



Department of Computer Science and Engineering
B.Tech- Cyber Forensics and Information Security
Curriculum and Syllabus – 2018 Regulation

I SEMESTER							
S.NO.	SUBJECT CODE	SUBJECT NAME	C	L	T/ SLr	P/R	Ty/ Lb/ ETL
1	BEN18001	Technical English –I	2	1	0/0	2/0	Ty
2	BMA18001	Mathematics – I	4	3	1/0	0/0	Ty
3	BPH18001	Engineering Physics –I	3	2	0/1	0/0	Ty
4	BCH18001	Engineering Chemistry –I	3	2	0/1	0/0	Ty
5	BES18001	Basic Electrical & Electronics Engineering	3	2	0/1	0/0	Ty
6	BES18002	Basic Mechanical & Civil Engineering	3	2	0/1	0/0	Ty
PRACTICALS*							
1	BES18L01	Basic Engineering Workshop	1	0	0/0	2/0	Lb
2	BES18ET1	Orientation To Entrepreneurship & Project Lab	1	0	0/0	2/0	ETL

Credits Sub Total: 20

II SEMESTER							
S.NO.	SUBJECT CODE	SUBJECT NAME	C	L	T/ SLr	P/R	Ty/ Lb/ ETL
1	BMA18003	Mathematics – II	4	3	1/0	0/0	Ty
2	BPH18002	Engineering Physics –II	3	2	0/1	0/0	Ty
3	BCH18002	Engineering Chemistry – II	3	2	0/1	0/0	Ty
4	BES18003	Environmental Science*	Non credit course				Ty
PRACTICALS*							
1	BEN18ET1	Communication lab	1	1	0/0	2/0	ETL
2	BES18ET2	Basic engineering graphics	2	1	0/0	2/0	ETL
3	BES18L02	Integrated physical science lab	1	0	0/0	2/0	Lb
4	BES18ET3	C programming and lab	2	1	0/0	2/0	ETL

Credits Sub Total: 16

TOTAL CREDITS: 36

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



Department of Computer Science and Engineering

III SEMESTER							
S.NO.	SUBJECT CODE	SUBJECT NAME	C	L	T/SLr	P/R	Ty/Lb/ETL
1	BIS18001	Fundamentals of Networking	4	3	1/0	0/0	Ty
2	BIS18015	Cyber Criminology and Cyber Crime	3	3	0/0	0/0	Ty
3	BEC18I01	Digital Systems	3	3	0/0	0/0	Ty
4	BCS18014	Computer Organization and Architecture	3	3	0/0	0/0	Ty
5	BCS18002	Object Oriented Programming With C++	4	3	0/1	0/0	Ty
6	BMA18008	Discrete Mathematics	4	3	1/0	0/0	Ty
PRACTICALS*							
1	BCS18L02	Object Oriented Programming With C++ Lab	1	0	0/0	3/0	Lb
2	BIS18L01	Fundamentals of Networking Lab	1	0	0/0	3/0	Lb
3	BHS20ET5	Universal Human Values 2: Understanding Harmony	3	2	1/0	0/0	ETL

Credits Sub Total: 26

IV SEMESTER							
S.NO.	SUBJECT CODE	SUBJECT NAME	C	L	T/SLr	P/R	Ty/Lb/ETL
1	BIS18003	Fundamentals of Information Security and Cryptography	4	3	1/0	0/0	Ty
2	BMA18016	Statistics for Computer Engineers	4	3	1/0	0/0	Ty
3	BIS18004	TCP / IP	4	3	1/0	0/0	Ty
4	BIS18005	Fundamentals of Digital Forensics	4	3	1/0	0/0	Ty
5	BCS18015	Database Management Systems	3	3	0/0	0/0	Ty
6	BHS18NC1/ BHS18NC2	The Indian Constitution*/ The Indian Traditional Knowledge*	NC	2	0/0	0/0	Ty
PRACTICALS*							
1	BCS18L03	Database Management Systems Lab	1	0	0/0	3/0	Lb
2	BIS18L02	Information Security and Cryptography Lab	1	0	0/0	3/0	Lb
3	BIS18TS1	Technical Skill I	1	0	0/0	3/0	Lb
4	BEN18SK1	Soft Skill I (Career & Confidence Building)	1	0	0/0	3/0	ETL

Credits Sub Total: 23

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



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V SEMESTER

S.NO.	SUBJECT CODE	SUBJECT NAME	C	L	T/SLr	P/R	Ty/Lb/ETL
1	BIS18006	Advanced Networking	3	3	0/0	0/0	Ty
2	BIS18007	Advanced Digital Forensics	3	3	0/0	0/0	Ty
3	BIS18008	PERL / Python	4	3	0/1	0/0	Ty
4	BXXS18EXX	Elective I	3	3	0/0	0/0	Ty
5	BXX18OEX	Open Elective I	3	3	0/0	0/0	Ty
PRACTICALS*							
1	BIS18L03	Advanced Networking Lab	1	0	0/0	3/0	Lb
2	BIS18L04	Advanced Digital Forensics Lab	2	0	0/0	6/0	Lb
3	BIS18TS2	Technical Skill II	1	0	0/0	3/0	Lb

Credits Sub Total: 20

VI SEMESTER

S.NO.	SUBJECT CODE	SUBJECT NAME	C	L	T/SLr	P/R	Ty/Lb/ETL
1	BIS18009	Vulnerability Analysis / Penetration Testing	3	3	0/0	0/0	Ty
2	BIS18010	Advanced Information Security	3	3	0/0	0/0	Ty
3	BIS18011	Resilience Management	4	3	0/1	0/0	Ty
4	BXX18EXX	Elective II	3	3	0/0	0/0	Ty
PRACTICALS*							
1	BIS18L05	Vulnerability Analysis / Penetration Testing	1	0	0/0	3/0	Lb
2	BIS18L06	Advanced Information Security Lab	1	0	0/0	3/0	Lb
3	BSK18ET2	Soft Skill II (Qualitative and Quantitative Skills)	1	0	0/0	3/0	ETL
4	BIS18L07	Mini Project/In plant Training/Industrial training	1	0	0/0	3/0	Lb
5	BIS18TS3	Technical Skill III	1	0	0/0	3/0	Lb

Credits Sub Total: 18

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

R : Research Ty/Lb/ETL: Theory/Lab/Embedded Theory and Lab*Internal evaluation



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VII SEMESTER							
S.NO.	SUBJECT CODE	SUBJECT NAME	C	L	T/ SLr	P/R	Ty/ Lb/ ETL
1	BIS18012	Database Security	3	3	0/0	0/0	Ty
2	BIS18013	Application Security	3	3	0/0	0/0	Ty
3	BXX18EXX	Elective III	3	3	0/0	0/0	Ty
4	BXX18EXX	Elective IV	3	3	0/0	0/0	Ty
5	BMG18002	Management Concepts and Organizational Behavior	3	3	0/0	0/0	Ty
PRACTICALS*							
1	BIS18L08	Application Security Lab	1	0	0/0	3/0	Lb
2	BIS18L09	Database Security Lab	1	0	0/0	3/0	Lb
3	BIS18L10	Project Phase – I	2	0	0/0	3/3	Lb
4	BHS18FLX	Foreign Language	1	0	0/0	3/0	Lb

Credits Sub Total: 20

VIII SEMESTER							
S.NO.	SUBJECT CODE	SUBJECT NAME	C	L	T/ SLr	P/R	Ty/ Lb/ ETL
1	BIS18014	Web Security	3	3	0/0	0/0	Ty
2	BXX18EXX	Elective V	3	3	0/0	0/0	Ty
3	BXX18EXX	Elective VI	3	3	0/0	0/0	Ty
PRACTICALS*							
1	BIS18L11	Project (Phase – II)	8	0	0/0	12/12	Lb

Credits Sub Total: 17

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

Credit Summary

Semester : 1 : 20
 Semester : 2 : 16
 Semester : 3 : 26
 Semester : 4 : 23
 Semester : 5 : 20
 Semester : 6 : 18
 Semester : 7 : 20
 Semester : 8 : 17
Total Credits : 160



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ELECTIVE -I							
S.NO.	SUBJECT CODE	SUBJECT NAME	C	L	T/ SLr	P/R	Ty/ Lb/ ETL
1	BIS18E01	Protocol Filtering and Analysis	3	3	0/0	0/0	Ty
2	BIS18E02	Digital Forensic Lifecycle	3	3	0/0	0/0	Ty
3	BIS18E03	Network Infrastructure	3	3	0/0	0/0	Ty
4	BIS18E04	Digital Evidence	3	3	0/0	0/0	Ty

ELECTIVE -II							
S.NO.	SUBJECT CODE	SUBJECT NAME	C	L	T/ SLr	P/R	Ty/ Lb/ ETL
1	BIS18E05	Incident Response	3	3	0/0	0/0	Ty
2	BIS18E06	Mobile Forensics	3	3	0/0	0/0	Ty
3	BIS18E07	IT Risk Management	3	3	0/0	0/0	Ty
4	BIS18E08	Malware Analysis	3	3	0/0	0/0	Ty

ELECTIVE –III							
S.NO.	SUBJECT CODE	SUBJECT NAME	C	L	T/ SLr	P/R	Ty/ Lb/ ETL
1	BIS18E09	Identity and Access Management	3	3	0/0	0/0	Ty
2	BIS18E10	Virtualization	3	3	0/0	0/0	Ty
3	BIS18E11	Cloud Computing & Governance	3	3	0/0	0/0	Ty
4	BIS18E12	IOT Security & Smart City Security	3	3	0/0	0/0	Ty

ELECTIVE –IV							
S.NO.	SUBJECT CODE	SUBJECT NAME	C	L	T/ SLr	P/R	Ty/ Lb/ ETL
1	BIS18E13	Cyber Law	3	3	0/0	0/0	Ty
2	BIS18E14	Information Security Audits	3	3	0/0	0/0	Ty
3	BIS18E15	Data Carving	3	3	0/0	0/0	Ty
4	BIS18E16	Professional Ethics	3	3	0/0	0/0	Ty



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ELECTIVE -V

S.NO.	SUBJECT CODE	SUBJECT NAME	C	L	T/ SLr	P/R	Ty/ Lb/ ETL
1	BIS18E17	Intellectual Property Rights	3	3	0/0	0/0	Ty
2	BIS18E18	General Forensic Science	3	3	0/0	0/0	Ty
3	BIS18E19	BFSI& Telecom Frauds	3	3	0/0	0/0	Ty
4	BIS18E20	Cyber Terrorism	3	3	0/0	0/0	Ty

ELECTIVE -VI

S.NO.	SUBJECT CODE	SUBJECT NAME	C	L	T/ SLr	P/R	Ty/ Lb/ ETL
1	BIS18E21	Threats in Social Media	3	3	0/0	0/0	Ty
2	BIS18E22	Data Privacy	3	3	0/0	0/0	Ty
3	BIS18E23	Social Network Analysis	3	3	0/0	0/0	Ty
4	BIS18E24	Criminal Justice Administration	3	3	0/0	0/0	Ty



Department of Computer Science and Engineering

SEMESTER – I

DEPARTMENT OF ENGLISH

Subject Code : BEN18001	Subject Name : TECHNICAL ENGLISH - I	C	L	T/S.Lr	P/R
	Prerequisite : None	2	1	0/0	2/0

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

OBJECTIVES :

- Strengthen their vocabulary in both technical and business situations
- Get practice in functional grammar
- Learn the effective way of corresponding with officials
- Learn to give instructions, suggestions, recommendations and comprehend and infer the information from the given passages.
- 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
			✓						



Department of Computer Science and Engineering

Subject Code	Subject Name	C	L	T/S. Lr	P/R	Ty/Lb/ ETL
BEN18001	TECHNICAL ENGLISH - I	2	1	0/0	2/0	Ty

OBJECTIVES :

- Strengthen their vocabulary in both technical and business situations
- Get practice in functional grammar
- Learn the effective way of corresponding with officials
- Learn to give instructions, suggestions, recommendations and comprehend and infer the information from the given passages.
- Strain learners in organized academic and professional writing in LSRW skills

UNIT I VOCABULARY BUILDING

6HRS

The concept of Word Formation-Root words and affixes from foreign languages and their use in English to form derivatives.-Homophones- Words often confused-Verbal analogy

UNIT II BASIC WRITING SKILLS

6HRS

Using Idioms and phrases in sentences-Sentence structures: statements, interrogative and imperative-Use of Conditional/if clauses in sentences-Importance of proper punctuation-Creating coherence with sentence markers-Organizing coherent paragraphs in essays

UNIT III IDENTIFYING COMMON ERRORS IN WRITING

6 HRS

Subject-verb agreement-Noun-pronoun agreement- Misplaced modifiers-Articles-Prepositions- Redundancies and Clichés

UNIT IV WRITING PRACTICE- NATURE AND STYLE OF TECHNICAL WRITING

6 HRS

Describing Gadgets- Defining Concepts-Classifying data-Comprehension-Essay Writing-Informal and Formal Letter Writing:

UNIT V ORAL COMMUNICATION AND INTERACTIVE LEARNING

6HRS

(This unit involves interactive practice sessions in Language Lab)

Activities to develop knowledge in Word formation, Vocabulary and analytical thinking-Instructions and – Recommendations-Formal and Informal Registers in Speech-Listening and taking notes

Total no. of periods : 30

TEXT BOOK :

Quest : A Textbook of Communication Skills, Vijay Nicole, 2017.

Pushkala, R, Padmasani Kannan S, Anuradha V, Chandrasena M Rajeswaran

SUGGESTED READINGS:

(i) *Practical English Usage*. Michael Swan. OUP. 1995.

(ii) *Remedial English Grammar*. F.T. Wood. Macmillan.2007

(iii) *On Writing Well*. William Zinsser. Harper Resource Book. 2001

(iv) *Study Writing*. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006.

(v) *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.

(vi) *Exercises in Spoken English*. Parts.I-III. CIEFL, Hyderabad. Oxford University Press

(vi) Pronunciation in Use ,Mark Hancock. Cambridge University Press. 2012



Department of Computer Science and Engineering

DEPARTMENT OF MATHEMATICS

Subject Code : BMA18001	Subject Name : MATHEMATICS – I	C	L	T/S.Lr	P/R
	Prerequisite : None	4	3	1/0	0/0

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

OBJECTIVES :

- Apply the Basic concepts in Algebra
- Use the Basic concepts in Matrices
- Identify and solve problems in Trigonometry
- Understand the Basic concepts in Differentiation
- Apply the Basic concepts in Functions of Several variables

COURSE OUTCOMES (COs) :

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
	✓								



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Subject Code	Subject Name	C	L	T/S.Lr	P/R	Ty/Lb/ETL
BMA18001	MATHEMATICS – I	4	3	1/0	0/0	Ty

OBJECTIVES :

- Apply the Basic concepts in Algebra
- Use the Basic concepts in Matrices
- Identify and solve problems in Trigonometry
- Understand the Basic concepts in Differentiation
- Apply the Basic concepts in Functions of Several variables

UNIT I ALGEBRA

12Hrs Binomial,

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

UNIT II MATRICES

12Hrs

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

UNIT III TRIGONOMETRY

12Hrs

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.

UNIT IV DIFFERENTIATION

12Hrs

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

UNIT V FUNCTIONS OF SEVERAL VARIABLES

12Hrs

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

Total Hours : 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).

REFERENCE BOOKS:

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 Computer Science and Engineering

DEPARTMENT OF PHYSICS

Subject Code : BPH18001	Subject Name : ENGINEERING PHYSICS - I	C	L	T/S.Lr	P/R
	Prerequisite : None	3	2	0/1	0/0

L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits
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OBJECTIVES :

- Outline the relation between Science, Engineering & Technology.
- Demonstrate competency in understanding basic concepts.
- Apply fundamental laws of Physics in Engineering & Technology.
- To identify & solve applied Physics problems.
- 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
	✓								



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Subject Code	Subject Name	C	L	T/S. Lr	P/R	Ty/Lb/ ETL
BPH18001	ENGINEERING PHYSICS - I	3	2	0/1	0/0	Ty

UNIT I MECHANICS & PROPERTIES OF MATTER

9Hrs

Mechanics : Introduction- scalar and vector quantities - rigid body - moment of inertia - forces in nature - Newton's laws of motion - derivation of Newton's second law of motion - motion of rocket – dynamical concepts - kinematics - conservation of energy and momentum - conservative and non-conservative forces - mechanics of continuous media - friction and its applications.

Properties of Matter: Elasticity - stress, strain and Hook's law - Poisson's ratio - three moduli of elasticity - twisting couple on a wire - viscosity - flow of liquid through a narrow tube: Poiseuille's law - Ostwald's viscometer - flow of blood in human body.

UNIT II SHM AND ACOUSTICS

9Hrs

SHM: Simple harmonic motion - differential equation of SHM - graphical representation of SHM - average kinetic energy of vibration - total energy of vibration - free and forced vibrations - damped and undamped vibrations - resonance - transverse wave on a string - law of transverse vibration of string - verification of the laws of transverse vibration of string - standing waves.

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

UNIT III WAVE OPTICS

9Hrs

Huygen's principle - interference of light - wavefront splitting and amplitude - airwedge - Newton's rings - Michelson interferometer and its applications - Fraunhofer diffraction from a single slit - Rayleigh criterion for limit of resolution - diffraction grating and resolving power of a telescope.

UNIT IV ELECTROMAGNETIC THEORY

9Hrs

Electric field - coulomb's law - alternating emf - rms and average value of an alternating current & voltage - resistors, capacitors and inductor - energy stored in a capacitor - LCR circuit & resonance – magnetism- definition - types - Biot Savart law - energy stored in a magnetic field - Domain theory - electromagnetic induction - self and mutual inductance - Faraday's law of electromagnetic induction -Lenz law.

UNIT V LASER

9Hrs

Laser principle and characteristics - amplification of light by population inversion - properties of laser beams: mono-chromaticity, coherence, directionality and brightness - different types of lasers - Ruby laser-Nd-YAG laser-He-Ne laser-CO₂ laser - semiconductor laser - applications of lasers in science, engineering and medicine.

Total Hours : 45

TEXT BOOKS :

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

REFERENCE BOOKS:

1. Dr. Senthil Kumar *Engineering Physics I* VRB Publishers, 2016
2. N Subrahmanyam & Brijlal, *Waves and Oscillations*, Vikas Publications, New Delhi, 1988
3. N Subrahmanyam & Brijlal, *Properties of Matter*, S. Chand Co., New Delhi, 1982
4. N Subrahmanyam & Brijlal, *Text book of Optics*, S. Chand Co., New Delhi, 1989
5. R. Murugesan, *Electricity and Magnetism*, S. Chand & Co., New Delhi, 1995
6. Thygarajan K & Ajay Ghatak, *Laser Theory and Applications*, Macmillan, New Delhi, 1981



Department of Computer Science and Engineering

DEPARTMENT OF CHEMISTRY

Subject Code : BCH18001	Subject Name : ENGINEERING CHEMISTRY – I	C	L	T/S.Lr	P/R
	Prerequisite : None	3	2	0/1	0/0

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

OBJECTIVES :

- Providing an insight into basic concepts of chemical thermodynamics.
- To create awareness about the water quality parameters, water analysis and softening of water from industrial perspective.
- Imparting fundamentals of emf, storage and fuel cells.
- Creating awareness about corrosion and its control methods.
- 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
	√								



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Department of Computer Science and Engineering

Subject Code	Subject Name	C	L	T/S.Lr	P/R	Ty/Lb/ ETL
BCH18001	ENGINEERING CHEMISTRY – I	3	2	0/1	0/0	Ty

UNIT I CHEMICAL THERMODYNAMICS

8Hrs

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.

UNIT II TECHNOLOGY OF WATER

9Hrs

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.

UNIT III ELECTROCHEMISTRY AND ENERGY STORAGE DEVICES

10Hrs

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.

UNIT IV CORROSION AND PROTECTIVE COATING

9Hrs

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

UNIT V POLYMERS AND COMPOSITES

9Hrs

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 Hours : 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.

REFERENCE BOOKS:

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 Mc Graw Hill (1996).
3. B.R.Puri, L.R.Sharma & M.S.Pathania, “Principles of Physical Chemistry”, Vishal publishing co., (2013).



Department of Computer Science and Engineering

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Subject Code : BES18001		Subject Name : BASIC ELECTRICAL & ELECTRONICS ENGINEERING					C	L	T/S.Lr	P/R		
		Prerequisite : None					3	2	0/1	0/0		
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : <ul style="list-style-type: none">Understand the concepts of circuit elements, circuit laws and coupled circuits.Acquire knowledge on conventional &non conventional energy production.Gain information on measurement of electrical parameters.Identify basic theoretical principles behind the working of modern electronic gadgets.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	PO 10	PO11	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												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	/		Internships Technical Skills	Soft Skills	
		√										



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Department of Computer Science and Engineering

Subject Code	Subject Name	C	L	T/S. Lr	P/R	Ty/Lb/ ETL
BES18001	BASIC ELECTRICAL & ELECTRONICS ENGINEERING	3	2	0/1	0/0	Ty

UNIT I ELECTRIC CIRCUITS

9Hrs

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.

UNIT II MACHINES & MEASURING INSTRUMENTS

9Hrs

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.

UNIT III BASICS OF POWER SYSTEM

9Hrs

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

UNIT IV ELECTRON DEVICES

9Hrs

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

UNIT V DIGITAL SYSTEM

9Hrs

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 Hours : 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,

REFERENCE BOOK:

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



Department of Computer Science and Engineering
DEPARTMENT OF MECHANICAL ENGINEERING

Subject Code : BES18002	Subject Name : BASIC MECHANICAL & CIVIL ENGINEERING						C	L	T/S.Lr		P/R	
	Prerequisite : None						3	2	0/1		0/0	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : <ul style="list-style-type: none">Learn Basics of Internal Combustion Engines, power plants and boilersDemonstrate How metals are formed, joined, using machining operations Lathe, Milling and Drilling machinesTo identify & solve problems in Engineering MechanicsLearn basics of Building materials and constructionKnow 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												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	/		Internships Technical Skills	Soft Skills	
		√										



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Subject Code	Subject Name	C	L	T/S.Lr	P/R	Ty/Lb/ETL
BES18002	BASIC MECHANICAL & CIVIL ENGINEERING	3	2	0/1	0/0	Ty

UNIT I THERMAL ENGINEERING

9 Hrs

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 Hrs

Metal forming processes – Rolling, forging, drawing, extrusion and sheet metal operations- fundamentals only. Metal Joining processes – Welding - arc and gas welding, Soldering and Brazing. Casting process – Patterns -Moulding tools - Types of moulding - Preparation of green sand mould -Operation of Cupola furnace. Basics of metal cutting operations – Working of lathe- parts-Operations performed. Drilling machine – Classification – Radial drilling machine - Twist drill nomenclature.

UNIT III MECHANICS

9 Hrs

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

UNIT IV BUILDING MATERIALS AND CONSTRUCTION

7 Hrs

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

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

UNIT V ROADS, RAILWAYS, BRIDGES & DAMS

7 Hrs

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

Total Hours : 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

REFERENCE BOOKS:

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



Department of Computer Science and Engineering

DEPARTMENT OF ENGINEERING SCIENCES

Subject Code : BES18L01	Subject Name : BASIC ENGINEERING WORKSHOP	C	L	T/S.Lr	P/R
	Prerequisite : None	1	0	0/0	2/0

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

OBJECTIVES :

- Familiarize the plumbing tools, fittings, carpentry tools, etc.
- Identify basic electrical wiring and measurement of electrical quantities.
- Identify Electronic components ,logic gates and soldering process
- Display simple fabrication techniques
- 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
							√		



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Department of Computer Science and Engineering

Subject Code	Subject Name	C	L	T/S.Lr	P/R	Ty/Lb/ ETL
BES18L01	BASIC ENGINEERING WORKSHOP	1	0	0/0	2/0	Lb

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. 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.
4. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
5. Fluorescent lamp wiring.
6. Stair case wiring

ELECTRONIC ENGINEERING PRACTICE

1. Study of Electronic components and equipments – Resistor, colour coding measurement of AC signal parameter (peak- peak, rms period, frequency) using CRO
2. Soldering practice – Components Devices and Circuits – Using general purpose PCB



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Department of Computer Science and Engineering
Abdul Kalam CoE for Innovation & Entrepreneurship

Subject Code : BES18ET1	Subject Name : ORIENTATION TO ENTREPRENEURSHIP & PROJECT LAB						C	L	T/S.Lr		P/R	
	Prerequisite : None						1	0	0/0		2/0	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : <ul style="list-style-type: none">Understand how entrepreneurship Education transforms individuals into successful leaders.Identify individual potential &S have career dreamsUnderstand difference between ideas & opportunitiesIdentify components & create action plan.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											
C05	Identify the required skills for entrepreneurship & develop											
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		
							√					



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Subject Code	Subject Name	C	L	T/S.Lr	P/R	Ty/Lb/ ETL
BES18ET1	ORIENTATION TO ENTREPRENEURSHIP & PROJECT LAB	1	0	0/0	2/0	ETL

UNIT I CHARACTERISTICS OF A SUCCESSFUL ENTREPRENEUR 3HRS

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

UNIT II ENTREPRENEURIAL STYLE 3HRS

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

UNIT III DESIGN THINKING 3HRS

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

UNIT IV RISK MANAGEMENT 3HRS

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

UNIT V PROJECT 3HRS

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

Total : 15 periods



Department of Computer Science and Engineering

SEMESTER – II

DEPARTMENT OF MATHEMATICS

Subject Code : BMA18003	Subject Name : MATHEMATICS – II	C	L	T/S.Lr	P/R
	Prerequisite : None	4	3	1/0	0/0

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

OBJECTIVES :

- Understand the Basic concepts in Integration
- Identify the Basic concepts in Multiple integrals
- Use the Basic concepts in Ordinary Differential equations
- Apply the Basic concepts of Analytical Geometry
- 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
	✓								

Department of Computer Science and Engineering

Subject Code	Subject Name	C	L	T/S.Lr	P/R	Ty/Lb/ ETL
BMA18003	MATHEMATICS – II	4	3	1/0	0/0	Ty

UNIT I INTEGRATION

12 Hrs

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

UNIT II MULTIPLE INTEGRALS

12Hrs

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).

3UNIT III ORDINARY DIFFERENTIAL EQUATIONS

12 Hrs

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

UNIT IV THREE DIMENSIONAL ANALYTICAL GEOMETRY

12Hrs

Direction

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

UNIT V VECTOR CALCULUS

12 Hrs

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

Total Hours : 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).

REFERENCE BOOKS:

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).



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DEPARTMENT OF PHYSICS

Subject Code : BPH18002	Subject Name : ENGINEERING PHYSICS – II	C	L	T/S.Lr	P/R							
	Prerequisite : None	3	2	0/1	0/0							
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : <ul style="list-style-type: none">• Design, conduct experiment and analyze data.• Develop a Scientific attitude at micro and nano scale of materials• Understand the concepts of Modern Physics• 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			
	√											



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Subject Code	Subject Name	C	L	T/S.Lr	P/R	Ty/Lb/ ETL
BPH18002	ENGINEERING PHYSICS - II	3	2	0/1	0/0	Ty

UNIT I QUANTUM PHYSICS

9 Hrs

Quantum free electron theory - deBroglie waves - derivation of deBroglie waves - Davisson and Germer experiment - uncertainty principle - electron microscope - scanning electron microscope - physical significance of wave function - Schrodinger wave equation and its applications - Fermi energy- effective mass - phonons - Fermi function-density of states - origin of bandgap in solids - 1D scattering of electrons in periodic potential.

UNIT II SEMICONDUCTORS

9 Hrs

Introduction - properties of semiconductors - classification of semiconductor - effect of temperature in semiconductor - hole current - carrier concentration in intrinsic semiconductor (electron and hole density) - variation of Fermi energy level and carrier concentration with temperature in an intrinsic semiconductor - carrier transport - diffusion - drift - mobility - Hall effect - determination of Hall coefficient and its applications - diodes.

UNIT III LIGHT SEMICONDUCTOR INTERACTION

9 Hrs

Types of electronic materials: metals, semiconductors and insulators - qualitative analysis of extrinsic semiconductor & its applications - optical transition in bulk semiconductors: absorption, spontaneous and stimulated emission - exciton and its types - traps and its types - colour centers and its types and importance - luminescence - classifications of luminescence based on excitation - optical loss and gain - Photovoltaic effect - Photovoltaic potential - spectral response - solar energy converters - solar cells.

UNIT IV OPTO ELECTRONIC DEVICES

9 Hrs

Photodetectors - photoconductors - photodiodes principle, construction, working and characteristics - Phototransistors - Laser diodes - LED theory, construction and working - seven segment display, advantages of LED - LCD theory, construction and working.

UNIT V ENGINEERED MATERIALS

9 Hrs

Classification of engineered materials - nano phase materials - its synthesis and properties - shape memory alloys and its applications - biomaterials - non linear materials - metallic glasses - metamaterials - homo and hetero junction semiconductors - semiconducting materials for optoelectronic devices - quantum wells, wires and dots.

Total Hours : 45

TEXT BOOKS:

1. P.K. Palanisamy, Semiconductor Physics and Optoelectronics, Scitech Publications, 2010
2. Jyoti Prasad Bandyopadhyay, Semiconductor Devices, S. Chand Publications, 2014
3. Charles Kittel, Introduction to Solid State Physics, Wiley Publications, 2012

REFERENCE BOOKS:

1. S. Shubhashree, S. Bharathi Devi & S. Chellammal Madhusudanan, Engineering Physics, Sree Lakshmi Publications, 2004
2. G. Senthil Kumar, N. Iyandurai, & G. Vijayakumar, Material Science, VRB Publishers, 2017
3. R.Murugesan & Kiruthigasivaprakash, Modern Physics, 14th edition, S. Chand & Co, 2008
4. Pallab Bhattacharya, Semiconductor optoelectronic devices, second edition, Pearson Education, 2003
5. V Rajendran & A. Marikani, Materials Science, Tata McGraw- Hill, New Delhi, 2004



Department of Computer Science and Engineering
DEPARTMENT OF CHEMISTRY

Subject Code : BCH18002	Subject Name : ENGINEERING CHEMISTRY – II	C	L	T/S.Lr	P/R							
	Prerequisite : None	3	2	0/1	0/0							
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : <ul style="list-style-type: none">• Imparting the basic concepts of phase rule and apply the same to one and two component systems.• Introducing the chemistry of engineering materials such as cement, lubricants, abrasives, refractories, alloys and nano materials.• To impart a sound knowledge on the principles of chemistry involving different application oriented topics• Introducing salient features of fuels and combustion.• To give an overview on modern analytical techniques												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	Understand the science of phase equilibria and apply the phase rule to different systems.											
CO2	Gain an overview of Engineering Materials such as Lime, Cement, Lubricants, Abrasives, Refractories, Alloys and Nanomaterials.											
CO3	Recognize the essential information about consumer products such as Soaps and Detergents, also gaining the basic knowledge about Explosives and Propellants.											
CO4	Discover the fuel Chemistry and Combustion process.											
CO5	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												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	/	Internships Technical Skills	Soft Skills		
	√											



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Department of Computer Science and Engineering

Subject Code	Subject Name	C	L	T/S. Lr	P/R	Ty/Lb/ ETL
BCH18002	ENGINEERING CHEMISTRY – II	3	2	0/1	0/0	Ty

UNIT I PHASE EQUILIBRIA

8 Hrs

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.

UNIT II MATERIAL CHEMISTRY

10 Hrs

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.

UNIT III APPLIED CHEMISTRY

9 Hrs

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.

UNIT IV FUELS & COMBUSTION

9 Hrs

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.

UNIT V ANALYTICAL AND CHARACTERIZATION TECHNIQUES

9 Hrs

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 Hours : 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.

REFERENCE BOOKS:

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



Department of Computer Science and Engineering
DEPARTMENT OF ENGINEERING SCIENCES

Subject Code : BES18003		Subject Name : ENVIRONMENTAL SCIENCE (Non- Credit Course)					C	L	T/S.Lr		P/R	
		Prerequisite : None					-	-	-		-	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : <ul style="list-style-type: none">To acquire knowledge of the Environment and Ecosystem & BiodiversityTo acquire knowledge of the different types of Environmental pollutionTo know more about Natural ResourcesTo gain understanding of social issues and the EnvironmentTo 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			
			√									



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Department of Computer Science and Engineering

Subject Code	Subject Name	C	L	T/S. Lr	P/R	Ty/Lb/ ETL
BES18003	ENVIRONMENTAL SCIENCE					Ty

UNIT I ENVIRONMENT AND ECOSYSTEM

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

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

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

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

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

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).

REFERENCE BOOKS:

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 Computer Science and Engineering
DEPARTMENT OF ENGLISH

Subject Code : BEN18ET1		Subject Name : COMMUNICATION LAB						C	L	T/S.Lr		P/R
		Prerequisite : None						1	1	0/0		2/0
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : The Student should be able to <ul style="list-style-type: none">• Use appropriate vocabulary and structure for effective interpersonal and academic communication• Interpret charts, diagrams, advertisements, etc.,• Participate in group discussions and present project effectively• Present project and ideas effectively• Attend interviews												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course will be able to												
CO1		Use appropriate vocabulary and structure for effective interpersonal and academic communication										
CO2		Interpret charts, diagrams, advertisements, etc.,										
CO3		Participate in group discussions and present project effectively										
CO4		Present project and ideas effectively										
CO5		Attend 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		
CO2										H		
CO3										H		
CO4										H		
CO5										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			
			√									



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Subject Code	Subject Name	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL
BEN18ET1	COMMUNICATION LAB	1	1	0/0	2/0	ETL

OBJECTIVES :

The Student should be able to

- Use appropriate vocabulary and structure for effective interpersonal and academic communication
- Interpret charts, diagrams, advertisements, etc.,
- Participate in group discussions and present project effectively
- Present project and ideas effectively
- Attend interviews

UNIT I

6HRS

Listening and Speaking- Informal and Formal Contexts\

UNIT II

6HRS

Interpretation of charts/ Diagrams – Group Discussion

UNIT III

6HRS

Compeering –Anchoring – Welcome Speech – Vote of Thanks

UNIT IV

8HRS

Formal Presentation -Power point presentation – Poster Presentation

UNIT V

4HRS

Interview

SUGGESTED READINGS:

- (i) *Practical English Usage*. Michael Swan. OUP. 1995.
- (ii) *Remedial English Grammar*. F.T. Wood. Macmillan.2007
- (iii) *On Writing Well*. William Zinsser. Harper Resource Book. 2001
- (iv) *Study Writing*. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006.
- (v) *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
- (vi) *Exercises in Spoken English*. Parts.I-III. CIEFL, Hyderabad. Oxford University Press
- (vi) *Pronunciation in Use* ,Mark Hancock. Cambridge University Press. 2012



Department of Computer Science and Engineering
DEPARTMENT OF MECHANICAL ENGINEERING

Subject Code : BES18ET2	Subject Name : BASIC ENGINEERING GRAPHICS						C	L	T/S.Lr	P/R		
	Prerequisite : None						2	1	0/0	2/0		
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : <ul style="list-style-type: none">Learn to know what kind of pencils to be used to sketch lines, numbers, Letters and Dimensioning in drawing sheet.Draw Projection of points, line, planes and solids using DraftersTo identify the angle of projection and development of surfaces, isometric projection and Orthographic projectionKnow the basics of elevation and plan of building.Learn the basics of Drafting using AutoCAD Software												
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/P Os	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			
		√										



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Department of Computer Science and Engineering

Subject Code	Subject Name	C	L	T/S. Lr	P/R	Ty/Lb/ ETL
BES18ET2	BASIC ENGINEERING GRAPHICS	2	1	0/0	2/0	ETL

CONCEPTS AND CONVENTIONS (Not for examination)

3 Hrs

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

UNIT I PROJECTION OF POINTS, LINES AND PLANE SURFACES

6 Hrs

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

UNIT II PROJECTION OF SOLIDS

6 Hrs

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

UNIT III DEVELOPMENT OF SURFACES AND ISOMETRIC PROJECTION

6 Hrs

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 ORTHOGRAPHICS PROJECTIONS

6 Hrs

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 Hrs

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

Total Hours: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.

REFERENCE BOOKS:

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

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
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.



Department of Computer Science and Engineering

Subject Code : BES18L02	Subject Name : INTEGRATED PHYSICAL SCIENCE LAB	C	L	T/S.Lr	P/R
	Prerequisite : None	1	0	0/0	2/0

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

OBJECTIVES :

- Demonstrate the ability to make physical measurements & understand the limits of precision in measurements.
- Display the ability to measure properties of variety of electrical, mechanical, optical systems. To help learners measure conductivity and EMF using electrical equipment.
- To understand the analytical skills through chromatography & viscometry
- To familiarize the concepts of cheminformatics

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 mechanical, optical, electrical and electronic systems.
CO3	Familiarizing the titration methods using conductometry & potentiometry
CO4	Developing the Research spirit through the knowledge of Cheminformatics & Analytical skills.

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	H							
CO2	H	H	M	H	H					M		
CO3	H	H	M	H	H				H			
CO4	H	H	H	H	H				H		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
	✓								



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Department of Computer Science and Engineering

Subject Code	Subject Name	C	L	T/S.Lr	P/R	Ty/Lb/ ETL
BES18L02	INTEGRATED PHYSICAL SCIENCE LAB	1	0	0/0	2/0	Lb

LIST OF EXPERIMENTS

1. Determination of Coefficient of Viscosity of a given liquid by Poiseuille's method.
2. Particle Size determination using Laser Source.
3. Determination of Numerical Aperture of an Optical Fiber.
4. Spectrometer- Refractive Index/Dispersive power/i-d curve.
5. Potentiometer - Resistance of a wire.
6. Transistor Characteristics - Input Resistance, Output Resistance and Gain .
7. Studies on acid-base conductometric titration.
8. Determination of redox potentials using potentiometry.
9. Determination of R_f values of various components using thin layer chromatography.
10. Viscosity studies using Digital capillary viscometer.
11. Compute the structures of the given polymers, drugs, biomolecules using Chem Draw.
12. Studies on potential energy surface of the given molecules.
13. Estimate NMR spectra from a Chem Draw structure.



Department of Computer Science and Engineering
DEPARTMENT OF COMPUTER SCIENCE

Subject Code : BES18ET3	Subject Name : C PROGRAMMING AND LAB						C	L	T/S.Lr		P/R	
	Prerequisite : None						2	1	0/0		2/0	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : <ul style="list-style-type: none">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/P Os	PO1	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												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	/	Internships Technical Skills	Soft Skills		
		✓										



Department of Computer Science and Engineering

Subject Code	Subject Name	C	L	T/S.Lr	P/R	Ty/Lb/ ETL
BES18ET3	C PROGRAMMING AND LAB	2	1	0/0	2/0	ETL

UNIT I INTRODUCTION

6Hrs

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

UNIT II EXPRESSION AND STATEMENT

6 Hrs

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

UNIT III ARRAYS AND FUNCTIONS

6 Hrs

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.

UNIT IV STRUCTURES AND POINTERS

6HrsWorking with

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

UNIT V STRINGS AND FILE HANDLING

6 Hrs

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 Hours: 30

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

REFERENCE BOOKS :

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.



Department of Computer Science and Engineering

SEMESTER – III

Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18001	FUNDAMENTALS OF NETWORKING	4	3	1/0	0/0	Ty

OBJECTIVES:

At the end of this session the students will be able to understand:

- Basics Concepts of Networking
- Protocols required for Networking and their function and
- How to implement and manage a network environment

UNIT I BASICS OF NETWORKING AND NETWORK TOPOLOGIES 12 Hrs

Networking Concepts - Logical or physical network topologies - Star/Hierarchical – bus - mesh - ring - wireless

UNIT II MAIN FEATURES 12 Hrs

Main features of 802.2 (LLC), 802.3 (Ethernet), 802.5 (token ring), 802.11b (wireless) and FDDI networking technologies - Speed - Access - Method - Media – Characteristics of 10BASE-T, 100BASE-TX , 10BASE2, 10BASE5, 100BASE-FX, Gigabit Ethernet

UNIT III MEDIA CONNECTORS AND THEIR USES 12 Hrs

RJ-11 - RJ-45 - AUI - BNC - ST

UNIT IV NETWORK DEVICES 12 Hrs

Purpose, features - Hubs , Switches , Bridges , Routers , Gateways, CSU/DSU , Network Interface Cards/ISDN adapters/system area network cards , Wireless access points , Modems

UNIT V MAC ADDRESS 12 Hrs

Concepts and applications - Seven layers of the OSI model and their functions - IP addresses (Ipv4, Ipv6) and their default subnet masks.

Total Hours: 60

TEXT BOOK:

1. Huitema, C., Routing in the Internet, 2nd ed., Prentice-Hall, 2000. Keshav, S., An Engineering Approach to Computer Networking, Addison-Wesley, 1997

REFERENCE BOOKS:

1. Tanenbaum, A., (1996), "Computer Networks", 3rd ed., Prentice-Hall, Wright and Stevens, TCP/IP Illustrated v.2, Addison-Wesley.
2. Peterson and Davie, "Computer Networks: A Systems Approach," 2nd ed., Morgan Kaufmann, 2000



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Department of Computer Science and Engineering

Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18015	CYBER CRIMINOLOGY AND CYBER CRIME	3	3	0/0	0/0	Ty

OBJECTIVES:

This paper will provide a detailed knowledge on cyber crime behavior and the concepts of cyber crime.

UNIT I

9 Hrs

Definition – Crime, Tort, Vice, Cyber Crime, Cyber Criminology, history of cybercrimes in India – uniqueness and challenges of cyber crimes

UNIT II

9 Hrs

Forms of Cyber Crimes – Virus, Worms, Hacking, Cracking, Phishing, Salami Attack, DoS, DDoS, Cyber Bullying, Cyber Staking, cyber harassment, cyber defamation, social media crimes, Financial and Economic crimes through cyber space

UNIT III

9 Hrs

Cyber Crime Behaviour – Application of Criminological, Sociological and Psychological Theories in understanding cyber crimes.

UNIT IV

9 Hrs

Cyber Crime Modus Operandi – Types of Modes Operandi – Cyber Criminal Profiling

UNIT V

9 Hrs

Cyber Crime and Criminal Justice Agencies – Cyber Crime cells, Cyber Crime Appellate – Cyber Crime Investigation – Investigation Procedures – F.I.R. – Charge Sheet

Total Hours: 45

TEXT BOOK:

1. Prof .V Paranjape, “Criminology, Penology and Victimology”, Central Law Publication, Paperback, 2017
2. Ram Ahuja, “Criminology”, Rawat Publication, Reprinted 2015
3. Mohamed Chawki, Ashraf Darwish, Mohammad Ayoub Khan, Sapna Tyagi, “Cybercrime, Digital Forensics and Jurisdiction” Springer; 2015 edition (23 March 2015), ISBN-13: 978-3319151496
4. Chuck Easttom, “Computer Crime, Investigation, and the Law”, Paperack Edition Delmar Cengage Learning, 2010

REFERENCE BOOKS:

1. *Burke, Roger Hopkins, “Introduction to Criminological Theory”, Willan Publishing; 4th New edition, 2013*
2. *Srivastava S S, “Criminology and Criminal Administration”, Central Law Agency, New Delhi, Paperback, 2017*



Department of Computer Science and Engineering

Subject Code: BEC18I01	Subject Name : DIGITAL SYSTEMS					C	L	T/S. Lr	P/R	Ty/L b/ ETL		
	Prerequisite: BES18001					3	3	0/0	0/0	Ty		
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVE : <ul style="list-style-type: none">To introduce number systems and codes and its conversionsTo introduce Boolean algebra and its applications in digital systemsTo introduce the design of various combinational digital circuits using logic gatesTo 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		PSO5		PSO6	
CO1	L		H		L		L		M		L	
CO2	L		H		L		L		M		L	
CO3	H		M		L		L		M		M	
CO4	H		M		L		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	Soft Skills			
		✓										



Department of Computer Science and Engineering

SUBJECT CODE	SUBJECT NAME	C	L	T/S.Lr	P/R	Ty /Lb /ETL
BEC18I01	DIGITAL SYSTEMS	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 Computer Science and Engineering

Subject Code: BCS18014	Subject Name : COMPUTER ORGANIZATION AND ARCHITECTURE	C	L	T / S.Lr	P/ R	Ty /Lb /ETL
	Prerequisite: BEC18I02	3	3	0/0	0/0	Ty

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

OBJECTIVES :

- To 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 / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5		PSO6	
CO1	H		H		M		H		L		H	
CO2	H		H		L		H		M		H	
CO3	M		H		M		M		L		M	
CO4	M		H		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			
				✓								



Department of Computer Science and Engineering

SUBJECT CODE	SUBJECT NAME	C	L	T/S.Lr	P/R	Ty /Lb /ETL
BCS18014	COMPUTER ORGANIZATION AND ARCHITECTURE	3	3	0/0	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

9 Hrs

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

UNIT II ARITHMETIC AND LOGIC UNIT

9 Hrs

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

UNIT III PROCESSOR UNIT

9 Hrs

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

UNIT IV MEMORY SYSTEM

9 Hrs

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

UNIT V INPUT/OUTPUT AND PERIPHERALS

9 Hrs

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

Total Hours: 45

TEXT BOOKS:

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

REFERENCE BOOKS:

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



Department of Computer Science and Engineering

Subject Code: BCS18002	Subject Name : OBJECT ORIENTED PROGRAMMING WITH C++	C	L	T / S.Lr	P/ R	Ty/Lb/ETL
	Prerequisite: BES18ET2	4	3	0/1	0/0	Ty

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

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.
- 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	PSO5	PSO6
CO1	H	H	M	H	H	H
CO2	H	M	H	H	M	H
CO3	M	H	M	L	M	H
CO4	H	H	M	H	M	H
CO5	H	M	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			
				✓								



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Department of Computer Science and Engineering

Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BCS18002	OBJECT ORIENTED PROGRAMMING WITH C++	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.
- To understand the concepts of Java programs and develop basic networking programs using Java

UNIT I BASICS, TOKENS, EXPRESSIONS

12 Hrs

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

UNIT II FUNCTIONS, CLASSES AND OBJECTS

12 Hrs

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

UNIT III CONSTRUCTORS AND DESTRUCTORS

12 Hrs

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

UNIT IV INHERITANCE

12 Hrs

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

UNIT V POINTERS, VIRTUAL FUNCTIONS AND POLYMORPHISM

12 Hrs

Introduction to Memory Management, new Operator and delete Operator, Pointer to Objects, this Pointer, Pointers to Derived Classes, Polymorphism, Compile time polymorphism, Run time polymorphism, Virtual Functions, Pure Virtual Functions, Virtual Base Classes, Virtual Destructors.

Total Hours: 60

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 Computer Science and Engineering

Subject Code : BMA18008	Subject Name : DISCRETE MATHEMATICS	C	L	T/SLr	P/R	Ty /Lb /ETL
	Prerequisite : None	4	3	1/0	0/0	Ty

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

OBJECTIVES :

- 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) :

Students completing the course were able to

CO1	Find the summation of the given series logical equations and predicate calculus.
CO2	To determine the functions of permutation and combination.
CO3	To understand the concept of group theory and analysis operation of set operations.
CO4	Apply knowledge and concepts in finding the derivative of given function and to find the maxima / minima of the given function using lattices.
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
	✓								



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Department of Computer Science and Engineering

SUBJECT CODE	SUBJECT NAME	C	L	T/S.Lr	P/R	Ty /Lb /ETL
BMA18008	DISCRETE MATHEMATICS	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)

OBJECTIVES :

- To understand the Basic concepts in Logic and Predicate calculus
- To understand the Basic concepts in Combinatory
- 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 Hours: 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 Computer Science and Engineering

Subject Code: BCS18L02	Subject Name : OBJECT ORIENTED PROGRAMMING WITH C++ LAB						C	L	T / S.Lr	P/ R	Ty /Lb /ETL	
	Prerequisite: BES18ET2						1	0	0/0	3/0	Lb	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVES : <ul style="list-style-type: none">1.To develop skills to design and analyze simple linear and non linear data structures2.To Strengthen the ability to identify and apply the suitable data structure for the given real world problem3. 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	PO 9	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		PSO5		PSO6	
CO1	H		H		H		H		H		H	
CO2	H		M		H		M		H		H	
CO3	H		H		M		H		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			
							✓					



Department of Computer Science and Engineering

Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BCS18L02	OBJECT ORIENTED PROGRAMMING WITH C++ LAB	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.
 - a. If statement
 - b. Switch case statement and do while loop
 - c. For loop
 - d. While loop
2. Programs to Understand Structure & Unions.
 - a. Structure
 - b. Union
3. Programs to Understand Pointer Arithmetic.
4. Functions & Recursion.
 - a. Function
 - b. Recursion
5. Inline Functions.
6. Programs to Understand Different Function Call Mechanism.
 - a. Call by reference & Call by Value
8. Programs to Understand Storage Specifiers.
8. Constructors & Destructors.
9. Use of “this” Pointer, using class
10. Programs to Implement Inheritance and Function Overriding.
 - a. Multiple inheritances –Access Specifiers
 - b. Hierarchical inheritance – Function Overriding /Virtual Function
11. Programs to Overload Unary & Binary Operators as Member Function & Non Member Function.
 - a. Unary operator as member function
 - b. Binary operator as non member function
12. Programs to Understand Friend Function & Friend Class.
 - a. Friend Function
 - b. Friend class
13. Programs on Class Template



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Department of Computer Science and Engineering

Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18L01	FUNDAMENTALS OF NETWORKING LAB	1	0	0/0	3/0	Lb

OBJECTIVES:

The fundamentals of networking lab will assist a student in getting firsthand knowledge on:

- Understanding the establishment of different topologies, cabling, domain controller and client server architecture
- How to assign the rights to users in a networked system and
- The functions of routers, firewalls and IDS

Sessions:

1. Understanding different types of topologies e.g.: Bus, Star and Ring topologies.
2. LAN Installation and Configuration
3. IP subnet addressing – Network & Transport Layers
4. Setting up of a simple network and subnet it.
5. TCP/IP Connectivity
6. Analyzing Logs, routing protocols.
7. Encapsulation & Multiplexing
8. HTTP interaction using Telnet
9. Understanding Client – Server Architecture
10. Understanding the concept of workgroup.
11. Understanding and configuring file sharing between computers.
12. Installing and configuring network switch.



Department of Computer Science and Engineering

Subject Code: BHS20ET5	SubjectName: UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY	L	T/S.Lr	P/R	C							
	Prerequisite:None, UHV1 (Desirable)	2	1/0	0/0	3							
L:LectureT :Tutorial SLr: SupervisedLearning P:Project R:ResearchC:CreditsT/L/ETL:Theory/Lab/Embedded Theoryand Lab												
OBJECTIVES: Human Values Courses: During the Induction Program, students would get an initial exposure to human values through Universal Human Values – I. This exposure is to be augmented by this compulsory full semester foundation course.												
1. Development of a holistic perspective based on self- exploration about themselves (human being), family, society and nature/existence. 2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence 3. Strengthening of self-reflection. 4. Development of commitment and courage to act.												
COURSEOUTCOMES(Cos) :(3–5) The students will be ableto												
CO1	Relate self and surroundings and identify responsibility in life											
CO2	Associate human relationship and nature to handle problems and provide sustainable solutions											
CO3	Develop critical ability and engage in reflective and independent Thinking											
CO4	Show commitment towards understanding of values											
CO5	Apply Human values in day to day setting in real life											
Mappingof CourseOutcomeswithProgramOutcomes(POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			1	1		2	1		1	1		2
CO2			2	2	1	2	3	1		2		2
CO3			1	1	1	2			1	2		3
CO4			2		1	1	1	3	1	1		3
CO5			1			2	1	2	1	1		3
Cos/PSOs		PSO1			PSO2			PSO3			PSO4	
CO1		1			1			1			1	
CO2		2			2			2			2	
CO3		1			1			1			1	
CO4		1			1			1			2	
CO5		1			2			2			1	
3/2/1indicatesstrengthofcorrelation3 –High,2–Medium,1– Low												
Category	BasicSci ences	EnggSci ences	Humaniti es &SocialS ciences	Program	Program Electives	OpenEle ctives	Practical /Project		Internship s /	SoftS kills		
			√									



BHS20ET5 Universal Human Values 2: Understanding Harmony 2 1/0 0/03

UNIT I

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

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

UNIT II

Understanding Harmony in the Human Being - Harmony in Myself!

Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’.- Understanding the needs of Self (‘I’) and ‘Body’ - happiness and physical facility. - Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer). - Understanding the characteristics and activities of ‘I’ and harmony in ‘I’ - Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail - Programs to ensure Sanyam and Health.

Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one’s own life Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

UNIT III

Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship - Understanding the meaning of Trust; Difference between intention and competence - Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship - Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals - Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationship. Discuss with scenarios. Elicit examples from students’ lives.

UNIT IV

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

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



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UNIT V

Implications of the above Holistic Understanding of Harmony on Professional Ethics

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

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

Text Book

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

Reference Books

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



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SEMESTER – IV

Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18003	FUNDAMENTALS OF INFORMATION SECURITY AND CRYPTOGRAPHY	4	3	1/0	0/0	Ty

OBJECTIVES:

This paper on fundamentals of information security is intended to provide

- Basics of Information Security, Security Policies and Procedures along with its standards and guidelines
- An overview of risk analysis, risk management and access control and;
- The importance of physical security and techniques involved in physical security.

UNIT I FUNDAMENTALS OF INFORMATION SECURITY 12 Hrs

Definition - Information Security – Threats - Vulnerability – Risk - Business Requirements - Security Policies – Procedures – Standards- Guidelines, Retention and Disposal of Information Assets - Provide Authorization for Access – Owner, Custodian, User

UNIT II RISK ANALYSIS & RISK MANAGEMENT 12 Hrs

Risk Analysis Process - Asset Definition - Threat Identification - Determine Probability of Occurrence - Risk Mitigation - Control Types/Categories - Cost/Benefit Analysis

UNIT III ACCESS CONTROL - USER 12 Hrs

Identity and Access Management - Account Authorization - Operating Systems Access Controls - Monitoring Systems Access Controls - Intrusion Detection System - Event Logging

UNIT IV INTRODUCTION CRYPTOGRAPHY 12 Hrs

Classical Systems, Caesar, substitutions, transpositions - The Shannon approach - Product ciphers, confusion & diffusion, P & S boxes - Shift registers – Public key Systems – RSA - Knapsacks - NP completeness - Crypto complexity - Packing - Hamming codes

UNIT V CRYPTOGRAPHY 12 Hrs

Vocabulary - History - Steganography - Visual , Textual , Cipher hiding, False errors - Public key cryptography - Authentication , Signatures - RSA - Modes - Random numbers - Attacking systems

Total Hours: 60

TEXT BOOK:

1. Dhillon, G., *Principles of Information Systems Security: text and cases*, John Wiley & Sons, 2007.

REFERENCES BOOKS:

1. Easttom, C., *Computer Security Fundamentals (2nd Edition)* Pearson Press, 2011.
2. Peltier, Thomas R. (2002). *Information Security Policies, Procedures, and Standards: guidelines for effective information security management*. Boca Raton, FL: Auerbach publications. ISBN 0-8493-1137-3



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Subject Code : BMA18016	Subject Name : STATISTICS FOR COMPUTER ENGINEERS	C	L	T/SLr	P/R	Ty /Lb /ETL
	Prerequisite : None	4	3	1/0	0/0	Ty

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

OBJECTIVES :

- 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) :

Students completing the course were able to

CO1	Find the summation of the given series.
CO2	To determine the functions of permutation and combination.
CO3	To understand the concept of corelation operations.
CO4	Apply knowledge and concepts in finding the derivative of given function and to find the maxima / minima of the given function using lattices.
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
	✓								



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SUBJECT CODE	SUBJECT NAME	C	L	T/S.Lr	P/R	Ty /Lb /ETL
BMA18016	STATISTICS FOR COMPUTER ENGINEERS	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) – CSE,IT)

OBJECTIVES:

- 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 (9thed)*, Prentice Hall of India, (2016).



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18004	TCP / IP	4	3	1/0	0/0	Ty

OBJECTIVES:

End of reading this paper a student will be able to appreciate:

- The properties and functioning of TCP / IP
- What is connection establishment and termination with respect TCP and the algorithms relating to it, switching technology and traffic engineering with IP switching ; and
- How TCP/IP have an edge over ATM networks.

UNIT I

12 Hrs

TCP / IP – Properties – Reliable Transport Service – Sliding Window Protocol – Segments – Basics – File Transfer Protocol

UNIT II

12 Hrs

TCP header- services - Connection establishment and termination - Interactive data flow - Bulk data flow – Flow control and Retransmission - TCP timers - Urgent Data processing – Congestion control – Extension headers - Timeout and Retransmission - Karn's algorithm - Tail Drop policy - RED Algorithm – Congestion – Silly Window Syndrome

UNIT III

12 Hrs

Internet Protocol -IP Datagram-IP Package-IP forwarding and routing algorithms-computing paths-RIOSPF- ICMP-IGMP

UNIT IV

12 Hrs

IP Switching and Traffic Engineering - Switching technology- MPLS fundamentals – signaling protocols – LDP – IP traffic engineering – ECMP – SBR – Routing extensions for traffic engineering – Traffic engineering limitations and future developments.

UNIT V

12 Hrs

TCP/IP over ATM networks – Basics , AAL types, Packet format

Total Hours: 60

TEXT BOOK:

1. Richard Stevens, "TCP/IP illustrated", Published by Addison-Wesley.

REFERENCE BOOKS:

1. Douglas Comer's, "Internetworking with TCP/IP", Published by Prentice-Hall
2. Eric A. Hall, " Internet Core Protocols", Published by O'Reilly



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18005	FUNDAMENTALS OF DIGITAL FORENSICS	4	3	1/0	0/0	Ty

OBJECTIVES:

After studying this paper a student will be able to follow:

- The fundamentals of Digital Forensics
- Basic Techniques involved in digital forensics investigation; and
- Digital Forensic practice relating to internet

UNIT I DIGITAL FORENSICS

12 Hrs

Definition, Nature and Scope. Role of Forensic Analyst and forensic tools – Traditional Analysis vs Tools-based Analysis – Forensic Analysis Tools Requirements

UNIT II TYPES OF FORENSIC INVESTIGATIONS

12 Hrs

Branches of Investigations – Document Examination – Fingerprint Analysis – Handwriting Analysis – Crime Scene Investigation – Criminalistics – Ballistics – Crime Scene Photography

UNIT III SEIZURE OF COMPUTERS

12 Hrs

Preparations to be made before seizure - Actions at the scene - Treatment of exhibits. Witness statements, briefing case officers and Counsel - An outline on recovery of evidence from computers.

UNIT IV ANALYSIS CATEGORIES

12 Hrs

Physical Media – Media Management – File System Analysis – Application Analysis – Network Analysis- Memory Analysis

UNIT V DIGITAL FORENSIC TOOLS CATEGORIES

12 Hrs

Disk & Data capture tools – File Viewers – File Analysis Tools - Network Forensic Tools – Database Forensics Tools – Mobile Devices Analysis Tools – Email Analysis Tools – Internet Analysis Tools – Registry Analysis Tools

Total Hours: 60

TEXT BOOK:

1. **John Sammons (2012)**, The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics published by Elsevier, ISBN: 978-1-59749-661-2
2. Brown, C. "Computer Evidence: Collection & Preservation." Hingham: Thomson/Delmar. 2006.

REFERENCE BOOKS:

1. Eoghan Casey (2009), "Handbook of Digital Forensics and Investigation" published by Elsevier Science and Technology
2. Vacca, J, Computer Forensics, Computer Crime Scene Investigation(2005), 2nd Ed, Charles River Media, 2005, ISBN: 1-58450-389.
3. Carrier, B. "Digital Forensics Tool Testing Images." Accessed 06 Feb 2011. <http://dfft.sourceforge.net/>



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Subject Code: BCS18015	Subject Name : DATABASE MANAGEMENT SYSTEMS						C	L	T / S.Lr	P/ R	Ty /Lb /ETL	
	Prerequisite: BCS18001						3	3	0/0	0/0	Ty	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVES : <ul style="list-style-type: none">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		<ul style="list-style-type: none">Understand the most fundamental DBMS concepts and techniques										
CO2		<ul style="list-style-type: none">Learn techniques required for building, maintaining, and querying databases.										
CO3		<ul style="list-style-type: none">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		PSO5		PSO6	
CO1	H		H		H		M		H		H	
CO2	M		M		H		L		M		M	
CO3	M		H		M		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			
				✓								



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SUBJECT CODE	SUBJECT NAME	C	L	T/S.Lr	P/R	Ty /Lb /ETL
BCS18015	DATABASE MANAGEMENT SYSTEMS	3	3	0/0	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

9 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

9 Hrs

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

UNIT III FILE STRUCTURE, INDEXING & HASHING

9 Hrs

File and system structure – overall system structure – file transaction – data dictionary – indexing and hashing basic concepts and B+ tree Indices - static and dynamic hash functions

UNIT IV QUERY PROCESSING AND TRANSACTIONS

9 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

9 Hrs

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

Total Hours: 45

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Ramez, E. Shamkant, B. Navathe (2008) Fundamentals of database systems (5th ed.), Pearson Education
2. Date, C. J, (2012) An Introduction to Database Systems (8th ed.), Pearson Education



Department of Computer Science and Engineering

Subject Code: BHS18NC1	Subject Name THE INDIAN CONSTITUTION	C	L	T / S.Lr	P/ R	Ty /Lb /ETL
	Prerequisite: NIL	NC	2	0/0	0/0	Ty

L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits

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

OBJECTIVES:

- To provide an overview of the history of the making of Indian Constitution
- To understand the preamble and the basic structures of the Constitution.
- To Know the fundamental rights, duties and the directive principles of state policy
- To understand the functionality of the legislature, the executive and the judiciary

COURSE OUTCOMES (COs) : After studying this course the student would be able to

CO1	To provide an overview of the history of the making of Indian Constitution
CO2	To understand the preamble and the basic structures of the Constitution.
CO3	To Know the fundamental rights, duties and the directive principles of state policy

Mapping of Course Outcomes with Program Outcomes (POs)

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



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SUBJECT CODE	SUBJECT NAME	C	L	T/S.Lr	P/R	Ty /Lb /ETL
BHS18NC1	THE INDIAN CONSTITUTION	NC	2	0/0	0/0	Ty

OBJECTIVES:

- To provide an overview of the history of the making of Indian Constitution
- To understand the preamble and the basic structures of the Constitution.
- To know the fundamental rights, duties and the directive principles of state policy
- To understand the functionality of the legislature, the executive and the judiciary

UNIT I **3Hrs**

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

UNIT II **3Hrs**

Fundamental Rights and Duties , Directive Principles of State Policy

UNIT III **3Hrs**

Legislature, Executive and Judiciary

UNIT IV **3Hrs**

Emergency Powers

UNIT V **3Hrs**

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

Total Hours: 15

TEXT BOOKS:

1. D D Basu, Introduction to the Constitution of India, 20th Edn., Lexisnexis Butterworths, 2012.

REFERENCE BOOKS:

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



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Subject Code: BHS18NC2	Subject Name : THE INDIAN TRADITIONAL KNOWLEDGE	C	L	T / S.Lr	P/ R	Ty /Lb /ETL
	Prerequisite: NIL	NC	2	0/0	0/0	Ty

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

OBJECTIVES:

- To understand the Pre- colonial and Colonial Period, Indian Traditional Knowledge System
- To understand the Traditional Medicine, Traditional Production and Construction Technology
- To Know the History of Physics and Chemistry, Traditional Art and Architecture and Vastu Shashtra, Astronomy and Astrology
- To understand the Origin of Mathematics, Aviation Technology in Ancient India, Crafts and Trade in Ancient India

COURSE OUTCOMES (COs) : After studying this course the student would be able to

CO1	To understand the Pre- colonial and Colonial Period, Indian Traditional Knowledge System
CO2	To understand the Traditional Medicine, Traditional Production and Construction Technology
CO3	To understand the Origin of Mathematics, Aviation Technology in Ancient India, Crafts and Trade in Ancient India

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

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

Category	Basic Sciences	Engg Sciences	Humanities & Social	Program core	Program Electives	Open Electives	Practical/ Project	Internships / Technical	Soft Skills			
			✓									



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SUBJECT CODE	SUBJECT NAME	C	L	T/S.Lr	P/R	Ty /Lb /ETL
BHS18NC2	THE INDIAN TRADITIONAL KNOWLEDGE	NC	2	0/0	0/0	Ty

OBJECTIVES:

- To understand the Pre- colonial and Colonial Period, Indian Traditional Knowledge System
- To understand the Traditional Medicine, Traditional Production and Construction Technology
- To Know the History of Physics and Chemistry, Traditional Art and Architecture and Vastu Shashtra, Astronomy and Astrology
- To understand the Origin of Mathematics, Aviation Technology in Ancient India, Crafts and Trade in Ancient India

UNIT I

3Hrs

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

UNIT II

3Hrs

Traditional Medicine, Traditional Production and Construction Technology

UNIT III

3Hrs

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

UNIT IV

3Hrs

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

UNIT V

3Hrs

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

Total Hours: 15

TEXT BOOKS:

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



Department of Computer Science and Engineering

Subject Code:	Subject Name :	C	L	T / S.Lr	P/ R	Ty /Lb /ETL
BCS18L03	DATABASE MANAGEMENT SYSTEMS LAB					
	Prerequisite: BCS18L01	1	0	0/0	3/0	Lb

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

OBJECTIVES :

To 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		PSO5		PSO6	
CO1	M		M		H		M		M		M	
CO2	M		H		M		M		L		H	
CO3	H		M		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			
							✓					



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SUBJECT CODE	SUBJECT NAME	C	L	T/S.Lr	P/R	Ty /Lb /ETL
BCS18L03	DATABASE MANAGEMENT SYSTEMS LAB	1	0	0/0	3/0	Lb

OBJECTIVES:

- To create a database and query using SQL.
- 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)



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18L02	INFORMATION SECURITY AND CRYPTOGRAPHY LAB	1	0	0/0	3/0	Lb

OBJECTIVES:

This lab session will give practical training on:

- Understand the Information security
- Cryptography cracking

1. User identity and access management
2. User account controls and its authentications
3. Windows password management policy
4. Windows firewall and its configuration of rules
5. To make understand the importance of group policy
6. Windows monitoring tools
7. Vulnerability assessment and scanning
8. Event log and its correlation with an incident.
9. Importance of hashing
10. Steganography
11. Rainbow attack



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18TS1	TECHNICAL SKILL I	1	0	0/0	3/0	Lb

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 Computer Science and Engineering

Subject Code: BEN18SK1	SOFT SKILL I(Career & Confidence Building)						C	L	T/S.Lr	P/R	Ty /Lb /ETL	
	Prerequisite: NIL						1	0	0/0	3/0	ETL	
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVES : <ul style="list-style-type: none">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			
			✓						✓			



Department of Computer Science and Engineering

Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/
BEN18SK1	SOFT SKILL I(Career & Confidence Building)	1	0	0/0	3/0	ETL

OBJECTIVES:

- 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.

UNIT I

6 Hrs

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

UNIT II

6 Hrs

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

UNIT III

6 Hrs

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

UNIT IV

6 Hrs

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

UNIT V

6 Hrs

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

Practical component P : Include case studies / application scenarios

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

Total Hours: 30



SEMESTER – V

Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18006	ADVANCED NETWORKING	3	3	0/0	0/0	Ty

OBJECTIVES:

End of the session the student will have an understanding on:

- Various network topologies and technologies
- Purpose and functions of network components; and
- The seven layer OSI Model

UNIT I INTRODUCTION

9 Hrs

Need for computer networks - Devices used in networking – Hubs – Switches – Routers - Wireless Access Points - Introduction to IP address - Classes of IP address - Need for sub netting - Basics of IPV6

UNIT II ROUTING

9 Hrs

Routing Fundamentals - Link State Routing - Distance Vector Routing – RIP – EIGRP – OSPF - Configuring Routers - Understanding the router architecture - Assigning IP address to the routers - Configuring routing protocols

UNIT III PROTOCOLS

9 Hrs

Types of protocols and need for protocols - Packet switched Protocols - TCP/ IP - Introduction to TCP/ IP - Origins of TCP/ IP and evolution of Internet - IP Layers Vs OSI - IP number concepts - Network address - Classes of Networks - Subnet masking - Static and dynamic IP numbers - UDP - Establishing a TCP session (Three way handshake)

UNIT IV DOMAIN NAME SYSTEM

9 Hrs

Introduction to ADS (Active Directory Service), introduction organizational unit, user and groups, introduction to group policy, introduction to DNS and DHCP

UNIT V IMPLEMENTING AND MANAGING NETWORKS

9 Hrs

Network operating system - Client Server applications - Peer to Peer Applications - Measuring performance - Monitoring tools

TEXT BOOK:

1. Basic of Networking – Prentice Hall (ISBN 8120324897)

Total Hours: 45

REFERENCE BOOKS:

1. *Introduction to Networking – Prentice Hall (ISBN 8120313860)*
2. *Computer Networking First Step – Odom Wendell – (ISBN 8129706075)*



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18007	ADVANCED DIGITAL FORENSICS	3	3	0/0	0/0	Ty

OBJECTIVES:

This paper will help a student to understand:

- The process of forensic analysis of the registry and web site hosting
- Managing forensic data using open source tools and
- The workflow including repeatability, validity and preserving evidence

UNIT I FORENSIC ANALYSIS OF THE REGISTRY

9 Hrs

Use of registry viewers, Encase, Regedit and WinHex - Analysis of complete and partial MRU streams, Need for Live Forensics -Traditional vs Live Forensics – Weakness of Traditional Forensics

UNIT II FORENSIC ANALYSIS OF WEB SITE HOSTING AND ADMINISTRATION

9 Hrs

Memory –Swap File – Network Processes – System Processes – File System Information – Raw Disk Blocks - Open & Deleted files – Network Connections – Routes – Processes – Users, Anti Forensic Techniques - Methods used which attempt to thwart subsequent forensic analysis - Forensic traces left by these methods

UNIT III MANAGING FORENSIC DATA

9 Hrs

Tools for basic process functions, such as viewing, converting, cryptographic hashing - Open source analysis tools and their Use, Benefits – Risks - Challenges (Encryption, Anonymity, Volatility, Anti-Forensic Programs, Operating System Dependency)

UNIT IV BUILDING A FORENSICALLY SOUND WORKFLOW

9 Hrs

Choices: tools and approach - Forensic issues within the workflow, including repeatability and validity - Managing and preserving evidence. Photographing the scene – Recording System Time – Data Acquisition in order of volatility –Securing the Evidence – Documenting & Labelling – Transporting the Evidence

UNIT V OTHER EXAMINATION OPTIONS

9 Hrs

Review other workflow tools and options and the circumstances in which they are useful, Hard Disk – File System – User Interface – Visualization – Forensic Server

Total Hours: 45

TEXT BOOK:

1. Warren G. Kruse II and Jay G. Heiser, “Computer Forensics: Incident Response Essentials”, Addison Wesley, 2002.
2. Ellick M Chan (2012) *A Framework for Live Forensics*, Proquest, Umi Dissertation Publishing

REFERENCE BOOKS:

1. Nelson, B, Phillips, A, Enfinger, F, Stuart, C., “Guide to Computer Forensics and Investigations, 2nd ed., Thomson Course Technology, 2006, ISBN: 0-619-21706-5.
2. Albert J. Marcella Jr et al (2012), *Cyber Forensics: From Data to Digital Evidence*, Wiley
3. Kam-Pui Chow (Editor), Sujeet Sheno (Editor) (2010) *Advances in Digital Forensics VI: Sixth IFIP WG 11.9 International Conference on Digital Forensics, Hong Kong, China, January 4-6, 2010, Revised ... in Information and Communication Technology*, Springer



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18008	PERL / PYTHON	4	3	0/1	0/0	Ty

OBJECTIVES:

- The goal of the course is the study of scripting languages such as PERL, JAVA SCRIPT , Python and BASH
- Creation of programs in the Linux environment
- The study of the principles of scripting languages
- The study of usage of scripting languages in IC design flow

Learning Outcomes:

- Ability to create and run scripts using Perl / Java Script / Python in IC design flow
- Ability to use Linux environment and write programs for automation of scripts in VLSI tool design flow

UNIT I LINUX BASICS

12 Hrs

Introduction to Linux, File System of the Linux, General usage of Linux kernel & basic commands, Linux users and group, Permissions for file, directory and users, Searching a file & directory, zipping and unzipping concepts

UNIT II LINUX NETWORKING

12 Hrs

Introduction to Networking in Linux, Network basics & tools, File transfer protocol in Linux, Network file system, Domain Naming Services, Dynamic hosting configuration Protocol & Network information Services.

UNIT III PERL SCRIPTING

12 Hrs

Introduction to Perl Scripting, working with Simple Values, Lists and Hashes, Loops and Decisions, Regular Expressions, Files and Data in Perl Scripting, References & Subroutines, Running and Debugging Perl, Modules, Object-Oriented Perl.

UNIT IV JAVA SCRIPT

12 Hrs

Introduction, programming constructs: variables, operators and expressions, conditional checking, functions and dialog boxes, JavaScript DOM, creating forms, introduction to Cookies

UNIT V PYTHON SCRIPTING

12 Hrs

Introduction to Python, Using the Python Interpreter, More Control Flow Tools, Data Structures, Modules, Input and Output, Errors and Exceptions, Classes, Brief Tour of the Standard Library.

Total Hours: 60

TEXT BOOK:

1. Python Tutorial by Guido van Rossum, and Fred L. Drake, Jr., editor, Release 2.6.4

REFERENCE BOOKS:

1. *Instructor reference material.*
2. *Practical Programming in Tcl and Tk by Brent Welch , Updated for Tcl 7.4 and Tk 4.0*
3. *Teach Yourself Perl 5 in 21 days by David Till.*
4. *Red Hat Enterprise Linux 4: System Administration Guide Copyright 2005 Red Hat, Inc*



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18L03	ADVANCED NETWORKING LAB	1	0	0/0	3/0	Lb

OBJECTIVES:

This lab session will give practical training on:

- LAN installation and configuration
- It includes IP subnet addressing, setting up a simple network; and
- Analyzing logs and routing protocols

Sessions:

1. Installing and configuring windows 2008 R2
2. Promoting windows 2008 R2 in to Domain controller
3. Creating and organizing organizational unit
4. Installing and configuring group policy
5. Understanding user and groups
6. Installing and configuring DHCP
7. Installing and configuring DNS
8. Installing and configuring RODC
9. Installing and configuring IIS
10. Installing and configuring windows Update services
11. Installing and configuring the functions of Routers.
12. Installing and configuring firewalls and IDS



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18L04	ADVANCED DIGITAL FORENSICS LAB	2	0	0/0	6/0	Lb

OBJECTIVES:

This practical laboratory session will help students work on:

- To understand Various digital forensic tools
- Acquisition of data, search, seizure and review process along with controls; and
- Email investigation along with recovering image files from various sources

Sessions:

1. Deleted File recovery in FAT file system
2. Mobile data acquisition using “SUNTOKU_0.5”.
3. Network forensics analysis using “Xplico “.
4. Perform digital forensics incident response using “CAIN-8”.
5. Perform digital forensics data analysis using “Autopsy”.
6. Open source forensics tool analysis using “DEFT”.
7. CRD Analysis
8. SIM card analysis data acquisition using SIM card reader.
9. Forensic image analysis using SANS SIFT
10. Tempering of digital evidence using **hxd**
11. Mobile data acquisition and analysis using Mobile Check
12. Network pcap analysis using NeSA2.0



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18TS2	TECHNICAL SKILL II	1	0	0/0	3/0	Lb

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 Computer Science and Engineering

SEMESTER – VI

Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18009	VULNERABILITY ANALYSIS / PENETRATION TESTING	3	3	0/0	0/0	Ty

OBJECTIVES:

Students would learn:

- the degree of exposure to external and internal attacks
- the methodologies of assessing the appropriate defence systems ; and
- the importance of patch management

UNIT I OVERVIEW

9 Hrs

Definition of VA & PT – Need & Benefits of VA & PT – Types of VA & PT – Application – Performance Analysis of VA & PT – Challenges & Limitations of VA & PT – Skillset Required – Ethics

UNIT II INTRODUCTION HACKING METHODOLOGY

9 Hrs

Hacking Methodology, Process of Malicious Hacking, Footprinting and Scanning: Footprinting, Scanning. Enumeration: Enumeration. System Hacking and Trojans: System Hacking, Trojans and Black Box Vs White Box Techniques

UNIT III WEB AND NETWORK HACKING VULNERABILITY ASSESSMENT

9 Hrs

SQL Injection, Hacking Wireless Networking, Viruses, Worms Denial of Service, Sniffers, Session Hijacking and Hacking Web Servers: Session Hijacking, Hacking Web Servers. Web Application Vulnerabilities and Web Techniques Based Password Cracking: Web Application Vulnerabilities, Web Based Password Cracking Techniques

UNIT IV PENETRATION TESTING

9 Hrs

Pen Testing Strategies - Usefulness of Test Results – Assets Connection Testing – Security Risk Assessment – Manual vs. Automated Testing – Various Tools for PT

UNIT V REPORT WRITING & MITIGATION

9 Hrs

Introduction to Report Writing & Mitigation, requirements for low level reporting & high level reporting of Penetration testing results, Demonstration of vulnerabilities and Mitigation of issues identified including tracking

Total Hours: 45

TEXT BOOK:

1. Mark Dowd, John McDonald, Justin Schuh (2006) *The Art of Software Security Assessment: Identifying and Preventing Software Vulnerabilities*, Addison Wesley

REFERENCE BOOKS:

1. Georgia Weidman (2014) *Penetration Testing: A Hands-On Introduction to Hacking*, No Starch Press
2. Felicia M. Nicastro (2011) *Security Patch Management*, CRC Press
3. *Hacking Exposed 7th Edition*, by Stuart McClure, Joel Scambray, George Kurtz – McGraw Hill-2010
4. *Basic of Hacking and Penetration* – Patrick Engerbrestson 2010



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18010	ADVANCED INFORMATION SECURITY	3	3	0/0	0/0	Ty

OBJECTIVES:

The paper on Advanced Information Security would appraise a student on

1. Digital Rights Management
2. Authentication Protocols and IPSec; and
3. The Concepts of Email Security and Application Security

UNIT I DIGITAL RIGHTS MANAGEMENT

9 Hrs

Meaning, Need, DRM schemes - Digital Rights Management (DRM) – Content Scrambling System – Requirements for a DRM

UNIT II COMMON AUTHENTICATION PROTOCOLS

9 Hrs

Authentication concepts – Types – Protocol and MS Chap - Extensible Authentication Protocols - Remote Access with RADIUS and TACACS - Single Sign on – Kerberos, SEASAME – Authentication in Wireless networks – Real World Protocols

UNIT III INTRODUCTION TO IPSEC

9 Hrs

IPSec building Architects - Security Associations (SAs) - Security Parameter Index (SPI) - IPSec Architecture - IPSec Protocols - Authentication Header (AH) - Encapsulation Security Payload (ESP) - Tunneling and Transport Mode - Internet Key Exchange (IKE) – ISAKMP

UNIT IV E-MAIL SECURITY

9 Hrs

Working principle of email - The role of Mail User Agent, Mail Delivery Agent, Mail Transfer Agent, and DNS servers – SMTP – Spamming and Phishing – Email Forensics

UNIT V APPLICATION SYSTEM SECURITY

9 Hrs

SDLC concepts - Testing: types, methods and issues - Program coding and security to be built into it - Software maintenance and change control processes - Configuration management - Software Capability Maturity model (CMM) .

Total Hours: 45

TEXT BOOK:

1. Network Security Essentials, William Stallings, Prentice-Hall, 2000

REFERENCE BOOKS:

1. Security Technologies for the World Wide Web, Rolf Oppliger, Artech House, 2000
2. Internet and Intranet Security, Rolf Oppliger, Artech House, 1998
3. Building Internet Firewalls, Brent Chapman and Elizabeth Zwicky, O'Reilly and Associates, 1995



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18011	RESILIENCE MANAGEMENT	4	3	0/1	0/0	Ty

OBJECTIVES:

This paper introduces the students to the

- Concept of risk and its various types faced by an organization
- Involvement of human factor and the reaction of people to risks being posed.
- Concepts of business continuity, managing crisis and the ability of an organization to overcome such crisis.

UNIT I INTRODUCTION 12 Hrs

Introduction to operational risk, resilience, and resilience management – Definition, Nature and Scope

UNIT II STRATEGIC RISK AND RISK BEHAVIOUR 12 Hrs

Risk Management in Organizations – Human Factors and People Skills in Risk Perception – Role of Individuals, teams and leaders – Implementation of Management Policies and Strategies.

UNIT III ORGANISATIONAL AND ENVIRONMENTAL RISK 12 Hrs

Theories of Environmental and Organizational Risk Management – Legislative provisions and Organizational Risk

UNIT IV CRISIS MANAGEMENT AND GOVERNANCE 12 Hrs

Continuity and Crisis Planning – Challenges Facing Organizations

UNIT V CASE STUDIES 12 Hrs

Total Hours: 60

TEXT BOOK:

1. James J. Leflar (2013), “Organizational Resilience: Managing the Risks of Disruptive Events - A Practitioner's Guide” 1st Edition, CRC Press

REFERENCE BOOKS:

1. Tierney, K. and Bruneau, M., (2007) *Conceptualizing and Measuring Resilience: A Key to Disaster Loss Reduction*. *TR News* 250, May-June 2007, 14-17
2. Manyena, S. B. (2006) ‘The concept of resilience revisited’, *Disasters*, 30(4): 433-450. *Disasters Journal*. Overseas Development Institute: London



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18L05	VULNERABILITY ANALYSIS / PENETRATION TESTING LAB	1	0	0/0	3/0	Lb

OBJECTIVES:

This lab session focus on training the students in

- Penetration Testing methodologies
- Monitoring the network traffic and
- To understand the host and services discovery

Sessions:

- Monitoring Network Traffic
- Host & Services Discovery using Nmap
- Vulnerability Scanning using OpenVAS
- Internal Penetration Testing
 - Mapping
 - Scanning
 - Gaining access through CVE's
 - Sniffing POP3/FTP/Telnet Passwords
 - ARP Poisoning
 - DNS Poisoning
- External Penetration Testing
 - Evaluating external Infrastructure
 - Creating topological map & identifying IP address of target
 - Lookup domain registry for IP information
 - Examining use of IPV6 at remote location



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18L06	ADVANCED INFORMATION SECURITY LAB	1	0	0/0	3/0	Lb

OBJECTIVES:

In this practical paper the students will hands on experience on:

- Understanding access control systems, firewalls and log security
- Learning VA techniques
- Server security and Malware defence mechanisms

Sessions:

1. Passive Reconnaissance using “Who is” and Online tools
2. UDP and Ping Scanning using “Advance Lan Scanner” and “Superscan”
3. Full Scan, Half Open Scan and Stealth scan using “nmap”
4. Packet crafting using “Colasoft Packet Builder” tool
5. Exploiting MS08-067 Microsoft Server Service Relative Path Stack Corruption
6. Creating and Analyzing Virus
7. OS password cracking
8. Network packet password sniffing
9. Web application vulnerability assessment for SQL injection
10. Web application vulnerability assessment for CSRF/ XSS
11. Web application penetration testing using burp suite
12. Vulnerability Scanning using OpenVAS / Nessus



Department of Computer Science and Engineering

Subject Code: BEN18SK2	Subject Name : SOFT SKILL II(Qualitative & Quantitative Skills)	C	L	T/S.L r	P/R	Ty/Lb/ETL
	Prerequisite: BEN18SK1	1	0	0/0	3/0	ETL

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

OBJECTIVE :

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

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	PSO5				
CO1												
CO2												

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			
									✓			



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Department of Computer Science and Engineering

Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/
BEN18SK2	SOFT SKILL II(Qualitative & Quantitative Skills)	1	0	0/0	3/0	ETL

OBJECTIVE:

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

UNIT I Logical Reasoning I

Logical Statements – Arguments – Assumptions – Courses of Action.

UNIT II Logical Reasoning II

Logical conclusions – Deriving conclusions from passages – Theme detection.

UNIT III Arithmetical Reasoning I

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

UNIT IV Arithmetical Reasoning II

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

UNIT V Data Interpretation

Tabulation – Bar graphs – Pie graphs – Line graphs.

REFERENCE BOOKS:

1. R.S.Agarwal, *A modern approach to Logical Reasoning*, S.Chand & Co., (2017).
2. R.S.Agarwal, *A modern approach to Verbal and Non verbal Reasoning*, S.Chand & Co., (2017).
3. R.S.Agarwal, *Quantitative Aptitude for Competitive Examinations*, S.Chand & Co., (2017).
4. A.K.Gupta, *Logical and Analytical Reasoning*, Ramesh Publishing House, (2014).
5. B.S.Sijwali, Indu sijwali, *A new approach to Reasoning (Verbal and Non verbal)*, Arihant Publishers, (2014).



Department of Computer Science and Engineering

Subject Code: BIS18L07	Subject Name : INPLANT TRAINING / INTERNSHIP / MINI PROJECT (EVALUATION)	C	L	T/S.Lr	P/R	Ty/Lb /ETL
	Prerequisite : NIL	1	0	0/0	3/0	Lb

L : Lecture T : Tutorial S.Lr : 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		PSO5			
CO1												

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	Co-curricular			
								✓				



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18L07	MINI PROJECT / INPLANT TRAINING / INTERNSHIP	1	0	0/0	3/0	Lb

OBJECTIVE :

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



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18TS3	TECHNICAL SKILL III	1	0	0/0	3/0	Lb

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.



SEMESTER – VII

Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18012	DATA BASE SECURITY	3	3	0/0	0/0	Ty

Objectives:

This paper deals with the importance of

- database security in an organizational set-up
- various measures of controlling access to data and defence strategies
- database security lifecycle and also common security vulnerabilities of databases

UNIT I DATABASE SECURITY LIFECYCLE 9 Hrs

Overview of DB Security Lifecycle - Data Risk Assessment – Identifying & Analyzing data threats, risks & vulnerabilities – Understanding the need for database security architecture

UNIT II SECURITY MODELS 9 Hrs

Access Matrix Models - Objects & Subjects - Types of Objects & Subjects - Access Modes (Static & Dynamic) - Access Levels – Data Holding Accounts – Data Access Accounts – Pre Created SWDs – User Managed SWDs

UNIT III USERS & PROFILE 9 Hrs

Listing all Users & Roles – Listing Privileges Granted to Users - Profiles – Password & Account Parameters – Auditing Privileges – Cascading Privileges – Roles with Passwords & Default Roles

UNIT IV COMMON DATABASE SECURITY VULNERABILITIES 9 Hrs

Deployment Failures – Broken Databases – Data Leaks – Stolen Database Backups – Abuse of Database Features – Hopscotch – SQL Injections – Sub-standard Key Management – Database Inconsistencies

UNIT V DATABASE SECURITY DEFENCE STRATEGY 9 Hrs

Discovery & Assessment – User Rights Management – Monitoring & Blocking – Auditing – Data Protection – Non-technical Security

Total Hours: 45

TEXT BOOK:

1. Basta, Zgola (2014) *Database Security*, Cengage

REFERENCE BOOKS:

1. United States Congress Senate Committee (2010) *Database Security: Finding Out When Your Information Has Been Compromised*, Bibliogov
2. Silvana Castano, Mariagrazi Fugini, Giancarlo Martella, Pierangela Samarati (1994) *Database Security* (ACM Press), Addison Wesley



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18013	APPLICATION SECURITY	3	3	0/0	0/0	Ty

OBJECTIVES:

This paper will explain

- principles of software security and testing methodologies
- about various application types and their vulnerabilities
- overview of various security models pertinent to applications

UNIT I FUNDAMENTALS OF SOFTWARE SECURITY

9 Hrs

Software Security design principles – Pillars of Software Security – Fixing Bugs - Building Secure Software Systems – Software Security Best Practices -

UNIT II APPLICATION VULNERABILITIES

9 Hrs

Buffer Overruns – Format String Problems – Integer Overflows – SQL Injection – Command Injection – Cross-Site Scripting – Weak Password-Based Systems – Information Leakage – Improper File Access – Race Conditions

UNIT III APPLICATION TYPES

9 Hrs

Client/Server Applications - Web Applications - Components of Web Application Architecture - Data Warehouse Applications - About DW Applications – Uses - Physical & Logical Architecture

UNIT IV APPLICATION TESTING

9 Hrs

Overview of Application Software Testing – Application Testing Methodologies – Software Test Plan – Application Testing Cycles – Application Testing Tools – Best Practices

UNIT V APPLICATION SECURITY MODELS

9 Hrs

Types of Models - Use Application Roles - Connect to DB as Proxy Server - Retrieve Application Role Name - Security Model based on Application Roles - Architecture - Implementation in SQL Server - Characteristics of Application Security Models

Total Hours: 45



Department of Computer Science and Engineering

Subject Code:	Subject Name : MANAGEMENT CONCEPTS AND ORGANIZATIONAL BEHAVIOR					C	L	T/S.L r	P/R	Ty/Lb/ET L		
BMG18002	Prerequisite: BES18ET3 Basic Knowledge such as Statistical Techniques and Probability Theory					3	3	0/0	0/0	Ty		
L : Lecture T : Tutorial P : Project C: Credits												
OBJECTIVE: The student will learn: <ul style="list-style-type: none">This course is aimed at addressing the contemporary issues, which fall under the broad title of management, and its functions.There will also be an attempt to analyze the behavior of individuals within an organization and the issues of working with other group or teams.												
COURSE OUTCOMES (COs) :												
CO1		Effective leadership skills										
CO2		Accommodating with co workers and at Work environment										
CO3		Enhanced leadership skills										
CO4		Understanding and implementing good policies for the welfare of management and workers										
Mapping of Course Outcomes (COs) with Program Outcomes (POs) & Program Specific Outcomes (PSOs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H		M		M		L		M		L	
CO2	M	M				M		H	M	M	L	H
CO3	L		H	H	M		M	H	M	L	M	
CO4	M	L				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	Management Science		
										✓		



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SUBJECT CODE	SUBJECT NAME	C	L	T/S.Lr	P/R	Ty /Lb /ETL
BMG18002	MANAGEMENT CONCEPTS AND ORGANIZATIONAL BEHAVIOR	3	3	0/0	0/0	Ty

OBJECTIVE: The student will learn:

- This course is aimed at addressing the contemporary issues, which fall under the broad title of management, and its functions.
- There will also be an attempt to analyze the behavior of individuals within an organization and the issues of working with other group or teams.

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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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18L08	APPLICATION SECURITY LAB	1	0	0/0	3/0	Lb

OBJECTIVES:

This lab would explain to students

- How to create and drop application roles and activating the application
- To implement SQL Server in the application, creating a database and connecting it to the application; and
- Authentication of users by the application

Sessions:

- Implementation in SQL Server
- Use Application Roles
- Create/Drop application roles using command line
- Activating application
- Connect to DB as Proxy Server
- Retrieve Application Role Name
- Activate the application role
- Creating DB & connecting to application
- Application authenticates users



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18L09	DATABASE SECURITY LAB	1	0	0/0	3/0	Lb

Objectives:

- This lab deals in
- Various steps to be taken in order to secure a database
- Creating and managing users and also to grant and revoke privileges to such users
- Various authentication modes, learn how to configure various policies and parameters

Sessions:

- Managing Users
 - Creating Users
 - Check for Default Users
 - Modifying Users
 - Check or weak passwords
 - Lock & Remove Accounts
 - List of Logins
 - Pre-Defined Roles
- Closing Unnecessary Services
- Server Authentication Modes
- Configuration Parameters
- Database Links
- Permission on Procedures
- Linked Servers
- Designing & Implementing Password Policies
- Grant & Revoke User Privileges



Department of Computer Science and Engineering

Subject Code: BIS18L10	Subject Name : PROJECT PHASE - I	C	L	T/S.Lr	P/R	Ty /Lb /ETL
	Prerequisite: NIL	2	0	0/0	3/3	Lb

L : Lecture T : Tutorial S.Lr : 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		PSO 5			
CO1												

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			
							✓					



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18L10	PROJECT PHASE - I	2	0	0/0	3/3	Lb

OBJECTIVES:

The objective of the Main Project is to culminate the academic study and provide an opportunity to explore a problem or issue , address through focused and applied research under the direction of a faculty mentor. The project demonstrates the student's ability to synthesize and apply the knowledge and skills acquired to real-world issues and problems. This project affirms the students to think critically and creatively, find an optimal solution, make ethical decisions and to present effectively.

B.Tech ISDF Project carries 8 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.



Department of Computer Science and Engineering

Subject Code: BHS18FLX	Subject Name : FOREIGN LANGUAGE (EVALUATION)						C	L	T / S.Lr	P/ R	Ty /Lb /ETL	
	Prerequisite: NIL						1	0	0/0	3/0	Lb	
L : Lecture T : Tutorial S.Lr : 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	PO 9	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		PSO3		PSO4		PS O5			
CO1												
CO2												
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			
			✓									



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SEMESTER –VIII

Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18014	WEB SECURITY	3	3	0/0	0/0	Ty

OBJECTIVES:

This session on web security will focus on:

- The concepts, traffic analysis under a web environment and Models
- Various types of web attacks and vulnerabilities ; and
- The threats and defenses on web applications

UNIT I OVERVIEW AND CONCEPTS

12 Hrs

Introduction to HTTP/HTTPS - Web Methods – Botnets – Worms - Automated Scanners

UNIT II RENDERING

12 Hrs

Isolation – Document Object Model - Communication - Navigation – Cookies – Cookies and Protocol Management Issues - Secure UI – Session Management – Session Hijacking – Generating Session Tokens

UNIT III TRAFFIC ANALYSIS

12 Hrs

Information Gathering in a web environment - Authentication/Authorization - Proxy Tools - Encoding/Encryption - Types of Encoding - Types of Encryption

UNIT IV OWASP

12 Hrs

Web Security Attacks and Vulnerabilities - Frame Busting - Command Injection – Other types causes and analysis – Input validation – Blacklist Bypass

UNIT V THREATS & DEFENSES

12 Hrs

SQL Injection - Running Online Background Check – Injection Defenses – Input validation for SQL – Input escaping for SQL – Cross site scripting – Script Injection – Cross Site Scripting

Total Hours: 60

TEXT BOOK:

1. "Testing and Comparing Web Vulnerability Scanning Tools for SQL Injection and XSS Attacks" (PDF). Fonseca, J.; Vieira, M.; Madeira, H., Dependable Computing, IEEE. Dec 2007

REFERENCE BOOKS:

1. "Improving Web Application Security: Threats and Countermeasures". Microsoft Corporation. June 2003
2. Bryan Sullivan et al, (2012), "Web Application Security, A Beginner's Guide", Mc Graw Hill



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Subject Code: BIS18L11	Subject Name : PROJECT (PHASE – II)	C	L	T/S.Lr	P/R	Ty /Lb /ETL
	Prerequisite: BCS18L13	8	0	0/0	12/12	Lb

L : Lecture T : Tutorial S.Lr : 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	CO1	H	CO1	H	CO1	H	CO1	H	CO1	H	CO1
CO2	H	CO2	H	CO2	H	CO2	H	CO2	H	CO2	H	CO2
CO3	H	CO3	H	CO3	H	CO3	H	CO3	H	CO3	H	CO3
CO4	H	CO4	H	CO4	H	CO4	H	CO4	H	CO4	H	CO4
COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5			
CO1												

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			
							✓					



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18L11	PROJECT PHASE - II	8	0	0/0	12/12	Lb

OBJECTIVES:

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.

Students are expected to carry out the following :

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



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ELECTIVE – I

Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E01	PROTOCOL FILTERING AND ANALYSIS	3	3	0/0	0/0	Ty

OBJECTIVES:

- Understanding about the networking protocols
- To gain knowledge about the inside details of the packets which go across the networks.
- Understanding of how to filter the packets within the networks and what details to get from them

UNIT I OVERVIEW

9 Hrs

Packet Filtering – Protocol Analysis – TCP/IP, OSI Model – Network Protocols – IP Address

UNIT II PACKET SNIFFING AND FILTERING

9 Hrs

NIC, Promiscuous mode – Packet Sniffing – Packet Filtering Techniques - Protocol Analysis, Protocol Analysis Methods – Network Layer Protocols

UNIT III PROTOCOL ANALYSIS

9 Hrs

Transport Layer Protocols - Application Layer Protocols – Functioning of Firewall, VPN, Filters, Intrusion Detection and Anti-Virus etc. - Tools used for Protocol Analysis

UNIT IV INVESTIGATING PACKETS

9 Hrs

Deep Packet Inspection – Ethereal and TCPDUMP – Examining IP Header Fields – Recognizing Attacks - Investigating TCP/IP, HTTP, ARP, ICMP and other packets (WIRESHARK)

UNIT V SECURITY PROTOCOLS

9 Hrs

Understanding Security Protocols: SSL, TLS, and IPsec etc.

Total Hours: 45

TEXT BOOK:

1. Kenneth D. Reed, “Protocol Analysis”, Westnet Learning Technologies, 2001

REFERENCE BOOKS:

1. Ed Wilson, “Network Monitoring and Analysis: A Protocol Approach to Troubleshooting”, Prentice Hall, 1999
2. Houmani Hanane, “Security Protocols Analysis”, LAP Lambert Academic Publishing, 2012



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E02	DIGITAL FORENSIC LIFECYCLE	3	3	0/0	0/0	Ty

OBJECTIVES:

- To learn about the Forensic Methodology during Investigation.
- To adopt best practices for Investigation.
- Understanding Technical and Legal aspects involved in Digital Forensics

UNIT I INTRODUCTION

9 Hrs

Digital Forensics: Importance and Objective – Overview of Digital Forensics Life Cycle, Phases involved in Digital Forensics Life Cycle – Incident Response

UNIT II DIGITAL FORENSICS LIFE CYCLE

9 Hrs

Different Computer Forensic Investigation Models, Cyber Crime Investigation approach – Crime Scene Investigation – Evidence: Digital Evidence - Evidence Handling

UNIT III SEIZURE AND ACQUISITION

9 Hrs

Identification - Seizure Procedure – Acquisition Procedure – Best Practices for Seizure and Acquisition Procedure – Chain of Custody

UNIT IV AUTHENTICATION AND ANALYSIS

9 Hrs

Authentication Phase – Analysis Phase – Precautions while performing Analysis – Evidence Interpretation

UNIT V REPORTING/DOCUMENTATION

9 Hrs

Report Writing/Generation – Documentation Procedure – Expert Witness – Investigation of Networked Systems

Total Hours: 45

TEXT BOOK:

1. Angus McKenzie Marshall, “Digital Forensics: Digital Evidence in Criminal Investigations”, Wiley-Blackwell, 2008

REFERENCE BOOKS:

1. John Sammons, “The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics”, Syngress, 2014
2. Eoghan Casey, “Digital Evidence and Computer Crime Forensic science, Computers and Internet”, Elsevier Academic Press, Third Edition, 2011



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E03	NETWORK INFRASTRUCTURE	3	3	0/0	0/0	Ty

OBJECTIVES:

- Understand the concept of Critical Infrastructure Protection and the cybersecurity risks
- Security and Risk Assessments of critical systems; and
- Concepts of Industrial Control Systems and their security controls

UNIT I OVERVIEW

9 Hrs

Scope of Critical Infrastructure – Role of Cybersecurity in Critical Infrastructure Protection – Various security incidents globally, Infrastructure sectors, Significance

UNIT II FUNDAMENTALS OF INDUSTRIAL CONTROL SYSTEMS

9 Hrs

System Operation – Common Vulnerabilities – Communication Protocols – Network Design, Experiment Based Validation of CIIP, Security Requirements Model for Grid Data Management Systems

UNIT III RISK ASSESSMENT

9 Hrs

Manufacturing Systems risk assessment – Risk Classification - Threat Identification , Assessing the Risk of an Information Infrastructure Through Security, Modeling Risk and Identifying Countermeasure in Organizations.

UNIT IV SYSTEM ASSESSMENT

9 Hrs

Security Assessment – Vulnerability Assessment – Auditing, A Framework for Conceptualizing Social Engineering Attack

UNIT V SECURITY CONTROLS

9 Hrs

Standards & Security Controls – Understanding ICS Security Technologies – Risk Mitigation, Intelligent Network-Based Early Warning Systems, Can an Early Warning System for Home Users and SMEs Make

Total Hours: 45

TEXT BOOK:

1. John D Moteff (2013), Critical Infrastructures: Background, Policy, and Implementation, Bibliogov

REFERENCE BOOKS:

1. Tyson Macaulay (2008), Critical Infrastructure: Understanding Its Component Parts, Vulnerabilities, Operating Risks, and Interdependencies, CRC Press
2. United States Government Accountability Office (2014), Critical Infrastructure Protection: Dhs Action Needed to Enhance Integration and Coordination of Vulnerability Assessment Efforts, CreateSpace Independent Publishing Platform



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E04	DIGITAL EVIDENCE	3	3	0/0	0/0	Ty

OBJECTIVES :

This paper deals with:

- Overview of digital evidence from procurement to presentation
- Steps involved in digital evidence lifecycle
- Techniques of handling digital evidence and its importance in courtroom

UNIT I OVERVIEW

9 Hrs

Principles of Digital Evidence – Role of Digital Evidence – Legal Issues - Digital Evidence Lifecycle - Quality Control & Assurance – Digital Evidence Admissibility & Expert Witness

UNIT II DIGITAL EVIDENCE

9 Hrs

COLLECTION – Requirement Analysis – Various scenarios of collection of evidence (Live, On-Site, Off-Site) – Seizure of Artifacts – Digital Crime Scene Photography - Retrieval of Data – Organization of Data - Checking for Reliability

UNIT III DIGITAL EVIDENCE

9 Hrs

PRESERVATION – Safeguarding the collected data – Ensuring accessibility – Security of Evidence – Chain of Custody - Backup of Data - Archiving of Data – Change Management – Data Migration – Moving Big Data

UNIT IV DIGITAL EVIDENCE

9 Hrs

ANALYSIS – Pre-determined Search Queries – Information from Informants & Interviews – Paper Documents – Print Spoolers – Bad Files Signatures – Lookup Encrypted Information – Review Registry Files, Cache Files, & Trace Files – Compare Hash Values – Interpreting Results

UNIT V DIGITAL EVIDENCE

9 Hrs

REPORTING – Detailing Scope of Investigation –Seizure details - Enumerate tools and techniques utilized – Enumerating digital evidence repositories & artifacts –Details of findings- Supporting Materials - Recommendations

Total Hours: 45

TEXT BOOK:

1. Casey, Eoghan (2004). Digital Evidence and Computer Crime, Second Edition. Elsevier. ISBN 0-12-163104-4.

REFERENCE BOOKS:

1. Eoghan Casey (2009), ed. Handbook of Digital Forensics and Investigation. Academic Press, ISBN 0-12-374267-6. .
2. Eoghan Casey (2011) , Digital Evidence and Computer Crime: Forensic Science, Computers, and the Internet Hardcover , Kindle



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ELECTIVE – II

Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E05	INCIDENT RESPONSE	3	3	0/0	0/0	Ty

OBJECTIVES:

- Understand Incident response management.
- To gain knowledge about Incident response methodology
- To know about importance of LOGS and log management

UNIT I INCIDENT MANAGEMENT

9 Hrs

Introduction – ITIL , COBIY and NIST SP800 – 61 perspectives – stages in IR - Initial preparation - Need for incident response team - Roles and responsibilities of Incident response team.

UNIT II HANDLING INCIDENTS

9 Hrs

Types of incidents and their categorization - Incident prioritization - Sources of incidents - Precursors - Indicators - End Users - Methods of identifying incidents - reporting and recovery - Incident containment eradication and recovery.

UNIT III LOG MANAGEMENT

9 Hrs

The Basics of Computer Security Logs, Security Software, Usefulness of Logs, Need for Log Management, Challenges in Log Management- Log Generation and Storage, Log Protection, Log Analysis

UNIT IV LOG MANAGEMENT INFRASTRUCTURE & LOG MANAGEMENT PLANNING

9 Hrs

Architecture, Functions, Syslog-Based Centralized Logging Software- Syslog Format & Syslog Security, Security Information and Event Management Software, Additional Types of Log Management Software

UNIT V LOG MANAGEMENT OPERATIONAL PROCESSES

9 Hrs

Configure Log Sources- Log Generation, Log Storage and Disposal, Log Security. Analyze Log Data- Gaining an Understanding of Logs, Prioritizing Log Entries, Comparing System-Level and Infrastructure-Level Analysis, Respond to Identified Events, Manage Long-Term Log Data Storage, Provide Other Operational Support, Perform Testing and Validation

Total Hours: 45

TEXT BOOK:

1. Jason Luttgens, “**Incident Response & Computer Forensics**”, , Edition, McGraw Hill Osbourne Media, 2014

REFERENCE BOOKS:

1. Leighton Jhonson, “*Computer Incident Response and Forensics Team Management: Conducting a Successful Incident Response*”, First Edition, Syngress, 2013
2. Anton A. Chuvakin, “*Logging and Log Management*”, Syngress, 2012



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E06	MOBILE FORENSICS	3	3	0/0	0/0	Ty

OBJECTIVES:

- To understand the Mobile Technology and security related issues.
- To gain knowledge about Mobile Phones and different OS used.
- To master the Digital forensics techniques used in mobile phones.

UNIT I INTRODUCTION

9 Hrs

Mobile System Network (Architecture) - 2G/3G/4G Technologies and its evolution - GSM, CDMA, GPRS, PDA etc. – Communication Protocols –Bluetooth, NFC - Cell Phone Security - Wireless Technology

UNIT II EVIDENCES

9 Hrs

Type of Data present in Mobile Phones - Digital Evidences found in Mobile Phones - Storage Media Available (RAM, ROM, USB, External memory Card) – different Software's and Applications used in Smart Phones

UNIT III FORENSIC PROCEDURE

9 Hrs

Forensic Methodology for Mobile Forensics - Best Practices while handling Mobile Devices from a Crime Scene - Seizure and Acquisition of Mobile Phones – Handling of Devices with Passcode for Mobile and Applications

UNIT IV ANALYSIS

9 Hrs

Imaging Process - Mobile Device Analysis Tools and their features - Where to look for Evidence - Analysis Phase – Documentation

UNIT V OPERATING SYSTEMS

9 Hrs

Types of Mobile Phone Operating Systems Available - Windows Forensics - Android Forensics - Blackberry Forensics - I Phone Forensics

Total Hours: 45

TEXT BOOK:

1. Iosif I. Androulidakis, "Mobile phone security and forensics: A practical approach", Springer publications, 2012

REFERENCE BOOKS:

1. Andrew Hoog, "Android Forensics: Investigation, Analysis and Mobile Security for Google Android", Elsevier publications, 2011
2. Eamon P.Doherty, "Digital Forensics for Handhelh Devices", CRC Press, 2012



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E07	IT RISK MANAGEMENT	3	3	0/0	0/0	Ty

OBJECTIVES:

- To gain knowledge about Information Risk.
- Understand Risk management process
- To learn and perform Risk assessment

UNIT I INTRODUCTION TO RISK

9 Hrs

Risk and its Characteristics – Elements and factors of risk – Types of Risk , Importance of Risk Management

UNIT II OVERVIEW OF ITRM

9 Hrs

Role of IT Risk Management – Scope of ITRM – Drivers of Key Risk (External & Internal) – Risk Planning – Risk Identification, Integration of Risk Management into SDLC..

UNIT III RISK ASSESSMENT

9 Hrs

Step 1: System Characterization- System-Related Information, Information-Gathering Techniques, Step 2: Threat Identification, Threat-Source Identification, Motivation and Threat Actions. Step 3: Vulnerability Identification, Vulnerability Sources, System Security Testing, Development of Security Requirements Checklist. Step 4: Control Analysis, Control Methods, Control Categories, Control Analysis Technique, Step 5: Likelihood Determination, Step 6: Impact Analysis, Step: Risk Determination

UNIT IV PRIORITIZING RISK

9 Hrs

Determining Risk Tolerance – Establishing & Evaluating Profitability – Decision Trees – Risks vs Opportunities, Risk Mitigation Options, Risk Mitigation Strategy, Control Categories- Technical Security Controls, Management Security Controls, Operational Security Controls

UNIT V RISK RESPONSE

9 Hrs

Strategies for Opportunities & Threats – Risk Acceptance - Risk Avoidance – Risk Transference – Risk Mitigation – Monitoring & Controlling Response - Contingency Planning – Reassessment – Documentation.

Total Hours: 45

TEXT BOOK:

1. David L. Cannon, “CISA Certified Information Systems Auditor Study Guide”, SYBEX Publication. ISBN: 978-0-470-23152-4.

REFERENCE BOOKS:

1. Westerman, “IT Risk: Turning Business Threats Into Competitive Advantage”, Harvard Business School Press, 2007
2. Manish Agarwal, “Information Security and IT Risk Management”, John Wiley and Sons, 2014



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E08	MALWARE ANALYSIS	3	3	0/0	0/0	Ty

OBJECTIVES:

- To understand malwares: Viruses, Worms, and Trojans etc.
- To gain insight into how to do Malware analysis.
- Understanding malware functioning and behavior along with some malware analysis tools.

UNIT I INTRODUCTION

9 Hrs

Basic Static Techniques, Malware Analysis in Virtual Machines, Basic Dynamic Analysis, Malware Analysis - VM infra creation for Malware Analysis

UNIT II DEBUGGING

9 Hrs

Ring 3 Debugging and other methods - Decoding and self Extracting code segment - Tools for collecting Malware - Analyzing Malware, Malware Behavior, Covert Malware Launching, Data Encoding, Malware-Focused Network Signatures

UNIT III STATIC ANALYSIS

9 Hrs

Behavior Analysis - PE introduction - Shell code and packages/unpackaged, Advanced Static Analysis, Packed and Obfuscated Malware, Portable Executable File Format, Static Analysis in Practice, The PE File Headers and Sections.

UNIT IV MALWARE SANDBOX

9 Hrs

Dynamic binary analysis - Analyzing Malware Websites, Virtualization, virtual box, sandbox network infrastructure, integrating virus total signature with VM, Using a Malware Sandbox

UNIT V MALWARE CLASSIFICATION AND CLUSTERING

9 Hrs

Evaluation of Automated Malware Analysis system - Evaluation of Automated Malware Analysis Tools., The Quick-and-Dirty Approach, Using a Malware Sandbox, Monitoring with Process Monitor

Total Hours: 45

TEXT BOOK:

1. Michael Sikorski, "Practical Malware Analysis: The Hands-On Guide to Dissecting Malicious Software", 1st Edition, No Starch Press, 2012

REFERENCE BOOKS:

1. Michael Ligh, "Malware Analyst's Cookbook and DVD: Tools and Techniques for Fighting Malicious Code", Wiley, 1st Edition, 2010
2. Christopher Elisan, "Advanced Malware Analysis", first edition, McGraw-Hill Education, 2015



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ELECTIVE – III

Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E09	IDENTITY AND ACCESS MANAGEMENT	3	3	0/0	0/0	Ty

OBJECTIVES:

- To understand about Authorization and Authentication.
- Learn different access control methods.
- Understanding of the issues pertained to Identity and Access Management

UNIT I INTRODUCTION

9 Hrs

Identity and Access Management – Components of Identity access Management: Authorization, Authentication, User Management, and Central User Repository - Uses and Benefits of Identity and Access Management

UNIT II AUTHENTICATION

9 Hrs

Identity and Access Management Architecture - Authentication: Different Authentication Techniques

UNIT III AUTHORIZATION

9 Hrs

Authorization: Access Controls, Different types of Access Controls – Different Standards related to Identity Access Management – Access Control for Operating Systems

UNIT IV DATA MANAGEMENT

9 Hrs

Data Owner, Custodian and User - Account Management, Password Management – Security Risks associated: Piggy Backing/Tail Gating, Shoulder Surfing etc. - Components of Central user Repository

UNIT V ISSUES

9 Hrs

Challenges faced in Identity Access Management – Identity Theft – Data Collection and Aggregation – Privacy and Compliance related – Identity Management related to Cloud Technology – Data Retention and Disposal

Total Hours: 45

TEXT BOOK:

1. Ertem Osmanoglu, “Identity and Access Management: Business Performance through Connected Intelligence”, Syngress, 2013

REFERENCE BOOKS:

1. Peter O. Orondo, “Identity & Access Management: A Systems Engineering Approach”, CreateSpace Independent Publishing, 2014
2. Khandakar Entenam Unayes Ahmed, “Identity and Access Management in Cloud Computing”, LAP Lambert Academic Publishing, 2011



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E10	VIRTUALIZATION	3	3	0/0	0/0	Ty

OBJECTIVES:

- The concepts of Virtualization and its types
- The purpose and various applications of Virtualization in different environments
- Operations of virtual machines and the hardware requirement

UNIT I FUNDAMENTALS OF VIRTUALIZATION 9 Hrs

Concept of Virtualization – Benefits of Virtualization – Understanding Cloud - Types of Virtualizations - Disadvantages - Virtual Machine – Key Properties of Virtual Machine

UNIT II VIRTUALIZATION PURPOSE 9 Hrs

More efficient utilization of hardware – Increasing availability – Disaster Recovery – Just-in-time delivery of resources – Saving Energy

UNIT III APPLICATIONS 9 Hrs

Desktop Computers – Running Specific Program – Setting Test & Development Environments – Designing private cloud – utilizing public cloud

UNIT IV HARDWARE REQUIREMENTS 9 Hrs

Virtual CPU – Virtual Memory – Virtual Storage – Virtual Networking – Virtual Graphic Processing – Choosing between SAN, NAS, local storage

UNIT V VIRTUAL MACHINES OPERATIONS 9 Hrs

Cloning a Virtual Machine – Backing Up & Recovering a Virtual Machine – Converting Physical Server into a Virtual Server - Converting Virtual Server into a Physical Server

Total Hours: 45

TEXT BOOK:

1. Michael Fox (2010), “Demystifying the Virtual Desktop: Starting With Desktop Virtualization: Volume 1” CreateSpace Independent Publishing Platform

REFERENCE BOOKS:

1. Nelson Reust (2009), “Virtualization, A Beginner's Guide, McGraw-Hill Osborne
2. Uhlig, R. et al.; "Intel virtualization technology," Computer , vol.38, no.5, pp. 48-56, May 2005



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ FVT
BIS18E11	CLOUD COMPUTING & GOVERNANCE	3	3	0/0	0/0	Ty

OBJECTIVES:

- This paper gives an overview of the concept of cloud computing including different types of clouds
- Students will be able to understand various ways of cloud authentication and user access management
- This paper also highlights the security architecture built around the cloud

UNIT I CLOUD COMPUTING

9 Hrs

Introduction to Cloud Computing, History and Evolution of Cloud Computing, Types of clouds, Private, Public cloud and Hybrid Clouds, Cloud Computing architecture, Cloud computing infrastructure, Merits of Cloud computing, Practical applications of cloud computing, Cloud computing delivery models and services (IaaS, PaaS, SaaS), obstacles for cloud technology, Cloud vulnerabilities, Cloud challenges, Examining IaaS-Enabling Technology, Trusting the Cloud, Exploring Infrastructure as a Service and Platform as a service (PaaS), Using Software as a service(SaaS).

UNIT II CLOUD COMPUTING COMPANIES AND MIGRATING TO CLOUD 9 Hrs

Web-based business services, Delivering Business Processes from the Cloud: Business process examples, EC2/AWS service model, Services offered by AWS, AWS zones, NAT, Google Cloud Computing Services, Microsoft Windows Azure as Cloud Computing, Open-source software for private cloud, Audit and security risk with Cloud computing, Broad Approaches to Migrating into the Cloud, The Seven-Step Model of Migration into a Cloud, Efficient Steps for migrating to cloud., Risks: Measuring and assessment of risks, Company concerns Risk Mitigation methodology for Cloud computing, Case Studies. Unit 3: Security Design and Architecture - Cloud Computing Service Models

UNIT III CLOUD COST MANAGEMENT AND SELECTION OF CLOUD PROVIDER 9 Hrs

Assessing the Cloud: software Evaluation, System Testing, Seasonal or peak loading, Cost cutting and cost-benefit analysis, Selecting the right scalable application. Selecting cloud solution to lower total cost of ownership (TCO), higher return on investment (ROI), increased efficiency, dynamic provisioning and utility-like pay-as-you-go services Creating Economic Model: Listing Application Costs, Recovering costs, Adjustments in the economic model; Private cloud and allocation costs, Service levels and compliance costs, Strategies for Costs, General issues for adopting new technologies in an organization Case Studies. Vendors and products for Cloud computing, Comparing and Selecting ISPs and IaaS, Consideration for selecting Cloud Solution Understanding Best Practices used in selection of Cloud service and providers, Clouding the Standards and Best Practices Issue: Interoperability, Portability, Integration, Security, Standards Organizations and Groups associated with Cloud Computing, Commercial and Business Consideration

UNIT IV GOVERNANCE IN THE CLOUD

9 Hrs

Industry Standards Organizations and Groups associated with Cloud Computing, Need for IT governance in cloud computing, Cloud Governance Solution: Access Controls, Financial Controls, Key Management and Encryption, Logging and Auditing, API integration. Legal Issues: Data Privacy and Security Issues, Cloud Contracting models, Jurisdictional Issues Raised by Virtualization and Data Location, Legal issues in Commercial and Business Considerations Case Studies

UNIT V PRODUCTION READINESS OF CLOUD SERVICES

9Hrs

Service Management, Producer-Consumer Relationship: Business Mindset, Distribution, Quality of Service, Cloud Service Life Cycle: Service Strategy, Service Design, Service Transitions Service Operations, Service Improvement, Assessing Production Readiness: Services Facility Readiness, Service Infrastructure Readiness, Service Technology Readiness, Service Monitoring Readiness, Service maintenance and operations readiness, Case Studies

. Total Hours: 45

TEXT BOOK:

1. Voorsluys, William; Broberg, James; Buyya, Rajkumar (February 2011). "Introduction to Cloud Computing". In R. Buyya, J. Broberg, A.Goscinski.

REFERENCE BOOKS:

B.Tech- Cyber Forensics and Information Security– 2018 Regulation



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1. *Ronald L. Krutz & Russell Dean Vines (2010), "Cloud Security: A Comprehensive Guide to Secure Cloud Computing", Wiley*
2. *Vic (J.R.) Winkler (2011) "Securing the Cloud", Elsevier*



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E12	IOT SECURITY & SMART CITY SECURITY	3	3	0/0	0/0	Ty

OBJECTIVES:

This subject introduces students to

- The concepts of IoT and Smart City
- Components of IoT and the security threats to such components and devices; and
- Vulnerability and security aspects of smart cities

UNIT I FUNDAMENTALS OF IOT

9 Hrs

History – Applications – Requirements – IoT Architecture

UNIT II COMPONENTS OF IOT

9 Hrs

Hardware – Sensors – System on a Chip – Firmware – Application Software – Device Drivers – Cloud – Security

UNIT III IOT CONNECTIVITY & COMMUNICATION TECHNOLOGIES

9 Hrs

Communication & Networking Protocols – Wireless 101 – RF 101 – RFID – Bluetooth LE – IEEE 802.15.4, IEEE 802.15.4e, 802.11ah - Relay Access Point – Target Wake Time

UNIT IV OVERVIEW OF SMART CITY

9 Hrs

Need for Smart Cities – Three Pillars of Development – Demographic Change & Implications for Cities – Planning a Smart City

UNIT V SECURING SMART CITIES

9 Hrs

Cyber Attacks on Smart Cities – Traffic Control Systems – Mobile Applications – Public Transportation – Cameras – Smart Grid – City Management System – Smart Street Lighting – Public Data

Total Hours: 45

TEXT BOOK:

1. Charalampos Doukas (2012), *Building Internet of Things With the Arduino: Volume 1*, CreateSpace Independent Publishing Platform

REFERENCE BOOKS:

1. Emanuel Delgado (2015), *The Internet of Things: Emergence, Perspectives, Privacy and Security Issues (Internet Theory Technology App)*, Nova Science Publishers Inc
2. Anthony M. Townsend (2014), *Smart Cities - Big Data, Civic Hackers, and the Quest for a New Utopia*, W. W. Norton & Company



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ELECTIVE – IV

Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E13	CYBER LAW	3	3	0/0	0/0	Ty

OBJECTIVES:

- To understand the fundamentals of cyber law.
- Study IT ACT 2000 (INDIA).
- Understanding Intellectual Property Rights .

UNIT I

9 Hrs

Fundamentals of Cyber Law –Concepts of cyber law – cyber space – jurisprudence – cyber jurisprudence – jurisdiction – jurisdiction and cyber law

UNIT II

9 Hrs

Cyber law in India with special reference to Information Technology Act, 2000 – Amendments in IT Act, 2002 - 2008

UNIT III

9 Hrs

Information Technology Laws in United States, United Kingdom, Europe, Canada and Australia

UNIT IV

9 Hrs

Intellectual Property Rights – Basics of IPR – Intellectual Property Rights – Copy Rights – Patents – Trade Marks – Importance of IPR – Role of IPR in a business – Role of IPR in Academics and Research - Infringements and Remedies of Copy Rights, Trademark, Trade Secrets and Patent Law

UNIT V

9 Hrs

Intellectual Property Rights Global Scenario and Case Studies

Total Hours: 45

TEXT BOOK:

1. Saurabh Sharma, “Information Security and Cyber Law”,Vikas publication, 2010

REFERENCE BOOKS:

1. Peggy E Chaudhary, “Protecting Your Intellectual Property Rights: Understanding the Role of Management, Governments, Consumers and Pirates”, Springer, 2013
2. Brain Craig, “Cyber Law: The Law of Internet and IT”, Prentice Hall, 2012



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E14	INFORMATION SECURITY AUDITS	3	3	0/0	0/0	Ty

OBJECTIVES:

- To know about information security audit and the role played by Auditors.
- Have knowledge of best practices for IT compliances.
- Understanding the Audit process.

UNIT I INFORMATION SYSTEM AUDIT 9 Hrs

Nature and Scope of System Audit – Purpose and Value of IS Audits, Integration into the ISMS process, Different types of IS audits, Key aspects of the IS audit

UNIT II AUDIT PLANNING 9 Hrs

Basics and responsibilities, Planning individual IS audits, IS audit team, Call for tenders procedure, Audit Manual - Audit check lists - Audit Reports, Evaluating an IS audit

UNIT III BEST PRACTICES FOR IT COMPLIANCE AND REGULATORY REQUIREMENTS 9 Hrs

IT Compliance requirements under clause 49 of SEBI Listing agreement - IT Compliance requirements under Sarbanes Oxley Act of USA - COBIT

UNIT IV AUDIT VS. ASSESSMENT AND ETHICS 9 Hrs

Major Guidelines, Role of Lead Auditors – Ethics of Lead Auditors,

UNIT V PERFORMING AN IS AUDIT 9 Hrs

Audit techniques, Evaluation scheme, Preparing the IS audit (Step 1), Creating the IS audit plan and screening documents (Step 2), Examining documents and updating the IS audit plan (Step 3), On-site examination (Step 4), Evaluating the on-site examination (Step 5), Producing the IS audit report (Step 6)

Total Hours: 45

TEXT BOOK:

1. Chris Davis, "IT Auditing Using Controls to Protect Information Assets, McGraw Hill, 2nd Edition, 2011

REFERENCE BOOKS:

1. Stephen D. Gantz, "The Basics of IT Audit: Purposes, Processes, and Practical Information" Syngress, 2013
2. CISA Certified Information Systems Auditor All-in-One Exam Guide, 2011



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E15	DATA CARVING	3	3	0/0	0/0	Ty

OBJECTIVES:

- To understand data carving and recovery techniques
- To gain insight into different File Systems that exists across various OS.
- Get familiar with data carving tools and issues related to this concept.

UNIT I INTRODUCTION

9 Hrs

Introduction to Data Carving – its Evolution – Understanding: text, executable, png, mp3, and jpeg files etc. - Data Recovery, Difference between Data Recovery and Carving – MFT Parse

UNIT II FILE SYSTEM

9 Hrs

File System: FAT, NTFS, EXT, HFS and UFS – File system metadata - Digital Evidence in HDD: Slack Spaces, Unallocated Spaces etc.

UNIT III DATA CARVING TECHNIQUES

9 Hrs

Different Data Carving Techniques – Metadata Extraction – Fragmentation in Operating Systems – File Signatures, file extortion. Mac Time.Magic number. Cluster based file carving, Sector based file carving, Byte based file carving

UNIT 4: DATA CARVING TOOLS

9 Hrs

Data Carving tools and their features - Analysis of Files - Live Memory Analysis - OS Fingerprinting, registry analysis. Hex editing. unallocated space

UNIT 5: ISSUES

9 Hrs

Encryption, Disc tempering, SSD, Physical damage, Tools, Trends and Challenges - Legal and Ethical Issues, bulk extraction, Data searching

Total Hours: 45

TEXT BOOK:

1. Nicholas Mikus, “An Analysis of Disc Carving Techniques”, Kindle Edition

REFERENCE BOOK:

1. Mathew Blank, “File Data Recovery: PC Hard Drive Data Recovery, Usb Data Recovery, MAC Data Recovery, Android Data Recovery, Data Recovery Services”, CreateSpace Independent Publishing, 2014



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E16	PROFESSIONAL ETHICS	3	3	0/0	0/0	Ty

OBJECTIVES:

- Understanding of moral values and ethics.
- Understanding organizational and social issues related to IT security and Ethics.
- To know about the Computer ethics and professional responsibilities.

UNIT I HUMAN VALUES

9 Hrs

Morals, Values and Ethics – Integrity – Work Ethic – Honesty – Courage –Empathy – Self-Confidence Character

UNIT II ENGINEERING ETHICS

9 Hrs

Senses of 'Engineering Ethics' - variety of moral issues - types of inquiry - moral dilemmas - moral autonomy - Theories about right action - Self-interest - customs and religion - uses of ethical theories.

UNIT III

9 Hrs

Rights and Duties as enshrined in the Constitution of India

UNIT IV

9 Hrs

Ethical Practices in Information Security – Collection , preservation and dissemination of digital evidence – Data Protection and Privacy Ethics

UNIT V

9 Hrs

Code of Ethics to Information Security Professional, Digital Forensic Experts and Information Security Auditors.

Total Hours: 45

TEXT BOOK:

1. Terrell Ward Bynum, “Computer Ethics and Professional responsibilities”, Willey-Blackwell, First Edition, 2003

REFERENCE BOOKS:

1. Marian Quigley, “Encyclopedia of Information Ethics and Security”, IGI Global, First Edition, 2007
2. Marian Quigley, “Information Security and Ethics: Social and Organizational Issues”, Irm Pr, 2004



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ELECTIVE – V

Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E17	INTELLECTUAL PROPERTY RIGHTS	3	3	0/0	0/0	Ty

OBJECTIVES: End of this course the students will be able to understand the

- Concept of intellectual Property and the need for protection
- Salient features of Patents and Trade Mark
- The Copyright Act (1957) and recent amendments
- Industrial Designs

UNIT I INTELLECTUAL PROPERTY

9 Hrs

Meaning and concept of intellectual Property and the need for protection - The world Intellectual property Organisation (WIPO) Convention - Origin and functions of World Trade Organisation (WTO) - Trade Related Intellectual property Rights (TRIPS) Agreement of WTO and its effects on Intellectual Property law in India; Dispute Settlement Mechanism.

UNIT II PATENTS

9 Hrs

The Patents Act O(1970), object definitions, salient features, patentable and non- patentable inventions, product and process patents –Patent applicants, provisional and complete specifications, priority dates, of claims, opposition to grant of patent, anticipation, provisions for secrecy of certain inventions - Patent office and power of Controller - Grant and sealing of patents, rights of patentees, rights of co-owners of patents, term of patent, patents of addition, assignment and transmission, register of patents - Amendment of applications and specifications and restoration of lapsed patents, rights of patentees of lapsed patents, surrender and revocation of patents - Compulsory licences, exclusive marketing rights, licences of right, use of invocation of patents purposes of government, acquisition of inventions by Central Government - Remedies for infringement of patents - Patent agents, scientific advisers, international arrangements - Right of plant breeders and farmers - National Law on Biological Diversity

UNIT III TRADE MARKS

9 Hrs

The Trade Mark Act (1999), object, definitions, salient features, marks registrable and non – registrable, conditions for registration, absolute and relative grounds for refusal of registration, procedure for and duration of registration, effects of registration - Powers and functions of Registrar - Distinctiveness, deceptive similarity, concurrent registration, rectification and correction of register - Assignment and transmission - Use of trademarks and registered users, collective marks, registration of certification marks, trade mark agents - Appellate board - Infringement action, passing off action - International treaties.

UNIT IV COPYRIGHT

9 Hrs

The Copyright Act (1957) and recent amendments: works in which copyright subsists - meaning of copyright ; ownership and rights of the owner; assignment; term of copyright - Registration of copyright; compulsory licences - copyright societies - Rights of broadcasting organisations and of performers - International copyright - Acts constituting & not constituting infringement; remedies for infringement

UNIT V INDUSTRIAL DESIGNS

9 Hrs

The designs Act, 2000 - definitions, registration of designs, copyright in registered designs, piracy of registered designs, remedies, powers and duties of Controller, International Law - Semi conductor integrated circuit layout – Design Act – 2000

Total Hours: 45

REFERENCE BOOKS:

1. *Law relating to patents, trademarks, copyright, design and geographical indications* by Dr. B.L. Wadehra, 5th edition, Universal law Publication, 2012
2. *Law of Intellectual Property* by Dr. S.R. Myneni, 6th Edition, Asia Law House Publication, 01 Jan 2013
3. *International Property* by David I. Bainbridge, 9th Edition, Pearson Education Publication, 24 May 2012
4. *Intellectual Property, Patents, Copyright, trademarks and allied rights* by W.R. Cornish, D Llewelyn, 6th Edition, sweet and Maxwell Publication, 18 June 2007



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E18	GENERAL FORENSIC SCIENCE	3	3	0/0	0/0	Ty

OBJECTIVES:

Forensic Investigation paper will give a brief overview on

- General Forensic Science basics and legal procedures relating to it,
- Types of physical evidence and the collecting and preservation of the same
- Basics of Document Examination and the importance of Forensic Psychology

UNIT I INTRODUCTION 9 Hrs

Forensic Science - Definition - Statutory recognition of Forensic Science: Indian Evidence Act and Code of Criminal Procedure – Importance of Forensic practices in Cyber Crime Cases.

UNIT II PHYSICAL EVIDENCE 9 Hrs

Information that physical evidence can reveal - Classification of physical evidences - stages in physical evidence analysis

UNIT III PERSONAL IDENTIFICATION 9 Hrs

Finger Prints - Foot Prints - Bite Marks - Voice Prints – Forensic Anthropology and Criminal Profiling - DNA Typing - Lie Detector.

UNIT IV DOCUMENT EXAMINATION 9 Hrs

Questioned document examination - Different types of forgeries, alterations and the methods for detecting them

UNIT V FORENSIC PSYCHOLOGY: CONCEPT AND IMPORTANCE 9 Hrs

Definition, meaning and scope of Forensic Psychology- Role of Forensic Psychologist in the investigation of crimes

Total Hours: 45

TEXT BOOK:

1. Brewster, F. (1932). Contested documents and forgeries. [On methods of testing documents in legal cases, with special reference to conditions in India. With plates.]. Calcutta: Book Co.

REFERENCE BOOKS:

1. James, S. (2005). *Forensic science: An introduction to scientific and investigative techniques* (2nd ed.). Boca Raton, Florida: CRC Press.
2. Svensson, A., & Nicol, J. (1965). *Techniques of crime scene investigation*, by Arne Svensson and Otto Wendel (2d, rev. and expanded American ed.). New York: American Elsevier.



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E19	BFSI & TELECOM FRAUDS	3	3	0/0	0/0	Ty

OBJECTIVES:

- Introducing the banking concepts and core banking systems
- Vulnerable areas in core banking; and
- Telecom frauds and security controls

UNIT I INTRODUCTION

9 Hrs

Banking Concepts - Broad features of Deposit and Loan Products - Types of banks: Retail, Corporate, Investment, Development, Private, etc. - Ancillary services like Trade Finance, Remittances - Anti Money Laundering and KYC concepts – ATM Frauds

UNIT II COMPUTERIZED OPERATIONS OF BANKS

9 Hrs

Evolution of computerization in banks - Core Banking Solution - Infrastructure requirements - Broad software features - Various methods

UNIT III VULNERABLE AREAS IN CBS AND THEIR EXPLOITATION

9 Hrs

Application related - Parameters and freedom available to users - Empowerment of users - Access to - organization -wide data - Direct access to database and records

UNIT IV TELECOM FRAUD

9 Hrs

Definition – Classification of Telecom Frauds – Frauds in Fixed Network – Frauds using 2G/3G/4G networks – Telecom Fraud Risk Management

UNIT V SECURITY CONTROLS

9 Hrs

Log of User activities in the application - Change management procedures - Internal data consistency checks - Account related frauds - Internet Banking related - Social Engineering, Phishing tactics

Total Hours: 45

TEXT BOOK:

1. Retail Banking by Raghu Palat

REFERENCE BOOKS:

1. *Information System for Banks – Indian Institute of Banking & Finance*
2. *Core Banking Solution – Evaluation of Security & Controls by M Revathy Sriram, P K Ramanan and R Chandrasekhar*



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E20	CYBER TERRORISM	3	3	0/0	0/0	Ty

OBJECTIVES:

- Various types of terrorism, their definition, operational strategies and the groups operating
- The concepts of cyber terrorism and cyber warfare and the importance of combating them; and
- Various case studies and legal remedies nationally and internationally

UNIT I INTRODUCTION

9 Hrs

Terrorism – Types of Terrorism – Terrorist Groups – National and International

UNIT II CYBER TERRORISM

9 Hrs

Definition and Concepts – Transnational Dimensions of Cyber Crimes and Cyber Terrorism – Issues and Threats

UNIT III CYBER WARFARE

9 Hrs

Definition and Concepts – Information Warfare – Electronic Warfare –Special Information Operations – Computer Network Attacks

UNIT IV

9 Hrs

National and International Cyber Terrorist Attacks – Case Studies and Legal Remedies

UNIT V

9 Hrs

National and International Cyber Warfare Attacks – Case Studies and Legal Remedies

Total Hours: 45

TEXT BOOK:

1. Paul Grishman (2009), Cyber Terrorism: The Use Of The Internet For Terrorist Purposes, Navyug Publishers & Distributors

REFERENCE BOOKS:

1. Defence Against Terrorism Centre of Excellence (2008), Responses to Cyber Terrorism (NATO Science for Peace and Security Series E: Human and Societal Dynamics), IOS Press,US
2. Joint Forces Staff College (2014), Cyber Warfare: "A New Dod Core Mission Area" (Defense), CreateSpace Independent Publishing Platform



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ELECTIVE – VI

Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E21	THREATS IN SOCIAL MEDIA	3	3	0/0	0/0	Ty

OBJECTIVE:

On successful completion of the course the student should have understood the cyber threats in Social websites, classify their types, discuss the cyber threats and its impact

UNIT I MEDIA & JOURNALISM 9 Hrs

Overview – History, Types , advantages and disadvantages of various media – Journalism – Types of Journalism, Investigative Journalism – Yellow Journalism – Ethics of a Journalist

UNIT II SOCIAL MEDIA 9 Hrs

Print and Television media – Social Networking Sites, Types, advantages and disadvantages, Social Media ethics – Do's and Don'ts in various social medias

UNIT III VICTIMIZATION IN SOCIAL MEDIA 9 Hrs

Types of victimization – Profiles of social media victims - causes of victimization – trends in victimization in social media in India and other countries.

Impact Of Social Media Threats – Harm to Brand Reputation - Lost Productivity - Strains on Bandwidth - Data Leaks & Disclosure

UNIT IV THREATS AGAINST ORGANIZATIONS FROM SOCIAL MEDIA 9 Hrs

Executive impersonations - Account takeover - Watering hole phishing and malware - Customer scams - Corporate impersonations - Information Leakage - Planning of an attack - Clickbait attacks - Hashtag/traffic Hijacking

UNIT V SOCIAL MEDIA SECURITY POLICIES 9 Hrs

Individuals - Organizational Security Policies – Safe surfing - Safe Message Handling - Anti-Malware Software - Privacy Policies -Safe Browsing practices

Total Hours: 45

REFERENCE BOOKS:

1. *Security in the Digital Age: Social Media Security Threats and Vulnerabilities* by Henry A. Oliver, Paperback – Import Edition, CreateSpace Independent Publishing Platform, 11 August 2015
2. *Threats and anti threats Strategies for Social Networking Websites* by Amir Rokiifard, volume 5, International Journal of Computer networks and Communications, July 2013
3. *Securing the Social Media in the Enterprise* by Henry Dalziel, 1st Edition, Elsevier Publication, 2015
4. *Securing the Clicks: Network Security in the Age of Social media* by Gary Bahadur, Jason Inasi, Alex de Carvalho, Illustrated Edition, Mc. Graw Hill Professional Publication, 2011
5. *Policing Cyber Crime: Networked and Social Media Technologies and the challenges for Policing* by David S Wall, Matthew L Williams, 1st Edition, Routledge Publication, 16 May 2014



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E22	DATA PRIVACY	3	3	0/0	0/0	Ty

OBJECTIVES:

- To learn about privacy of our personal information.
- To get idea about data privacy and data protection.
- Understanding Legal aspects as well as data privacy and data protection laws

UNIT I INTRODUCTION

9 Hrs

Data, Data Privacy and Data Protection. Data Protection and the Value of Privacy, The Evolution of Privacy Principles, Comparative Approaches to Data Protection, Data Protection in India

UNIT II UNDERSTANDING PERSONAL INFORMATION

9 Hrs

Issues and International Practices, Information or data?, Information about/relating an individual, Identified or Identifiable Individual., Pseudo anonymisation and Anonymisation, Sensitive Information – Corporate Information – Corporate Intelligence, Collection and processing of data with prior consent.

UNIT III FAIR INFORMATION PRACTICES

9 Hrs

Data Quality Principle, Purpose Specification Principle, Use Limitation Principle, Security Safeguards Principle, Individual Participation Principle Day-to-Day Roles in Protecting the Privacy of Personal Information - Recognizing and Responding to Social Engineering

UNIT IV SECURITY BREACH BASICS

9 Hrs

Types and Countermeasures – Hot Spots / Risk Areas - Due Diligence – Personal, corporate, customer, vendor – Reality Check, Miscellaneous

UNIT V DATA PRIVACY AND DATA PROTECTION LAWS

9 Hrs

Legal Provisions – India and other countries, Financial Sector, Health Sector, Information Technology and Telecommunications Sector

Total Hours: 45

TEXT BOOK:

1. Timothy, “Understanding Privacy and Data Protection”, Thomson Reuters, 2014

REFERENCE BOOKS:

1. Graham Greenleaf, “Asian Data Privacy Laws: Trade and Human Rights Perspective”, Oxford University Press, 2014
2. Terence Craig, “Privacy and Big Data”, O’Reilly Media, First Edition, 2011



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E23	SOCIAL NETWORK ANALYSIS	3	3	0/0	0/0	Ty

OBJECTIVES:

- To understand the role played by social media on our life's.
- Understand data privacy and crimes that occur over social media.
- To learn about the advantages and disadvantages of social media.

UNIT I

9 Hrs

Introduction to Media and Social Media/Social Network – Definition and Types

UNIT II

9 Hrs

Working of Facebook, Twitter, Linkedin and other social networks – Advantages and Disadvantages – Social Network Inventory

UNIT III

9 Hrs

Understanding Sharing Behavior – Psychology of Sharing information in social media – News Sharing – Business sharing – E-commerce through Social Media –Crowd Sourcing – Twitter Scavenger Hunt – following attribution

UNIT IV

9 Hrs

Safe Social Networking – Crimes through social networks - Disclosure of personal information – Stranger Acquaintance – Chat Sites – Data Privacy, Protection, filters, gate keeping – securing information.

UNIT V

9 Hrs

Social Network Management – Need and Guidelines for Personal and Commercial Use

TEXT BOOK:

1. Luca Cavignone, “**Social Network Engineering for Secure Web Data and Services**”, 1st Edition, IGI Global, 2013

Total Hours: 45

REFERENCE BOOKS:

1. Yaniv Altshuler, “*Security and Privacy in Social Networks*”, Springer, 2013
2. Charu Aggarwal, *Social Network Data Analytics*, Springer, 2011



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Course Code	Course Title	C	L	T/S.Lr	P/R	Ty/ Lb/ ETL/ EVL
BIS18E24	CRIMINAL JUSTICE ADMINISTRATION	3	3	0/0	0/0	Ty

OBJECTIVES:

- The pillars of a Criminal Justice Administration
- The functioning of the Criminal Justice Agencies ; and
- The role of investigation officers in any criminal investigation

UNIT I INTRODUCTION 9 Hrs

Criminal Justice Administration – Introduction – Police, Judiciary and Prison

UNIT II POLICE 9 Hrs

State and District Police Set Up and Functions– Police Station – F-I.R. – Charge Sheet - Records maintained in a police station – C.B.I – Para Military Forces.

UNIT III JUDICIARY 9 Hrs

Court – Different Types of Courts – Functions – Powers and Procedures – Special Courts

UNIT IV PRISON 9 Hrs

Definitions of Prison and Jail – Theories of Punishment - Types of Prisons – Categories of Prisoners – Prison Authorities – Prison Adalat – Treatment Programmes in Prisons.

UNIT V CRIMINAL INVESTIGATION 9 Hrs

Role of Investigation Officers – Steps involved in an investigation – Outline of Cr.P.C., and Investigation – Challenges faced in cyber crime investigation.

Total Hours: 45

TEXT BOOK:

1. Edelston, C. D., & Wicks, R. I. (1977). An introduction to criminal justice. New York: Gregg Division, McGraw-Hill.

REFERENCE BOOKS:

1. Swanson, Charles, R. (1983). *Police administration: Structure, processes and behaviour*. New York: MacMillan Publishing Co., Inc.
2. Das, Bharat B. (1997). *Victims in the criminal justice system*. New Delhi: APH Publishing Corporation.