	L	L	M	M	M	M	M
CO3	H	H	M	M	L	L	L	L	L	L	L	M
COs / PSOs	PS01		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		M		M		L		L	
CO2	H		H		L		L		M		M	
CO3	H		H		M		L		L		L	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17OE4	NIL	SOFTWARE TESTING	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- The student should be made to:
- Expose the criteria for test cases.
- Learn the design of test cases.
- familiar with test management and test automation techniques.
- Be exposed to test metrics and measurements

Unit I: Introduction**9 Hrs**

Software testing – Role of software testing – A structural approach to testing – Test strategy – methods for developing test strategy Testing methodologies.

Unit II: Life Cycle Testing Approach**9 Hrs**

Test plan – Requirements testing – Walk through test tool – Risk matrix test tool – Testing for requirements phase and design phase – Design review test tool – Test data and volume test tools.

Unit III: Installation**9 Hrs**

Installation phase testing – Tools for acceptance test – Software acceptance process – Software maintenance – Methodologies for testing – Training and change installation.

Unit IV: Testing Methods**9 Hrs**

Tools and techniques – Cost estimate – For testing – Testing phase of life cycle – Point accumulation tracking system – Performance analysis of testing – Inspection plan and test plan documents.

Unit V: Testing Strategy**9 Hrs**

Rapid prototyping – Spiral testing – Tool selection processes – Structural system testing – Documentation of test results – Test effectiveness evaluation – Test measurement process – Test metrics.

Total Hours: 45**Text Books:**

1. William Perry, 2007, "Effective Methods for Software Testing", John Wiley & Sons,
2. Ron Patton, 2006, "Software Testing", Techmedia



Department of Information Technology

Subject Code: BCS17OE5	Subject Name : Information Security Management	Ty / L b/ 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

OBJECTIVE : The objective of the course is

- To provide an understanding of the principles of information security management commonly used in business
- Introduce the commonly used frameworks and methods
- Explore critically the suitability and appropriateness of security needs.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Develop an understanding of the key themes and principles of information security management
CO2	Apply the principles in designing solutions to manage security risks effectively
CO3	Apply the principles of information security management in a variety of contexts
CO4	Understand the various elements of information security management and its role in protecting organizations

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	L	L	L	M	L	L	L	L	H	M
CO2	H	H	H	H	M	H	H	H	H	H	H	H
CO3	H	H	H	M	M	H	M	H	M	H	H	H
CO4	M	M	M	H	M	H	H	H	H	M	M	H
COs /PSOs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6						
CO1	H	H	L	L	M	L						
CO2	H	H	M	M	H	M						
CO3	H	H	M	M	H	M						
CO4	H	H	M	M	H	M						

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	Practical / Project	Internships / Technical Skill	Soft Skills			
	✓											

Approval	27 th meeting of Academic council, June2017
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**Department of Information Technology**

Course Code	Prerequisite Course Code	Course Title	Category	C	L	T/SLr	P/R	Ty/ Lb/ ETL/ EVL
BCS17OE5	NIL	INFORMATION SECURITY MANAGEMENT	OE	3	3	0/0	0/0	Ty

OBJECTIVES :

The objective of the course is

- To provide an understanding of the principles of information security management commonly used in business
- Introduce the commonly used frameworks and methods
- Explore critically the suitability and appropriateness of security needs.

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 Hrs**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.



Department of Information Technology

U6TH SEM ELECTIVES E-II

Subject Code:		Subject Name:						Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
BCS17005		DESIGN AND ANALYSIS OF ALGORITHMS										
		Prerequisite:BCS17001						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												
OBJECTIVE :												
<ul style="list-style-type: none">To Learn the algorithm analysis techniques.To understand the different algorithm design techniques.To Understand Iterative algorithmsTo Understand the limitations of Algorithm power.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Design 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.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	M	M	L	L	L	M	L	L	M	L
CO2	H	H	H	L	M	L	M	M	H	M	M	M
CO3	H	M	M	M	H	M	L	M	H	L	M	M
COs / PSOs	PSO 1	PSO2		PSO3		PSO4		PSO5		PSO6		
CO1	H	H		M		L		H	H	M	L	
CO2	M	H		M		L		H	M	M	L	
CO3	M	M		L		L		H	M	M	L	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17005	BCS17001	DESIGN AND ANALYSIS OF ALGORITHMS	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- The students will be able to understand the design of advanced algorithms
- Create problems by applying Greedy methods and understand the dynamic programming
- Apply the graph coloring techniques to solve the real time problems.

UNIT I: Introduction**9 Hrs**

Fundamental characteristics of an algorithm. Basic algorithm analysis –Asymptotic analysis of complexity bounds – best, average and worst-case behaviour, standard notations for expressing algorithmic complexity. Empirical measurements of performance, time and space trade-offs in algorithms. Using recurrence relations to analyze recursive algorithms – illustrations using recursive algorithms.

UNIT II: Fundamental Algorithmic Strategies**9 Hrs**

Fundamental Algorithmic Strategies: Brute-Force, Greedy, Branch-and-Bound, Backtracking and Dynamic Programming methodologies as techniques for design of algorithms – Illustrations of these techniques for Problem Solving. Euristico- characteristics and their domains of applicability. Design of algorithms for String / Text matching problems, Huffman Code and Data compression problems, Subset-sum and Knapsack problems.

UNIT III: Graph and Tree Algorithms**9 Hrs**

Graph and Tree Algorithms: Depth- and Breadth- First traversals. Shortest path algorithms, Transitive closure, Minimum Spanning Tree, Topological sort, Network Flow problems.

UNIT IV: Tractable and Intractable Problems**9 Hrs**

Tractable and Intractable Problems: Computability. The Halting problem. Computability classes –P, NP, NP - complete and NP-hard. Cook's theorem. Standard NP complete problems Reduction techniques.

UNIT V: Advanced Algorithms**9 Hrs**

Approximation algorithms, Randomized algorithms, Class of problems beyond NP – SPACE.

Total Hours: 45**Text Books:**

1. T.H. Corman et. al , (2009) Introduction to Algorithms Mit Press
2. Jon Kleinberg and Eva Tardos (2006) Algorithm Design, Pearson Education India.

Reference Books:

1. E. Horowitz et al (2008) Fundamentals of Algorithms --, Prentice Hall of India
2. Anany Levitin,(2003) "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia.



Department of Information Technology

Subject Code: BCS17E01	Subject Name : IMAGE PROCESSING						Ty / Lb/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: BCS17ET1						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												
OBJECTIVES : <ul style="list-style-type: none">To Lean the image fundamentals and mathematical transforms neceSSary for image processing.To Learn the image enhancement techniquesTo Learn image restoration procedures.To Learn the image compression procedures.To Learn the image segmentation and representation techniques.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Discuss digital image fundamentals											
CO2	Apply image enhancement and restoration techniques											
CO3	Use image compression and segmentation techniques											
CO4	Represent features of images											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	L	M	M	M	L	M	L	M	M	M	L
CO2	H	H	H	H	H	L	M	L	M	M	H	M
CO3	H	H	H	H	H	M	M	L	H	M	H	M
CO4	M	M	M	L	M	M	M	M	L	M	M	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		M		M		M		M		M	
CO2	H		H		L		H		H		H	
CO3	M		H		M		H		H		H	
CO4	M		H		L		M		M		M	
H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low												
Categor y	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E01	BCS17ET1	IMAGE PROCESSING	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- To Learn the image fundamentals and mathematical transforms necessary for image processing
- To Learn the image enhancement techniques
- To Learn image restoration procedures.
- To Learn the image compression procedures.
- To Learn the image segmentation and representation techniques.

UNIT I: Introduction**9 Hrs**

Digital image representation-Fundamental steps in image processing -Elements of digital image processing systems, Digital Image Fundamentals - :Elements of visual perception-A simple image model -Sampling and quantalization -Some basic relationship between pixels-Imaging geometry - Photographic film.

UNIT II: Image Transforms**9 Hrs**

Introduction to the Fourier transform -The Discrete Fourier transform -Some properties of the two dimensional Fourier transform -The fast Fourier transform-Other separable image transforms-The hotelling transform.

UNIT III: Image Enhancement:**9 Hrs**

Background -Enhancement by point Processing -Spatial filtering-Enhancement in the frequency domains -Generations of the spatial masks from frequency Domain specifications- Color image processing -Image Restoration: Degradation Model -diagonalization of Circulant and Block circulant Matrices -Algebraic approach to restoration-Inverse filtering -Least mean square filter - constrained least square restoration-Restoration in spatial domain-Geometric transformation.

UNIT IV: Image Compression**9 Hrs**

Fundamentals -image Compression models -Elements of information Theory - Error-free Compression - Lossy Compression - Image Compression standards, Images Segmentation : Edge linking and boundary detection - Thresholding - Region - Oriented segmentation – The use of motion in segmentation.

UNIT V: Representation and Description**9 Hrs**

Representation Schemes - Boundary descriptors - Morphology - Relational descriptors, Recognition and Interpretation: Elements of image Analysis - Pattern and pattern classes - Decision theoretic methods - Structural Methods - Interpretation.

Total Hours: 45



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Text Books:

1. RAFAEL C.GONZALEZ and RICHARD E.WOODS. Digital Image Processing - 2009,Prentice Hall.
2. Jayaraman, S. Esakkirajan and T. Veerakumar, Digital Image Processing – Tata McGraw Hill, 2009

Reference Books :

1. M.A.SID AHMAED, Image Processing Theory, Algorithm and Architecture – McGraw Hill, 1995
2. DON PEARSON, Image Processing, McGraw Hill, 1991.



Department of Information Technology

Subject Code: BCS17E02	Subject Name : GEOGRAPHICAL INFORMATION SYSTEMS						Ty / Lb/ 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												
OBJECTIVE : ➤ The students will be able to design, explore, interpolate and analyze GIS models ➤ To create a new geo coding technique and apply the learnt GIS modeling for a real time case study.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	To design, explore, interpolate and analyze GIS models											
CO2	Create a new geo coding technique											
CO3	Apply the learnt GIS modeling for a real time case study											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	M	H	M	M	M	H	H	H
CO2	H	H	H	M	M	H	M	M	L	M	M	L
CO3	H	H	M	M	M	H	H	H	H	H	M	M
Mapping of Course Outcomes with Program Specific Outcomes (PSOs)												
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		M		M		H		H	
CO2	H		H		L		M		H		H	
CO3	H		M		M		M		H		M	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											



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BCS17E02	NIL	GEOGRAPHICAL INFORMATION SYSTEMS	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- The students will be able to design, explore, interpolate and analyze GIS models
- To create a new geo coding technique and apply the learnt GIS modeling for a real time case study.

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*, (8th 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



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Subject Code:	Subject Name :						Ty /	L	T /	P/	C	
BCS17E03	DATA BASE TUNING						Lb/		S.Lr	R		
	Prerequisite: BCS17004						ETL					
							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												
OBJECTIVE :												
1. The students will be able to tune the databases for different data base applications												
2. To develop case studies in data bases, and able to troubleshoot the data bases												
3. Identify the critical performance tuning steps												
COURSE OUTCOMES (COs) : (3- 5)												
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										
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	M	H	M	H	H	M	H	H	H	M
CO2	H	H	H	H	L	H	M	H	M	H	H	M
CO3	M	H	H	M	H	M	H	H	M	H	H	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		M		H		H		M		H	
CO2	H		H		H		M		H		M	
CO3	H		H		M		H		M		H	
H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low												
Categor y	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E03	BCS17004	DATABASE TUNING	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- The students will be able to tune the databases for different data base applications.
- To develop case studies in data bases
- Able to troubleshoot the data bases.

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**9 Hrs**

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 Carlolyn Begg (2009) Database Systems, A Practical Approach to Design, Implementation and Management, (4th ed.) Pearson Education



Department of Information Technology

Subject Code: BCS17E04	Subject Name : COMPONENT BASED TECHNOLOGY						Ty / Lb/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: BCS17ET2&BCS17012						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												
OBJECTIVE : <ul style="list-style-type: none">• Show clear understanding of theoretical concepts of component based development and be able to apply the appropriate techniques of implementation using EJB 3 technology.• To show the ability to critically discuss the key concepts in component based development and influence of this topic to modern trends in business computing and software engineering.• Show detailed knowledge of aspects of EJB 3 technology that allow development of applications based on components and service oriented architecture.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Mastering the principles for building software systems from components.											
CO2	Familiarity with the technologies and standards for component models and service-oriented computing.											
CO3	Familiarity with the Java realization of components including Java Beans, JSP, Servlets, EJB, and Java RMI and how Web services are realized in Java.											
CO4	Familiarity with the CORBA realization of components (CCM).											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	M	M	L	H	L	H	M
CO2	H	H	M	M	H	L	L	L	H	L	H	H
CO3	H	H	H	H	H	H	M	L	H	L	H	H
CO4	H	M	M	M	M	M	M	L	M	L	M	L
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		L		H		H		M	
CO2	H		M		M		H		M		H	
CO3	H		H		M		H		M		H	
CO4	M		M		M		H		M		M	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E04	BCS17ET2 &BCS17012	COMPONENT BASED TECHNOLOGY	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- Show clear understanding of theoretical concepts of component based development and be able to apply the appropriate techniques of implementation using EJB 3 technology.
- To show the ability to critically discuss the key concepts in component based development and influence of this topic to modern trends in business computing and software engineering .
- Show detailed knowledge of aspects of EJB 3 technology that allow development of applications based on components and service oriented architecture.

UNIT I: Distributed Object Technology**9 Hrs**

Introduction-Evolution of distributed systems-Evolution of distributed objects- Methods of distribution-Multi-Tier Architecture. **Component Technology:** Component Concepts-Modules-Interfaces-Callbacks – Directory services-Component Architecture-Component Based Software development.

UNIT II: Enterprise Foundations**9 Hrs**

Enterprise Architecture Overview-Object Oriented Software Development for the Enterprise-Component based Software development for the Enterprise- Java Enterprise System Architecture with J2EE.**JAVA Based Component Model:** JAVA Beans-Remote Method Invocation(RMI)-RMI-IIOP. **Enterprise Java Beans:** Introduction-EJP Architecture-Types of Enterprise Beans-Life Cycle of Beans-Steps in developing an EJP.

UNIT III: Architecture of Corba**9 Hrs**

The History of CORBA- CORBA Architecture-ORB-Portable Object Adapter-Internet inter-ORB Protocol(IIOP)- Dynamic CORBA-OMG IDL-CORBA Services-CORBA Object Location Service-CORBA Activation Framework-CORBA Messaging Services-CORBA Event Service- CORBA Security Service-CORBA Object Transaction Service. CORBA Component Model-Model Driven Architecture.

UNIT IV: Microsoft Component Technologies**9 Hrs**

Evolution of Microsoft Component Technologies-OLE-Active X Controls-DLL Surrogates and Executables-Components with ATL-DCOM Architecture-Interface-COM IDL. **Service Oriented Architecture:** Introduction to Web Services-Introduction to Service oriented architecture-Business Value of SOA- Architectural Elements of SOA- Web Services and Service Oriented Architecture.

UNIT V: Application**9 Hrs**

Client Server using –RMI-RMI-IIOP- CORBA-Enterprise Beans. Componentized Application Development using EJP.

Total Hours: 45



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Text Books:

1. G. Sudha Sadasivam(2008)- Component Based Technology, Wiley India Pvt.Ltd.

Reference Books:

1. Robert Orfali, Dan Harkey and Jeri Edwards (2002)-The Essential Client / Server Survival Guide, Galgotia Publications Pvt. Ltd.
2. Tom Valesky (2002) - Enterprise Java Beans, Pearson Education.
3. Jason Pritchard (2000) —COM and CORBA Side by Side, Addison Wesley.
4. Joel Murach, Anne Boehm (2012)- C#, Murach.



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Subject Code: BCS17E05	Subject Name : E-COMMERCE	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BCS17I01	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

OBJECTIVE :

- Understand the nature of e-Commerce
- Recognize the business impact and potential of e-Commerce
- Explain the technologies required to make e-Commerce viable
- Discuss the current drivers and inhibitors facing the business world in adopting and using eCommerce;
- Explain the economic consequences of e-Commerce;
- Discuss the trends in e-Commerce and the use of the Internet.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Analyze the impact of E-commerce on business models and strategy
CO2	Describe the infrastructure for E-commerce
CO3	Assess electronic payment systems

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	H	H	H	H	H	H	H	M	M	M
CO2	H	H	H	H	H	H	H	H	H	M	M	M
CO3	H	H	H	H	H	H	H	H	H	H	M	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		H		H		M		H	
CO2	H		H		H		H		M		H	
CO3	H		H		H		H		M		H	

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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							

27th meeting of Academic Council, June 2017

Approval



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Department of Information Technology

BCS17E05	BCS17I01	E-COMMERCE	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- Understand the nature of e-Commerce
- Recognize the business impact and potential of e-Commerce
- Explain the technologies required to make e-Commerce viable
- Discuss the current drivers and inhibitors facing the business world in adopting and using e-Commerce;
- Explain the economic consequences of e-Commerce.
- Discuss the trends in e-Commerce and the use of the Internet.

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-paymentSystem- 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 wordpress.

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.



Department of Information Technology

Subject Code: BCS17E06	Subject Name : ARTIFICIAL INTELLIGENCE	Ty / Lb/ 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

OBJECTIVE :

- The students will be able to solve problems using AI techniques
- To develop new games using AI techniques
- To guide the process of deducing information in a computational manner

COURSE OUTCOMES (COs) : (3- 5)

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

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	M	H	M	M	H	H	H	H
CO2	H	H	H	H	M	H	M	M	H	H	H	H
CO3	H	H	H	H	L	H	M	M	H	M	H	H
CO4	H	H	H	H	M	H	M	M	H	H	H	H
CO5	H	H	H	H	M	H	M	M	H	M	H	H
COs / PSO _s	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		M		M		H		H	
CO2	H		H		H		H		H		H	
CO3	H		H		H		H		H		H	
CO4	H		H		M		H		H		H	
CO5	H		M		H		H		H		H	

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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											



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Department of Information Technology

BCS17E06	NIL	ARTIFICIAL INTELLIGENCE	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- The students will be able to solve problems using AI techniques
- To develop new games using AI techniques
- To guide the process of deducing information in a computational manner

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 Logically

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



Department of Information Technology

Subject Code: BCS17E07	Subject Name : Human Computer Interaction	Ty / Lb/ 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

OBJECTIVE :

The student should be made to:

- Learn the foundations of Human Computer Interaction
- Be familiar with the design technologies for individuals and persons with disabilities
- Manage HCI

COURSE OUTCOMES (COs) : (3- 5)

CO1	To learn the basic terminologies of HCI
CO2	Understand the design technologies for individuals and persons with disabilities
CO3	Understand how to manage the emerging issues in HCI

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	M	H	M	H	H	M	H	H	H	H
CO2	H	H	H	H	H	H	M	M	H	H	H	M
CO3	H	H	H	H	M	M	H	H	H	M	H	L
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		M		M		H		H	
CO2	H		H		H		H		H		H	
CO3	H		H		H		H		M		M	

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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E07	NIL	HUMAN COMPUTER INTERACTION	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

The student should be made to:

- Learn the foundations of Human Computer Interaction
- Be familiar with the design technologies for individuals and persons with disabilities
- Manage HCI

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 ,3rd edition,2012.

Reference Book:

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



Department of Information Technology

Subject Code: BCS17E08/ BIS15005	Subject Name : WIRELESS AND MOBILE NETWORKING							Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BCS17I01							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												
OBJECTIVE : <ul style="list-style-type: none">To show the ability to critically discuss the key concepts in wireless and mobile communication standards and mobile networking concepts.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Various forms of wireless communication and the standards and architecture of wireless LAN											
CO2	Concepts of mobile communications, their architecture and procedures											
CO3	Mobile networking and application layer including WAP protocols											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	M	M	L	H	L	H	M
CO2	H	H	M	M	H	L	L	L	H	L	H	H
CO3	H	H	H	H	H	H	M	L	H	L	H	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		L		H		H		M	
CO2	H		M		M		H		M		H	
CO3	H		H		M		H		M		H	
M	M		H		M		M					
H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low												
Categor y	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E08/ BIS15005	BCS17I01	WIRELESS AND MOBILE NETWORKING	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

The lectures on wireless and mobile networking will help a student to understand

- Various forms of wireless communication and the standards and architecture of wireless LAN
- Concepts of mobile communications, their architecture and procedures; and
- Mobile networking and application layer including WAP protocols

UNIT I: Wireless Communication**9 Hrs**

Cellular systems- Frequency Management and Channel Assignment- dropped call rates & their evaluation - MAC - SDMA - FDMA - TDMA - CDMA - Cellular Wireless Networks.

UNIT II: Wireless LAN**9 Hrs**

IEEE 802.11 Standards – Architecture – Services – Mobile Ad hoc Networks- WiFi and WiMAX - Wireless Local Loop.

UNIT III: Mobile Communications**9 Hrs**

GSM-architecture-Location tracking and call setup- Mobility management- GSM SMS —Mobile Number portability -VoIP service for Mobile Networks – GPRS –Architecture and procedures.

UNIT IV: Mobile Networking**9 Hrs**

Mobile IP – Dynamic Host Configuration Protocol-Mobile Ad Hoc Routing Protocols– Multicast routing-TCP over Wireless Networks – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit / Fast Recovery - Wireless Networks.

UNIT V: Application Layer**9 Hrs**

WAP Model- Mobile Location based services -WAP Gateway –WAP protocols – WAP user agent profile- caching model-wireless bearers for WAP - WML – WMLScripts – WTA - iMode-SyncML.

Total Hours: 45**Text Book:**

1. Goldsmith, Andrea (2005). *Wireless Communications*. Cambridge University Press. ISBN 0-521-83716-2.

References:

1. Lenzini, L.; Luise, M.; Reggiannini, R. (June 2001). "CRDA: A Collision Resolution and Dynamic Allocation MAC Protocol to Integrate Data and Voice in Wireless Networks". *IEEE Journal on Selected Areas in Communications* (IEEE Communications Society) **19** (6): 1153-1163. ISSN 0733-8716
2. Pahlavan, Kaveh; Krishnamurthy, Prashant (2002). *Principles of Wireless Networks – a Unified Approach*. Prentice Hall. ISBN 0-13-093003-2.
3. Rappaport, Theodore (2002). *Wireless Communications: Principles and Practice*. Prentice Hall. ISBN 0-13-042232-0.



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7TH SEM ELECTIVES – E-III AND E-IV (Common to CSE&IT)

Subject Code: BCS17E09	Subject Name : WEB MINING							Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BCS17011							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												
OBJECTIVE : 1.To understand the characteristics of the Internet and data mining 2. To know about the web crawling algorithm implementation 3. To study the web data collection and analysis of web data for new patterns												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	• Develop semantic web related applications.											
CO2	• Represent knowledge using ontology.											
CO3	• Predict human behaviour in social web and related communities											
CO4	• Visualize social networks											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	M	H	M	M	M	L	H	H	M	M
CO2	H	L	L	M	H	H	M	H	H	L	H	L
CO3	M	H	H	H	M	H	M	M	M	L	L	M
CO4	M	H	M	M	M	M	M	H	M	M	H	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	M		M		H		H		L		M	
CO2	H		M		M		H		H		H	
CO3	M		H		H		L		H		M	
CO4	M		L		M		M		M		M	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

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BCS17E09	BCS17011	WEB MINING	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- To understand the characteristics of the Internet and data mining
- To know about the web crawling algorithm implementation
- To study the web data collection and analysis of web data for new patterns

UNIT I: Data Mining Foundations**9 Hrs**

Association Rules and Sequential Patterns - Basic Concepts of Association Rules - Apriori Algorithm- Data Formats for Association Rule Mining - Mining with Multiple Minimum Supports - Mining Class Association Rules - Basic Concepts of Sequential Patterns - Generating Rules from Sequential Patterns.

UNIT II: Information Retrieval and Web Search**9 Hrs**

Basic Concepts of Information Retrieval - Information Retrieval Models - Relevance Feedback - Evaluation Measures - Text and Web Page Pre-Processing - Inverted Index and Its Compression - Latent Semantic Indexing - Web Search - Meta-Search - Web Spamming.

UNIT III: Social Network Analysis**9 Hrs**

Social Network Analysis - Co-Citation and Bibliographic Coupling – Page Rank – HITS- Community Discovery

UNIT IV: Web Crawling**9 Hrs**

A Basic Crawler Algorithm - Implementation Issues - Universal Crawlers – Focused Crawlers - Crawler Ethics and Conflicts.

UNIT V: Opinion Mining and Sentiment Analysis**9 Hrs**

The Problem of Opinion Mining - Document Sentiment Classification - Sentence Subjectivity and Sentiment Classification- Opinion Lexicon Expansion - Aspect-Based Opinion Mining - Mining Comparative Opinions - Opinion Search and Retrieval.

Total Hours: 45**Text Book**

1. Bing Liu, 2011, Web Data Mining Exploring Hyperlinks, Contents and Usage Data, , Second Edition, Springer.

Reference Book

1. Soumen Chakrabarti, 2002, “Mining the Web”, Morgan-Kaufmann Publishers, Elseiver.



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Subject Code: BCS17E10	Subject Name : WEB DATA DESIGN & MANAGEMENT					Ty / Lb/ ETL	L	T / S.Lr	P/ R	C		
	Prerequisite: BCS17I01					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												
OBJECTIVE :												
<ul style="list-style-type: none">• The students will be able to analysis and evaluate to propose a new web site based upon recent trend• To learn to develop a client-server based application using server and client side scripting languages like Java script, JSP, ASP and PHP.• To learn to develop a dynamic web site using scripting languages and the technologies like XML, AJAX.• The student will learn how to plan, design, testing and production and post- production process in a web site designing.• The student will have the ability to design a static and dynamic web site based upon the end user need.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Able to evaluate a web site											
CO2	Ability to make a well interactive online applications.											
CO3	Have knowledge to analysis and evaluate on web site and design a quality web site.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	H	L	H	M	L	L	M	M	H	H
CO2	H	M	H	M	H	H	M	L	H	M	H	H
CO3	H	H	H	H	H	M	M	L	H	M	H	H
COs /PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		L		H		H		H	
CO2	H		H		L		H		H		H	
CO3	H		H		L		H		H		H	
H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low												
Categor y	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E10	BCS17I01	WEB DATA DESIGN & MANAGEMENT	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- The students will be able to analysis and evaluate to propose a new web site based upon recent trend
- To learn to develop a client-server based application using server and client side scripting languages like Java script, JSP, ASP and PHP.
- To learn to develop a dynamic web site using scripting languages and the technologies like XML, AJAX.
- The student will learn how to plan, design, testing and production and post- production process in a web site designing.
- The student will have the ability to design a static and dynamic web site based upon the end user need .

UNIT I: Site Organization and Navigation**9 Hrs**

User centered design – Web medium – Web design process – Evaluating process – Site types and architectures – Navigation theory – Basic navigation practices – Search – Site maps

UNIT II: Elements of Page Design**9 Hrs**

Browser compatible design issues - Pages and Layout – Templates – Text – Color – Images – Graphics and Multimedia - GUI Widgets and Forms – Web Design patterns.

UNIT III: Scripting Languages**9 Hrs**

Client side scripting: XHTML – DHTML– JavaScript– XML Server side scripting: Perl – PHP – ASP/JSP Designing a Simple web application.

UNIT IV: Pre-Production Management**9 Hrs**

Principles of Project Management – Web Project Method – Project Road Map – Project Clarification – Solution Definition – Project Specification – Content – Writing and Managing content.

UNIT V: Production, Maintenance and Evaluation**9 Hrs**

Design and Construction – Testing, Launch and Handover – Maintenance – Review and Evaluation – Case Study

Total Hours: 45



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Text Books:

1. 1.Themas A. Powell (2003)*The Complete Reference – Web Design* (3rd ed.), Tata McGraw Hill
2. Ashley Friedlein (2001)*Web Project Management*, Morgan Kaufmann Publishers
3. H. M. Deitel, P. J. Deitel, A. B. Goldberg (2004)*Internet and World Wide Web – How to Program*(3rd ed.) Pearson Education

Reference Books:

1. Joel Sklar (2001)*Principles of Web Design*, Thomson Learning
2. Van Duyne, Landay, and Hong (2006)*The Design of Sites: Patterns for creating winning websites* (2nd edition.) Prentice Hall
3. Lynch, Horton and Rosenfeld (2002) *Web Style Guide: Basic Design Principles for Creating Web Sites* (2nd edition.) Yale University Press.



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Subject Code: BCS17E11	Subject Name : RISK MANAGEMENT						Ty / Lb/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: BIT17002						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												
OBJECTIVE : Identify and categories the various risks face by an organization; Explain the various risk control measures available Design a risk management program for a business organization.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	demonstrate knowledge of the range of financial and financial related risks facing organizations											
CO2	understand the approach to risk management through risk identification, risk measurement and risk management (or mitigation)											
CO3	understand operational risk and how to manage it.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	L	M	M	H	M	L	M	M	M	H	H
CO2	L	L	M	H	H	M	M	H	H	H	L	H
CO3	H	M	L	H	M	L	H	M	L	L	M	M
COs /PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		M		M		M		H		H	
CO2	M		M		M		L		M		H	
CO3	H		L		L		M		M		H	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E11	BIT17002	RISK MANAGEMENT	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- Identify and categories the various risks face by an organization
- Explain the various risk control measures available
- Design a risk management program for a business organization.
- Suggest ways to finance risk.
- Apply the insurance mechanism in risk management.
- Describe the management of international risk.

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 Book:**

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



Department of Information Technology

Subject Code: BCS17E12	Subject Name : MOBILE COMMERCE						T / L/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: BCS17I01						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												
OBJECTIVE To understand the E – commerce strategies and value chains To understand the M-commerce services To understand M – commerce infrastructure and applications. To know the availability of latest technology and applications of M- commerce in various domains. To apply mobile commerce in business-to-business application:												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Various forms of wireless communication and the standards and architecture of wireless LAN											
CO2	Concepts of mobile communications, their architecture and procedures; and											
CO3	Mobile networking and application layer including WAP protocols											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	H	H	M	H	M	H	M
CO2	H	H	H	H	H	H	H	M	H	H	M	M
CO3	H	H	H	H	H	M	M	M	M	M	M	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		H		H		H		H	
CO2	H		H		H		H		H		H	
CO3	H		H		H		H		H		H	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E12	BCS17I01	M- COMMERCE	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- To understand the E – commerce strategies and value chains
- To understand the M-commerce services
- To understand M – commerce infrastructure and applications.
- To know the availability of latest technology and applications of M- commerce in various domains.
- To apply mobile commerce in business-to-business application.

UNIT I: Electronic Commerce**9 Hrs**

Traditional commerce and E-commerce – Internet and WWW – Role of WWW – Value Chains – Strategic Business And Industry Value Chains – Role of E-commerce. Packet Switched Networks – TCP/IP Protocol Script – Internet Utility Programmes – SGML, HTML and XML – Web Client And Servers – Web Client/Server Architecture.

UNIT II: Mobile Commerce**9 Hrs**

Introduction – Infrastructure of M–Commerce – Types Of Mobile Commerce Services – Technologies Of Wireless Business – Benefits And Limitations, Support, Mobile Marketing & Advertisement, Non– Internet Applications In M–Commerce – Wireless/Wired Commerce Comparisons.

UNIT III: Mobile Technology**9Hrs**

A Framework For The Study Of Mobile Commerce – NTT Docomo's I-Mode – Wireless Devices For Mobile Commerce – Towards A Classification Framework For Mobile Location Based Services – Wireless Personal And Local Area Networks .

UNIT IV: Theory and Applications**9Hrs**

The Ecology Of Mobile Commerce – The Wireless Application Protocol – Mobile Business Services – Mobile Portal – Factors Influencing The Adoption of Mobile Gaming Services – Mobile Data Technologies And Small Business Adoption And Diffusion – E–commerce in The Automotive Industry – Location– Based Services.

UNIT V: Business– To– Business Mobile E– Commerce**9Hrs**

Enterprise Enablement – Email and Messaging – Field Force Automation (Insurance, Real Estate, Maintenance, Healthcare) – Field Sales Support (Content Access, Inventory) – Asset Tracking and Maintenance/Management – Remote IT Support – Customer Retention (B2C Services, Financial, Special Deals) – Warehouse Automation – Security.

Total Hours: 45



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Text Books:

1. E.BrianMennecke, J.TroyStrader, (2005) Mobile Commerce: Technology, Theory and Applications, Idea Group
2. Ravi Kalakota, B.AndrewWhinston,(2007) Frontiers of Electronic Commerce, Pearson Education

Reference Books:

1. P. J. Louis (2009) M-Commerce Crash Course, McGraw- Hill Companies
2. Paul May (2006) Mobile Commerce: Opportunities, Applications, and Technologies Of Wireless Business,,Cambridge University Press.



Department of Information Technology

Subject Code:	Subject Name :						T / L/ ETL	L	T / S.Lr	P/ R	C	
BCS17E13	Cryptography and Network Security											
	Prerequisite: BCS17I01						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												
OBJECTIVE :												
The student will be able :												
<ul style="list-style-type: none">Understand OSI security architecture and classical encryption techniques.gain basic knowledge on the number theory.Understand various block cipher modes.understands the principles of public key cryptosystems, and different message authentication and integrity techniques												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	To identify the major types of threats to Network security and the associated attacks											
CO2	To develop strategies to protect organization information assets from common attacks, understand how security policies, standards and practices are developed											
CO3	To design, analyse and implement different network security protocols											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	M	M	M	M	M	M	L	L	L
CO2	H	M	H	M	H	M	M	M	M	L	L	L
CO3	H	H	H	M	H	M	M	M	M	L	L	L
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		L		M		M		L		H	
CO2	H		L		M		M		L		H	
CO3	H		L		M		M		L		H	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E13	BCS17I01	CRYPTOGRAPHY AND NETWORK SECURITY	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

The student will be able:

- Understand OSI security architecture and classical encryption techniques.
- gain basic knowledge on the number theory.
- Understand various block cipher modes.
- understands the principles of public key cryptosystems, and different message authentication and integrity techniques

UNIT I: Introduction & Number Theory**9 Hrs**

OSI security architecture - Security attacks ,Services and Mechanisms - -Network security model- Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, stenography)- **NUMBER THEORY:** Modular arithmetic-Euclid's algorithm- Fermat's and Euler's theorem- The Chinese remainder theorem- Discrete logarithms.

UNIT II: Block Ciphers & Public Key Cryptography**9 Hrs**

Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES -RC5 algorithm. **Public key cryptography:** Principles of public key cryptosystems-The RSA algorithm-Key management - Diffie Hellman Key exchange-- Elliptic curve cryptography.

UNIT III: Cryptographic Data Integrity Algorithms**9 Hrs**

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC –MD5 - SHA - HMAC – CMAC - Digital signature and authentication protocols-DSS.

UNIT IV: Network Security Practice**9 Hrs**

Authentication Applications – Kerberos – X.509 Authentication Service – Electronic mail Security – Pretty Good Privacy – S/MIME – IP Security – Web Security.

UNIT V: System Security**9 Hrs**

Intruders – Intrusion Detection – Password Management – Malicious Software – Viruses and Related Threats -Viruses Countermeasures – Distributed Denial of Service Attacks - Firewalls – Firewall Design Principles – Trusted Systems.

Total Hours: 45**Text Book:**

1. William Stallings (2011) *Cryptography And Network Security – Principles and Practices*, (5th ed.) Pearson Education.

Reference Books:

1. Atul Kahate (2008) *Cryptography and Network Security* Tata McGraw Hill
2. Bruce Schneier (2007) *Applied Cryptography*, John Wiley & Sons Inc.
3. Charles B. Pfleeger, Shari Lawrence Pfleeger (2007) *Security in Computing* (4th ed.), Pearson Education



Department of Information Technology

Subject Code: BCS17E14	Subject Name : Mobile Adhoc Networks							Ty / Lb ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BCS17I01							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												
OBJECTIVE : Knowledge of mobile ad hoc networks, design and implementation issues, and available solutions. knowledge of routing mechanisms Knowledge of the 802.11 Wireless Lan (WiFi) and Bluetooth standards. This includes their designs, operations, plus approaches to interoperability.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Have gained an understanding of the current topics in MANETs and WSNs, both from an industry and research point of views.											
CO2	Have an understanding of the principles of mobile ad hoc networks (MANETs) and what distinguishes them from infrastructure-based networks.											
CO3	Understand how proactive routing protocols function and their implications on data transmission delay and bandwidth consumption.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	M	L	M	L	L	L	L	M	L	L
CO2	H	H	M	L	M	L	L	L	L	M	L	L
CO3	H	M	M	L	M	L	L	L	L	M	L	L
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		M		L		L		H		L	
CO2	H		L		L		M		M		L	
CO3	H		M		L		M		L		L	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E14	BCS17I01	MOBILE ADHOC NETWORKS	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- Knowledge of mobile ad hoc networks, design and implementation issues, and available solutions.
- knowledge of routing mechanisms
- Knowledge of the 802.11 Wireless Lan (WiFi) and Bluetooth standards.
- This includes their designs, operations, plus approaches to interoperability.

UNIT I: Introduction**9 Hrs**

Introduction to adhoc networks – definition, characteristics features, applications - Characteristics of Wireless channel, Adhoc Mobility Models:- Indoor and outdoor models.

UNIT II: Medium Access Protocols**9 Hrs**

MAC Protocols: design issues, goals and classification. Contention based protocols- with reservation, scheduling algorithms, protocols using directional antennas. IEEE standards: 802.11a, 802.11b, 802.11g, 802.15. HIPERLAN .

UNIT III: Network Protocols**9 Hrs**

Routing Protocols: Design issues, goals and classification. Proactive Vs reactive routing, Unicast routing algorithms, Multicast routing algorithms, hybrid routing algorithm, Energy aware routing algorithm, Hierarchical Routing, QoS aware routing.

UNIT IV: End-End Delivery and Security**9 Hrs**

Transport layer : Issues in designing- Transport layer classification, adhoc transport protocols. Security issues in adhoc networks: issues and challenges, network security attacks, secure routing protocols.

UNIT V: Cross Layer Design And Integration of Adhoc For 4g**9 Hrs**

Cross layer Design: Need for cross layer design, cross layer optimization, parameter optimization techniques, Cross layer cautionary perspective. Intergration of adhoc with Mobile IP networks.

Total Hours: 45**Text Books:**

1. C.Siva Ram Murthy and B.S.Manoj (2007) Ad hoc Wireless Networks Architectures and Protocols, (2nd ed.), Pearson Education
2. Charles E. Perkins (2000) Ad hoc Networking , Addison Wesley

Reference Books:

1. Mohammad Ilyas (2002) The handbook of adhoc wireless networks, CRC press,
2. T. Camp, J. Boleng, and V. Davies ,A Survey of Mobility Models for Ad Hoc Network Research, WirelessCommun. and Mobile Comp., Special Issue on Mobile
3. V.T.Raisinhani and S.Iyer (2004) ÉCLAIR; “An Efficient Cross-Layer Architecture for wireless protocol stacks, World Wireless cong., San francisco,CA,



Department of Information Technology

Subject Code:	Subject Name : TCP/IP Design and Implementation						Ty / Lb / ETL	L	T / S.Lr	P/ R	C	
	BCS17E15						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												
OBJECTIVE : The objective of the course is <ul style="list-style-type: none">To learn the principles of TCP / IP and its ArchitectureUnderstand the transport layer protocolsIP addressing and routing												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Understand IP Addressing schemes and TCP/IP Architecture											
CO2	Learn the fundamentals of network design and implementation											
CO3	Understand network management issues											
CO4	Learn and implement network applications											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	M	L	L	M	M	L	H	M	H	M
CO2	H	M	M	L	M	M	M	L	H	M	H	M
CO3	H	H	H	M	M	M	M	L	H	M	H	M
CO4	H	H	H	M	M	M	M	M	H	M	H	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		L		M		H		M	
CO2	H		H		M		H		H		H	
CO3	H		H		M		H		H		H	
CO4	H		H		L		H		H		H	
H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low												
Categor y	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E15	BCS17I01	TCP/IP DESIGN AND IMPLEMENTATION	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- Understand the IP addressing schemes.
- Understand the fundamentals of network design and implementation
- Understand the design and implementation of TCP/IP networks
- Understand on network management issues
- Learn to design and implement network applications.

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.



Department of Information Technology

Subject Code:	Subject Name :							Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
BCS17E16	Cyber Forensics and Internet Security											
	Prerequisite: BCS17OE5							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												
OBJECTIVE :												
<ul style="list-style-type: none">To learn the computer forensic fundamentalsTo understand various types of cyber crime activities involved in the digital worldTo study various network security technologies to prevent the data from hacker or intruder												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Students understood how to protect the data or how to secure their personal and official data in their computer.											
CO2	The students have the awareness on digital forensics frauds											
CO3	The students have the knowledge on keep the data in secure manner in the network using network security technologies.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	L	H	H	H	L	M	M	H	H
CO2	H	H	H	M	H	H	H	H	H	M	H	H
CO3	H	H	H	H	H	H	H	M	H	M	H	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		M		H		H		H	
CO2	H		H		M		H		H		H	
CO3	H		H		M		H		H		H	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E16	BCS17OE5	CYBER FORENSICS AND INTERNET SECURITY	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- To learn the computer forensic fundamentals
- To understand various types of cyber crime activities involved in the digital world
- To study various network security technologies to prevent the data from hacker or intruder.

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.



Department of Information Technology

Subject Code:	Subject Name : Database Security							Ty / Lb / ETL	L	T / S.Lr	P/ R	C
	BCS17E17							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												
OBJECTIVE : The objective of the course is <ul style="list-style-type: none">To provide a foundation in database securityUnderstand the various database vulnerabilitiesLearn to audit the databases.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	To understand the fundamentals of security and architecture.											
CO2	To identify risks and vulnerabilities in operating systems from a database perspective											
CO3	To learn security policies and techniques.											
CO4	To understand the various database security models and their advantages.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	L	L	L	H	H	M	H	M	H	L
CO2	H	H	M	H	H	H	M	M	H	M	H	M
CO3	H	H	H	H	M	M	M	M	H	M	H	M
CO4	H	H	M	L	M	M	M	M	H	M	H	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		L		M		H		H	
CO2	H		H		H		M		H		H	
CO3	H		H		M		M		H		H	
CO4	H		H		M		L		H		M	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											



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BCS17E17	BCS17004	DATABASE SECURITY	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVE:

- The objective of the course is to provide a foundation in database security, understand various database vulnerabilities and learn to mitigate database.

UNIT I: Security Architecture & Operating System Security Fundamentals 9 Hrs

Security Architecture: Introduction-Information Systems- Database Management Systems- Information Security Architecture- Database Security-Asset Types and value-Security Methods
Operating System Security Fundamentals: Introduction-Operating System Overview-Security Environment – Components- Authentication Methods-User Administration-Password Policies-Vulnerabilities-E-mail Security.

UNIT II: Administration of Users, Profiles, Password Policies, Privileges and Roles 9 Hrs

Administration of Users: Introduction-Authentication-Creating Users, SQL Server User-Removing, Modifying Users-Default, Remote Users-Database Links-Linked Servers-Remote Servers-Practices for Administrators and Managers-Best Practices Profiles, Password Policies, Privileges and Roles: Introduction-Defining and Using Profiles-Designing and Implementing Password Policies-Granting and Revoking User Privileges-Creating, Assigning and Revoking User Roles-Best Practices.

UNIT III: Database Application Security Models 9 Hrs

Introduction-Types of Users-Security Models: Access Matrix model, Access mode model- Application Types: Client/Server Applications, Web Applications, Data ware house applications- Application Security Models-Data Encryption.

UNIT IV: Virtual Private Databases 9 Hrs

Virtual Private Databases: Introduction-Overview of VPD-Implementation of VPD using Views, Application Context in Oracle-Implementing Oracle VPD-Viewing VPD Policies and Application contexts using Data Dictionary, Policy Manager Implementing Row and Column level Security with SQL Server.

UNIT V: Security and Auditing Project Cases 9 Hrs

Case Studies : Developing an online database, payroll management, tracking database changes, developing a secured authorization repository.

Total Hours: 45

Text Book:

- Hassan A. Afyouni, 2009 “Database Security and Auditing”, Third Edition, Cengage Learning.

Reference books:

- Charu C. Aggarwal, Philip S Yu, 2008, “Privacy Preserving Data Mining”: Models and Algorithms, Kluwer Academic Publishers.
- Ron Ben Natan, 2005, ”Implementing Database Security and Auditing”, Elsevier Digital Press.



Department of Information Technology

Subject Code:	Subject Name : REAL TIME SYSTEMS							Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
BCS17E18	Prerequisite:BCS17006							Ty	3	0/0	0/0	3
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits Ty/LbETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVE : 1. Real-time scheduling and schedulability analysis 2. Formal specification and verification of timing constraints and properties 3. Design methods for real-time systems												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	An ability to understand advanced concepts in theory of computer science											
CO2	An ability to understand advanced concepts in applications of computer science											
CO3	An ability to apply knowledge of advanced computer science to formulate the analyze problems in computing and solve them											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/P Os	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	M	M	H	M	L	M	M	M	H	H
CO2	L	M	M	H	H	M	M	H	H	H	L	H
CO3	H	M	L	H	M	L	H	M	L	L	M	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		M		M		M		H	M	M	M
CO2	M		M		M		L		M	H	M	M
CO3	H		L		L		M		M	H	M	M
H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low												
Cat ego ry	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Appro val	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E18	BCS17006	REAL TIME SYSTEMS	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

Student Learning Objectives/Outcomes:

- Real-time scheduling and schedulability analysis
- Formal specification and verification of timing constraints and properties
- Design methods for real-time systems
- Development and implementation of new techniques to advance the state-of-the-art real-time systems research

UNIT I: Introduction**9 Hrs**

Architecture of real time systems/embedded systems-operating systems issues-performance measures-estimating program run times.

UNIT II: Task Assignment and Scheduling**9 Hrs**

Uniprocessor scheduling-IRIS tasks-task assignment algorithms- mode changes –fault tolerance scheduling.

UNIT III: Programming Languages and Tools**9 Hrs**

Desired characteristics based on ADA-data typing-control structures-packages-exception handling-overloading-multitasking-timing specification-task scheduling-just in time compilation-run time support.

UNIT IV: Real Time Databases**9 Hrs**

Basic definitions-main memory databases -transaction processing-concurrency control-disk scheduling algorithms-serialization and consistency-real time communication

UNIT V: Fault Tolerance, Reliability and Synchronornization**9 Hrs**

Fault types-fault detection and containment-redundancy-data diversity-reversal checks-obtaining parameter values-reliability models for hardware redundancy-software error models-clocks-fault tolerance synchronization-synchronization and software.

Total Hours: 45**Text book:**

1. C.M.Krishna, Kang.G.Shin, 2010, Realtime Systems, McGraw Hill.

Reference books:

1. Rajib Mall, 2007 "Real-time systems: theory and practice", Pearson Education.
2. Phillip A.Laplante 2011 Real Time System Design and Analysis,4 th edition,Wiley.
3. Alan burns and andy wellings,2009 "Real time systems and prog. Languages", 4 th edition,pearson.



Department of Information Technology

Subject Code:	Subject Name :	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
BCS17E19	DISTRIBUTED COMPUTING					
	Prerequisite: BCS17I01&BCS17006	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

OBJECTIVE :

- The students will be able to understand the design of distributed systems
- To understand communication concepts of distributed systems
- To apply the memory management design of distributed systems to design a new memory

COURSE OUTCOMES (COs) : (3- 5)

CO1	Understand the design of distributed computing systems
CO2	Understand the communication concepts of distributed systems
CO3	Design a new memory by applying the memory management design of distributed systems
CO4	Understand the distributed file system security

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	H	M	M	H	H	M	H	M	H	H
CO2	H	H	H	H	M	H	H	H	H	H	H	H
CO3	H	M	H	M	M	H	M	M	H	M	H	M
CO4	H	M	H	M	M	H	H	H	H	H	H	H

Mapping of Course Outcomes with Program Specific Outcomes (PSOs)

COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	M	M
CO2	H	H	H	H	H	M
CO3	H	H	M	M	M	M
CO4	H	H	H	M	H	H

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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							

Approval

27th meeting of Academic Council, June 2017

**Department of Information Technology**

BCS17E19	BCS17I01& BCS17006	DISTRIBUTED COMPUTING	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- The students will be able to understand the design of distributed systems
- To understand communication concepts of distributed systems
- To apply the memory management design of distributed systems to design a new memory

UNIT I: Fundamentals**9 Hrs**

Introduction to distributed computing system, Evolution, Different models, Gaining popularity, Definition, Issues in design, DCE, Message passing-Introduction, Desirable features of a good message passing system, Issues in IPC, Synchronization, Buffering, Multidatagram, Process addressing, Failure handling, Group communication.

UNIT II: Remote Procedure Call**9 Hrs**

Introduction, RPC model, transparency of RPC, Implementing RPC mechanism, Stub generation, RPC messages, Marshalling arguments and results, Server management, parameter-passing semantics, Call semantics, Communication protocols for RPCs, Complicated RPC, Client-server binding, exceptional handling, security, Lightweight RPC.

UNIT III: Distributed Shared Memory and Synchronization**9 Hrs**

Introduction, General architecture of DSM systems, Design and implementation issues of DSM, Granularity, Structure of shared memory space, Consistency model, Replacement strategy, Thrashing, Different approaches to DSM, Advantages of DSM, Clock synchronization, Event ordering, Mutual exclusion, Deadlock, Election algorithm.

UNIT IV: Resource and Process Management**9 Hrs**

Introduction, Desirable features of a good global scheduling algorithm, Task assignment approach, Load balancing approach, Load sharing approach, Process migration, Threads.

UNIT V: DFS/DCE Security**9 Hrs**

Desirable features of good DFS, File models, File accessing, models, File sharing semantics, File caching schemes, File replication, Fault tolerance, Atomic Transaction, Design principles, Authentication, Access control, Digital signatures, DCE security service.

Total Hours: 45**Text book:**

1. Pradeep K. Sinha (2012 Reprint) , *Distributed Operating System Concepts and Design* PHI

Reference Books:

1. Andrew S. Tenenbaum (2012), *Modern Operating System* (3rd ed.) PHI
2. Ajay D. Kshemkalyani , Mukesh Singhal (2008), *Distributed computing : principles, algorithms and systems* – Cambridge University Press
3. Andrew S. Tenenbaum & Maatren Vansteern (2012) *Distributed systems: Principles & Paradigms* (2nd ed.), PHI
4. Hagit Attiya And Jennifer Welch (2004) *Distributed computing fundamentals, simulations and Advanced Topics* (Digitized in 2007) (2nd ed.), Wiley
5. Jean Dollimore, Tim Kindberg, And George Coulouris (2005) *Distributed Systems: Concepts and Design* (4th ed.) Pearson Education



Department of Information Technology

Subject Code:	Subject Name :						Ty /	L	T /	P/	C	
BCS17E20	OPTIMIZATION TECHNIQUES						Lb/		S.Lr	R		
							ETL					
	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												
OBJECTIVE :												
To understand importance of optimization of industrial process management and apply basic concepts of mathematics to formulate an optimization problem.												
To analyse and appreciate variety of performance measures for various optimization problems												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Apply knowledge of optimization to formulate and solve engineering problems.											
CO2	Understand the different methods of optimization and be able to suggest a technique for a specific problem.											
CO3	Understand how optimization can be used to solve industrial problems of relevance to the chemical and oil industries.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	M	L	L	L	L	M	M	L	M	L
CO2	H	H	M	L	L	L	L	M	M	L	M	L
CO3	H	M	M	L	L	L	L	M	M	L	M	L
COs /PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		L		M		L		L	
CO2	H		H		L		M		L		L	
CO3	H		H		L		M		L		L	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E20	NIL	OPTIMIZATION TECHNIQUES	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVE:

- To understand importance of optimization of industrial process management and apply basic concepts of mathematics to formulate an optimization problem. To analyse and appreciate variety of performance measures for various optimization problems

UNIT I: Introduction to Operation Research**9 Hrs**

Operation Research approach, scientific methods, introduction to models and modeling techniques, general methods for Operation Research models, methodology and advantages of Operation Research, history of Operation Research.

UNIT II: Linear Programming (LP)**9 Hrs**

Introduction to LP and formulation of Linear Programming problems, Graphical solution method, alternative or multiple optimal solutions, Unbounded solutions, Infeasible solutions, Maximization – Simplex Algorithm, Minimization – Simplex Algorithm using Big-M method, Two phase method, Duality in linear programming, Integer linear programming.

UNIT III: Transportation & Assignment Problems**9 Hrs**

Introduction to Transportation problems, various methods of Transportation problem, Variations in Transportation problem, introduction to Assignment problems, variations in Assignment problems. **Network Analysis:** Network definition and Network diagram, probability in PERT analysis, project time cost trade off, introduction to resource smoothing and allocation.

UNIT V: Sequencing**9 Hrs**

Introduction, processing N jobs through two machines, processing N jobs through three machines, processing N jobs through m machines. **Inventory Model:** Introduction to inventory control, deterministic inventory model, EOQ model with quantity discount. **Queuing Models:** Concepts relating to queuing systems, basic elements of queuing model, role of Poisson & exponential distribution, concepts of birth and death process.

Total Hours: 45**Reference Books :**

1. J K Sharma, Operations Research Theory and Applications, MacMillan India Ltd.
2. N D Vohra, Quantitative Techniques in management, Tata McGraw Hill.
3. Handy A Taha, Operations Research – An Introduction, Prentice Hall of India, New Delhi.
4. Wagner H M, Principles of Operations Research: With Applications to Management Decisions, Prentice-Hall of India, New Delhi.



Department of Information Technology

Subject Code: BCS17E21	Subject Name : MANAGEMENT INFORMATION SYSTEMS						Ty / Lb/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: BCS17004						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												
OBJECTIVE : Evaluate the role of the major types of information systems in a business environment and their relationship to each other; Assess the impact of the Internet and Internet technology on business electronic commerce and electronic business; Identify the major management challenges to building and using information systems and learn how to find appropriate solutions to those challenges												
COURSE OUTCOMES (COs) : (3- 5)												
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											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	M	L	L	L	L	M	L	M	L	L
CO2	H	H	L	H	M	L	L	M	L	M	L	L
CO3	H	M	M	L	L	L	L	M	L	M	L	L
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		M		L		M		L		L	
CO2	H		L		L		L		L		L	
CO3	H		M		L		M		L		L	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E21	BCS17004	MANAGEMENT INFORMATION SYSTEMS	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- why information systems are so important today for business and management;
- Evaluate the role of the major types of information systems in a business environment and their relationship to each other;
- Assess the impact of the Internet and Internet technology on business electronic commerce and electronic business;
- Identify the major management challenges to building and using information systems and learn how to find appropriate solutions to those challenges

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.
3. Alexis Leon,(2007) Enterprise Resource Planning, TMH



Department of Information Technology

7TH SEMESTER - SPECIAL ELECTIVE – TECHNOLOGY BASED (ES-EV) (Common to CSE&IT)

Subject Code: BCS17E22	Subject Name : Mobile Application Development							T / L/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BCS17ET2							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												
OBJECTIVE : Describe the limitations and challenges of working in a mobile and wireless environment Describe and apply the different types of application models/architectures used to develop mobile software applications. Describe the components and structure of a mobile development frameworks												
COURSE OUTCOMES (COs) : (3- 5)												
CO1		Able to understand the various Mobile Platforms and analyze its architectures										
CO2		Able to design and develop various Mobile Applications for Android and Apple										
CO3		Able to develop own mobile application										
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	L	L	M	M	L	M	L	L	H	L	L
CO2	M	H	H	M	H	L	L	M	M	M	M	H
CO3	M	H	H	M	H	L	L	M	H	M	H	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	L		L		H		L		H		M	
CO2	M		H		L		M		M		H	
CO3	H		H		L		H		M		H	
H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low												
Categor y	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills	Special Elective		
										✓		
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E22	BCS17ET2	MOBILE APPLICATION DEVELOPMENT	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- Describe the limitations and challenges of working in a mobile and wireless environment
- Describe and apply the different types of application models/architectures used to develop mobile software applications
- Describe the components and structure of a mobile development frameworks

UNIT I: Introduction**9 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**9 Hrs**

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

UNIT III: Google Android Platform**9 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**9 Hrs**

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

UNIT V: Implementing Software as a Service**9 Hrs**

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

Total No. of Hrs: 45**Text Books:**

1. Ed Burnette (2015) Hello, Android: Introducing Google's Mobile Development Platform, 4th edition, Pragmatic Bookshelf.
2. Marko Gargenta (2011) Learning Android, O'Reilly Media.

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.



Department of Information Technology

Subject Code: BCS17E23	Subject Name : DATA SCIENCE AND BIG DATA ANALYTICS	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BCS17004	T	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

OBJECTIVE :

1. Deploying the Data Analytics Lifecycle to address big data analytics projects
2. Reframing a business challenge as an analytics challenge
3. Applying appropriate analytic techniques and tools to analyze big data, create statistical models, and identify insights that can lead to actionable result
4. Using tools such as: R and RStudio, MapReduce/Hadoop, in-database analytics, Window and MADlib functions.

COURSE OUTCOMES (Cos) : (3- 5)

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
CO4	To explore the next generation of big data tools and applications, and other advanced topics if time permits.

Mapping of Course Outcomes with Program Outcomes (Pos)

Cos/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	M	H	H	H	M	H	M	H	H
CO2	H	H	M	H	H	H	H	L	H	M	H	M
CO3	H	H	H	H	M	M	H	M	H	L	H	H
CO4	H	H	H	H	M	H	L	H	H	H	H	H
Cos / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		H		M		L		H	
CO2	H		H		H		M		H		H	
CO3	H		H		M		H		H		M	
CO4	H		H		H		M		H		H	

H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills	Special elective		
										✓		

Approval

27th meeting of Academic Council, June 2017

**Department of Information Technology**

BCS17E23	BCS17004	DATA SCIENCE AND BIG DATA ANALYTICS	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- Deploying the Data Analytics Lifecycle to address big data analytics projects
- Reframing a business challenge as an analytics challenge
- Applying appropriate analytic techniques and tools to analyze big data, create statistical models, and identify insights that can lead to actionable result
- Selecting appropriate data visualizations to clearly communicate analytic insights to business sponsors and analytic audiences
- Using tools such as: R and RStudio, MapReduce/Hadoop, in-database analytics, Window and MADlib functions.

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 - Operationalisation 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)**9 Hrs**

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



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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.

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



Department of Information Technology

Total Hours: 45

Subject Code: BIT17007	Subject Name : Cloud Technology							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												
➤ OBJECTIVE : To learn Cloud computing infrastructure and services, to acquire knowledge about cloud storage. to understand cloud computing security and to test web application in cloud platform.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Understand the application of cloud computing											
CO2	Recognize the importance cloud security.											
CO3	Design the efficient flexible cloud applications											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	M	H	M	M	M	H	M	H	H
CO2	H	M	H	M	H	M	M	H	M	H	M	M
CO3	H	H	M	M	H	M	M	M	H	M	H	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		M		H		M		M	
CO2	H		M		H		M		H		H	
CO3	H		M		H		M		H		M	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BIT17007	NIL	CLOUD TECHNOLOGY	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- To learn Cloud application Development
- To acquire knowledge about public and private cloud
- To understand critical success factor
- To examine cloud audit

UNIT I: Cloud Computing and Public Cloud**9 Hrs**

Introduction – voice in the cloud – commerce in the cloud – distributed hosting in the cloud – Enterprise – Public cloud – virtualization – remote hosting – hosting services – cloud service model – deployment model – cloud software – divisive issues of multi tendency - public vs private cloud – hybrid solutions – Eucalyptus

UNIT II: Vision of Computer Utility**9 Hrs**

Not remote hosting – desktop virtualization – PaaS – SaaS Applications – Moving into and around the cloud – portable software – openness – closed architecture – legacy applications and migration to the cloud – preventing vendor lock in – cloud software – Zend – Abiquo - 3Tera – Elasta – RightScale – VMWare's focus – OMTF – Cloud broker – Inter clouding – DTMF & OVFS.

UNIT III: Cloud Economics and Demystifying The Cloud**9 Hrs**

Capacity planning – Queuing theory – capacity management – evidence based decision making – measuring resource conception - bottlenecks – strategies for capacity planning – critical success factors – key volume indicators – AWS - Amazon S3 functionality – Gladinet desktop face on S3 – move static content to S3 – move web servers and back end – accessing public data – Eucalyptus – Nimble.

UNIT IV: Virtualization and Securing The Cloud**9 Hrs**

Hypervisor – KVM – Xen – QEMU – Azure – Hyper-V – VPLEX and VMWare – Vmforce – spring for AppEngine – OpenStack – FUDD factor – leakage – virtualization is inherently more secure – cloud security provider employ – DoS attack – OASIS and SPLM – standards and vendor selection – Cloud security alliance – Cloud Audit.

UNIT V: Scale and Reuse**9 Hrs**

Hardware reuse – Service oriented architecture – Windos Azure – prologue – deployment scenarios - Azure pricing – Google in the cloud – App Engine cost structure – Google web toolkit – Google gears R.I.P – Enterprise cloud vendors – Cloud service providers.

Total Hours: 45



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TEXT BOOK:

1. David E.Y Sarna 2011 “ Implementing and Developing cloud computing Applications” CRC Press.
2. Kevin Roebuck 2011“ Cloud Application development Tools” Emereo pty Ltd.

REFERENCE BOOKS:

1. Scott Adkins 2016 “OpenStack cloud Application Development” Wrox
2. Christopher M Moyer 2011“Building Applications in the cloud -Concept Patterns and Projects” Pearson .



Department of Information Technology

Subject Code:	Subject Name :	Ty / L b/ ETL	L	T / S.Lr	P/ R	C
BCS17E24	Network Forensics					
	Prerequisite: BCS17I01	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

OBJECTIVE : The objective of the course is

- Provide a comprehensive understanding of network forensic analysis principles
- Understand the relationship between network forensic analysis and network security technologies.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Learn to identify network security incidents and potential sources of digital evidence.
CO2	Demonstrate the ability to perform basic network data acquisition and analysis using computer based applications and utilities
CO3	Identify potential applications for the integration of network forensic technologies
CO4	Apply tools for network forensic investigation

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	L	H	L	H	H	M	H	M	H	M
CO2	H	H	H	H	H	M	M	M	H	M	H	M
CO3	H	H	H	H	H	M	M	M	H	M	H	L
CO4	H	H	H	H	H	M	M	H	M	M	H	H
COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6						
CO1	H	H	L	M	H	H						
CO2	H	H	M	M	H	H						
CO3	H	H	L	M	H	H						
CO4	H	H	M	H	H	H						

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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							

Approval	27th meeting of Academic Council, June 2017
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**Department of Information Technology**

BCS17E24	BCS17I01	NETWORK FORENSICS	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVE:

- This course provides a comprehensive understanding of network forensic analysis principles, understand the relationship between network forensic analysis and network security technologies.

UNIT I: Technical Fundamentals**9 Hrs**

Concepts in digital evidence- challenges- investigative methodology- sources of network based evidence- principles of internetworking-Internet Protocol suite- Evidence acquisition

UNIT II: Packet and Statistical Flow Analysis**9 Hrs**

Packet analysis - protocol analysis - flow analysis- higher layer traffic analysis – Statistical Flow analysis:- sensors-flow record export protocols- collection and aggregation- analysis tools and techniques – Case study and Tools Analysis: Wire Shark

UNIT III: Network Intrusion Detection and Analysis**9 Hrs**

NIDS/NIPS functionality- modes of detection-types-NIDS/NIPS evidence acquisition -NIPS/NIDS interfaces –packet logging – Case study and Tools Analysis : Snort

UNIT IV: Network Devices and Servers**9 Hrs**

Sources of Logs-Network log architecture- collecting and analyzing evidence- Switches- routers – firewalls-interfaces-logging - Case study and Tools Analysis: Angry IP Scanner

UNIT V: Network Tunnelling and Case Studies**9 Hrs**

Tunneling for functionality, confidentiality- covert tunneling- trends in malware evolution-network behavior of malware – future of malware and network forensics - Case study and Tools Analysis : Cuckoo Sandbox

Total Hours: 45**Text Book:**

1. Network Forensics : Tracking Hackers Through Cyberspace Sherri Davidoff,Jonathan Ham Pearson Education 2012

Reference books:

1. Introduction to Security and Network Forensics William J. Buchanan Auerbach Publications 2012
2. Handbook of Digital Forensics and Investigations, 1st Edition Eoghan Casey ed., Elsevier Academic Press, ISBN 13: 978-0-12-374267-4,.



Department of Information Technology

Subject Code: BCS17E25	Subject Name : INTERNET OF THINGS							T y/ Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BCS17I01							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												
OBJECTIVES : <ul style="list-style-type: none">• Vision and introduction to IoT• Data knowledge management and use of devices in IoT Technology• Understand the state of Art – IoT Architecture• Real world IoT Design constraints, industrial automation and commercial building automation in IoT												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Understand the vision of IoT from a global context.											
CO2	Determine the Market perspective of IoT.											
CO3	Use of Devices, Gateways and Data Management in IoT											
CO4	Understand the Application of IoT in Industrial and Commercial Building Automation and Real World Design Constraints											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	M	M	M	M	L	L	H	M	H	H
CO2	M	M	H	H	H	L	H	L	H	M	H	H
CO3	H	H	H	H	H	H	H	M	H	M	H	M
CO4	H	H	H	H	H	H	H	M	H	H	H	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		M		L		M		H		L	
CO2	H		H		M		H		M		H	
CO3	M		H		H		H		M		H	
CO4	H		H		L		H		H		H	
H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low												
Categor y	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills	Special Elective		
										✓		
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E25	BCS17I01	INTERNET OF THINGS	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

The student should be able to:

- Vision and introduction to IoT
- Data knowledge management and use of devices in IoT Technology
- Understand the state of Art – Iot Architecture
- Real world Iot Design constraints, industrial automation and commercial building automation in IoT

UNIT I: Introduction To IoT**9 Hrs**

Definition – characteristics of IoT-Physical Design of IoT – Logical Design of IoT- IoT enabling technologies – IoT Levels and Deployment Templates

UNIT II: IoT and M2M**9 Hrs**

M2M to IoT – A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies.

M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

UNIT III: IoT Platforms Design Methodology**9 Hrs**

Introduction – IoT Design Methodology – Case study on IoT system for Weather Monitoring – Motivation of using Python

UNIT IV: IoT Physical Devices and Endpoints**9 Hrs**

IoT Device – Basic building blocks of an IoT Device – Exemplary Device: Raspberry Pi – Linux on Raspberry Pi – Raspberry Pi Interfaces – Raspberry Pi with Python – Simple Programs

UNIT V: IoT Applications For Value Creations**9 Hrs**

Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management, eHealth. Case Studies Illustrating to IoT Design.

Total Hours: 45



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Text Book:

1. Vijay Madiseti and Arshdeep Bahga, , 2015“Internet of Things (A Hands-on-Approach)”, Universities Press

Reference Books:

1. Francis daCosta, 2013 “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, 1st Edition, A press Publications
2. Cuno Pfister, Getting Started with the Internet of Things, O“ Reilly Media, 2011, ISBN: 978-1-4493-9357-1



Department of Information Technology

Subject Code: BCS17E26	Subject Name : SOCIAL COMPUTING	Ty / Lb/ 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

OBJECTIVE :

- Understand important features of social computing.
- Design and prototype new social computing systems.
- Analyze data left behind in social media.
- Understand the research issues in this field.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Understand emerging themes in social and web based computing – focusing on current Research topics dominant in this area.
CO2	Use specialist Application Programming Interfaces (APIs) for analysing social media data feeds
CO3	Understand the use of graph theory in representing relationships in social networks and Distributed systems
CO4	Understand and make use of specialist technologies used to harvest, analyse and visualise “social data
CO5	Demonstrate the use of specialist programming environments and tools for managing distributed social data.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	M	L	M	M	M	M	L	L	M	M
CO2	H	H	M	M	L	L	M	M	L	M	M	M
CO3	H	H	M	M	L	L	L	L	M	L	M	M
CO4	H	H	L	M	M	M	M	L	L	L	M	M
CO5	H	H	M	M	M	L	L	L	M	M	M	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		M		M		L		M	
CO2	H		H		M		L		L		M	
CO3	H		H		M		M		M		L	
CO4	H		H		L		L		M		M	
CO5	H		H		M		M		M		L	

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	Practical / Project	Internships / Technical Skill	Soft Skills	Special Elective
										✓

Approval	27th meeting of Academic Council, June 2017
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**Department of Information Technology**

BCS17E26	NIL	SOCIAL COMPUTING	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- Understand important features of social computing.
- Design and prototype new social computing systems.
- Analyze data left behind in social media.
- Understand the research issues in this field.

UNIT I: Basic Concepts**9 Hrs**

Web 2.0 Introduction – Advantages & Disadvantages of Web2.0 – Business Aspects of Web2.0 – Web2.0 Principles – Characteristics – design aspects – Introduction to Web services.

UNIT II: Web2.0 Services**9 Hrs**

Web2.0 Services – Applications –Communication - Blogs – Topic, Event, Marketing, Learning , Scholarly - Wiki – Wikia, Wetpaint, Pbwiki, Wikispaces -Podcasting , Vodcasting - 21st century skills - Social Networking- Social Bookmarking – RSS & Syndication –Newer Web2.0 services and Applications

UNIT III: Technology**9 Hrs**

Ajax – Alternatives to Ajax – Open APIs –SOAP –REST - Microformats – Client side technologies – Web gateway - Security Challenges with Web2.0 – Content Management System(CMS)

UNIT IV: Application Creation**9 Hrs**

DOJO toolkit - Creation of Application with DOJO, JSON ,Adobe Flex, Cloud computing, Hadoop – Building Offline Applications using Adobe AIR.

UNIT V: Case Studies**9 Hrs**

Teaching & Learning Issues – Research – Academic Publishing – Library – Repositories – Archiving – Future of Web2.0 – Web2.0 & Semantic Web –Emergence of Web Science.

Total Hours: 45**Reference Books:**

1. shelly / Frydenberg, 2011, “Web2.0- concepts & Applications”, Cengage Learning.
2. Gwen Solomon, Lynne Schrum, 2007, “Web 2.0 – new tools, new schools”, ISTE Publication.
3. www.jisc.ac.uk - JISC Technology and Standards Watch, Feb. 2007 Web 2.0(PDF)
4. Web2.0 Tutorials(from web)
5. Mastering Web2.0 Technologies(from web)
6. www.dojotoolkit.org



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Subject Code: BCS17E27	Subject Name : ENTERPRISE ARCHITECTURE							Ty / Lb/ 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												
OBJECTIVE : <ul style="list-style-type: none">To define and explain gapsHelp to achieve the business strategy, vision and Target Operating ModelProvide the flexibility to include new ideas in the futureEnable faster decision making, avoiding the need for long studiesLearn UML and BPMN Modeling.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Construct models for enterprise architecture definition which conform to industry standards and frameworks											
CO2	Analyze alternative models for enterprise architecture components and processes for different organizations											
CO3	Identify critical success factors for common enterprise architect approaches											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	M	H	M	H	H	L	H	L	M	H
CO2	H	M	H	H	M	M	H	L	H	M	H	H
CO3	H	H	M	H	M	H	H	M	H	M	L	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		M		H		M		M	
CO2	H		H		M		H		H		H	
CO3	H		H		H		M		M		M	
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	Practical / Project	Internships / Technical Skill	Soft Skills	Special Elective		
										✓		
Approval	27 th meeting of Academic Council, June 2017											



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BCS17E27	NIL	ENTERPRISE ARCHITECTURE	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVE:

- To define and explain gaps
- Help to achieve the business strategy, vision and Target Operating Model
- Provide the flexibility to include new ideas in the future
- Enable faster decision making, avoiding the need for long studies
- Learn UML and BPMN Modeling.

UNIT I: Introduction

9 Hrs

TOGAF- General Presentation-Keypoints-ADM Method: ADM Cycle-The Phases of the ADM-Iterations-ADM Techniques and Guidelines. **Components of TOGAF Architecture:** Architecture components-The Metamodel-Artifacts-Building Blocks-Deliverables. Repository and Governance: Architecture Repository-Architecture Governance.

UNIT II: Key Modeling Techniques

9 Hrs

Models: Benefits Uses and Characteristics-The concepts of viewpoints-Special role played by diagrams-consistency and traceability-Architecture Repository-Risks and main difficulties-Repository governance-Tools and Languages. **TOGAF Models:** TOGAF Artifacts-UML and BPMN for TOGAF Modeling-**Model Vision:** Stakeholder Matrix-Artifacts linked to Goals, Requirement, and Business Process-Solution Concept Diagram-Value Chain Diagram.

UNIT III: Model Business Architecture

9 Hrs

Business Dictionary Artifacts-Artifacts linked to Enterprise Organization, function and Services, Business Processes, Data. Information System Architecture: Application Communication Diagram-Migration Diagram- User Location Diagram-System use Case Diagram-Process System Realization Diagram-Enterprise Manageability diagram-Data Architecture-Service Data Diagram-

UNIT IV: Technology Architecture

9 Hrs

Environment and Location Diagram-Processing Diagram-Network Computing Hardware Diagram-Benefits Diagram. SOA Processes and Information:SOA-Business Processes-Information-TOGAF Within AMUE, EDF. Archimate.

UNIT V:

9 Hrs

Draw Business Process Diagram Using UML and BPMN.

Total Hours: 45

Text Book:

1. Philippe Desfray, Gilbert Raymond (2014) –Modelling Enterprise Architecture with TOGAF A Practical Guide Using UML and BPMN. Elsevier Pub.

Reference Books:

1. Peter Rittgen, (2007)-Enterprise Modeling and Computing with UML , Idea Group Publishing.
2. Marc Lankhorst et al (2013) , The Enterprise Engineering Series, Springer



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BCS17EXX	NIL	Any other that is important time to time based on Industry Demand	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty



Department of Information Technology

8TH SEM ELECTIVES E-VI AND E-VII (Common to CSE&IT)

Subject Code: BCS17E28	Subject Name : Information Storage Management	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BCS17004	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

OBJECTIVE :

- Provides a comprehensive understanding of the various storage infrastructure components in data center environments.
- It enables participants to make informed decisions on storage-related technologies in an increasingly complex IT environment
- The adoption of software-defined infrastructure management and third platform technologies.
- It provides a strong understanding of storage technologies and prepares participants for advanced concepts, technologies, and processes.
- To learn the architectures, features, and benefits of intelligent storage systems
- Includes block-based, file-based, object-based, and unified storage; software-defined storage; storage networking technologies such as FC SAN, IP SAN, and FCoE SAN; business continuity solutions such as backup and replication; the highly-critical area of information security; and storage infrastructure management.

COURSE OUTCOMES (COs) : (3- 5)

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

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	H	H	H	H	H	H	H
CO2	H	H	M	H	H	H	M	H	H	H	H	H
CO3	H	H	H	H	H	H	M	M	H	M	H	M
CO4	H	H	H	H	H	M	M	M	H	H	H	H
CO5	H	H	H	H	H	H	M	M	H	M	H	M
COs /PSOs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	H	H	H	H	H	H	H	H	H	H	H	H
CO2	H	H	M	H	H	H	M	H	H	H	H	H
CO3	H	H	M	H	H	H	M	M	H	M	H	M
CO4	H	H	M	H	H	M	M	M	H	H	H	H
CO5	H	H	H	H	H	H	M	M	H	M	H	M

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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							

Approval	27 th meeting of Academic Council, June 2017
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BCS17E28	BCS17004	INFORMATION STORAGE MANAGEMENT	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- To have a comprehensive understanding of the various storage infrastructure components in data center environments.
- To make informed decisions on storage-related technologies in an increasingly complex IT environment
- To have strong understanding of storage technologies and prepares participants for advanced concepts, technologies, and processes.
- To learn the architectures, features, and benefits of intelligent storage systems
- To learn about storage concepts and networking technologies such as FC SAN, IP SAN, and FCoE SAN

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, 2nd 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.



Department of Information Technology

Subject Code: BCS17E29	Subject Name : Network Infrastructure Management						Ty / Lb/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: BCS17I01						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												
OBJECTIVE : To learn Network Layers functionality, to acquire knowledge about and VLANs, and to test. Network security and wireless security.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1		Understand the use of network infrastructure										
CO2		Recognize the importance and relevance of VLANs and EIGRP										
CO3		Troubleshoot the network infrastructure										
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	H	H	H	M	M	M	M	M	H	H
CO2	H	H	M	H	M	H	M	H	H	H	M	H
CO3	H	H	M	H	H	M	H	M	H	M	H	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		M		H		M		M	
CO2	M		H		H		H		H		H	
CO3	H		H		H		H		M		M	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E29	BCS17I01	NETWORK INFRASTRUCTURE MANAGEMENT	C	L	T/SL	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- To learn Network Layers functionality
- To acquire knowledge about and VLANs
- To understand IP routing, EIGRP and OSPF
- To test Network security and wireless security

UNIT I: Internetworking & Ip Addressing**9Hrs**

Internetworking Models – Layered Approach – OSI Reference Models – Ethernet Networking – Cabling – Data Encapsulation – Three Layer Hierarchical model – core layer – distribution layer – Access layer – TCP/IP and DoD Model – IP Addressing – Hierarchical IP Addressing scheme – Broadcast Address.

UNIT II: Subnetting, VLSM And Ios**9Hrs**

Subnetting basics – CIDR – VLSM Design – Summarization – Troubleshooting IP Addressing – IOS user interface – CLI – Router and switch Administrative Configuration – Router Interfaces – viewing, saving, and erasing configuration

UNIT III: Managing Internetwork And Ip Routing**9Hrs**

Internal component of a Router – routing boot sequence – configuration register – backing up and restoring configuration – CDP – resolving hostnames – Checking network connectivity – IP routing basics – Static routing – default routing – dynamic routing – RIP – IGRP

UNIT IV: Eigrp, OSPF, STP and VLANs**9Hrs**

EIGRP features – RTP – DUAL – EIGRP to support large Networks –Configuring EIGRP - Load balancing – OSPF terminology – Configuring and verifying OSPF – DR and BDR elections – Loopback interfaces – troubleshooting – STP spanning tree terms and operations – VLANs Basics – memberships – VTP – Configuring VLAN – Inter VLAN routing.

UNIT V: ACLS, NAT and Wireless Technologies**9Hrs**

Access Lists, VTY access, advanced Access List, Named ACLs, monitoring Access List, configuring access list – NAT names – PAT configuration – NAT using SDM – Wireless technologies – Unified wireless solutions – split MAC architecture – MESH and LWAPP - wireless security

Total Hours: 45**Text Books:**

1. Todd Lammle, 2011 “CCNA Cisco Certified Network Associate study guide – Wiley India.
2. Brian Hill, 2013 “The complete Reference - Cisco ” Tata McGraw-Hill.

Reference Books:

1. Richard Deal, 2013 “CCNA Cisco Certified Network Associate study guide” Tata McGraw-Hill.
2. Steven Latre et al 2015 “Intelligent Mechanism for Network Component and Security” Springer.



Department of Information Technology

Subject Code: BCS17E30	Subject Name : Foundations of Parallel Programming						Ty / Lb/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: BCS17007						T	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												
OBJECTIVE : Fundamental concepts of Multi threaded, Parallel and Distributed Computing paradigms of parallel programs. Systematic methods for developing parallel programs. Techniques typical for parallel programming in Java.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Understanding of Concurrent Programming Concepts											
CO2	Understand and handle Semaphores and Monitors											
CO3	Learn the Message Passing methods and Process Interaction for Parallel Programming											
CO4	Understand the practical parallel programming scenarios and possibilities											
CO5												
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	M	L	L	L	L	M	M	L	M	L
CO2	H	H	M	L	L	L	L	M	M	L	M	L
CO3	H	M	M	L	L	L	L	M	M	L	M	L
CO4	H	M	M	L	L	L	L	L	M	M	L	L
CO5												
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		L		M		L		L	
CO2	H		H		L		M		L		L	
CO3	H		M		L		M		L		L	
CO4	H		H		L		M		L		L	
CO5												
H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low												
Categor y	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E30	BCS17007	FOUNDATIONS OF PARALLEL PROGRAMMING	C	L	T/SL	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES

The students will be able to understand and to apply

- fundamental concepts of Multi threaded, Parallel and Distributed Computing paradigms of parallel programs,
- systematic methods for developing parallel programs,
- Techniques typical for parallel programming in Java;

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 Monitors**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



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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



Department of Information Technology

Subject Code: BCS17E31	Subject Name : VIRTUALIZATION							Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BIT17007							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												
OBJECTIVE : Candidates should know and understand the general concepts, theory and terminology of Virtualization.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1		Server virtualization and desktop virtualization										
CO2		Virtual machines installation, configuration and administration										
CO3		Introduction to networking fundamentals and layering structure										
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	M	L	M	L	L	L	L	L	L	M
CO2	H	M	M	L	M	L	L	L	L	L	L	M
CO3	H	M	M	L	M	L	L	L	L	L	L	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		M		L		M		M		L	
CO2	H		M		L		M		M		L	
CO3	H		M		L		M		M		L	
H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low												
Categor y	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E31	BIT17007	VIRTUALIZATION	C	L	T/SL	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- Candidates should know and understand the general concepts, theory and terminology of Virtualization.
- Work in Network virtualization

UNIT I: Overview of Virtualization**9Hrs**

Basics of Virtualization - Virtualization Types – Desktop Virtualization – Network Virtualization – Server and Machine Virtualization – Storage Virtualization – System-level or Operating Virtualization – Application Virtualization-Virtualization Advantages - Virtual Machine Basics – Taxonomy of Virtual machines - Process Virtual Machines - System Virtual Machines – Hypervisor - Key Concepts

UNIT II: Server Consolidation**9 Hrs**

Hardware Virtualization – Virtual Hardware Overview - Server Virtualization – Physical and Logical Partitioning - Types of Server Virtualization – Business cases for Server Virtualization – Uses of Virtual server Consolidation – Planning for Development – Selecting server Virtualization Platform

UNIT III: Network Virtualization**9Hrs**

Design of Scalable Enterprise Networks - Virtualizing the Campus WAN Design - WAN Architecture - WAN Virtualization - Virtual Enterprise Transport Virtualization–VLANs and Scalability - Theory Network Device Virtualization Layer 2 - VLANs Layer 3 VRF Instances Layer 2 - VFI's Virtual Firewall Contexts Network Device Virtualization - Data-Path Virtualization Layer 2: 802.1q - Trunking Generic Routing Encapsulation - IPsec L2TPv3 Label Switched Paths - Control-Plane Virtualization–Routing Protocols- VRF - Aware Routing Multi-Topology Routing.

UNIT IV: Virtualizing Storage**9Hrs**

SCSI- Speaking SCSI- Using SCSI buses – Fiber Channel – Fiber Channel Cables – Fiber Channel Hardware Devices – iSCSI Architecture – Securing iSCSI – SAN backup and recovery techniques – RAID – SNIA Shared Storage Model – Classical Storage Model – SNIA Shared Storage Model – Host based Architecture – Storage based architecture – Network based Architecture – Fault tolerance to SAN – Performing Backups – Virtual tape libraries.

UNIT V: Virtual Machines Products**9Hrs**

Xen Virtual machine monitors- Xen API – VMware – VMware products - VMware Features – Microsoft Virtual Server – Features of Microsoft Virtual Server

Total Hours: 45**Text Books:**

1. William von Hagen (2008) Professional Xen Virtualization, Wrox Publications
2. Chris Wolf, Erick M. Halter (2005) Virtualization: From the Desktop to the Enterprise, APress

Reference Books:

1. Reddy, Victor Moreno (2006) Network virtualization, Cisco Press
2. James E. Smith, Ravi Nair (2005) Virtual Machines: Versatile Platforms for Systems and Processes, Elsevier/Morgan Kaufmann
3. David Marshall, Wade A. Reynolds (2006) Advanced Server Virtualization: VMware and Microsoft Platform in the Virtual Data Center, Auerbach Publications



Department of Information Technology

Subject Code: BCS17E32	Subject Name : Hadoop Distributed File System	T y/ Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BCS17006	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

- **OBJECTIVE :** To understand the concepts of Distributed file system, to acquire knowledge about Hbase, YARN, PIG and OOZIE and to examine MapReduce types and formats.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Understand the application of distributed file system.
CO2	Recognize the importance and relevance of HDFS.
CO3	Create efficient application using Pig and Oozie.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	H	H	H	H	M	M	M	H	M	H	H
CO2	H	M	H	M	H	M	M	H	M	H	M	M
CO3	H	H	M	H	H	M	M	M	H	M	H	H
COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	H	H	M	H	M	M	H	M	M	H	M	M
CO2	M	M	H	M	H	M	M	H	M	H	M	M
CO3	H	H	H	H	H	M	M	M	M	H	M	M

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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							

Approval 27th meeting of Academic Council, June 2017

**Department of Information Technology**

BCS17E32	BCS17006	HADOOP DISTRIBUTED FILE SYSTEM	C	L	T/SL	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- To understand the concepts of Distributed file system
- To acquire knowledge about Hbase, YARN, PIG and OOZIE
- To understand MapReduce types and formats
- To examine Hadoop Usage
- To understand the concepts of NoSQL, Flume and Sqoop

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



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Text Books:

1. DT Editorial Services, 2016 “Big Data Black Book” dreamteck press .
2. Alex Holmes, 2015 “ Hadoop in Practice” dreamteck press.

Reference Books:

1. Tom White, 2015 “ Hadoop – The Definitive Guide 4th 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.



Department of Information Technology

Subject Code: BCS17E33	Subject Name : MOBILE DATABASES						Ty / Lb/ ETL	L	T / S.Lr	P/ R	C	
	Prerequisite: BCS17004						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												
OBJECTIVE : 1.To learn about the fundamentals of distributed databases 2. To understand Data Processing and mobility models 3. To learn about the Data Consistency and Concurrency Control mechanisms 4. To study mobile Database Recovery techniques and Wireless Information Broadcast schemes												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Design and implement a complete problem solution using current database technology											
CO2	Propose, implement and maintain database security mechanisms											
CO3	Become familiar with the expanding role of Mobile database technology.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	H	M	H	H	H	H	H
CO2	M	H	M	H	H	M		M	M	M	L	L
CO3	H	M	H	M	M	H	H	H		L	M	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	M				H		H		H		H	
CO2	H		H		M		L		H		L	
CO3	H		M		H		H		H		H	
H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low												
Categor y	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E33	BCS17004	MOBILE DATABASES	C	L	T/SLr	P/R	Ty /Lb /ETL/EV L
			3	3	0/0	0/0	Ty

OBJECTIVES:

- To learn about the fundamentals of distributed databases
- To understand Data Processing and mobility models
- To learn about the Data Consistency and Concurrency Control mechanisms
- To study mobile Database Recovery techniques and Wireless Information Broadcast schemes

UNIT I: Introduction**9Hrs**

Fully connected information space – Types of Mobility – Wireless Network Communication. Radio Frequency: Spectrum and Band – Cellular Communication - Continuous Connectivity – Structure of a Channel – Absence of Free Channel – Signal Fading – Frequency Reuse – PCS and GSM – PCS Personal Communication Service – Interface – Call Processing – GSM Global System for Mobile Communication – Location and Handoff Management – Location Management – Handoff Management – Roaming.

UNIT II: Fundamentals of Distributed Databases**9Hrs**

Conventional Database Architecture – Database Partition and Distribution – Database Processing – Transaction Structure – Serialization of Transactions – Serializability – Based Correctness Criteria – Serializability Theory – Degree of Isolation – Advanced Transaction Model – Nested Transaction Model – SAGA – Cooperative Transaction – ConTract – Flex Transaction – Introduction to Concurrency Control Mechanisms – Ways of Locking Data Items – The Phantom Problem – Multigranularity Locking – Heuristic Approach in Locking Schemes – Non-Locking Based Schemes

UNIT III: Data Processing and Mobility**9Hrs**

Effect of Mobility on the Management of Data – Transaction Management in Mobile Database Systems – Mobile Database System – Transaction Execution in MDS – Mobile Transaction Model – Execution Model based on ACID Transaction 230 CS-Engg&Tech-SRM-2013 Framework – Pre-write Transaction Execution Model – Mobile Transaction Models – HiCoMo – Moflex - Kangaroo – MDSTPM Transaction Execution Model – Mobilaction – Atomicity for Mobilaction – Isolation for Mobilaction – Consistency and Durability for Mobilaction

UNIT IV: Data Consistency and Concurrency**9Hrs**

Data Consistency in intermittent Connectivity - The Consistency Model – Weak Connectivity Operation – A Consistency Restoration Schema – Concurrency Control Mechanism – Transaction Commit – Commitment of Mobile Transactions – Transaction Commitment in Mobile Database Systems.



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UNIT V: Mobile Database Recovery

9Hrs

Log Management in Mobile Database Systems – Mobile Database Recovery Schemes – Wireless information Broadcast – introduction – Broadcast Disk – Broadcast Infrastructure – Exponential Index – Location-Based Indexing – OnDemand Data Scheduling – Data Dissemination System.

Total Hours: 45

Text Book:

1. Vijay Kumar , 2006 “Mobile Database Systems”, Wiley Inderscience Publication, 2006

Reference Books:

1. Leong (Hong VA) , 1999 Lee (Wang Chen), “Mobile Data Access”, Springer.
2. Rifaat A. Dayem, 1997 “Mobile Data & Wireless LAN Technologies”, Prentice Hall Inc.
3. TAN(Kian Lee), Franklin(Michael J), “Mobile Data Management”, Springer.



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Subject Code: BCS17E34	Subject Name : WEB ENGINEERING	Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BCS17I01	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

OBJECTIVE :

- To be able to analyze and design comprehensive systems for the creation, dissemination, storage, retrieval, and use of electronic records and documents
- 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.
- To learn techniques and evaluation metrics for ensuring the proper operability, maintenance and security of a web application.

COURSE OUTCOMES (COs) : (3- 5)

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.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	H	M	M	H	M	M	L	L	M	M
CO2	M	M	M	H	M	M	M	M	H	M	M	M
CO3	H	L	M	H	H	L	L	L	M	H	L	L
COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6						
CO1	M	M	M	H	H	H						
CO2	M	M	L	M	M	M						
CO3	L	L	M	M	L	L						

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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E34	BCS17I01	WEB ENGINEERING	C	L	T/SL	P/R	Ty /Lb /ETL/EV L
			3	3	0/0	0/0	Ty

OBJECTIVES:

- To be able to analyze and design comprehensive systems for the creation, dissemination, storage, retrieval, and use of electronic records and documents
- 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.
- To learn techniques and evaluation metrics for ensuring the proper operability, maintenance and security of a web application.

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.



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Subject Code: BCS17E35	Subject Name : 4G Networks							Ty / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: BCS17I01							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												
OBJECTIVE : To understand the latest technology in mobile communication and the high speed data communication through wireless network.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1		Able to develop new technology in wireless communication										
CO2		Capable to design new protocols for high speed mobile devices										
CO3		Able to design new air interface for effective communication in mobile technology										
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	H	L	H	M	M	H	H	H	H	M
CO2	H	M	M	M	H	H	M	M	H	H	H	M
CO3	H	H	H	M	L	H	M	M	H	M	H	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		M		M		H		H		H	
CO2	H		H		M		M		H		M	
CO3	H		M		M		M		H		M	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

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BCS17E35	BCS17I01	4G NETWORKS	C	L	T/SL	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- To understand the latest technology in mobile communication.
- To know recent development in wireless communication.
- To understand the high speed data communication through wireless network
- To learn the technology behind VoLTE, VoIP technology

UNIT I: LTE Network Architecture and Protocols**9 Hrs**

Evolution of 3GPP Standards-Radio Interface Techniques in 3GPP Systems-Radio Access Mode Operations-Spectrum Allocation in UMTS and LTE-EPS Interfaces-EPS Protocols and Planes-EPS Procedures.

UNIT II: LTE Air Interface and Procedures**9 Hrs**

LTE Protocol Stack - SDU and PDU - LTE Radio Resource Control (RRC) - LTE Packet Data Convergence Protocol Layer (PDCP)- LTE Radio Link Control (RLC)- LTE Medium Access Control (MAC) - LTE Physical Layer (PHY)- Channel Mapping of Protocol Layers- LTE Air Interface

UNIT III: Analysis and Optimization of LTE System Performance**9Hrs**

Deployment Optimization Processes - LTE Performance Analysis Based on Field Measurements - LTE Case Studies and Troubleshooting- LTE Inter-RAT Cell Reselection- Inter-RAT Cell Reselection Optimization Considerations- LTE to LTE Inter-frequency Cell Reselection- LTE Connected Mode Discontinuous Reception - Circuit Switch Fallback (CSFB) for LTE Voice Calls- Multiple-Input, Multiple-Output (MIMO) Techniques.

UNIT IV: Coverage And Capacity Planning Of 4G Networks**9 Hrs**

LTE System Foundation- PCI and TA Planning- PRACH Planning- Coverage Planning- LTE Throughput and Capacity Analysis.

UNIT V: Voice Evolution in 4G Networks**9 Hrs**

Voice over IP Basics- Voice Options for LTE- IMS Single Radio Voice Call Continuity- VoLTE Features- Deployment Considerations for VoLTE. Carrier Aggregation- Enhanced MIMO.

Total Hours: 45**Text Book:**

1. Design, Deployment and Performance of 4G-LTE Networks- A Practical Approach- Ayman Elnashar Emirates Integrated Telecomms Co., UAE- Mohamed A. El-saidny QUALCOMM Technologies, Inc., USA- Mahmoud R. Sherif Emirates Integrated Telecomms Co., UAE. Wiley Publication.

Reference Books:

1. Clint Smith, P.E., Daniel Collins, Wireless Networks: Design and Integration for TE,EVDO,HSPA and WiMax Third Generation.



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Subject Code:	Subject Name : ENTERPRISE RESOURCE PLANNING						Ty / Lb/ ETL	L	T / S.Lr	P/ R	C	
	BCS17E36						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												
OBJECTIVE : 1. Know basic business functional areas and explains how they are related. 2. Illustrate how unintegrated 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 3. 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												
COURSE OUTCOMES (COs) : (3- 5)												
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											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	H	H	H	H	H	L	H	M	H	H
CO2	H	H	H	M	H	H	H	M	H	H	H	H
CO3	H	M	H	H	H	M	H	L	H	M	H	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		H		H		M		H	
CO2	H		H		M		H		M		M	
CO3	H		H		H		M		H		H	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E36	NIL	ENTERPRISE RESOURCE PLANNING	C	L	T/SLr	P/R	Ty /Lb /ETL/EV L
			3	3	0/0	0/0	Ty

OBJECTIVES:

- Know basic business functional areas and explains how they are related.
- Illustrate how unintegrated 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.
- 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

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.



Department of Information Technology

Subject Code: BCS17E37	Subject Name : SUPPLY CHAIN MANAGEMENT						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												
OBJECTIVE : 1. For students to analytically solve problems related to inventory management, facility location, and supply chain optimization 2. To utilize computer resources to research and analyze supply chain operations. 3. To understand the global environment and strategic alliances in modern business and their impact on supply chain management												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Understand recent trends in green legislation with respect to supply chains.											
CO2	Understand the environmental impacts of supply chains and hence the need for green supply chains											
CO3	Integrate green practices, based on green legislation, into supply chain activities for sustainable development											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	M	H	H	L	H	M	H	H
CO2	H	H	M	H	H	H	H	M	H	M	H	H
CO3	H	H	H	H	M	M	H	L	H	M	H	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		H		H		L		M	
CO2	H		H		M		H		H		M	
CO3	H		H		M		H		H		H	
H/M/L indicates Strength of Correlation H- High, M- Medium, L-Low												
Categor y	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E37	NIL	SUPPLY CHAIN MANAGEMENT	C	L	T/SLr	P/R	Ty /Lb /ETL/EV L
			3	3	0/0	0/0	Ty

OBJECTIVES:

- This will provide the foundation for design and analysis of supply chains.
- For students to analytically solve problems related to inventory management, facility location, and supply chain optimization.
- To utilize computer resources to research and analyze supply chain operations.
- To understand the global environment and strategic alliances in modern business and their impact on supply chain management.

UNIT I: Introduction**9 Hrs**

Defining Supply Chain management and logistics management. Evolution. Supply Chain – Fundamentals, , and Importance. Supply chain strategy, Enablers/ Drivers of Supply Chain Performance. Supply Chain relationships.

UNIT II: Logistics Management**9 Hrs**

Logistics – functions, objectives, solution. Customer Service. Warehousing and Material Storage, Material Handling, Transportation and Packaging – 3PL and 4PL.

UNIT III: Network Design**9 Hrs**

Distribution Network Design – Role, Factors Influencing, Options, Value Additions. Models for Facility Location and Capacity allocation. Impact of uncertainty on Network Design. Network Design decisions using Decision trees.

UNIT IV: Sourcing And Inventory Management**9 Hrs**

Sourcing – Make vs buy decision, Creating World Class Supply base, World Wide Sourcing Inventory Management – managing cycle inventory, safety inventory. Value of information, Bullwhip effect, Coordination in supply chain, Analysing impact of supply chain redesign on the inventory.

UNIT V: Current Trends**9 Hrs**

E-Business – Framework and Role of Supply Chain in e- business and b2b practices. Supply Chain IT Framework.E-Supply Chains, E – Logistics- eSRM, eLRM, eSCM, Agile Supply Chains. Reverse Logistics, Global Logistics.

Total Hours: 45**Text Books:**

1. Bowersox Donald J, 2000 Logistical Management – The Integrated Supply Chain Process” Tata McGraw Hill.
2. Sunil Chopra and Peter Meindl, 2007 Supply Chain Management-Strategy Planning and Operation, Prentice Hall.

Reference Books:

1. Donald J. Bowersox, David J. Closs and M. Bixby Cooper, 2008 “Supply Chain Logistics Management”, Tata McGraw Hill.
2. Altekhar Rahul V, 2005 Supply Chain Management-Concept and Cases, Prentice Hall India.



Department of Information Technology

Subject Code:	Subject Name :							Ty / Lb ETL	L	T / S.Lr	P/ R	C
BCS17E38	MAIN FRAME COMPUTING											
	Prerequisite: BCS17004							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												
OBJECTIVE :												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Understand the concepts of MVS, JCL, VSAM and IDCAMS											
CO2	Write moderately complex COBOL programs to process files.											
CO3	Understand CICS and supply transactions											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	M	H	M	M	H	M	H	H
CO2	H	H	H	H	M	H	M	M	H	H	H	H
CO3	H	H	H	M	M	M	M	M	H	H	H	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		H		H		H		H	
CO2	H		H		M		H		M		M	
CO3	H		H		M		H		H		H	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E38	BCS17004	MAINFRAME COMPUTING	C	L	T/SLr	P/R	Ty /Lb /ETL/EVL
			3	3	0/0	0/0	Ty

OBJECTIVES:

- To understand the concepts of MVS, JCL, VSAM and IDCAMS
- To study the details of COBOL and DB2
- To understand CICS and supply transactions

UNIT I: MVS Concepts**9 Hrs**

Main frame in Today's Business -Introduction to Z series H/W , Z/OS .- MVS overview-system initialization-storage management-job management ISPF Editor ISPF Data Utility Functions - managing work-data management-I/O processing-termination and recovery.TSO commands-general syntax of JCL statements

UNIT II: JCL and VSAM**9 Hrs**

Explanation of job statements-explanation of EXEC statements-explanation of DD statements-additional parameters on JOB,EXEC,DD statements-classification-instream and catalog procedures-utilities-abend codes.VSAM data set organization structure-IDCAMS commands-JCL for VSAM-buffering-alternative index-repro-backup and recovery-export and import.

UNIT III: COBOL/370**9Hrs**

Structured programming constructs-fundamentals of COBOL-data definition-conditional statements-perform statements-compiler option-table definition-COBOL call and parameter passing-file handling.

UNIT IV: DB2**9Hrs**

RDBMS concepts-structural query language-normalisation-DB2 architecture-DB2 objects-locks-program preparation-cursors-null indicators-optimisation - utilities.

UNIT V: CICS**9 Hrs CICS**

introduction-terminal control-application housekeeping-EXEC,interface locks-supply transactions –CESM,CESF,CEMT,CEDF-NMDS-BMS-abend codes-file control-program control-TSQ-TDQ-pseudo conversation-recovery and roll back.

Total Hours: 45**Text Books:**

1. Mike Ebbers, John Kettner, Wayne O'Brien, Bill Ogden, (2011) Introduction to the New Mainframe: z/OS Basics, IBM Redbooks (SG24-6366-01)
2. Alexis Leon, IBM Mainframe Handbook, vikas Publishing, 2014

Reference Books:

1. M.K. Roy and D.Gosh Dastidar, (2006) COBOL PROGRAMMING, John Wiley And Sons
2. Stern & Stern (2007) STRUCTURED COBOL PROGRAMMING, (8th ed.), JOHN Wiley India
3. Grant Allen (2008) Beginning DB2 : from Novice to Professional, Apress
4. Mary Lovelace, Jose Dovidauskas, Alvaro Salo, Valerio Sokai, (2012) VSAM Demystified (SG246105) IBM Red Books.
5. Doug Lowe, (1994) MVS JCL, (2nd ed.), MIKE MURACH ASSOCIATE Saba Zamir, Chandan Ranade, (2007) MVS JCL Primer, McGrawhill



Department of Information Technology

Subject Code:	Subject Name :						Ty / Lb/ ETL	L	T / S.Lr	P/ R	C	
BCS17E39	Neuro Fuzzy Computing											
	Prerequisite: BCS17E06						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												
OBJECTIVE :												
<ul style="list-style-type: none">The students will be able to design and develop neuro fuzzy modeling and will have the ability to understand Neural Network.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	To know about the basics of soft computing techniques and also their use in some real life situations											
CO2	To solve the problems using neural networks techniques.											
CO3	To find the solution using different fuzzy logic techniques											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	M	H	H	M	H	H	M	L	H	H
CO2	H	H	M	H	H	M	H	H	M	M	H	H
CO3	H	H	M	H	M	M	M	H	M	L	H	H
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		M		H		H		H	
CO2	H		M		H		H		M		H	
CO3	H		M		H		H		H		H	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
				✓								
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E39	BCS17E06	NEURO FUZZY COMPUTING	C	L	T/SL	P/R	Ty /Lb /ETL/EV L
			3	3	0/0	0/0	Ty

OBJECTIVES:

- The students will be able to design and develop neuro fuzzy modeling and will have the ability to understand Neural Network.

UNIT I: Neuro – Fuzzy and Soft Computing Fuzzy Systems**9 Hrs**

Introduction to Fuzzy Sets – Fuzzy Rules and – Fuzzy Reasoning and – Inference- Fuzzy Inference Systems - Compositional Rules of Inference in Fuzzy System – Defuzzification Strategies , Fuzzy Models– System Identification – Several Least Square Methods – Optimization Techniques- Derivative-based Optimization, Derivative and Free Optimization.

UNIT II: Regression and Optimization**9 Hrs**

System Identification – Several Least Square Methods – Optimization Techniques- Derivative-based and Derivative Free Optimization.

UNIT III: Neural Network**9 Hrs**

Neural Network Architecture -Network Inputs and Outputs – Feed back Inter Connections and Network Stability – Feed Forward Networks –Back Propagation Networks- Learning Methods- Adaptive Networks – Supervised Learning Neural Networks –RBFN – Unsupervised Learning Networks - Self Organizing maps, Adaptive Resonance Architectures, Radial Basis Networks- LVQM , Principle Component Analysis.

UNIT IV: Neuro Fuzzy Modelling**9 Hrs**

Neural Component of a Fuzzy System – Fuzzy neural Network Controllers – Adaptive Neuro Fuzzy Inference System(ANFIS) – CANFIS – Neural Networks based Fuzzy Inference System - Classification and Regression Tests – Data Clustering Techniques and Algorithms – Rule base Structure Identification

UNIT V: Artificial Neural Networks Hardware**9 Hrs**

Implementation Issues – Evaluation of Neural network Architectures – Hardware Realization – VLSI approach – Optical techniques.

Total Hours: 45**Text Book:**

- Jyh-shing roger Jang, Chnesy-tasi sur, Eiji Miziltazui, “ *Neuro and Soft Computing: A Computational Approach to Learning and machine Intelligence*”, Pearson Education 2004, Digitized in 2007 ISBN 0132610663, 9780132610667

Reference Books:

- Timothy J.rass (2011), “ *Fuzzy Logic with Engineering Application*”, (3rd ed.)Wiley India,
- S.Rajasekaran , G.A.Vijayalakshmi Pai , *Neural N/Ws, Fuzzy Logic and Genetic Algorithm Sysnthesis and Applications*, PHI (2004)



Department of Information Technology

Subject Code:	Subject Name : WEB CONTENT MANAGEMENT						Ty / Lb/ ETL	L	T / S.Lr	P/ R	C	
BCS17E40	Prerequisite: BCS17E09						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												
OBJECTIVE : <ul style="list-style-type: none">To Lean the basics of Content Management SystemTo Learn the Tools and techniquesTo Learn the use of web browser,navigate to a web pageTo Learn the CMS tools for backup and customization												
COURSE OUTCOMES (COs) : (3- 5)												
CO1	Exploring CMS terminology, including open source, PHP, etc.,											
CO2	Capable of designing personalized template for content publishing.											
CO3	Implementing API code for text editor.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	H	L	H	M	M	H	H	H	H	M
CO2	H	M	M	M	H	H	M	M	H	H	H	M
CO3	H	H	H	M	L	H	M	M	H	M	H	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		M		M		H		H		H	
CO2	H		H		M		M		H		M	
CO3	H		M		M		M		H		M	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
					✓							
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E40	BCS17E09	WEB CONTENT MANAGEMENT	C	L	T/SLr	P/R	Ty /Lb /ETL/EV L
			3	3	0/0	0/0	Ty

OBJECTIVES:

The student should be able:

- To Learn the basics of Content Management System
- To Learn the Tools and techniques
- To Learn the use of web browser, navigate to a web page
- To Learn the CMS tools for backup and customization

UNIT I: Introduction to Content Management**9 Hrs**

CMS – Types of CMS –Create Content –System Versus implementation – Platform versus product – Open source versus commercial – management versus delivery – Content model manageability

UNIT II: Editorial Tools and Workflow**9 Hrs**

Shape of Content – Aggregation Models: Implicit and Explicit – URL Addressability of Aggregations – Content Lifecycle – workflow and approvals – Content File Management - Permissions

UNIT III: Output and Publication Management**9 Hrs**

Templating - Publishing Content – Multiple Language handling – Language Rules – Personalization, Analytics and Marketing Automation – Form Building – URL Management – Reporting Tools and Dashboards

UNIT IV: Implementation**9 Hrs**

APIs and Extensibility: Code API-Event Models-Customizing Rich Text Editors – CMS implementation – Types of implementation – Implementation process

UNIT V: Working With External Integrators**9 Hrs**

Engagement models – Sales and scoping – costs –Written agreements – Production – Training and support

Total Hours: 45**Text Book:**

1. Deane Barker, 2016, Web content Management systems, Features and Best Practices, O'Reilly Publications



Department of Information Technology

Subject Code:	Subject Name : Machine Learning							T / L/ ETL	L	T / S.Lr	P/ R	C
	BCS17E41							Prerequisite: BCS17E06	Ty	3	0/0	0/0
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits												
Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
➤ OBJECTIVE : To learn machine learning techniques, to acquire knowledge about clustering and nonparametric methods and to design and analyze machine learning experiments.												
COURSE OUTCOMES (COs) : (3- 5)												
CO1		Understand the concept of Machine Learning										
CO2		Recognize the importance and relevance of Machine Learning Models										
CO3		Design the efficient Machine Learning Application .										
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	M	H	H	M	M	M	H	M	H	H
CO2	M	H	M	H	H	M	M	H	M	H	M	H
CO3	H	H	M	H	H	M	H	M	H	M	H	M
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		M		M		H		M		M	
CO2	M		M		H		M		H		H	
CO3	H		H		H		M		M		M	
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	Practical / Project	Internships / Technical Skill	Soft Skills			
Approval	27 th meeting of Academic Council, June 2017											

**Department of Information Technology**

BCS17E41	BCS17E06	MACHINE LEARNING	C	L	T/SL	P/R	Ty /Lb /ETL/EV L
			3	3	0/0	0/0	Ty

OBJECTIVE:

- To learn machine learning techniques
- To acquire knowledge about clustering and nonparametric methods
- To understand multilayer perceptrons and dimensionality reduction
- To design and analyze machine learning experiments.

UNIT I: Introduction to Machine Learning**9Hrs**

Machine Learning – Machine learning applications – learning association – supervised learning – learning a class from examples – learning multiple classes – regression – model selection and generation – Bayesian decision theory – losses and risk – discriminant functions – association rules.

UNIT II: Parametric and Multivariate Methods**9Hrs**

Parametric methods – maximum likelihood estimation – Bayes' estimator – parametric classification – regression – tuning model – multivariate methods – multivariate data – multivariate normal distribution – multivariate regression – dimensionality reduction – subset selection – factor analysis – multidimensional scaling – Isomap

UNIT III: Clustering and Nonparametric Methods**9Hrs**

Clustering - Mixtures densities – k mean clustering – special and hierarchical clustering – Nonparametric density estimation – generalization to multivariate data – nonparametric classification – outlier data – decision trees – univariate trees – pruning – rule extraction from trees – multivariate trees.

UNIT IV: Linear Discrimination and Multilayer Perceptrons**9Hrs**

Linear discrimination – generalizing the linear model – pair wise separation – logistic discrimination – discrimination by regression – multilayer perceptrons – MLP – back propagation algorithms – training procedures – tuning – dimensionality reduction – deep learning – local models – competitive learning – radial basis – normalized basis – learning vector quantization - mixture of experts.

UNIT V: Kernel Machines and Graphical Models**9Hrs**

Kernel machine – optimal separating hyper plane – v SVM – multiple kernel learning – large margin nearest neighbour classifier – graphical models – generative models – d Separation - belief propagation – Hidden Markov models – Bayesian estimation – combining multiple learners – reinforcement learning.

Total Hours: 45**Text Books:**

1. Ethem Alpaydin, 2014 "Introduction to Machine Learning" 3rd Edition PHI
2. Snigdha Gollapudi, 2016 "Practical Machine Learning" PACKT.

Reference Books:

1. Tom M Mitchell, 2013 "Machine Learning" McGraw-Hill.
2. David Barber, 2015 "Bayesian Reasoning and Machine Learning" Cambridge University Press.