



Bharath

INSTITUTE OF HIGHER EDUCATION AND RESEARCH

(Declared as Deemed-to-be University under section 3 of UGC Act, 1956)
(Vide Notification No. F.9-5/2000 - U.3, Ministry of Human Resource Development, Govt. of India, dated 4th July 2002)

B.Tech Information Technology (Four Years)

CURRICULUM AND SYLLABUS - 2015

I –VIII SEMESTERS

SEMESTER I						
Code No.	Category	Course Title	L	T	P	C
THEORY						
BEN101	HS	English – I	3	1	0	3
BMA101	BS	Mathematics –I	3	1	0	3
BPH101	BS	Engineering Physics –I	3	0	0	3
BCH101	BS	Engineering Chemistry – I	3	0	0	3
BCS101	ES	Fundamentals of Computing & Programming	3	0	0	3
	HS	Foreign/Indian Language	3	0	0	3
BME102	ES	Engineering Graphics – C	1	0	3	3
BEE101	ES	Basic Electrical & Electronics Engineering	2	0	0	2
PRACTICAL						
BCS1L1	ES	Computer Practice Lab	0	0	3	1
BEE1L1	ES	Basic Electrical and Electronics Engineering Practices Lab	0	0	3	1
BPC1L1 #	BS	Physics and Chemistry Laboratory	0	0	3	0

BSS1L7	HS	Yoga (to be conducted during weekends)	1
# Laboratory Classes on alternate weeks for Physics and Chemistry. The Lab examinations will be held only in the second semester (including the first semester experiments also)			
Total No. of Contact Hours: 35		Total Credits: 26	

SEMESTER II						
Code No.	Category	Course Title	L	T	P	C
THEORY						
BEN201	HS	English-II	3	1	0	3
BMA201	BS	Mathematics –II	3	1	0	3
BPH201	BS	Engineering Physics –II	3	0	0	3
BCH201	BS	Engineering Chemistry – II	3	0	0	3
BCS202	ES	Internet programming	2	0	0	2
BSS2L2	HS	Personality Development	2	0	0	2
BBT202	BS	Biology for Engineers	2	0	0	2
BME201	ES	Basic Mechanical Engineering	2	0	0	2
BCE201	ES	Basic Civil Engineering	2	0	0	2
PRACTICAL						
BCS2L1	ES	Internet Practices lab	0	0	3	1
BCM2L1	ES	Basic Civil & Mechanical Engg. Practices Lab	0	0	3	1
BPC2L1	BS	Physics and Chemistry Lab	0	0	3/3	1
BSS2L4/ BSS2L5/ BSS2L6	HS	NSS/NCC/NSO (to be conducted during weekends)				1
#Laboratory Classes on alternate weeks for Physics and Chemistry. The lab examinations will be held only in the second semester (including the first semester experiments also)						
*Any one of the following courses:BFR201–French, BGM201–German, BJP201–Japanese,BKR201 – Korean, BCN201 – Chinese, BTM201 - Tamil						
Total No. of Contact Hours: 33			Total Credits: 26			

SEMESTER III						
THEORY						
Sub. Code	Category	Subject Name	L	T	P	C
BMA 301	BS	Probability and Queuing Model	3	2	0	4
BEC307	PC	Principles of Communication	3	0	0	3
BIT301	PC	Database Management Systems	3	0	0	3
BIT302	PC	Computer Organization and Architecture	3	0	0	3
BIT303	PC	Object Oriented Analysis and Design	3	0	0	3
BIT304	PC	Data Structure and Algorithms	3	2	0	4
PRACTICAL						
BIT3L1	PC	Database Management System Laboratory	0	0	3	2
BIT3L2	PC	Data Structure & Algorithm Laboratory in C	0	0	3	2
BIT3L3	PC	Object Oriented Programming using C++ Lab	0	0	3	2
BIT3S1	PR	Technical Seminar	0	0	2	1
Total Contact Hours: 31			Total Credits: 27			

SEMESTER IV						
THEORY						
Sub. Code	Category	Subject Name	L	T	P	C
BMA401	BS	Numerical Methods	3	2	0	4
BEC406	HS	Environmental studies	3	0	0	3
BIT402	PC	Operating Systems	3	0	0	3
BIT403	PC	Web Programming	3	0	0	3
BIT404	PC	Software Engineering	3	0	0	3
BIT405	PC	Distributed System	3	0	0	3
PRACTICAL						
BIT4L1	PC	Software Engineering Laboratory	0	0	3	2
BIT4L2	PC	Operating Systems Laboratory	0	0	3	2
BIT4L3	PC	Web Programming Laboratory	0	0	3	2
Total Contact Hours: 31			Total Credits- 25			

SEMESTER V						
THEORY						
Sub. Code	Category	Subject Name	L	T	P	C
BIT501	BS	Discrete Mathematics	3	2	0	4
BIT502	PC	Software Project Management	3	0	0	3
BIT503	PC	Data Communication and Computer	3	0	0	3
BIT504	PC	TCP/IP Principles and Architecture	3	0	0	3
	OE	Open Elective I	3	0	0	3
	CE	Core Elective I	3	0	0	3
PRACTICAL						
BIT5L1	PC	Networks Laboratory	0	0	3	2
BIT5L2	PC	Case Tools Laboratory	0	0	3	2
BIT5L3	PC	Multimedia Systems Laboratory	0	0	3	2
BIT5C1	PR	Comprehension I	0	0	0	1
Total Contact Hours: 29			Total Credits- 26			

SEMESTER VI						
THEORY						
Sub. Code	Category	Subject Name	L	T	P	C
BSS601	HS	Value Education & Professional Ethics	3	0	0	3
BIT603	PC	Grid and Cloud Computing	3	0	0	3
BIT604	PC	Artificial Intelligence & Expert Systems	3	0	0	3
BIT605	PC	Free/Open Source Software	3	0	0	3
	CE	Core Elective II	3	0	0	3
	NE	Non Major Elective- I	3	0	0	3
PRACTICAL						
BIT6L1	PC	Grid and Cloud Computing Lab	0	0	3	2
BIT6L2	PC	Machine Learning Laboratory	0	0	3	2
BIT6L3	PC	Free and Open Source Software Lab	0	0	3	2
Total Contact Hours: 27			Total Credits-24			

SEMESTER VII						
THEORY						
Sub. Code	Category	Subject Name	L	T	P	C
BIT701	PC	Wireless Networks	3	0	0	3
BIT702	PC	Cryptography and Security	4	0	0	4
BIT703	PC	Internet of Things	4	0	0	4
BIT704	PC	Soft Computing	3	0	0	3
	CE	Core Elective- III	3	0	0	3
	NE	Non Major Elective- II	3	0	0	3
PRACTICAL						
BIT7L1	PC	Software Testing Laboratory	0	0	3	2
BIT7L2	PC	Network Security Laboratory	0	0	3	2
BIT7P3	PR	Term Paper	0	0	4	2
Total Contact Hours: 30			Total Credits-26			

SEMESTER VIII						
THEORY						
Sub. Code	Category	Subject Name	L	T	P	C
	OE	Open Elective II	3	0	0	3
	NE	Non Major Elective – III	3	0	0	3
PRACTICAL						
BIT8C1	PR	Comprehension II	0	0	0	1
BIT8P1	PR	Project Work	0	0	18	9
Total Contact Hours: 24			Total Credits-16			

OVERALL CREDITS FOR THE PROGRAMME: 196

**SUMMARY OF CURRICULUM STRUCTURE AND CREDIT & CONTACT
HOUR DISTRIBUTION**

S.No	Sub Area	Credit As per Semester								No. of Credit	% of credit
		I	II	III	IV	V	VI	VII	VIII		
1	Humanities & Social Sciences (HS)	7	6	-	3	-	3		-	19	9.70
2	Basic Sciences (BS)	9	12	4	4	4		-	-	33	16.84
3	Engineering Sciences (ES)	10	8	-	-	-	-	-	-	18	9.18
4	Professional Core (PC)	-	-	22	18	15	15	18	-	88	44.90
5	Core Electives (CE)	-	-	-		3	3		3	9	4.60
6	Non major Electives (NE)	-	-	-	-	-	3	3	3	9	4.60
7	Open Electives (OE)	-	-	-		3	-	3	-	6	3.06
8	Project Work, Seminar, Internship, Term Paper, etc. (PR)	-	-	1		1		2	10	14	7.14
	Total Credit	26	26	27	25	26	24	26	16	196	100%
	Total Contact Hour	35	33	31	31	29	27	30	24	240 Hrs	

LIST OF CORE ELECTIVES (CEs)

SUB.CODE	SUBJECT NAME (CE)	L	T	P	C
CORE ELECTIVE (CE) - I					
BIT021	Parallel Computing	3	0	0	3
BIT022	Neural Networks	3	0	0	3
	Software Quality Management	3	0	0	3
BIT024	Object Oriented Software Engineering	3	0	0	3
BIT025	Natural Language Processing	3	0	0	3
CORE ELECTIVE (CE) -II					
BIT026	Distributed Operating System	3	0	0	3
BIT027	Fuzzy & Genetic Algorithm	3	0	0	3
BIT028	Software Reliability and Software Testing	3	0	0	3
BIT029	Unified Modeling Language	3	0	0	3
BIT030	Speech Technology	3	0	0	3
CORE ELECTIVE(CE)- III					
BIT031	Component Based System Design	3	0	0	3
BIT032	Bio-inspired Algorithms	3	0	0	3
BIT033	Software Metrics	3	0	0	3
BIT034	Software Architecture	3	0	0	3
BIT035	Pattern Recognition	3	0	0	3

LIST OF NON MAJOR ELECTIVES (NEs)

SUB.CODE	SUBJECT NAME	L	T	P	C
NON- MAJOR ELECTIVE (NE) - I					
BET301	Principles of Analog and Digital System	3	0	0	3
BEC405	Linear Integrated Circuits	3	0	0	3
BETE502	Satellite Communication	3	0	0	3
BBM055	Telemedicine	3	0	0	3
BBR 404	Genomics and Proteomics	3	0	0	3
NON- MAJOR ELECTIVE (NE)- II					
BET407	Digital Signal Processing	3	0	0	3
BET702	Cellular Mobile Communication	3	0	0	3
BBR701	Bio Safety, Bio Ethics, IPR Patents	3	0	0	3
BBM405	Biosensors and Transducer	3	0	0	3
BIT012	Bioinformatics	3	0	0	3
NON- MAJOR ELECTIVE(NE)- III					
BET603	Telecommunication Switching Systems	3	0	0	3
BET703	Telecommunication System Modelling	3	0	0	3
BIT037	Hacking Techniques	3	0	0	3
BBM701	Digital and Medical Image Processing	3	0	0	3
BBM054	Medical Informatics	3	0	0	3

LIST OF OPEN ELECTIVES(OEs)

SUB.CODE	SUBJECT NAME	L	T	P	C
OPEN ELECTIVE (OE)-I					
BIT036	Semantic Web	3	0	0	3
BBA002	Entrepreneurship Development	3	0	0	3
BBA001	Principles of Management and Organizational Behaviour	3	0	0	3
BIT039	Mobile Communication	3	0	0	3
BIT040	High Speed Networks	3	0	0	3
OPEN ELECTIVE(OE)-II					
BBA003	Marketing Management	3	0	0	3
BBA008	Total Quality Management	3	0	0	3
BBA009	Intellectual Property Rights	3	0	0	3
BBA006	Indian Constitution and Society	3	0	0	3
BBA007	Engineering Economics and Cost Analysis	3	0	0	3

BEN101	ENGLISH - I										L	T	P	C		
	Total Contact Hours – 60										3	1	0	3		
	Prerequisite – +2 Level English															
	Course Designed by – Dept of English															
OBJECTIVES																
To make the students learn the basic modes of communication for fluency and attainment of confidence in speech, reading and writing.																
COURSE OUTCOMES (COs)																
CO1	Understand the importance of being responsible, logical, and thorough.															
CO2	Respond to the situations where short reports and instructions are required.															
CO3	Explain -how things work, and what to suggest when -things don't work															
CO4	Develop our confidence and authority in the practical use of language.															
CO5	Understand the importance of being responsible, logical, and thorough.															
CO6	Prepare to Face interviews and competitive examinations															
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low																
1	COs/Pos	a	b	c	d	e	f	g	h	i	j	k	l			
2	CO1	H	H	H	H	H	M	L	L	H	H	H	H			
	CO2							L								
	CO3	H						H		H			H			
	CO4	H	M				M	L	H	H			H			
	CO5							L								
	CO6	H		H	H	H	H	L		H	H	M	H			
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)		Engg Sciences (ES)		Professional Core (PC)		Core Elective (CE)		Non-Major Elective (NE)		Open Elective (OE)		Project/Term Paper/ Seminar/ Internship (PR)	
		√														
4	Approval	37 th Meeting of Academic Council, May 2015														

UNIT I STRUCTURES

12

Parts of speech - Active and passive voices - Subject verb agreement. - Writing about School life, Hobbies, Family and friends – Word formation with prefixes and suffixes - Tenses - Concord - Summarizing - Note-making

UNIT II TRANSCODING

12

Cause and effect relations – Punctuations – Differences between verbal and nonverbal communication -E - mail communication – Homophones - Etiquettes of E mail communication. Interpreting graphic representation - Flow chart and Bar chart.

UNIT III REPORTING 12

Degrees of comparison – Positive, Comparative, Superlative - questions- SI units -Lab reports - Physics chemistry, workshop and Survey report for introducing new product in the market.

UNIT IV FORMAL DOCUMENTATION 12

Writing project proposals - Presentation skills - Prefixes and suffixes - If conditions - Writing a review-Preparing minutes of the meeting, Agenda, official circulars.

UNIT V METHODOLOGY 12

Accident reports (due to flood and fire) - Hints development - Imperatives - Marking the stress Connectives , prepositional relatives.

TEXT BOOK:

1. Department Of Humanities and Social Sciences Division, Anna University, Oxford University Press, 2013.

REFERENCES:

1. S.P.Danavel, English and Communication for Students of Science and Engineering, Orient Blackswan, Chennai, 2011.
2. Rizvi, M.Asharaf, Effective Technical Communication, New Delhi, Tata McGraw Hill Publishibg Company, 2007.
3. Murali Krishna and Sunitha Moishra, Communication Skills for Engineers . Pearson, New Delhi, 2011.

BMA101	MATHEMATICS I	L	T	P	C
	Total Contact Hours - 60	3	1	0	3
	Prerequisite – + 2 Level Mathematics				
	Course Designed by – Dept of Mathematics				
OBJECTIVES					
To make the students learn Mathematics in order to formulate and solve problems effectively in their respective fields of engineering.					
COURSE OUTCOMES (COs)					
CO1	Study the fundamentals of mathematics				
CO2	Students learn multiple integral techniques				
CO3	Students gain knowledge in application of variables				
CO4	Find area and volume based on a function with one or more variables.				
CO5	Apply matrix operations to solve relevant real life problems in engineering.				
CO6	Formulate a mathematical model for three dimensional objects and solve				

Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low																	
1	COs/Pos	a	b	c	D	e	f	g	h	i	j	k	l				
2	CO1	H															
	CO2			M		H											
	CO3		H				M										
	CO4								L								
	CO5							H			L						
	CO6											L					
3	Category	Humanities & Social Studies (HS)		Basic Sciences & Maths (BS)		Engg Sciences (ES)		Professional Core (PC)		Core Elective (CE)		Non-Major Elective (NE)		Open Elective (OE)		Project/ Term Paper Seminar/ Internship (PR)	
			√														
4	Approval	37 th Meeting of Academic Council, May 2015															

UNIT 1 MATRICES

12

Characteristic equations- Eigen values and eigen vectors of the real matrix- Properties- Cayley-Hamilton theorem(Excluding proof)- Orthogonal transformation of a symmetric matrix to diagonal form- Quadratic form- Reduction of quadratic form to canonical form by orthogonal transformation.

UNIT II THREE DIMENSIONAL ANALYTICAL GEOMETRY

12

Equation of a Sphere- Plane section of a sphere- Tangent plane- Equation of cone- Right circular cone- Equation of a cylinder- Right circular cylinder.

UNIT III DIFFERENTIAL CALCULUS

12

Curvature in Cartesian coordinates- Centre and radius of curvature- Circle of curvature- Evolutes- Envelopes- Applications of Evolutes and Envelopes.

UNIT IV FUNCTIONS OF SEVERAL VARIABLES

12

Partial derivatives- Euler's theorem for homogeneous functions- Total derivatives- Differentiation of implicit functions- Jacobians- Taylor's expansion- Maxima and Minima- Method of Lagrangian multipliers.

UNIT V MULTIPLE INTEGRALS

12

Double integration- Cartesian and Polar coordinates- Change of order of integration- Change of variables between Cartesian and Polar coordinates- Triple integration in Cartesian coordinates-Area as double integral- Volume as triple integral.

TEXT BOOK:

1. Ravish R.Singh and Mukkul Bhatt, -Engineering Mathematics-I First Reprint, Tata McGraw Hill Pub Co., New Delhi. 2011.
2. Grewal.B.S, -Higher Engineering Mathematics, 40th Edition, Khanna Publications, Delhi. 2007.

REFERENCES:

1. Ramana.B.V. -Higher Engineering Mathematics, Tata McGraw Hill Publishing Company, New Delhi, 2007.
2. Glyn James, -Advanced Engineering Mathematics, 7th Edition, Pearson Education, 2007.
3. Erwin Kreyszig, -Advanced Engineering Mathematics, 8th Edition, John Wiley and Sons, New York, 2003.
4. Murray R.Spiegel, -Advanced Calculus, Schaum's Outline Series, First Edn, McGraw Hill Intl Book Co.,New Delhi, 1981.

PH101		ENGINEERING PHYSICS I								L	T	P	C
		Total Contact Hours - 45								3	0	0	3
		Prerequisite – +2 level Physics											
		Course Designed by – Department of Physics											
OBJECTIVES:													
To enhance the fundamental knowledge in Physics and its applications relevant to various stream Engineering and Technology													
COURSE OUTCOMES (COs)													
CO1	Understand the Principles and Laws of Physics												
CO2	To understand the impact of Crystal Physics												
CO3	Learn the Properties of Elasticity and Heat transfer.												
CO4	Acquire Knowledge on Quantum Physics.												
CO5	Understand the concepts on Laser & Ultrasonic’s and its Applications												
CO6	Understand the Principle of Laser and its Applications in Engineering and Medicine.												
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	COs/Pos	A	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H						M			H		
	CO2		L	H		M				M		L	H
	CO3												
	CO4	H		M	L						L		M
	CO5		L	L								L	L
	CO6												
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				

			√						
4	Approval	37 th Meeting of Academic Council, May 2015							

UNIT I CRYSTAL PHYSICS 9

Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – d spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC and HCP structures – Diamond and graphite structures (qualitative treatment)- Crystal growth techniques –solution, melt (Bridgman and Czochralski) and vapour growth techniques (qualitative)

UNIT II PROPERTIES OF MATTER AND THERMAL PHYSICS 9

Elasticity-Hooke's law - Relationship between three moduli of elasticity (qualitative) – stress -strain diagram – Poisson's ratio –Factors affecting elasticity –Bending moment – Depression of a cantilever –Young's modulus by uniform bending- I-shaped girders Modes of heat transfer- thermal conductivity- Newton's law of cooling - Linear heat flow – Lee's disc method – Radial heat flow – Rubber tube method – conduction through compound media (series and parallel).

UNIT III QUANTUM PHYSICS 9

Black body radiation – Planck's theory (derivation) – Deduction of Wien's displacement law and Rayleigh – Jeans' Law from Planck's theory – Compton effect. Theory and experimental verification – Properties of Matter waves – G.P Thomson experiment-Schrödinger's wave equation – Time independent and time dependent equations – Physical significance of wave function – Particle in a one dimensional box - Electron microscope - Scanning electron microscope - Transmission electron microscope.

UNIT IV ACOUSTICS AND ULTRASONICS 9

Classification of Sound- decibel- Weber–Fechner law – Sabine's formula- derivation using growth and decay method – Absorption Coefficient and its determination –factors affecting acoustics of buildings and their remedies. Production of ultrasonics by magnetostriction and piezoelectric methods - acoustic grating -Non Destructive Testing – pulse echo system through transmission and reflection modes - A,B and C – scan displays, Medical applications – Sonogram.

UNIT V PHOTONICS AND FIBRE OPTICS 9

Spontaneous and stimulated emission- Population inversion –Einstein's A and B coefficients - derivation. Types of lasers – Nd:YAG, CO₂, Semiconductor lasers (homo junction & hetero junction)- Industrial and Medical Applications. Principle and propagation of light in optical fibres – Numerical aperture and Acceptance angle - Types of optical fibres (material, refractive index, mode) – attenuation, dispersion, bending - Fibre Optical Communication system (Block diagram) - Active and passive fibre sensors- Endoscope.

TEXT BOOKS:

1. Jayaraman D Engineering Physics I. Global Publishing House, 2014.
2. Arumugam M. Engineering Physics. Anuradha publishers, 2010.
3. Gaur R.K. and Gupta S.L. Engineering Physics. Dhanpat Rai Publishers, 2009.
4. Mani Naidu S. Engineering Physics, Second Edition, PEARSON Publishing, 2011.

REFERENCES:

1. Searls and Zemansky. University Physics, 2009
2. Marikani A. Engineering Physics. PHI Learning Pvt., India, 2009.
3. Palanisamy P.K. Engineering Physics. SCITECH Publications, 2011.
4. <http://ocw.mit.edu/courses/find-by-topic>
5. <http://nptel.ac.in/course.php?disciplineId=122>
6. https://en.wikipedia.org/wiki/Engineering_physics

BCH101	ENGINEERING CHEMISTRY - I								L	T	P	C	
	Total Contact Hours - 45								3	0	0	3	
	Prerequisite – +2 Level Chemistry												
	Course Designed by – Department of Chemistry												
OBJECTIVES To impart a sound knowledge on the principles of chemistry involving the different application oriented topics required for all engineering branches.													
COURSE OUTCOMES (COs)													
CO1	Understand the principles of water characterization and treatment for portable and industrial purposes.												
CO2	To impart knowledge on the essential aspects of Principles of polymer chemistry and engineering applications of polymers												
CO3	Having a sound knowledge in the Field of the Conventional and non-Conventional energy												
CO4	To impart knowledge on the essential aspects of electrochemical cells, emf and applications of EMF measurements												
CO5	To make the students understand the Principles of corrosion and corrosion control .												
CO6	To impart knowledge about the Conventional and non-conventional energy sources and energy storage devices												
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	COs/Pos	a	b	c	d	e	f	g	h	i	J	k	l
2	CO1	H						H					
	CO2		L	H		M							
	CO3		M		H								
	CO4	H		M	L			H					
	CO5		L	L									
	CO6	H						H					

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/Seminar/ Internship (PR)
			✓						
4	Approval	37 th Meeting of Academic Council, May 2015							

UNIT I WATER TECHNOLOGY

9

Introduction-Characteristics : Hardness of water – types - temporary and permanent hardness - estimation by EDTA method Alkalinity – types of alkalinity - Phenolphthalein and Methyl orange alkalinity - determination –Domestic water treatment – disinfection methods (Chlorination, Ozonation , UV treatment) Boiler feed water – requirements – disadvantages of using hard water in boilers Internal conditioning (Calgon Conditioning method) – External conditioning – Demineralization process – Desalination and Reverse osmosis.

UNIT II POLYMERS

9

Introduction-Polymers- definition – polymerization – degree of polymerization - types of polymerization– Addition polymerization and Condensation polymerization – Mechanism of Polymerization - free radical polymerization mechanism only, Plastics: Classification – thermoplastics and thermosetting plastics – difference between thermoplastics and thermosetting plastics - preparation, properties and uses of PVC, Teflon, nylon-6,6, PET, Rubber :Types – drawbacks of natural rubber -vulcanization of rubber - properties and uses of vulcanized rubber Synthetic rubbers – butyl rubber and SBR

UNIT III ELECTRO CHEMISTRY

9

Introduction CELLS: types of Electrochemical cells , Electrolytic cells – Reversible and irreversible cells EMF – measurement of EMF– Single electrode potential – Nernst equation Reference electrodes : Standard Hydrogen electrode -Calomel electrode Ion selective electrode :Glass electrode and measurement of pH using Glass electrode Electrochemical series – significance Titrations :Potentiometer titrations (redox - Fe^{2+} vs dichromate titrations) Conduct metric titrations (acid-base – HCl vs, NaOH titrations)

UNIT IV CORROSION AND CORROSION CONTROL

9

Introduction: Chemical corrosion Definition - Chemical Corrosion - Electrochemical corrosion – different types – galvanic corrosion – differential aeration corrosion – mechanism of Chemical and Electrochemical corrosion factors influencing corrosion control – sacrificial anode and impressed cathodic current methods – Protective coatings :Paints– constituents of the paint and their functions Metallic coatings – electroplating of Gold and electro less plating of Nickel.

UNIT V NON-CONVENTIONAL ENERGY SOURCES AND STORAGE DEVICES 9

Introduction : Nuclear fission and nuclear fusion reactions – differences between nuclear fission and nuclear fusion reactions – nuclear chain Reactions – nuclear energy critical mass - super critical mass - sub - critical mass Light water nuclear reactor for power generation (block diagram only) – breeder reactor Solar energy conversion – solar cells – wind energy Fuel cells – hydrogen – oxygen fuel cell

Batteries :Primary and secondary Batteries – differences between Primary and secondary Batteries
 Secondary batteries :Lead–acid storage battery –working –uses Nickel–cadmium battery - working –
 uses Solid – state battery : Lithium battery

TEXT BOOKS:

1. P.C.Jain and Monica Jain, -Engineering Chemistry/ Dhanpat Rai Pub, Co., New Delhi (2002).
2. S.S. Dara -A text book of engineering chemistry/ S.Chand & Co.Ltd., New Delhi (2006).
3. P. J. Lucia, M. Subhashini, -Engineering Chemistry, Volume 1, Crystal Publications, Chennai, (2007).

REFERENCES :

1. B.K.Sharma -Engineering chemistry/ Krishna Prakasan Media (P) Ltd., Meerut (2001).
2. B. Sivasankar -Engineering Chemistry/ Tata McGraw-Hill Pub.Co.Ltd, New Delhi (2008).
3. <http://ocw.mit.edu/courses/find-by-topic>
4. <http://nptel.ac.in/course.php?disciplineId=122>
5. <https://en.wikipedia.org/wiki/Electrochemistry>

BCS101		FUNDAMENTALS OF COMPUTING AND PROGRAMMING								L	T	P	C
		Total Contact Hours - 45								3	0	0	3
		Prerequisite – +2 level Physics											
		Course Designed by – Department of Physics											
OBJECTIVES													
Students will understand the basics of computers and solve computer oriented problems using various computing tools.													
COURSE OUTCOMES (COs)													
CO1		Learn the fundamental principles in computing.											
CO2		Learn to write simple programs using computer language											
CO3		To enable the student to learn the major components of a computer system.											
CO4		Computing problems											
CO5		To learn to use office automation tools.											
CO6		To interpret and relate programs											
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	COs/Pos	a	b	c	d	e	f	g	h	i	J	k	l
2	CO1	H					H						
	CO2		L	H		M							
	CO3		L		S								
	CO4	M		M	W		M						
	CO5		L	L									
	CO6	H					H						

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)
				✓					
4	Approval	37 th Meeting of Academic Council, May 2015							

UNIT I INTRODUCTION TO COMPUTER 9

Introduction- Characteristics of computer-Evolution of Computers-Computer Generations - Classification of Computers- Basic Computer Organization-Number system. Computer Software: Types of Software—System software-Application software-Software Development Steps

UNIT II PROBLEM SOLVING AND OFFICE AUTOMATION 9

Planning the Computer Program – Purpose – Algorithm – Flowcharts– Pseudo code Introduction to Office Packages: MS Word, Spread Sheet, Power Point, MS Access, Outlook.

UNIT III INTRODUCTION TO C 9

Overview of C-Constants-Variables-Keywods-Data types-Operators and Expressions. Managing Input and Output statements-Decision making-Branching and Looping statements.

UNIT IV ARRAYS AND STRUCTURES 9

Overview of C-Constants, Variables and Data types-Operators and Expressions -Managing Input and Output operators-Decision making-Branching and Looping.

UNIT V INTRODUCTION TO C++ 9

Overview of C++ - Applications of C++-Classes and objects-OOPS concepts -Constructor and Destructor- A simple C++ program –Friend classes and Friend Function.

TEXT BOOKS:

1. Ashok, N.Kamthane, ||Computer Programming||, Pearson Education (2012).
2. Anita Goel and Ajay Mittal, ||Computer Fundamentals and Programming in C||, Dorling V Kindersley (India Pvt Ltd), Pearson Education in South Asia, (2011).
3. Yashavant P. Kanetkar, -Let us C||, 13th Edition, BPB Publications (2013).
4. Yashavant P. Kanetkar, ||Let us C++|| 10th Edition, BPB Publications (2013).

REFERENCES:

1. Pradeep K.Sinha, Priti Sinha –Foundations of Computing, BPB Publications (2013).
2. Byron Gottfried, –Programming with C, 2nd edition, (Indian Adapted Edition), TMH Publication.
3. Pradip Dey, Manas Ghosh, Fundamentals of Computing and Programming in _C‘ First Edition, Oxford University Press(2009).
4. The C++ Programming Language , 4th Edition, Bjarne Stroustrup, Addison-Wesley Publishing Company (2013).

BFR 101	FRENCH							L	T	P	C		
	Total Contact Hours – 45							3	0	0	3		
	Prerequisite – +2 Level English												
	Course Designed by – Department of English												
OBJECTIVES Language gives access and insights into another culture. It is a fundamental truth that cultures define themselves through languages.													
COURSE OUTCOMES (COs)													
CO1	Introduce the basics of the language to beginners												
CO2	Understand a dialogue and dialogue presentation												
CO3	To develop their knowledge as well as their communicative skills so as to be able to respond in simple everyday contexts.												
CO4	Synchronies I includes documents which initiate the learners to another world, another culture and which acclimatize them to the authentic use of the French language through the exploitation of written and iconographic documents. The Indian context has been used.												
CO5	Grammatical and lexical notions as well as activities required for communication are learnt by the students.												
CO6	Interpreting skills and confidence in the language.												
CO6	Interpreting skills and confidence in the language.												
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	COs/Pos	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	L										
	CO2			H	L				H	H	M	L	L
	CO3			H	L				H	H	M	L	L
	CO4			H					H	H	M	L	L
	CO5			H	L				H	H	M		L
	CO6			H					H	H	M		L

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/Seminar/ Internship (PR)
		√							
4	Approval	37 th Meeting of Academic Council, May 2015							

UNIT I INTRODUCTION

8

At the airport: Savoir- faire: exchanging greetings, self introduction, introducing another, welcoming someone, identifying someone - Grammar: verbs _to be', _to call oneself', subject pronouns, interrogation

UNIT II GRAMMAR

8

At the University: Savoir-faire: enquiring after one's welfare, taking leave, expressing appreciation -Grammar: definite & indefinite articles, gender of nouns, adjectives, present tense of regular _er' verbs, _to have', _to learn', negation, irregular verbs

UNIT III CONVERSATION

8

At the café: Savoir –faire: speaking about one's likes, giving information, expressing admiration, asking information about someone - Grammar: Interrogative adjectives, irregular verbs, possessive and interrogative adjectives

UNIT IV PROPOSAL WRITING

7

At the beach: Savoir faire: proposing an outing, accepting/ refusing the proposal - Grammar: singular & plural, indefinite pronoun, demonstrative adjectives, negation, irregular verbs

UNIT V FORMAL LETTERS

7

A concert: Savoir –faire: inviting, accepting, expressing one's inability to accept an invitation

UNIT VI REGULAR & IRREGULAR VERBS

7

Grammar: Present tense of more irregular verbs, contracted articles, future tense, interrogative adverbs, **At Nalli's** Savoir- faire: asking the price of an article, protesting against the price, Grammar: possessive adjectives, Exclamative adjectives, imperative tense

REFERENCES:

1. Course Material: Synchronie I –Méthode de Français
2. Madanagobalane -Samita Publications, Chennai, 2007

BGM	GERMAN	L	T	P	C
	Total Contact Hours – 45	3	0	0	3

101	Prerequisite +2 Level English												
	Course Designed by – Department of English												
OBJECTIVES													
At the end of this course, students shall be able to obtain good knowledge of the language, to r write and speak German, whereby the emphasis is laid on speech.													
COURSE OUTCOMES (COs)													
CO1	Will have a basic knowledge of the language												
CO2	Will acquire reading and writing skills.												
CO3	Will develop basic conversational skills.												
CO4	Will understand German lifestyle												
CO5	Will gain confidence to survive in a global environment												
CO6	Will have attained to survive and adopt change in a foreign culture .												
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	COs/Pos	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	L										
	CO2			H	L				H	H	M	L	L
	CO3			H	L				H	H	M	L	L
	CO4			H					H	H	M	L	L
	CO5			H	L				H	H	M		L
	CO6			H					H	H	M		L
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
		√											
4	Approval	37 th Meeting of Academic Council, May 2015											

Course structure:

- A. German Language (speaking, reading, writing, grammar and test)
- B. Life in Germany (shopping, restaurant, doctor, government, bank, post)
- C. The German Way (introduction, doing business, conversation, meetings, dining)
- D. Germany (Culture, Climate)

UNIT I PRONOUNCIATION

9

Welcome: Introduction to the Language, Spelling and Pronunciation (The alphabets and numbers)
Greetings, ordering, requesting, saying thank you - Grammar – **the article “the”, conjugation of verbs**

UNIT II SELF INTRODUCTION**9**

Shopping - Grammar – adjectives, endings before nouns, practice. Self introduction

UNIT III TRAINING**9**

Addresses, Occupations, Studies - Grammar - „to be“, the definite/indefinite articles, individual Training

UNIT IV ORAL**9**

Leisure Time, Sports, Hobbies - Grammar – position of a verb in a main clause , oral practice

UNIT V NARRATION**9**

At a Restaurant, Food and Drink - Grammar – the personal pronoun in the Nominative and Accusative, Narrating an event

RESOURCES:

1. Sprachkurs Deutsch 1 (Verlag Diesterweg), New Delhi Learning Centre

BJP 101	JAPANESE								L	T	P	C	
	Total Contact Hours - 45								3	0	0	3	
	Prerequisite – +2 Level English												
	Course Designed by – Department of English												
OBJECTIVES													
To have a basic knowledge of Japanese language, Japanese culture and heritage													
To impart knowledge Japanese lifestyle.													
To give sufficient exposure to develop basic conversational skills.													
COURSE OUTCOMES (COs)													
CO1	Will have a basic knowledge of the language												
CO2	Will acquire reading and writing skills.												
CO3	Will develop basic conversational skills.												
CO4	Will understand Japanese lifestyle												
CO5	Will gain confidence to survive in a global environment												
CO6	Will have attained to survive and adopt change in a foreign culture .												
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	COs/Pos	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	L										
	CO2			H	L				H	H	M	L	L
	CO3			H	L				H	H	M	L	L
	CO4			H					H	H	M	L	L
	CO5			H	L				H	H	M		L
	CO6			H					H	H	M		L

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)
		√							
4	Approval	37 th Meeting of Academic Council, May 2015							

UNIT I CULTURAL HERITAGE 9

Introduction-history and origin of Japanese language-Japan and its cultural heritage-Self introduction-counting numbers (1-100)-time-conversation with the use of audio devices, grammar- usage of particles wa, no, mo and ka

UNIT II USAGE 9

Greetings, seasons, days of the week and months of the year-numbers (up to 99,999)-grammar- usage of kore, sore, are, kono, sono, ano, koko and kochira, arimasu and imasu-i-ending and na-ending adjectives-use of audio and drills for practice

UNIT III ORAL 9

Asking the price-associated vocabulary-usage of particles ni, ga and ne- use of audio and drills for practice-Introduction to basic Kanji characters- use of audio and drills for practice

UNIT IV ART AND CULTURE 9

Family relationships- colours-Kanji (numbers) and festivals of Japan-religion-Japanese art and culture-ikebana, origami-introduction to hiragana- use of audio and drills for practice

UNIT V DRILLS AND PRACTICE 9

Vocabulary associated with directions-asking way-particles – e, de, mo, koko, soko, asoko, doko, nani, mae, ushiro, ue, shita- use of audio and drills for practice-introduction to katakana

TEXT BOOKS

1. Japanese Hiragana and Katakana for beginners, Timothy G. Stout, 2011
2. Genki I: An integrated course in elementary Japanese, Eri Banno and Yuko Ikeda, 2011

REFERENCE BOOKS

1. Japanese Reader collection Volume I, Yumi Boutwell and Clay Boutwell, Kotoba books, 2013
2. Living Language Japanese Complete Edition beginners through advanced course, Living Language, 2012

BKR 101	KOREAN	L	T	P	C
	Total Contact Hours - 45	3	1	0	3

		Prerequisite – +2 Level English											
		Course Designed by – Department of English											
OBJECTIVES													
To have a basic knowledge of Korean language, Korean culture and heritage													
To impart knowledge on Korean lifestyle and heritage.													
COURSE OUTCOMES (COs)													
CO1	Will have a basic knowledge of the language												
CO2	Will acquire reading and writing skills.												
CO3	Will develop basic conversational skills.												
CO4	Will understand Korean lifestyle												
CO5	Will gain confidence to survive in a global environment												
CO6	Will have attained to survive and adopt change in a foreign culture .												
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	COs/Pos	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	L										
	CO2			H	L				H	H	M	L	L
	CO3			H	L				H	H	M	L	L
	CO4			H					H	H	M	L	L
	CO5			H	L				H	H	M		L
	CO6			H					H	H	M		L
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
		√											
4	Approval	37 th Meeting of Academic Council, May 2015											

UNIT I PLANNING

9

Asking/giving reasons for studying Korean, making plans for the holiday, writing letters, describing past travel experiences and future travel plans, shopping in a grocery store, shopping in electronics store, storytelling Grammar: would like to (do), want to (do), construct future tense.

UNIT II MODIFIERS

9

Asking about feelings, asking about problems and giving advice, brief introductions - Grammar: Noun modifier, please try doing (something), irregular adjective/verb

UNIT III PLACING ORDERS**9**

Asking about hobbies, asking about abilities (sports), job requirements, Ordering things for delivery, ordering a meal at a restaurant - Grammar: Sentence ending for the honorific form, please do something for me, have tried (something),

UNIT IV DESCRIPTIONS**9**

Asking about evening plans, making plans with others, making preparations - Asking about rooms, describing your room to your classmates, describing your house. Grammar: to know/not know how to do something, must (do), have to (do), should,

UNIT V GRAMMAR**9**

Describing your plans and giving reasons, cancelling appointments. Grammar: Shall we~? / Should we~?, with, and, irregular verbs/adjective, so, because, cannot, intend to, plan to, or hope to, (more) than, the most, tag question/is n't it? ,will (do)

COURSE MATERIAL:

Korean for Non-Native Speakers (Student Book 1B) Korean Language Education Center, Sogang University

BCN 101		CHINESE							L	T	P	C	
		Total Contact Hours - 60							3	0	0	3	
		Prerequisite – +2 Level English											
		Course Designed by – Department of English											
OBJECTIVES													
To have a basic knowledge of Chinese language, Chinese culture and heritage													
To impart knowledge on Chinese lifestyle and heritage.													
COURSE OUTCOMES (COs)													
CO1		Will have a basic knowledge of the language											
CO2		Will acquire reading and writing skills.											
CO3		Will develop basic conversational skills.											
CO4		Will understand Chinese lifestyle											
CO5		Will gain confidence to survive in a global environment											
CO6		Will have attained to survive and adopt change in a foreign culture											
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	COs/Pos	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	L										
	CO2			H	L				H	H	M	L	L
	CO3			H	L				H	H	M	L	L
	CO4			H					H	H	M	L	L
	CO5			H	L				H	H	M		L
	CO6			H					H	H	M		L

BME 102	ENGINEERING GRAPHICS - C										L	T	P	C			
	Total Contact Hours – 45										3	0	0	3			
	Prerequisite – +2 Level Maths + Physical Science																
	Course Designed by – Dept of Mechanical Engineering																
OBJECTIVES																	
• To develop graphical skills in students for communication of concepts, design ideas of engineering products, and expose them to existing standards related to technical drawings. • To impart a sound knowledge on the principles of computers involving the different application oriented topics required for all engineering branches. • Graduates will demonstrate the ability to apply knowledge of mathematics to develop and analyze computing systems. • Graduates will have a solid understanding of the theory and concepts underlying computer science																	
COURSE OUTCOMES (COs)																	
CO1	To visualize two dimensional graphic representation of three dimensional objects and buildings																
CO2	To produce two dimensional graphic representation of three dimensional objects and buildings																
CO3	To comprehend and visualize 3D views of objects.																
CO4	To understand and generate the different curves used in engineering applications.																
CO5	To learn and write program in -C.																
CO6	: To introduce the fundamental of CAD Graphics used in design.																
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low																	
1	COs/Pos	a	b	c	d	e	f	g	h	i	J	k	l				
2	CO1	H											H				
	CO2	M	H										M				
	CO3			L									M				
	CO4						L		H	H			L				
	CO5			L						H			L				
	CO6			L							H		L				
3	Category	Humanities & Social Studies (HS)		Basic Sciences (BS)		Engg Sciences (ES)		Professional Core (PC)		Core Elective (CE)		Non-Major Elective (NE)		Open Elective (OE)		Project/Term Paper/ Seminar/ Internship (PR)	
						√											
4	Approval	37 th Meeting of Academic Council, May 2015															

UNIT I BASIC CURVES, PROJECTION OF POINTS AND STRAIGHT LINES 9

Conics-construction of ellipse, parabola and hyperbola by eccentricity method-construction of involutes of square and circle-Drawing of tangent and normal to the above curves-Scales-Basic drawing conventions and standards- Orthographic projection principles-Principal planes-First angle projection-Projection of points.Projection of straight lines(only first angle projections) inclined to both the principal planes- Determination of true lengths and true inclinations by rotating line method.

UNIT II PROJECTIONS OF PLANES AND SOLIDS 9

Projection of planes (Polygonal and circular surfaces) inclined to both the principal planes. Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method

UNIT III ORTHO GRAPHIC PROJECTIONS, ISOMETRIC PROJECTIONS & FREEHAND SKETCHING 9

Orthographic projection of Simple parts from 3D diagram-Principles of isometric projection and isometric view-isometric scale- Isometric projections of simple solids and truncated solids- Prisms, pyramids, cylinders, cones.

UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES 9

Sectioning of solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other-obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids-Prisms, pyramids cylinders and cones.

UNIT V PERSPECTIVE PROJECTION, BUILDING DRAWING AND COMPUTER AIDED DRAFTING 9

Perspective projection of cubes and cylinders by visual ray method .Introduction-components of simple residential or office building-specifications-plan and elevation of different types of Residential buildings and office buildings. Introduction to drafting packages and basic commands used in AUTO CAD. Demonstration of drafting packages.

TEXT BOOKS:

1. N.D.Bhatt and V.M.Panchal, -Engineering drawing, charotar publishing house, 50th edition,2010.
2. K.V.Natarajan -A Textbook of Engineering Graphics, Dhanalakshmi Publishers, Chennai,2009.

REFERENCES:

1. K.R.Gopalakrishna, -Engineering drawing, (Vol-I&II combined) Subhas stores, Bangalore, 2007.
2. K.Venugopal and V.Prabhu Raja, -Engineering Graphics, New Age International Private limited, 2008.
3. Luzzader, Warren.J.,and Duff, John.M., -Fundamentals of Engineering Drawing with an introduction to Interactive computer graphics for design and production, Eastern economy edition, Prentice Hall of India Pvt Ltd, New Delhi,2005

BEE 101		BASIC ELECTRICAL AND ELECTRONICS ENGINEERING								L	T	P	C
		Total Contact Hours - 30								2	0	0	2
		Prerequisite – Engineering Mathematics, Engineering Physics-I & II											
		Course Designed by – Department of Electrical & Electronics Engineering											
OBJECTIVES: To understand the laws of electrical engineering.													
COURSE OUTCOMES (COs)													
CO1	Students will gain knowledge regarding the various laws and principles associated with electrical systems.												
CO2	Students will gain knowledge regarding electrical machines and apply them for practical problems.												
CO3	Students will gain knowledge regarding various types semiconductors.												
CO4	Student will gain knowledge digital electronics.												
CO5	Student will gain knowledge on electronic systems.												
CO6	Students will acquire knowledge in using the concepts in the field of electrical engg. projects and research.												
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	COs/Pos	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	M	H	M			L		L	L			
	CO2		H	M			L		L	L			
	CO3		H	M			L		L				
	CO4	M	H	M			L		L	L			
	CO5	M	H	M			L		L				
	CO6		H				L		L	H			
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
4	Approval	37 th Meeting of Academic Council, May 2015											

UNIT I ELECTRIC CIRCUITS

6

Ohm's law – Kirchoff's Laws, V – I Relationship of Resistor (R) Inductor (L) and capacitor (C). Series parallel combination of R, L&C – Current and voltage source transformation – mesh current & node voltage method –superposition theorem –Thevenin's and Norton's Theorem - Problems.

UNIT II ELECTRICAL MACHINES

6

Construction, principle of operation, Basic Equations and applications - D.C.Generators and D.C.Motors. -Single phase Induction Motor - Single Phase Transformer.

UNIT III BASIC MEASUREMENT SYSTEMS

6

Introduction to Measurement Systems, Construction and Operating principles of PMMC, Moving Iron, Dynamometer Wattmeter, power measurement by three-watt meter and two watt method – and Energy meter.

UNIT IV SEMICONDUCTOR DEVICES

6

Basic Concepts of semiconductor devices – PN Junction Diode Characteristics and its Applications – HWR, FWR –Zener Diode – BJT (CB, CE, CC) configuration & Characteristics.

UNIT V DIGITAL ELECTRONICS

6

Number system – Logic Gates – Boolean Algebra– De-Morgan's Theorem – Half Adder & Full Adder – Flip Flops.

TEXT BOOKS:

1. N.Mittal -Basic Electrical Engineering. Tata McGraw Hill Edition, New Delhi, 1990.
2. A.K. Sawhney, 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2004.
3. Jacob Millman and Christos C-Halkias, -Electronic Devices and Circuits, Tata McGraw Hill

REFERENCE BOOKS:

1. Edminister J.A. -Theory and Problems of Electric Circuits, Schaum's Outline Series. McGrawHill Book Company, 2nd Edition, 1983.
2. Hyatt W.H and Kemmerly J.E. -Engineering Circuit Analysis, McGraw Hill International Editions, 1993.
3. D. P. Kothari and I. J. Nagrath- Electric Machines, Tata McGraw-Hill Education, 2004
4. Millman and Halkias, -Integrated Electronics, Tata McGraw Hill Edition, 2004.

BCS 1L2	COMPUTER PRACTICE LABORATORY		L	T	P	C
	Total Contact Hours - 45		0	0	3	1
	Prerequisite – Fundamentals of Computer					
	Course Designed by – Department of Computer Science &Engineering					
OBJECTIVES: To impart basic computer knowledge						
COURSE OUTCOMES (COs)						
CO1	Demonstrate major algorithms and data					

CO2	Implementation of array operations													
CO3	Implementation of binary tree.													
CO4	Implementation of linked list													
CO5	Students will able to do analyse data using spread sheet													
CO6	Student will able to understand the basics of C programming.													
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low														
1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l	
2	CO1	H	H	L	H		H		L		H	H	H	
	CO2						H	H	L					
	CO3						H	H	L		M			
	CO4						H	H	L		M			
	CO5						H	H	L		M			
	CO6						H	H	L		M			
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)		Engg Sciences (ES)		Professional Core (PC)		Core Elective (CE)		Non-Major Elective (NE)		Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)
					√									
4	Approval	37 th Meeting of Academic Council, May 2015												

A) WORD PROCESSING

6

Document creation, Text manipulation with Scientific Notations. Table creation Table formatting and Conversion. Mail merge and Letter Preparation. Drawing-Flow Chart

B) SPREAD SHEET

9

Chart-Line Xy Bar and Pie – Formula-Formula Editor-Spread sheet-Inclusion of Object, Picture and Graphics Protecting the document and sheet-Sorting and Import/Export features.

C) SIMPLE C PROGRAMMING*

15

Data types, Expression Evaluation, Condition Statement. Arrays structures and Unions – Functions

D) SIMPLE C++PROGRAMMING

15

-Classes and Objects
-Constructor and Destructor

***For Programming exercises Flow chart and Pseudo code are essential.**

	BASIC ELECTRICAL AND ELECTRONIC ENGINEERING PRACTICES LABORATORY	L	T	P	C
--	---	----------	----------	----------	----------

BEE1L1	Total Contact Hours – 45										0	0	3	1			
	Prerequisite – Basic Electrical and Electronics Engineering																
	Course Designed by – Department of Electrical & Electronics Engineering																
OBJECTIVES: To enhance the student with knowledge on electrical and electronic equipments.																	
COURSE OUTCOMES (COs)																	
CO1	Students will able to handle basic electrical equipments.																
CO2	Students will able to do staircase wiring.																
CO3	Students will able to understand domestic wiring procedures practically.																
CO4	Student will able to assemble electronic systems.																
CO5	Students will understand all the fundamental concepts involving electrical engineering																
CO6	Students will understand all the fundamental concepts involving electronics engineering																
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low																	
1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l				
2	CO1	M	H	M			L		L	L	M	H					
	CO2		H	M			L		L	L		H					
	CO3		H	M			L		L			H					
	CO4	M	H	M			L		L	L	M	H					
	CO5	M	H	M			L		L		M	H					
	CO6		H				L		L	H		H					
3	Category	Humanities & Social Studies (HS)		Basic Sciences (BS)		Engg Sciences (ES)		Professional Core (PC)		Core Elective (CE)		Non-Major Elective (NE)		Open Elective (OE)		Project/Term Paper/ Seminar/ Internship (PR)	
						√											
4	Approval	37 th Meeting of Academic Council, May 2015															

I LIST OF EXPERIMENTS FOR ELECTRICAL ENGINEERING LAB

1. Fluorescent lamp wiring
2. Stair case wiring
3. Measurement of electrical quantities-voltage current, power & power factor in RLC circuit
4. Residential house wiring using fuse, switch, indicator, lamp and energy meter
5. Measurement of energy using single phase energy meter
6. Measurement of resistance to earth of electrical equipment

II LIST OF EXPERIMENTS FOR ELECTRONICS ENGINEERING LAB

1. Study of electronic components and equipments.

- a. Resistor colour coding using digital multi-meter.
- b. Assembling electronic components on bread board.
2. Measurement of ac signal parameters using cathode ray oscilloscope and function generator.
3. Soldering and desoldering practice.
4. Verification of logic gates (OR, AND, OR, NOT, NAND, EX-OR).
5. Implementation of half adder circuit using logic gates.

BEN 201	ENGLISH II										L	T	P	C
	Total Contact Hours – 60										3	1	0	3
	Prerequisite – English I													
	Course Designed by – Department of English													
OBJECTIVES														
Students will be able to actively participate in group discussions. Students will have Telephonic Skills, Giving Directions and Information Transfer														
COURSE OUTCOMES (COs)														
CO1	To make the students aware to different kinds of Learner-friendly modes of language to a variety of self- instructional learning (Computer based)													
CO2	To make students comprehend the habit of intelligent Reading as well as Computer- based competitive exams glob													
CO3	To achieve a reasonably good level of competency in Report Writing.													
CO4	To make the students aware to different kinds of Learner-friendly modes of language to a variety of self- instructional learning (Computer based)													
CO5	To achieve a reasonably good level of competency in group discussions													
CO6	To achieve a reasonably good level of competency in public speaking													
	Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	COs/POs	a	b	c	d	e	f	g	h	i	J	k	l	
2	CO1	M	L	H	L	M			H		M	L		
	CO2			H	L				H		M	L		
	CO3			H	L	M			H		H	L		
	CO4			H	L	M			H		M	L		
	CO5			H	L	M			H		M	L		
	CO6			H	L	M			H		M	L		
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)					
		√												
4	Approval	37 th Meeting of Academic Council, May 2015												

UNIT I ORIENTATION**12**

Numerical adjectives - Meanings in context - Same words used as different parts of speech - Paragraph writing - Non- verbal communication - Regular and Irregular verbs.

UNIT II ORAL SKILL**12**

Listening to audio cassettes - C.Ds , News bulletin - Special Lectures, Discourse - Note taking - Sentence patterns - SV, SVO, SVC, SVOC, SVOCA - and Giving Instructions - Reading Comprehension answering questions. Inferring meaning.

UNIT III THINKING SKILL**12**

Self- introduction describing –Group Discussion – Debate –Role play- Telephone- Things-etiquette- Recommendation and Sequencing jumbled sentences to make a suggestions-paragraph-advertisement and notice, Designing or drafting posters, writing formal and informal invitations and replies.

UNIT IV WRITING SKILL**12**

Definitions - Compound nouns - Abbreviations and acronyms – (a) business or official letters(for making enquiries, registering complaints, asking for and giving information, placing orders and sending replies): (b) Letters to the editor (giving suggestions on an issue) .

UNIT V FORMAL INFORMATION**12**

Editing – Prepositions - Articles - Permission letter for undergoing practical training , Essay writing - Application for a job , letter to the principal authorities regarding admissions, other issues, requirement or suitability of course etc.

TEXT BOOK:

1. Meenakshi Raman, Sangeetha Sharma , Technical English for Communication: Principle and Practice, OUP, 2009.

REFERENCE BOOKS:

1. Sumanth , English for Engineers, Vijay Nicole , Imprints Pvt ltd.2013.
2. Meenakshi Raman and Sangeetha Sharma , Technical Communication Principles and Practice, Oxford University Press, 2009.
3. Sangeetha Sharma, Binod M ishra , Communication skills for engineers and scientists , PHI Learning Pvt Ltd, New Delhi, 2010.

BMA 201	MATHEMATICS – II	L	T	P	C
	Total Contact Hours - 60	3	1	0	3
	Prerequisite – Mathematics I				
	Course Designed by – Department of Mathematics				

OBJECTIVES																	
Ability to apply these principles of mathematics in projects and research works.																	
COURSE OUTCOMES (COs)																	
CO1	Student shall be able to Solve differential equations, simultaneous linear equations, and some special types of linear equations related to engineering.																
CO2	Relate the use of mathematics in applications of various fields namely fluid flow, heat flow, solid mechanics, electrostatics, etc.																
CO3	Ability to test hypothesis																
CO4	Find intensity of degree of relationship between two variables and also bring out regression equations.																
CO5	Understand to solve matrix problems related to real life problems.																
CO6	Formulate mathematical models																
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low																	
1	COs/Pos	a	b	c	d	e	f	g	h	i	j	k	l				
2	CO1	H		L													
	CO2		H				H		L	L		M					
	CO3		H				H		L	L		M					
	CO4					M						M					
	CO5										M	M					
	CO6										M						
3	Category	Humanities & Social Studies (HS)		Basic Sciences (BS)		Engg Sciences (ES)		Professional Core (PC)		Core Elective (CE)		Non-Major Elective (NE)		Open Elective (OE)		Project/Term Paper/ Seminar/ Internship (PR)	
				√													
4	Approval	37 th Meeting of Academic Council, May 2015															

UNIT I ORDINARY DIFFERENTIAL EQUATION 12
Higher order linear differential equations with constant coefficients - Method of variation of parameters – **Cauchy’s and Legendre’s linear equations** - simultaneous first order linear equations with constant coefficients.

UNIT II VECTOR CALCULUS 12
Gradient, divergence and curl –Directional derivatives –Irrotational and solenoidal vector fields – vector integration– **Green’s theorem in a plane , Gauss divergence theorem and Stoke’s theorem** (without proofs) – simple applications involving cubes and rectangular parallelepipeds.

UNIT III ANALYTIC FUNCTIONS 12

Functions of a complex variable – Analytic functions – Necessary conditions, Cauchy-Riemann equation and sufficient conditions (without proofs) – Harmonic and orthogonal properties of analytic functions – Harmonic conjugate – construction of analytic functions – conformal mapping: $W = Z + C$, CZ , $1/Z$ and bilinear transformation.

UNIT IV COMPLEX INTEGRATION

12

Complex integration – **Statement and application of Cauchy's integral theorem and Cauchy's integral formula** – Taylor and Laurent expansions – Singular points – Residues – Residue theorem – Application of Residue theorem to evaluate real integrals – Unit circle and semi-circular contour (excluding poles on boundaries).

UNIT V STATISTICS

12

Mean, Median, Mode – Moments – Skewness and Kurtosis – Correlation – Rank Correlation – Regression – Chi square test for contingency tables.

TEXT BOOK:

1. R.M.Kannan and B.Vijayakumar- Engineering Mathematics-II -2nd Edition, SRB Publication, Chennai 2007.
2. Bali.N.P and Manish Goyal , -Engineering Mathematics—, 3rd Edition, Laxmi Publications (P) L Ltd, 2008 .
3. Grewal .B/S -Higher Engineering Mathematics, 40th Editon, Khanna Publications, Delhi, 2007

REFERENCES :

1. Ramana.B.V, -Higher Engineering Mathematic—, Tata McGraw Hill Publishing Company, New Delhi, 2007.
2. Gupta SC, and VK.Kapoor, -Fundamentals Mathematical Statistics, 11th edition, Sultan Chand Sons, New Delhi, 2014.

BPH201	ENGINEERING PHYSICS -II	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite – ENGINEERING PHYSICS -I				
	Course Designed by – Department of Physics				
OBJECTIVES					
- To expose the students to multiple areas of science of engineering materials which have direct relevance to different Engineering applications - To understand the concepts and applications of conducting, Semiconducting, magnetic & dielectric materials as well as their optical properties.					
COURSE OUTCOMES (COs)					
CO1	Understand about properties and advancements of conducting materials.				
CO2	Understand the principle and properties semiconducting materials.				
CO3	Acquire Knowledge on Magnetic and dielectric Materials.				

CO4	To Know about the creation of new materials with novel properties																
CO5	To Understand the impact of modern materials in technical uses.																
CO6	Learn new engineering materials and its characteristics																
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low																	
1	COs/Pos	a	b	c	d	e	f	g	h	i	j	k	l				
2	CO1	H															
	CO2		L	H		M											
	CO3		M		H												
	CO4	H		M	L												
	CO5		L	L													
	CO6	H															
3	Category	Humanities & Social Studies (HS)		Basic Sciences (BS)		Engg Sciences (ES)		Professional Core (PC)		Core Elective (CE)		Non-Major Elective (NE)		Open Elective (OE)		Project/Term Paper/ Seminar/ Internship (PR)	
				√													
4	Approval	37 th Meeting of Academic Council, May 2015															

UNIT I CONDUCTING MATERIALS

9

Conductors – classical free electron theory of metals – Electrical and thermal conductivity – Wiedemann – Franz law – Lorentz number – Draw backs of classical theory – Quantum theory – Fermi distribution function – Effect of temperature on Fermi Function – Density of energy states – carrier concentration in metals.

UNIT II SEMICONDUCTING MATERIALS

9

Intrinsic semiconductor – carrier concentration derivation Fermi level – Variation of Fermi level with temperature – electrical conductivity – band gap determination – compound semiconductors -direct and indirect band gap- derivation of carrier concentration in n-type and p-type semiconductor – variation of Fermi level with temperature and impurity concentration — Hall effect –Determination of Hall coefficient – Applications.

UNIT III MAGNETIC AND SUPERCONDUCTING MATERIALS

9

Origin of magnetic moment – Bohr magneton – comparison of Dia, Para and Ferro magnetism – Domain theory – Hysteresis – soft and hard magnetic materials – antiferromagnetic materials – Ferrites and its applications Superconductivity : properties – Type I and Type II superconductors – BCS theory of superconductivity(Qualitative) - High T_c superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.

UNIT IV DIELECTRIC MATERIALS

9

Electrical susceptibility – dielectric constant – electronic, ionic, orientational and space charge polarization – frequency and temperature dependence of polarisation – internal field – Claussius – Mosotti relation (derivation) – dielectric loss – dielectric breakdown – uses of dielectric materials (capacitor and transformer) – ferroelectricity and applications.

UNIT V ADVANCED ENGINEERING MATERIALS

9

Metallic glasses: preparation, properties and applications. Shape memory alloys (SMA): Characteristics, properties of NiTi alloy, application, Nanomaterials– Preparation -pulsed laser deposition – chemical vapour deposition – Applications – NLO materials –Birefringence- optical Kerr effect – Classification of Biomaterials and its applications.

TEXT BOOKS:

1. Jayaraman D Engineering Physics II. Global Publishing House, 2014.
2. Palanisamy P.K. Materials Science. SCITECH Publishers, 2011.
3. Senthilkumar G. Engineering Physics II. VRB Publishers, 2011.

REFERENCES:

1. Arumugam M., Materials Science. Anuradha publishers, 2010
2. Pillai S.O., Solid State Physics. New Age International(P) Ltd., publishers, 2009
3. Marikani A. Engineering Physics. PHI Learning Pvt., India, 2009
4. <http://ocw.mit.edu/courses/find-by-topic>
5. <http://nptel.ac.in/course.php?disciplineId=122>
6. https://en.wikipedia.org/wiki/Engineering_physics

BCH 201		ENGINEERING CHEMISTRY-II							L	T	P	C	
		Total Contact Hours - 45							3	0	0	3	
		Prerequisite – ENGINEERING CHEMISTRY –I											
		Course Designed by – Department of Chemistry											
OBJECTIVES													
To impart a sound knowledge on the principles of chemistry involving application oriented topics required for all engineering branches.													
COURSE OUTCOMES (COs)													
CO1		Students will understand the concepts and further industrial applications of surface chemistry											
CO2		To impart knowledge about the Industrial importance of Phase rule and alloys											
CO3		To make the students to be conversant with Analytical techniques of chemistry and their importance											
CO4		To have an idea and knowledge about the Chemistry of Fuels and											
CO5		Understanding of engineering materials											
CO6		All about bonding and molecular structures											
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	COs/Pos	a	b	c	d	e	f	g	h	i	j	k	l

2	CO1	H	H	L		H		H				M	
	CO2		H			H		H					
	CO3	H		L		H		H				M	
	CO4			L		H		H					
	CO5			L		H		H					
	CO6			L		H		H		H		M	
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
											√		
4	Approval	37 th Meeting of Academic Council, May 2015											

UNIT I SURFACE CHEMISTRY

9

Introduction : Adsorption , absorption , desorption , adsorbent, adsorbate and sorption – (definition only) Differences between adsorption and absorption Adsorption of gases on solids – factors affecting adsorption of gases on solids – Adsorption isotherms –Freundlich adsorption isotherm and Langmuir adsorption isotherm Role of adsorbents in catalysis, Ion-exchange adsorption and pollution abatement.

UNIT II PHASE RULE AND ALLOYS

9

Introduction :Statement of Phase Rule and explanation of terms involved – one component system – water system – Construction of phase diagram by thermal analysis - Condensed phase rule [Definition only] Two Component System : Simple eutectic systems (lead-silver system only) – eutectic temperature – eutectic composition – Pattinsons Process of desilverisation of Lead Alloys: Importance, ferrous alloys –nichrome and stainless steel – 18/8 stainless steel - heat treatment of steel – annealing – hardening – tempering normalizing – carburizing - nitriding . Non- ferrous alloys: Brass and Bronze

UNIT III ANALYTICAL TECHNIQUES

9

Introduction: Type of Spectroscopy - Atomic spectroscopy – molecular spectroscopy - Explanation IR spectroscopy – principles – instrumentation (block diagram only) – applications - finger print region UV-visible spectroscopy — principle – instrumentation (block diagram only) – Beer-Lambert's law- – estimation of iron by colorimetry– Atomic absorption spectroscopy- principle - instrumentation (block diagram only) - estimation of Nickel by Atomic absorption spectroscopy Flame photometry– principles – instrumentation (block diagram only) - estimation of sodium ion by Flame photometry

UNIT IV FUELS

9

Introduction : Calorific value – types of Calorific value - gross calorific value – net calorific value Analysis of Coal — Proximate and ultimate analysis – hydrogenation of coal - Metallurgical coke – manufacture by Otto-Hoffmann method Petroleum processing and fractions

– cracking – catalytic cracking – types – fixed bed catalytic cracking method- Octane number and Cetane number (definition only) Synthetic petrol – Bergius processes – Gaseous fuels- water gas, producer gas, CNG and LPG (definition and composition only) Flue gas analysis – importance - Orsat apparatus

UNIT V ENGINEERING MATERIALS

9

Introduction: Refractory's – classification – acidic, basic and neutral refractory's – properties (refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling) Manufacture of Refractory's: alumina bricks and Magnesite bricks, Abrasives – natural and synthetic abrasives Natural type : Siliceous - quartz ; Non –siliceous – diamond Synthetic Abrasives : silicon carbide and boron carbide. Lubricants: Liquid lubricants - Properties – viscosity index, flash and fire points, cloud and pour points, oiliness, Solid lubricants – graphite and molybdenum sulphide

TEXT BOOKS:

1. P.C.Jain and Monica Jain, -Engineering Chemistry/ Dhanpat Rai Pub, Co., New Delhi (2002).
2. S.S.Dara -A text book of Engineering Chemistry/ S.Chand &Co.Ltd., New Delhi (2006).
3. P. J. Lucia, M. Subhashini, -Engineering Chemistry, Volume 1, Crystal Publications, Chennai, (2007).

REFERENCES:

1. B.Sivasankar -Engineering Chemistry/ Tata McGraw-Hill Pub. Co.Ltd, New Delhi,(2008)
2. B.K.Sharma -Engineering Chemistry/ Krishna Prakasan Media (P) Ltd., Meerut (2001).
3. <http://ocw.mit.edu/courses/find-by-topic>
4. <http://nptel.ac.in/course.php?disciplineId=122>
5. <https://en.wikipedia.org/wiki/Spectroscopy>

BCS 202	INTERNET PROGRAMMING	L	T	P	C
	Total Contact Hours - 30	2	0	0	2
	Prerequisite – Fundamentals of Computer				
	Course Designed by – Dept of Information Technology				
OBJECTIVES					
• To impart a sound knowledge on the principles of computers involving the different application oriented topics required for all engineering branches. • Graduates will demonstrate the ability to apply knowledge of mathematics to develop and analyze computing systems. • Graduates will have a solid understanding of the theory and concepts underlying computer science.					
COURSE OUTCOMES (COs)					
CO1	To enable the student to learn the major components of a computer system.				
CO2	To know the correct way of solving problem.				
CO3	To identify efficient way of solving problem.				

CO4	To learn to use office automation tools.												
CO5	To implement office automation tools												
CO6	To learn and write program in -C.												
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	M	M	M	H	M		M			L	L	M
	CO2	H	M	M	H	H		M			L	L	M
	CO3	H	M		H	H		M			L	L	M
	CO4	H	M		H	H		M			L	L	M
	CO5	H	M	M	H	H		M			L	L	M
	CO6	H			H	H		M			L	L	M
3	Category	Humanities & Social Studies (HS)		Basic Sciences (BS)		Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)		Non-Major Elective (NE)	Open Elective (OE)		Project/Term Paper/ Seminar/ Internship (PR)
4	Approval	37 th Meeting of Academic Council, May 2015											

UNIT I BASIC INTERNET CONCEPTS

6

Internet principles-IP addressing-Internet Service Provider (ISP)-URL-Basic web concepts-World Wide Web (WWW)-Intranet and Extranet-Internet Protocols: HTTP, TCP, UDP, FTP, Telnet-Domain Name System(DNS)-E mail-Next generation internet.

UNIT II WEB DESIGN BASICS

6

Introduction to HTML-Structure of HTML Document- Tags-Headings-Links-Images-Lists-Tables-Forms-Frames-Style sheets and its types.

UNIT III DYNAMIC HTML

6

Introduction to Dynamic HTML-Object model and collections-Event model-Filters and transition-Data binding-Data control-Activex control.

UNIT IV CLIENT AND SERVER SIDE PROGRAMMING

6

VBScript & JavaScript: Introduction-Operators-Data type-Control structures-Looping-Classes and Objects-Arrays-Functions-Events-Example programs.

UNIT V INTERNET APPLICATIONS

6

Online database-functions of online database-Merits and Demerits-Internet Information Systems (IIS)-EDI applications in business and its types-Internet commerce-Types and Applications

TEXT BOOKS:

1. Deitel, Deitel and Nieto, th _ ‘Internet and World Wide Web- How to program‘, Pearson Education Publishers, 5 edition, 2008.
2. Elliotte Rusty Harold, _ ‘Java Network Programming‘, O‘Reilly Publishers, 2010
3. Java Script: A Beginners Guide John Pollock 4th Edition, TMH Edition (2013)
4. VB Script Beginners Guide, Jyoti B. Giramkar, Create Space Independent Publishing (2014)

REFERENCES:

- 1... Krishnamoorthy & S.Prabhu, _ ‘Internet and Java Programming‘, New Age International Publishers, 2010.
2. Thomno A.Powell, ‘‘The Complete Reference HTML and XHTML‘‘, fourth edition, Tata McGraw Hill, 2001
3. E Commerce Kamlesh K.Bajaj, Debjani Nag, Tata McGraw Hill, Second edition, 2010

BSS201		PERSONALITY DEVELOPMENT							L	T	P	C	
		Total Contact Hours - 30							1	1	0	2	
		Prerequisite – +2 Level Knowledge											
		Course Designed by – Department of Management Studies											
OBJECTIVES													
To make students groom their personality and prove themselves as good Samaritans of the society.													
COURSE OUTCOMES (COs)													
CO1		Individual or in-group class presentations pertaining to the applications of conce theories or issues in human development..											
CO2		Scores obtained from essay and or objective tests.											
CO3		Attendance, classroom participation, small group interactions.											
CO4		Research and write about relevant topics.											
CO5		Design and complete a research project that can take the form of a developme interview, an observation or assessment through service learning.											
CO6		Develop and maintain a Reflection											
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	COs/Pos	a	b	c	d	e	f	g	h	i	J	k	l
2	CO1	L		H				M					
	CO2		H	H				M					
	CO3							M	H				
	CO4									H	H		
	CO5							M			H	H	
	CO6							M					L

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/Seminar/ Internship (PR)
		√							
4	Approval	37 th Meeting of Academic Council, May 2015							

UNIT I INTRODUCTION TO PERSONALITY DEVELOPMENT 6

The concept personality- Dimensions of theories of Freud & Erickson- personality – significant of personality development. The concept of success and failure: What is success? - **Hurdles in achieving success - Overcoming hurdles - Factors responsible for success** – What is failure - Causes of failure. SWOT analyses.

UNIT II ATTITUDE & MOTIVATION 6

Attitude - Concept - Significance - Factors affecting attitudes - Positive attitude - Advantages – Negative attitude - Disadvantages - **Ways to develop positive attitude - Difference between personalities having positive and negative attitude**. Concept of motivation - Significance - Internal and external motives - Importance of self-motivation- Factors leading to de-motivation

UNIT III SELF-ESTEEM 6

Term self-esteem - Symptoms - Advantages - Do's and Don'ts to develop positive self-esteem – Low self-esteem - Symptoms - Personality having low self esteem - Positive and negative self-esteem. **Interpersonal Relationships – Defining the difference between aggressive, submissive and assertive behaviours** - Lateral thinking.

UNIT IV OTHER ASPECTS OF PERSONALITY DEVELOPMENT 6

Body language - Problem-solving - **Conflict and Stress Management - Decision-making skills** - Leadership and qualities of a successful leader - Character-building -Team-work - Time management -Work ethics –Good manners and etiquette.

UNIT V EMPLOYABILITY QUOTIENT 6

Resume building- The art of participating in Group Discussion – **Acing the Personal (HR & Technical) Interview -Frequently Asked Questions** - Psychometric Analysis - Mock Interview Sessions.

TEXT BOOKS:

1. Hurlock, E.B (2006). Personality Development, 28th Reprint. New Delhi: Tata McGraw Hill.
2. Stephen P. Robbins and Timothy A. Judge (2014), Organizational Behavior 16th Edition, Prentice Hall.

REFERENCE BOOKS:

1. Andrews, Sudhir. How to Succeed at Interviews. 21st (rep.) New Delhi. Tata McGraw-Hill 1988.

- Heller, Robert. Effective leadership. Essential Manager series. Dk Publishing, 2002
- Hindle, Tim. Reducing Stress. Essential Manager series. Dk Publishing, 2003
- Lucas, Stephen. Art of Public Speaking. New Delhi. Tata - Mc-Graw Hill. 2001
- Mile, D.J Power of positive thinking. Delhi. Rohan Book Company, (2004).
- Pravesh Kumar. All about Self- Motivation. New Delhi. Goodwill Publishing House. 2005.
- Smith, B . Body Language. Delhi: Rohan Book Company. 2004

BBT202	BIOLOGY FOR ENGINEERS									L	T	P	C				
	Total Contact Hours – 30									2	0	0	2				
	Prerequisite – Basic Science																
	Course Designed by – Department of Industrial Bio Technology																
OBJECTIVES																	
Gain vivid knowledge in the fundamentals and uses of biology, human system and plant system.																	
COURSE OUTCOMES (COs)																	
CO1	Graduates within the first five years will be able to grasp and apply biological engineering principles, procedures needed to solve real-world problems.																
CO2	To understand the fundamentals of living things, their classification, cell structure and biochemical constituents																
CO3	To apply the concept of plant, animal and microbial systems and growth in real life situations																
CO4	To comprehend genetics and the immune system																
CO5	To know the cause, symptoms, diagnosis and treatment of common diseases																
CO6	To give a basic knowledge of the applications of biological systems in relevant industries																
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low																	
1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l				
2	CO1	H						M									
	CO2		H							H							
	CO3			H							M						
	CO4										H						
	CO5																
	CO6						H						M				
3	Category	Humanities & Social Studies (HS)		Basic Sciences (BS)		Engg Sciences (ES)		Professional Core (PC)		Core Elective (CE)		Non-Major Elective (NE)		Open Elective (OE)		Project/Term Paper/ Seminar/ Internship (PR)	

			√						
4	Approval	37 th Meeting of Academic Council, May 2015							

UNIT I INTRODUCTION TO LIFE

6

Characteristics of living organisms-Basic classification-cell theory-structure of prokaryotic and eukaryotic cell-Introduction to biomolecules: definition-general classification and important functions of carbohydrates-lipids-proteins-nucleic acids vitamins and enzymes-genes and chromosome.

UNIT II BIODIVERSITY

6

Plant System: basic concepts of plant growth-nutrition-photosynthesis and nitrogen fixation-Animal System: elementary study of digestive-respiratory-circulatory-excretory systems and their functions-Microbial System: history-types of microbes-economic importance and control of microbes.

UNIT III GENETICS AND IMMUNE SYSTEM

6

Evolution: theories of evolution-**Mendel's** cell division-mitosis and meiosis-evidence of **laws of inheritance**-variation and speciation- nucleic acids as a genetic material-central dogma immunity-antigens-antibody-immune response.

UNIT IV HUMAN DISEASES

6

Definition- causes, symptoms, diagnosis, treatment and prevention of diabetes, cancer, hypertension, influenza, AIDS and Hepatitis

UNIT V BIOLOGY AND ITS INDUSTRIAL APPLICATION

6

Transgenic plants and animals-stem cell and tissue engineering-bioreactors-biopharming-recombinant vaccines-cloning-drug discovery-biological neural networks-bioremediation-biofertilizer-biocontrol-biofilters-biosensors-biopolymers-bioenergy-biomaterials-biochips-basic biomedical instrumentation.

TEXT BOOKS:

1. A Text book of Biotechnology, R.C.Dubey, S. Chand Higher Academic Publications, 2013
2. Diseases of the Human Body, Carol D. Tamparo and Marcia A. Lewis, F.A. Davis Company, 2011.
3. Biomedical instrumentation, Technology and applications, R. Khandpur, McGraw Hill Professional, 2004

REFERENCE BOOKS

1. Biology for Engineers, Arthur T. Johnson, CRC Press, Taylor and Francis, 2011
2. Cell Biology and Genetics (Biology: The unity and diversity of life Volume I), Cecie Starr, Ralph Taggart, Christine Evers and Lisa Starr, Cengage Learning, 2008
3. Biotechnology Expanding horizon, B.D. Singh, Kalyani Publishers, 2012

BME201	BASIC MECHANICAL ENGINEERING							L	T	P	C		
	Total Contact Hours – 30							2	0	0	2		
	Prerequisite – +2 Level Maths & Physical Science												
	Course Designed by – Dept of Mechanical Engineering												
OBJECTIVES													
• The program educational objectives (PEOs) for the mechanical-engineering program are to educate graduates who will be ethical, productive, and contributing members of society. • The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context • The ability to apply principles of engineering, basic science, and mathematics to design and realize physical systems, components, or processes													
COURSE OUTCOMES (COs)													
CO1	an ability to apply knowledge of mathematics												
CO2	an ability to apply knowledge of science, and engineering												
CO3	Ability to design and conduct experiments, as well as to analyze and interpret data.												
CO4	an ability to function on multi-disciplinary teams												
CO5	To provide basic Knowledge of basic manufacturing process.												
CO6	ability to identify, formulate, and solve engineering problems												
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	M	M	M	H	M		M			L	L	M
	CO2	H	M	M	H	H		M			L	L	M
	CO3	H	M		H	H		M			L	L	M
	CO4	H	M		H	H		M			L	L	M
	CO5	H	M	M	H	H		M			L	L	M
	CO6	H			H	H		M			L	L	M
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)		Professional Core (PC)	Professional Elective (PE)		Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)		
				√									
4	Approval	37 th Meeting of Academic Council, May 2015											

UNIT I ENERGY RESOURCES AND POWER GENERATION

6

Renewable and Non-renewable resources- solar, wind, geothermal, steam, nuclear and hydro power plants- Layout, major components and working. Importance of Energy storage, Environmental constraints of power generation using fossil fuels and nuclear energy.

UNIT II IC ENGINES

6

Classification, working principles of petrol and diesel engines- two stroke and four stroke cycles, functions of main components of I.C engine. Alternate fuels and emission control.

UNIT III REFRIGERATION AND AIR-CONDITIONING SYSTEM

6

Terminology of Refrigeration and Air-Conditioning, Principle of Vapor Compression & Absorption system- Layout of typical domestic refrigerator- window & Split type room air conditioner.

UNIT IV MANUFACTURING PROCESSES

6

Brief description of Mould making and casting process, Metal forming, Classification types of forging, forging operations, Brief description of extrusion, rolling, sheet forging, and drawing. Brief description of welding, brazing and soldering. Principal metal cutting processes and cutting tools, Brief description of Centre lathe and radial drilling machine.

UNIT V MECHANICAL DESIGN

6

Mechanical properties of material-Yield strength, ultimate strength, endurance limit etc., Stress-Strain curves of materials. Stresses induced in simple elements. Factor of safety - Design of Shafts and belts. Types of bearings and its applications. Introduction to CAD/CAM/CIM & Mechatronics.

TEXT BOOKS:

1. T.J.Prabhu et al , -Basic Mechanical Engineering- , SciTech Publications(p) Ltd, 2000

REFERENCES:

1. NAGPAL, G.R, -Power plant Engineering, Khanna Publishers, 2004.
2. RAO.P.N, -Manufacturing Technology, Tata McGraw-Hill Education, 2000.
3. Kalpakjian, -Manufacturing Engineering and Technology, Addison Wesley publishers, 1995.
4. Ganesan. V, -Internal combustion engine, Tata McGraw-Hill Education, 2000.
5. C.P.Arora, -Refrigeration and Air Conditioning, Tata McGraw-Hill Education, 2001.
6. V.B.Bhandari, Design of Machine elements, Tata McGraw-Hill Education, 2010.

BCE 201	BASIC CIVIL ENGINEERING	L	T	P	C
	Total Contact Hours – 30	2	0	0	2
	Prerequisite – +2 Level Maths & Physical Science				
	Course Designed by – Department of Civil Engineering				
OBJECTIVES: Understand the basic concepts of civil engineering.					
COURSE OUTCOMES (COs)					
CO1	Will gain knowledge in Design, concept preparation				

CO2	Loading calculation												
CO3	Structural component design												
CO4	Drawing and chart preparation												
CO5	Will understand the components of buildings.												
CO6	Will learn the engineering aspects to dams , water supply and sewage disposal.												
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H			H		L					
	CO2					H	H						
	CO3							H	L				
	CO4									L			
	CO5										H	L	
	CO6												
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
				√									
4	Approval	37 th Meeting of Academic Council, May 2015											

UNIT I CIVIL ENGINEERING MATERIALS

8

Introduction – Civil Engineering – Materials – Stones – Bricks – Sand – Cement – Plain Concrete – Reinforced Cement Concrete – Steel Sections – Timber – Plywood – Paints – Varnishes (simple examples only)

UNIT II SURVEYING

5

Surveying – objectives – classification – principles of survey-Measurement of distances – Chain survey – Determination of areas – Use of compass – Use of leveling Instrument – (simple examples only)

UNIT III FOUNDATION FOR BUILDING

5

Bearing Capacity of Soil – Foundation – Functions – Requirement of good foundations – Types of foundations – Merits & Demerits.

UNIT IV SUPERSTRUCTURE

7

Stone Masonry – Brick Masonry – Columns – Lintels – Beams – Roofing – Flooring – Plastering– White Washing (Simple examples only)

UNIT V MISCELLANEOUS TOPICS

5

Types of Bridges –Dam- purpose – selection of site - Types of Dams – Water Treatment & Supply sources – standards of drinking- distribution system. – Sewage Treatment (simple examples only)

TEXT BOOKS:

1. Raju.K.V.B, Ravichandran .P.T, -Basics of Civil Engineering, Ayyappa Publications, Chennai, 2012.
2. Seetharaman S., -Basic Civil Engineering, Anuradha Agencies, (1st ed. 2005).
3. Dr.M.S.Palanisamy, -Basic Civil Engineering (3rd ed. 2000), TUG Publishers, New Delhi/Tata McGrawHill Publication Co., New Delhi

REFERENCE BOOKS:

1. Rangwala.S.C, [Engineering Materials], Charotar Publishing House, Anand, 41st Edition: 2014.
2. National Building Code of India, Part V, -Building Materials, 2005
3. Ramesh Babu-A Textbook on Basic Civil Engineering (1998). Anuradha Agencies, Kumbakonam.
4. RamamruthamS., -Basic Civil Engineering, Dhanpat Rai Publishing Co. (P) Ltd. (1999).

BCS2L1	INTERNET PRACTICES LABORATORY						L	T	P	C			
	Total Contact Hours - 45						3	0	0	3			
	Prerequisite – Internet Programming												
	Course Designed by – Dept of Information Technology												
OBJECTIVES													
• To impart a sound knowledge on the principles of computers involving the different application oriented topics required for all engineering branches. • Graduates will demonstrate the ability to apply knowledge of mathematics to develop and analyze computing systems. • Graduates will have a solid understanding of the theory and concepts underlying computer science.													
COURSE OUTCOMES (COs)													
CO1	To enable the student to learn the major components of a computer system.												
CO2	To know the correct and efficient way of solving problem.												
CO3	To identify and implement the correct and efficient way of solving problem.												
CO4	To learn to use office automation tools.												
CO5	To infer from use office automation tools.												
CO6	To learn and write program in -C.												
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	M	M	M	H	M		M			L	L	M
	CO2	H	M	M	H	H		M			L	L	M

	CO3	H	M		H	H		M			L	L	M
	CO4	H	M		H	H		M			L	L	M
	CO5	H	M	M	H	H		M			L	L	M
	CO6	H			H	H		M			L	L	M
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/Seminar/ Internship (PR)				
				√									
4	Approval	37 th Meeting of Academic Council, May 2015											

LIST OF EXPERIMENTS

1. HTML (Hypertext Mark-up Language):

Basics of HTML.

How to create HTML Document

Steps for creating a simple HTML Program.

a) Favorite Personality

b) Resume Preparation

2. ADVANCED HTML: Advanced Topics of HTML

a) Time Table

b) Table Creation

3. JAVASCRIPT:

Script Basics.

Incorporating JavaScript into Web page.

a) Star Triangle

b) Temperature Converters

4. VBSCRIPT:

VBScript Basics.

Incorporating VBScript into HTML.

a) Changing Background Color

b) Simple Calculator

5. WEB DESIGN:

Inserting External Media in the Web Page.

a) Forms and Links

b) Frames with Links and Lists

To export a Dream weaver Document as XML File, checking entries, working in frames, windows control, the java script URL.

BCM1L1	BASIC CIVIL & MECHANICALENGINEERING PRACTICES LABORATORY										L	T	P	C
	Total Contact Hours - 30										0	0	2	1
	Prerequisite – Basic Civil and Mechanical Engineering													
	Course Designed by – Department of Mechanical Engineering& Civil Engineering													
OBJECTIVES														
To provide exposure to the students with hands on experience on various basic Civil & Mechanical Engineering practices.														
COURSE OUTCOMES (COs)														
CO1	Learn Basic concepts													
CO2	Students will get exposure regarding pipe connection for pumps & turbines and to study the joint used in roofs, doors, windows and furniture’s.													
CO3	Students will get exposure regarding smithy, foundry operations and in latest welding operations such as TIG, MIG, CO2, spot welding etc.,													
CO4	Students will get hands on experience on basic welding techniques, machining and sheet metal works.													
CO5	Students will get hands on experience on basic machining techniques													
CO6	Students will get hands on experience on basic sheet metal techniques													
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low														
1	COs/POs	a	b	c	d	e	f	g	h	i	J	k	l	
2	CO1	H	L											
	CO2				H									
	CO3					H	L	L						
	CO4		H				M		L			H		
	CO5		H				M		L			H		
	CO6		H				M		L			H		
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)					
4	Approval	37 th Meeting of Academic Council, May 2015												

LIST OF EXPERIMENTS

I. CIVIL ENGINEERING PRACTICE

Buildings:

- Study of plumbing and carpentry components of residential and industrial buildings. Safety aspects.

Plumbing Works:

- a) Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, elbows in household fittings.
- b) Study of pipe connections requirements for pumps and turbines.
- c) Preparation of plumbing line sketches for water supply and sewage works.
- d) Hands-on-exercise: Basic pipe connection of PVC pipes & G.I. Pipes – Mixed pipe material connection – Pipe connections with different joining components.
- e) Demonstration of plumbing requirements of high-rise buildings.

Carpentry using Hand tools and Power tools:

- a) Study of the joints in roofs, doors, windows and furniture.
- b) Hands-on-exercise: Wood work, joints by sawing, planing and cutting.
- c) Preparation of half joints, Mortise and Tenon joints.

II MECHANICAL ENGINEERING PRACTICE**Welding:**

- a) Preparation of butt joints, lap joints and tee joints by arc welding

Basic Machining:

- a) Simple Turning and Taper turning
- b) Drilling Practice

Sheet Metal Work:

- a) Forming & Bending:
- b) Model making – Trays, funnels, etc.
- c) Different type of joints
- d) Preparation of air-conditioning ducts
- e) Preparation of butt joints, lap joints and tee joints by arc welding

Machine assembly practice:

- a) Assembling, dismantling and Study of centrifugal pump
- b) Assembling, dismantling and Study of air conditioner
- c) Assembling, dismantling and Study of lathe

Moulding:

- a) Moulding operations like mould preparation for gear and step cone pulley etc

Fitting:

- a) Fitting Exercises – Preparation of square fitting and vee – fitting models.

Demonstration:

- a) Smithy operations, upsetting, swaging, setting down and bending. Example – Exercise – Production of hexagonal headed bolt.
- b) Gas welding.

REFERENCES:

- 1 K. Jeyachandran, S. Nararajan & S. Balasubramanian, –A Primer on Engineering Practices Laboratory, Anuradha Publications, (2007).
- 2 T. Jeyapooan, M. Saravanapandian & S. Pranitha, –Engineering Practices Lab Manual, Vikas Publishing House Pvt. Ltd. (2006)
- 3 H. S. Bawa, –Workshop Practice, Tata McGraw–Hill Publishing Company Limited, (2007).
- 4 A. Rajendra Prasad & P. M. M. S Sarma, –Workshop Practice, Sree Sai Publication, (2002).
- 5 P. Kannaiah & K.L. Narayana, –Manual on Workshop Practice, Sci tech Publication, (1999).

BPC 2L1		PHYSICS AND CHEMISTRY LABORATORY									L	T	P	C
		Total Contact Hours – 45									0	0	3	1
		Prerequisite – Physics and Chemistry												
		Course Designed by – Department of Physics & Chemistry												
OBJECTIVES: To impart knowledge to the students in practical physics and chemistry														
COURSE OUTCOMES (COs)														
CO1		Students will understand the concept of hall effect												
CO2		Students will understand the concept of semiconductors. .												
CO3		Student will understand the working of spectrometer.												
CO4		Student will able practically understand the chemical reactions.												
CO5		Students will Study the magnetic hysteresis and energy product												
CO6		Students understand the Determination of Band gap of a semiconductor												
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low														
1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l	
2	CO1	M	H	M			L		L	L	M	H	M	
	CO2		H	M			L		L	L		H		
	CO3		H	M			L		L			H		
	CO4	M	H	M			L		L	L	M	H	M	
	CO6		H				L		L	H		H		
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)					
			√											
4	Approval	37 th Meeting of Academic Council, May 2015												

I -LIST OF EXPERIMENTS – PHYSICS

1. Determination of Wavelength, and particle size using Laser
2. Determination of acceptance angle in an optical fiber.
3. Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer.

4. Determination of wavelength of mercury spectrum – spectrometer grating
5. Determination of thermal conductivity of a bad conductor – Lee's Disc method.
6. Determination of Young's modulus by Non uniform bending method
7. Determination of specific resistance of a given coil of wire – Carey Foster's Bridge
8. Determination of Young's modulus by uniform bending method
9. Determination of band gap of a semiconductor
10. Determination of Coefficient of viscosity of a liquid – Poiseuille's method
11. Determination of Dispersive power of a prism - Spectrometer
12. Determination of thickness of a thin wire – Air wedge method
13. Determination of Rigidity modulus – Torsion pendulum

II- LIST OF EXPERIMENTS – CHEMISTRY

1. Estimation of hardness of Water by EDTA
2. Estimation of Copper in brass by EDTA
3. Determination of DO in water (Winkler's method)
4. Estimation of Chloride in Water sample (Argento metry)
5. Estimation of alkalinity of Water sample
6. Determination of molecular weight
7. Conduct metric titration (Simple acid base)
8. Conduct metric titration (Mixture of weak and strong acids)
9. Conduct metric titration using BaCl_2 vs Na_2SO_4
10. Potentiometric Titration (Fe^{2+} / KMnO_4 or $\text{K}_2\text{Cr}_2\text{O}_7$)
11. pH titration (acid & base)
12. Determination of water of crystallization of a crystalline salt (Copper Sulphate)
13. Estimation of Ferric iron by spectrophotometer.

BMA301	PROBABLITY AND QUENEING MODEL	L	T	P	C
	Total Contact Hours –75	3	2	0	4
	Prerequisite – Mathematics I & II				
	Course Designed by – Dept of Information Technology				
OBJECTIVES					
To provide the required mathematical support in real life problems and develop probabilistic models which can be used in several areas of science and engineering.					
COURSE OUTCOMES (COs)					
CO1	Analyze random or unpredictable experiments and investigate important features of random experiments				
CO2	Construct probabilistic models for observed phenomena through distributions which play an important role in many engineering applications				
CO3	Associate random variables by designing joint distributions and correlate the random variables.				
CO4	Know about random processes, in particular about Markov chains which have applications in engineering.				
CO5	Identify the queueing model in the given system, find the performance measures and analyse the result.				

CO6	Students will demonstrate knowledge & be able to examine and understand & use basic Probability.
-----	--

UNIT I RANDOM VARIABLES

9+6

Discrete and continuous random variables – Moments – Moment generating functions - Binomial, Poisson, Geometric, Uniform, Exponential, Gamma and Normal distributions.

UNIT II TWO – DIMENSIONAL RANDOM VARIABLES

9+6

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables.

UNIT III RANDOM PROCESSES

9+6

Classification – Stationary process – Markov process – Poisson process – Discrete parameter Markov chain – Chapman Kolmogorov equations – Limiting distributions.

UNIT IV QUEUEING MODELS

9+6

Markovian queues – Birth and Death processes – Single and multiple server queueing models – Little's formula – Queues with finite waiting rooms – Queues with impatient customers: Balking and reneging.

UNIT V ADVANCED QUEUEING MODELS

9+6

Finite source models – M/G/1 queue – Pollaczek Khinchin formula – M/D/1 and M/EK/1 as special cases – Series queues – Open Jackson networks.

TEXT BOOKS:

1. Ibe. O.C., -Fundamentals of Applied Probability and Random Processes, Elsevier, 1st Indian Reprint, 2007.
2. Gross. D. and Harris. C.M., -Fundamentals of Queueing Theory, Wiley Student edition, 2004.

REFERENCES:

1. Robertazzi, -Computer Networks and Systems: Queueing Theory and performance Evaluation, Springer, 3rd Edition, 2006.
2. Taha. H.A., -Operations Research, Pearson Education, Asia, 8th Edition, 2007.
3. Trivedi. K.S., -Probability and Statistics with Reliability, Queueing and Computer Science Applications, John Wiley and Sons, 2nd Edition, 2002.
4. Hwei Hsu, -Schaum's Outline of Theory and Problems of Probability, Random Variables and Random Processes, Tata McGraw Hill Edition, New Delhi, 2004.
5. Yates. R.D. and Goodman. D. J., -Probability and Stochastic Processes, Wiley India Pvt.Ltd., Bangalore, 2nd Edition, 2012.
- 6 <http://arxiv.org/pdf/1307.2968.pdf>

BEC307	PRINCIPLES OF COMMUNICATION	L	T	P	C
---------------	------------------------------------	----------	----------	----------	----------

		Total Contact Hours – 45					3	0	0	3			
		Prerequisite – Basic Electrical & Electronics Engg											
		Course Designed by – Dept of Information Technology											
OBJECTIVES													
1. To introduce different methods of analog communication and their significance													
2. To introduce Digital Communication methods for high bit rate transmission.													
3. To introduce the concepts of source and line coding techniques for enhancing rating of transmission of minimizing the errors in transmission.													
4. To introduce MAC used in communication systems for enhancing the number of users.													
5. to Introduce various media for digital communication.													
COURSE OUTCOMES (COs)													
CO1	Understand the basic concept of information												
CO2	Understand how information is put into electronic for storage and delivery.												
CO3	Have detailed understanding of amplitude and frequency modulation and demodulation Methods including synchronous demodulation, nonlinear demodulation and phase-locked												
CO4	Have an understanding of design considerations for multiple access/use spectrum and Multiplexing.												
CO5	Have detailed understanding of digital communication basics including matched filters, signal.												
CO6	Understand basic principles of Gaussian noise processes and their use/utility in communication system design.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	H	M	H							
	CO2	H	H	H	M	H							
	CO3	H	H	H	M	H							
	CO4	H	H	H	M	H							
	CO5	H	H	H	M	H							
	CO6	H	H	H	M	H							
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
					✓								
4		37 th Meeting of Academic Council, May 2015											

UNIT I FUNDAMENTALS OF ANALOG COMMUNICATION 9

Principles of amplitude modulation, AM envelope, frequency spectrum and band width, modulation index and percent modulation, AM Voltage distribution, AM power distribution, Angle modulation - FM and PM waveforms, phase deviation and modulation index, frequency deviation and percent modulation, Frequency analysis of angle modulated waves. Bandwidth requirements for Angle modulated waves.

UNIT II DIGITAL COMMUNICATION 9

Introduction, Shannon limit for information capacity, digital amplitude modulation, frequency shift keying, FSK bit rate and baud, FSK transmitter, BW consideration of FSK, FSK receiver, phase shift keying – binary phase shift keying – QPSK, Quadrature Amplitude modulation, bandwidth efficiency, carrier recovery – squaring loop, Costas loop, DPSK.

UNIT III DIGITAL TRANSMISSION 9

Introduction, Pulse modulation, PCM – PCM sampling, sampling rate, signal to quantization noise rate, companding – analog and digital – percentage error, delta modulation, adaptive delta modulation, differential pulse code modulation, pulse transmission – Inter symbol interference, eye patterns.

UNIT IV SPREAD SPECTRUM AND MULTIPLE ACCESS TECHNIQUES 9

Introduction, Pseudo-noise sequence, DS spread spectrum with coherent binary PSK, processing gain, FH spread spectrum, multiple access techniques – wireless communication, TDMA and CDMA in wireless communication systems, source coding of speech for wireless communications.

UNIT V SATELLITE AND OPTICAL COMMUNICATION 9

Satellite Communication Systems-Keplers Law, LEO and GEO Orbits, footprint, Link model- Optical Communication Systems-Elements of Optical Fiber Transmission link, Types, Losses, Sources and Detectors.

TEXT BOOKS:

1. Wayne Tomasi, –Advanced Electronic Communication Systems, 6/e, Pearson Education, 2007.
2. Simon Haykin, —Communication Systems, 4th Edition, John Wiley & Sons., 2001.

REFERENCES:

1. H. Taub, D L Schilling, G Saha, Principles of Communication, 3/e, 2007.
2. B.P. Lathi, Modern Analog And Digital Communication systems, 3/e, Oxford University Press, 2007
3. Blake, –Electronic Communication Systems, Thomson Delmar Publications, 2002.
4. Martin S. Roden, –Analog and Digital Communication System, 3rd Edition, PHI, 2002.
5. B. Sklar, Digital Communication Fundamentals and Applications, 2/e Pearson Education 2007.
6. <https://arnabiitk.files.wordpress.com/2013/02/principles-of-communication-engineering-john-m-wozencraft-irwin-mark-jacobs.pdf>

BIT301	DATABASE MANAGEMENT SYSTEMS							L	T	P	C		
	Total Contact Hours - 45							3	0	0	3		
	Prerequisite – Fundamentals of Computing and Programming												
	Course Designed by – Dept of Information Technology												
OBJECTIVES													
- To expose the students to the fundamentals of Database Management Systems. - To make the students understand the relational model. - To familiarize the students with ER diagrams. - To expose the students to SQL. - To make the students to understand the fundamentals of Transaction Processing and Query Processing. - To familiarize the students with the different types of databases. - To make the students understand the Security Issues in Databases.													
COURSE OUTCOMES (COs)													
CO1	Learn the fundamentals of Database management and to design the database for any given problem.												
CO2	Understand the SQL and provide the proof of good database design												
CO3	Know the fundamentals of transaction processing, practical problems of Concurrency control and Recovery mechanisms.												
CO4	Design database solutions to solve common business problems.												
CO5	Evaluate the effectiveness of specific database solutions in solving business problems.												
CO6	Articulate organizational impact of database solutions.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1			H	H		H						
	CO2			H	H		H						
	CO3				H		H						
	CO4		H		H		H						
	CO5		M	H	H		H						
	CO6		H	H	H		H						

3	Category	Humanities & Social	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/Seminar/Internship (PR)
					✓				
4		37 th Meeting of Academic Council, May 2015							

UNIT I INTRODUCTION TO DBMS

9

File Systems Organization – Sequential, Pointer, Indexed, Direct – Purpose of Database System- Database System Terminologies-Database characteristics- Data models – Types of data models – Components of DBMS- **Relational Algebra**. LOGICAL DATABASE DESIGN: Relational DBMS – Codd's Rule – Entity-Relationship model – **Extended ER Normalization – Functional Dependencies, Anomaly**- 1NF to 5NF- Domain Key Normal Form – Denormalization.

UNIT II SQL & QUERY OPTIMIZATION

9

SQL Standards – Data types – Database Objects- DDL-DML-DCL-TCL-Embedded SQL-Static Vs Dynamic SQL – QUERY OPTIMIZATION: Query Processing and Optimization – **Heuristics and Cost Estimates in Query Optimization**.

UNIT III TRANSACTION PROCESSING AND CONCURRENCY CONTROL

9

Introduction-Properties of Transaction- **Serializability- Concurrency Control** – Locking Mechanisms- Two Phase Commit Protocol-Dead lock.

UNIT IV TRENDS IN DATABASE TECHNOLOGY

9

Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary storage – **File Organization – Organization of Records in Files** – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – **Introduction to Distributed Databases- Client server technology- Multidimensional and Parallel databases**- Spatial and multimedia databases- Mobile and web databases- Data Warehouse-Mining- Data marts.

UNIT V ADVANCED TOPICS IN DATABASE SECURITY

9

Data Classification-Threats and risks – Database access Control – Types of Privileges – Cryptography- Statistical Databases.- Distributed Databases-Architecture-Transaction Processing- **Data Warehousing and Mining-Classification**-Association rules-Clustering-Information Retrieval- **Relevance ranking**-**Crawling and Indexing the Web**- Object Oriented Databases-XML Databases

TEXT BOOK:

1. Ramez Elmasri and Shamkant B. Navathe, -Fundamentals of Database Systems, Fifth Edition, Pearson Education, 2008.

- 2 Ramez Elmasri, Shamkant B. Navathe, -Fundamentals of Database Systems", 6th Edition, Addison-Wesley, 2010.

REFERENCES:

- 1 Abraham Silberschatz, Henry F. Korth and S. Sudharshan, -Database System Concepts, Sixth Edition, Tata McGraw Hill, 2011.
- 2 C.J.Date, A.Kannan and S.Swamynathan, -An Introduction to Database Systems, Eighth Edition, Pearson Education, 2006.
- 3 Atul Kahate, -Introduction to Database Management Systems, Pearson Education, New Delhi, 2006.
- 4 Alexis Leon and Mathews Leon, -Database Management Systems, Vikas Publishing House Private Limited, New Delhi, 2003.
- 5 http://www.tutorialspoint.com/dbms/dbms_tutorial.pdf

BIT302	COMPUTER ORGANIZATION AND ARCHITECTURE							L	T	P	C		
	Total Contact Hours - 45							3	0	0	3		
	Prerequisite – Fundamentals of Computing and Programming												
	Course Designed by – Dept of Information Technology												
OBJECTIVES													
- To have a thorough understanding of the basic structure and operation of a digital computer. To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division. - To study the different ways of communicating with I/O devices and standard I/O interfaces. - To study the hierarchical memory system including cache memories and virtual memory													
COURSE OUTCOMES (COs)													
CO1	Students will have thorough knowledge about												
CO2	Basic structure of a digital computer												
CO3	Arithmetic operations of binary number system												
CO4	The organization of the Control unit, Arithmetic and Logical unit, Memory unit and the I/O unit.												
CO5	To apply the knowledge of performance metrics to find the performance of systems.												
CO6	To identify high performance architecture design.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l

2	CO1	H	H	H	M	H				L			
	CO2	H	H	H	M	H				L			
	CO3	H	H	H	M	H				L			
	CO4	H	H	H	M	H				L			
	CO5	H	H	H	M	H				L			
	CO6	H	H	H	M	H				L			
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)			Open Elective (OE)		Project/Term Paper/ Seminar/Internship (PR)	
					✓								
4		37 th Meeting of Academic Council, May 2015											

UNIT I BASIC STRUCTURE OF COMPUTERS

9

Functional units – Basic operational concepts – Bus structures – Performance and metrics – Instructions and instruction sequencing – Hardware – Software Interface – Instruction set architecture – Addressing modes – RISC – CISC. ALU design – Fixed point and floating point operations.

UNIT II BASIC PROCESSING UNIT

9 Fundamental concepts – Execution of a complete instruction – Multiple bus organization –

Hardwired control – Micro programmed control – Nano programming.

UNIT III PIPELINING

9

Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets – Data path and control considerations – Performance considerations – Exception handling.

UNIT IV MEMORY SYSTEM

9

Basic concepts – Semiconductor RAM – ROM – Speed – Size and cost – Cache memories – Improving cache performance – Virtual memory – Memory management requirements – Associative memories – Secondary storage devices.

UNIT V I/O ORGANIZATION

9

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

TEXTBOOK:

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, –Computer Organization, Fifth Edition, Tata McGraw Hill, 2002.

2. David A. Patterson and John L. Hennessy, -Computer Architecture-A Quantitative Approach, Elsevier, a division of Reed India Private Limited, Fifth edition, 2012
3. M. Mano, -Computer System Architecture, Third Edition, Pearson Education, 2008.

REFERENCES:

- 1 William Stallings, -Computer Organization and Architecture – Designing for Performance, Sixth Edition, Pearson Education, 2000 UNIT III
- 2 John P. Hayes, -Computer Architecture and Organization, Third Edition, Tata McGraw Hill, 1998.
- 3 V.P. Heuring, H.F. Jordan, -Computer Systems Design and Architecture, Second Edition, Pearson Education, 2004.
3. https://www.rose-hulman.edu/Users/faculty/young/CS-Courses/csse232/review/CODF_v02b.pdf

BIT303	OBJECT ORIENTED ANALYSIS AND DESIGN						L	T	P	C			
	Total Contact Hours - 45						3	0	0	3			
	Prerequisite – Fundamentals of Computing and Programming												
	Course Designed by – Dept of Information Technology												
OBJECTIVES													
- To provide a brief, hands-on overview of object-oriented analysis in software process - To discuss Case studies based project specifications to develop object-oriented models and identify implementation strategies. - To demonstrate and apply basic object oriented techniques to create and modify object oriented analysis and design models. - To understand and apply testing techniques for object oriented software.													
COURSE OUTCOMES (COs)													
CO1	Understand the basic concepts to identify state & behavior of real world objects												
CO2	Able to learn the various object oriented methodologies and choose the appropriate one for solving the problem with the help of various case studies												
CO3	Understand the concept of analysis, design & testing to develop a document for the project												
CO4	Able to implement analysis, design & testing phases in developing a software project.												
CO5	Able to understand the testing strategies and know about automated testing tools.												
CO6	Analyze a problem using an object-oriented approach.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H			M	M		M	H	H	H	

	CO2		H			M	M		M	H	H	H	
	CO3		H			M	M		M	H	H	H	
	CO4		H			M	M		M	H	H	H	
	CO5		H			M	M		M	H	H	H	
	CO6		H			M	M		M	H	H	H	
3	Category	Humanities & Social Studies	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/Internship (PR)				
					✓								
4		37 th Meeting of Academic Council, May 2015											

UNIT I INTRODUCTION TO OOAD

9 Introduction to OOAD – What is OOAD? – What is UML? What are the United process(UP) phases - Case study – the NextGen POS system, Inception -Use case Modeling - Relating Use cases – include, extend and generalization.

UNIT II CLASSES AND ATTRIBUTES

9

Elaboration - Domain Models - Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class hierarchies- Aggregation and Composition- UML activity diagrams and modeling

UNIT III UML

9

System sequence diagrams - Relationship between sequence diagrams and use cases Logical architecture and UML package diagram – Logical architecture refinement - UML class diagrams - UML interaction diagrams

UNIT IV COUPLING AND COHESION

9

GRASP: Designing objects with responsibilities – Creator – Information expert – Low Coupling –Controller – High Cohesion – Designing for visibility - Applying GoF design patterns – adapter, singleton, factory and observer patterns.

UNIT V TESTING AND DEPLOYMENT

9

UML state diagrams and modeling - Operation contracts- Mapping design to code -UML deployment and component diagrams- Testing: Issues in OO Testing – Class Testing – OO Integration Testing – GUI Testing – OO System Testing

TEXT BOOK:

1.Craig Larman, "Applying UML and Patterns: An Introduction to object-oriented Analysis and Design and iterative development", Third Edition, Pearson Education, 2005

REFERENCES:

- 1 Simon Bennett, Steve Mc Robb and Ray Farmer, -Object Oriented Systems Analysis and Design Using UML, Fourth Edition, Mc-Graw Hill Education, 2010.
- 2 Erich Gamma, and Richard Helm, Ralph Johnson, John Vlissides, -Design patterns: Elements of Reusable Object-Oriented Software, Addison-Wesley, 1995.
- 3 Martin Fowler, -UML Distilled: A Brief Guide to the Standard Object Modeling Language, Third edition, Addison Wesley, 2003.
- 4 Paul C. Jorgensen, -Software Testing:- A Craftsman's Approach, Third Edition, Auerbach Publications, Taylor and Francis Group, 2008.
- 5 <http://kmvportal.co.in/Course/OOAD/object-oriented-analysis-and-design-with-applications-2nd-edition.pdf>

BIT 304		DATA STRUCTURES AND ALGORITHMS						L	T	P	C		
		Total Contact Hours - 45						3	0	0	3		
		Prerequisite – Fundamentals of Computing and Programming											
		Course Designed by – Dept of Information Technology											
OBJECTIVES													
This course demonstrates familiarity with major algorithms and data structures and analyzes performance of algorithms. It is used to choose the appropriate data structure and algorithm design method for a specified application and determine which algorithm or data structure to use in different scenarios.													
COURSE OUTCOMES (COs)													
CO1	Understand numerous examples of relationships between data;												
CO2	Understand the purpose and mathematical background of algorithm analysis and be able to apply this to determine the run time and memory usage of algorithms;												
CO3	Understand the abstract data types of stacks, queues and dequeues;												
CO4	Understand the variety of ways that linearly and weakly ordered data can be stored, accessed, and manipulated;												
CO5	Understand the characteristics and optimal behaviour of hash tables for access and retrieval;												
CO6	Understand various sorting algorithms and the run-time analysis required to determine their efficiencies;												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H		M	H	H							
	CO2	H		M	H	H							
	CO3	H		M	H	H							
	CO4	H		M	H	H							

	CO5	H		M	H	H						
	CO6	H		M	H	H						
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/Seminar/Internship (PR)			
					✓							
4	37 th Meeting of Academic Council, May 2015											

UNIT I **LINEAR STRUCTURES** 9

Abstract Data Types (ADT) - List ADT - array-based Implementation - linked list implementation - cursor based linked lists - applications of lists - Static ADT - Queue ADT - circular Queue implementation - Applications of stacks and queues

UNIT II **TREE STRUCTURES** 9

Tree ADT - Tree Traversals - Left child sibling data structures for general trees - binary tree ADT - expression trees - application of trees - binary search tree ADT - AVL trees - binary heaps

UNIT III **HASHING AND SETS** 9

Hashing-Separate Chaining-Open Addressing - Rehashing - Extensible Hashing - Disjoint set ADT - Dynamic Equivalence problem - Smart Union Algorithms - Path Compression - Application of sets.

UNIT IV **GRAPHS** 9

Definitions-Topological sort - breadth first traversal - shortest path algorithms- Minimum spanning tree- Prim's and Kruskal's algorithms-Depth First Traversal - Bi-connectivity-Euler circuits-Application of graphs.

UNIT V **ALGORITHM DESIGN AND ANALYSIS** 9

Introduction to algorithm design techniques: Greedy Algorithms, Divide and Conquer- Dynamic Programming - Backtracking - Branch and bound , Randomized algorithm, Introduction to algorithm analysis: asymptotic notations, recurrences-Introduction to NP complete problems

TEXT BOOKS

1. Sartaj Sahni, -Data Structures, Algorithms and Applications in C++, Second Edition, Universities Press.2005
2. M.A.Weiss - "Data Structures and Algorithm Analysis in C" Second Edition

REFERENCE BOOKS:

1. Horowitz, Sahni, Mehta, -Fundamentals of Data Structures in C++, 2nd Edition, Universities Press, 2007.
2. Aho, Hopcroft, Ullman, -Data Structures & Algorithms, Pearson Education, 2005.

3. ftp://ftp.rau.am/_MAIN_/Books/Books%20CSharp%20New/Cambridge.University.Press.Data.Structures.and.Algorithms.Using.CSharp.Mar.2007.pdf

BIT 3L1	DATABASE MANAGEMENT SYSTEM LABORATORY						L	T	P	C			
	Total Contact Hours - 45						0	0	3	2			
	Prerequisite – Data Base Management System												
	Lab Manual Prepared by – Dept of Information Technology												
OBJECTIVES													
The major objective of this lab is to provide a strong formal foundation in database concepts, technology and practice to the participants to groom them into well-informed database application developers. Rather than imparting isolated knowledge/experience fragments in each of concepts, technology and practice, the course will aim at achieving a good blend of the three. The overriding concern, therefore, is to include just enough concepts and theory to motivate and enrich the practical component, and to include technology component to maximise the relevance of the course to the industry without sacrificing the long-term objectives of rigour and foundational strength that can withstand the vagaries of technological advances.													
COURSE OUTCOMES (COs)													
CO1	Master the basic concepts and appreciate the applications of database systems.												
CO2	Master the basics of SQL and construct queries using SQL.												
CO3	Be familiar with a commercial relational database system (Oracle) by writing SQL using the system.												
CO4	Be familiar with the relational database theory, and be able to write relational algebra expressions for queries.												
CO5	Mater sound design principles for logical design of databases, including the E-R method and normalization approach.												
CO6	Be familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B-tree, and hashing.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	H		H							
	CO2		H	H		H							
	CO3		H	H		H							
	CO4		H	H		H							
	CO5		H	H		H							
	CO6		H	H		H							

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/Seminar/Internship (PR)
					✓				
4		37 th Meeting of Academic Council, May 2015							

LIST OF EXPERIMENTS:

1. Creation of a database and writing SQL queries to retrieve information from the database.
2. Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions.
3. Creation of Views, Synonyms, Sequence, Indexes, Save point.
4. Creating an Employee database to set various constraints.
5. Creating relationship between the databases.
6. Study of PL/SQL block.
7. Write a PL/SQL block to satisfy some conditions by accepting input from the user.
8. Write a PL/SQL block that handles all types of exceptions.
9. Creation of Procedures.
10. Creation of database triggers and functions

REFERENCES:

1. <http://www.drnnce.ac.in/files/DBMS1-LM-04.12.13.pdf>

BIT 3L2	DATA STRUCTURE & ALGORITHMS LABORATORY IN C	L	T	P	C
	Total Contact Hours - 45	0	0	3	2
	Prerequisite – Data Structure and Algorithms				
	Lab Manual Prepared by – Dept of Information Technology				
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					
COURSE OUTCOMES (COs)					
CO1	Able to understand the importance of structure and abstract data type, and their basic usability in different applications through different programming languages.				
CO2	Able to analyze and differentiate different algorithms based on their time complexity.				

CO3	Able to understand the linked implementation, and its uses both in linear and non-linear Data structure.												
CO4	Able to understand various data structure such as stacks, queues, trees, graphs, etc. to solve various computing problems.												
CO5	Able to implement various kinds of searching and sorting techniques, and know when to Choose which technique.												
CO6	Able to decide a suitable data structure and algorithm to solve a real world problem.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H		H	H							
	CO2		H		H	H							
	CO3		H		H	H							
	CO4		H		H	H							
	CO5		H		H	H							
	CO6		H		H	H							
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)		Open Elective (OE)		Project/Term Paper/ Seminar/Internship (PR)		
					✓								
4		37 th Meeting of Academic Council, May 2015											

LIST OF EXPERIMENTS:

IMPLEMENTATION IN THE FOLLOWING TOPICS:

1. Implementation of-Lists, (Using Arrays, linked lists)
2. Implementation of Stacks,(Using Arrays, linked lists)
3. Implementation of Queues (Using Arrays, linked lists)
4. Applications of Stack and Queue
5. Binary Search Tree
6. Tree traversal Techniques
7. Minimum Spanning Trees
8. Shortest Path Algorithms

BIT 3L3	OBJECT- ORIENTED PROGRAMMING USING C++ LABORATORY	L	T	P	C
----------------	--	----------	----------	----------	----------

		Total Contact Hours - 45						0	0	3	2		
		Prerequisite – Fundamentals of Computing and Programming											
		Lab Manual Prepared by by – Dept of Information Technology											
OBJECTIVES													
1. Understand fundamentals of programming such as variables, conditional and Iterative execution, methods, etc.													
2. Understand fundamentals of object-oriented programming in C++, including defining classes, invoking methods, using class libraries, etc.													
3. Be aware of the important topics and principles of software development.													
4. Have the ability to write a computer program to solve specified problems.													
COURSE OUTCOMES (COs)													
CO1	To be able to apply an object oriented approach to programming and identify potential benefits of object-oriented programming over other approaches.												
CO2	To be able to reuse the code and write the classes which work like built-in types.												
CO3	To be able to design applications which are easier to debug, maintain and extend.												
CO4	To be able to apply object-oriented concepts in real world applications.												
CO5	Gain the basic knowledge on object oriented concepts.												
CO6	Ability to develop applications using Object Oriented Programming Concept.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	H		H							
	CO2		H	H		H							
	CO3		H	H		H							
	CO4		H	H		H							
	CO5		H	H		H							
	CO6		H	H		H							
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/Internship (PR)				
					✓								
4		37 th Meeting of Academic Council, May 2015											

LIST OF EXPERIMENTS:

1. Function overloading, default arguments in C++
2. Simple class design in C++, namespaces, objects creations
3. Class design in C++ using dynamic memory allocation, destructor, copy constructor
4. Operator overloading, friend functions
5. Overloading assignment operator, type conversions
6. Inheritance, run-time polymorphism
7. Template design in C++
8. I/O, Throwing and Catching exceptions
9. Program development using STL
10. Simple class designs in Java with Javadoc
11. Designing Packages with Javadoc comments
12. Interfaces and Inheritance in Java
13. Exceptions handling in Java
14. Java I/O
15. Design of multi-threaded programs in Java

REFERENCES:

1. http://ggnindia.dronacharya.info/itdept/downloads/labmanuals/aug09_dec09/iii_sem/object_oriented_programming_it-iii.pdf

BMA401	NUMERICAL METHODS		L	T	P	C
	Total Contact Hours - 75		3	2	0	4
	Prerequisite – Maths I & II					
	Course Designed by – Dept of Mathematics					
OBJECTIVES • To explore complex systems, physicists, engineers, financiers and mathematicians require computational methods since mathematical models are only rarely solvable algebraically • Linear algebra underlying systems of equations, ordinary differential equations to simulate systems, and stochastic simulation under random influences. • Explicit schemes to solve ordinary differential equations; random numbers; stochastic system simulation.						
COURSE OUTCOMES (COs)						
CO1	Solve a set of algebraic equations representing steady state models formed in engineering problems					
CO2	Fit smooth curves for the discrete data connected to each other or to use interpolation Methods over these data tables.					
CO3	Find the trend information from discrete data set through numerical differentiation and Summary information through numerical integration.					

CO4	Predict the system dynamic behavior through solution of ODEs modeling the system.												
CO5	Solve PDE models representing spatial and temporal variations in physical systems through numerical methods.												
CO6	Have the necessary proficiency of using MATLAB for obtaining the above solutions.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	H		H							
	CO2		H	H		H							
	CO3		H	H		H							
	CO4		H	H		H							
	CO5		H	H		H							
	CO6		H	H		H							
3	Category	Humanities & Social Studies	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/Internship (PR)				
			✓										
4		37 th Meeting of Academic Council, May 2015											

UNIT – I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9+6

Linear interpolation methods (method of false position) – Newton's method – Statement of fixed point theorem – Fixed point iteration: $x=g(x)$ method – Solution of linear system by Gaussian elimination and Gauss-Jordan methods - Iterative methods: Gauss Jacobi and Gauss-Seidel methods - Inverse of a matrix by Gauss Jordan method – Eigen value of a matrix by power method.

UNIT -II INTERPOLATION AND APPROXIMATION 9+6

Lagrangian Polynomials – Divided differences – Interpolating with a cubic spline – Newton's forward and backward difference formulas.

UNIT- III NUMERICAL DIFFERENTIATION AND INTEGRATION 9+6

Derivatives from difference tables – Divided differences and finite differences – Numerical integration by trapezoidal and Simpson's 1/3 and 3/8 rules – Romberg's method – Two and Three point Gaussian quadrature formulas – Double integrals using trapezoidal and Simpson's rules.

UNIT-IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9+6

Single step methods: Taylor series method – Euler and modified Euler methods – Fourth order Runge – Kutta method for solving first and second order equations – Multistep methods: Milne’s and Adam’s predictor and corrector methods.

**UNIT- V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL
DIFFERENTIAL EQUATIONS 9+6**

Finite difference solution of second order ordinary differential equation – Finite difference solution of one dimensional heat equation by explicit and implicit methods – One dimensional wave equation and two dimensional Laplace and Poisson equations.

TEXT BOOKS:

1. C.F. Gerald and P.O. Wheatley, ‘Applied Numerical Analysis’, Sixth Edition, Pearson Education Asia, New Delhi, 2002.
2. E. Balagurusamy, ‘Numerical Methods’, Tata McGraw Hill Pub.Co.Ltd, New Delhi, 1999.

REFERENCE BOOKS:

1. P. Kandasamy, K. Thilagavathy and K. Gunavathy, ‘Numerical Methods’, S.Chand Co. Ltd., New Delhi, 2003.
2. R.L. Burden and T.D. Faires, ‘Numerical Analysis’, Seventh Edition, Thomson Asia Pvt. Ltd., Singapore, 2002.
4. <http://ins.sjtu.edu.cn/people/mtang/textbook.pdf>

BCE406	ENVIRONMENTAL STUDIES		L	T	P	C
	Total Contact Hours - 45		3	0	0	3
	Prerequisite – Physical Sciences					
	Course Designed by – Dept of Civil Engineering					
OBJECTIVES						
1. To study the nature and facts about environment. 2. To find and implement scientific, technological, economic and political solutions to environmental problems. 3. To study the interrelationship between living organism and environment. 4. To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value. 5. To study the dynamic processes and understand the features of the earth's interior and surface. 6. To study the integrated themes and biodiversity, natural resources, pollution control and waste management.						
COURSE OUTCOMES (COs)						
CO1	Play an important role in transferring a healthy environment for future generations					
CO2	Analyze the impact of engineering solutions in a global and societal context					
CO3	Discuss contemporary issues that results in environmental degradation and would attempt to provide solutions to overcome those problems					

CO4		Ability to consider issues of environment and sustainable development in his personal and professional undertakings											
CO5		Highlight the importance of ecosystem and biodiversity											
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1						H	H	H	H			
	CO2						H	H	H	H			
	CO3						H	H	H	H			
	CO4						H	H	H	H			
	CO5						H	H	H	H			
	CO6						H	H	H	H			
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)			Open Elective (OE)	Project/Term Paper/ Seminar/Internship (PR)		
						✓							
4		37 th Meeting of Academic Council, May 2015											

UNIT I THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES 9

Definition, scope and importance, Need for public awareness.

Natural Resources : Renewable And Non – Renewable Resources

Natural resources and associated problems

- Forest resources : Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effect on forests and tribal people.
- Water resources : Use and over-utilization of surface and ground water, flood, drought conflicts over water, dams-benefits and problems.
- Mineral resources : Uses and exploitation, environmental effects of extracting and using mineral resources, case studies.
- Food resources : World food problems, changes caused by agriculture and overgrazing , effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, case studies.
- Land resources : Land as a resource, Land degradation, man induced landslides, soil erosion and desertification

Role of an individual in conservation of natural resources, Equitable use of resources for sustainable lifestyles.

UNIT II ECOSYSTEMS

8

Concepts of an ecosystem. Structure and function of an ecosystem, producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids - Introduction, types, characteristic features, structure and function of the following ecosystem :- Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems, (ponds, streams, lakes, rivers, oceans, estuaries)-

Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation - Ethics : Issues and possible Solutions, Climate change, global warming, acid rain, ozone layer depletion.

UNIT III BIODIVERSITY AND ITS CONSERVATION

7

Introduction and Definition - genetic, species and ecosystems diversity, Biogeographical classification of India - Value biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values - Biodiversity at global, national and local levels. India as a mega-diversity nation, Hot-spots of biodiversity -Threats to biodiversity, habitat, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation biodiversity - In-situ and Ex-situ conservation of biodiversity.

Environmental Pollution

7

Definition, Causes, effects and control measures of :- Air Pollution, Water pollution, Soil Pollution, Marine Pollution, Noise pollution, Thermal pollution, Nuclear hazards. Solid waste Management : Causes, effects and control measures of urban and industrial wastes - Role of an individual in prevention of pollution - Pollution case studies - Disaster Management : floods earthquake, cyclone and landslides.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT

8

From Unsustainable to Sustainable development, Urban problems related to energy, nuclear accident and holocaust, case studies, wasteland reclamation, Environmental Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife protection Act, Forest Conservation Act, Issues involved in enforcement of environmental Legislation, public awareness –

Fireworks and its impact on the Environment – Chemicals used in Fireworks – (Fuel –oxidizing Agent – Reducing Agent –Toxic Materials – Fuel –Binder- Regulator) – Harmful nature of ingredients – chemical effects on health due to inhaling fumes – Noise produced by fire crackers – Noise pollution – Noise level standards for fire crackers – Intensity of sound – Impact on hearing – Safety measures.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT

6

Population growth, variation among nations, population explosion-Family Welfare programs, Environment and human health, Human Rights, Value Education, HIV and AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human health - Case Studies.

TEXTBOOKS:

- 1 Gilbert M.Masters, -Introduction to Environmental Engineering and Science, Pearson Education Pvt., Ltd., Second Edition, ISBN 81-297-0277-0, 2004.
- 2 Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- 3 Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, 1989.
- 4 Benny Joseph, -Environmental Studies, TATA McGraw Hill, 2010

REFERENCES

1. Trivedi R.K., -Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol.I and II, Enviro Media 2009
2. Cunningham, W.P.Cooper, T.H.Gorhani, -Environmental Encyclopedia, Jaico Publ., House, Mumbai, 2001.
3. Wager K.D. -Environmental Management, W.B. Saunders Co., Philadelphia, USA, 1998.
4. Trivedi R.K. and P.K. Goel, -Introduction to Air Pollution, Techno Science Publications 2013
5. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB),2001.
6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
7. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
8. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
9. Mckinney, M.L. & School, R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition. 639p.
10. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
11. Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publish Co. Pvt. Ltd. 345p.
12. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut.
13. <http://eng.mft.info/uploadedfiles/gfiles/c8e31c9e52d84c3.pdf>

BIT402	OPERATING SYSTEMS			L	T	P	C
	Total Contact Hours - 45			3	0	0	3
	Prerequisite – Computer Organization and Architecture						
	Course Designed by – Dept of Information Technology						
OBJECTIVES Every computer professional should have a basic understanding of how an operating system controls the computing resources and provide services to the users. This course provides an introduction to the operating system functions, design and implementation.							
COURSE OUTCOMES (COs)							
CO1	To understand the structure and functions of OS						
CO2	To learn about Processes, Threads and Scheduling algorithms						

CO3	To understand the principles of concurrency and Deadlocks												
CO4	To learn various memory management schemes												
CO5	To study I/O management and File systems												
CO6	Understand the different channels that are functional at the work place												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H		H	H								H
	CO2	H		H	H								H
	CO3	H		H	H								H
	CO4	H		H	H								H
	CO5	H		H	H								H
	CO6	H		H	H								H
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)			Open Elective (OE)		Project/Term Paper/ Seminar/Internship (PR)	
					✓								
4		37 th Meeting of Academic Council, May 2015											

UNIT I OPERATING SYSTEMS OVERVIEW

9

Computer System Overview-Basic Elements, Instruction Execution, Interrupts, Memory Hierarchy, Cache Memory, Direct Memory Access, Multiprocessor and Multicore Organization. Operating system overview-objectives and functions, Evolution of Operating System.- Computer System Organization-Operating System Structure and Operations- System Calls, System Programs, OS Generation and System Boot.

UNIT II PROCESS MANAGEMENT

9

Processes-Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication; Threads- Overview, Multicore Programming, Multithreading Models; Windows 7 - Thread and SMP Management. Process Synchronization - Critical Section Problem, Mutex Locks, Semaphores, Monitors; CPU Scheduling and Deadlocks.

UNIT III STORAGE MANAGEMENT

9

Main Memory-Contiguous Memory Allocation, Segmentation, Paging, 32 and 64 bit architecture Examples; Virtual Memory- Demand Paging, Page Replacement, Allocation, Thrashing; Allocating Kernel Memory, OS Examples.

UNIT IV I/O SYSTEMS**9**

Mass Storage Structure- Overview, Disk Scheduling and Management; File System Storage-File Concepts, **Directory and Disk Structure, Sharing and Protection**; File System Implementation- File System Structure, **Directory Structure**, Allocation Methods, Free Space Management; I/O Systems.

UNIT V CASE STUDY**9**

Linux System- Basic Concepts; System Administration-Requirements for Linux System Administrator, **Setting up a LINUX Multifunction Server**, Domain Name System, **Setting Up Local Network Services**; Virtualization- Basic Concepts, **Setting Up Xen**, VMware on Linux Host and Adding Guest OS

TEXT BOOK:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, -Operating System Concepts, 9th Edition, John Wiley and Sons Inc., 2012.

REFERENCES:

1. William Stallings, —Operating Systems – Internals and Design Principles, 7th Edition, Prentice Hall, 2011.
2. Andrew S. Tanenbaum, —Modern Operating Systems, Second Edition, Addison Wesley, 2001.
3. Charles Crowley, -Operating Systems: A Design-Oriented Approach, Tata McGraw Hill Education, 1996.
4. D M Dhamdhare, -Operating Systems: A Concept-Based Approach, Second Edition, Tata McGraw-Hill Education, 2007.
- 5 http://iit.qau.edu.pk/books/OS_8th_Edition.pdf

BIT403	WEB PROGRAMMING		L	T	P	C
	Total Contact Hours - 45		3	0	0	3
	Prerequisite – Internet Programming					
	Course Designed by – Dept of Information Technology					
OBJECTIVES • To understand the concepts and architecture of the World Wide Web. • To understand and practice mark up languages • To understand and practice embedded dynamic scripting on client side Internet Programming • To understand and practice web development techniques on client-side						
COURSE OUTCOMES (COs)						
CO1	Acquire knowledge about functionalities of world wide web					
CO2	Explore markup languages features and create interactive web pages using them					

CO3	Learn and design Client side validation using scripting languages												
CO4	Acquire knowledge about Open source JavaScript libraries												
CO5	Able to design front end web page and connect to the back end databases												
CO6	Explain the functions of client and servers on Web.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H			H				H		M	H
	CO2		H			H				H		M	H
	CO3		H			H				H		M	H
	CO4		H			H				H		M	H
	CO5		H			H				H		M	H
	CO6		H			H				H		M	H
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)			Project/Term Paper/ Seminar/Internship (PR)		
					✓								
4		37 th Meeting of Academic Council, May 2015											

UNIT I SCRIPTING

9

Web page Designing using HTML, Scripting basics- Client side and server side scripting. Java Script-Object, names, literals, operators and expressions- statements and features- events - windows - documents - frames - data types - **built-in functions**- **Browser object model** - Verifying forms.-HTML5- CSS3- **HTML 5 canvas** - Web site creation using tools.

UNIT II JAVA

9

Introduction to object oriented programming-Features of Java – Data types, variables and arrays – Operators – Control statements – Classes and Methods – Inheritance. Packages and Interfaces – Exception Handling – Multithreaded Programming – **Input/output – Files – Utility Classes – String Handling.**

UNIT III JDBC

9

JDBC Overview – JDBC implementation – Connection class – Statements - Catching Database Results, **handling database Queries.** Networking– **InetAddress class** – **URL class**- TCP sockets - UDP sockets, **Java Beans –RMI.**

UNIT IV APPLET**9**

Java applets- Life cycle of an applet – Adding images to an applet – Adding sound to an applet. Passing parameters to an applet. Event Handling. Introducing AWT: Working with Windows Graphics and Text. Using AWT Controls, Layout Managers and Menus. Servlet – life cycle of a servlet. The Servlet API, Handling HTTP Request and Response, using Cookies, Session Tracking. Introduction to JSP.

UNIT V XML AND WEB SERVICES**9**

Xml – Introduction-Form Navigation-XML Documents- XSL – XSLT- Web services-UDDI-WSDL-Java web services – Web resources.

TEXT BOOKS:

1. Harvey Deitel, Abbey Deitel, Internet and World Wide Web: How To Program 5th Edition.
2. Herbert Schildt, Java - The Complete Reference, 7th Edition. Tata McGraw- Hill Edition.
3. Michael Morrison XML Unleashed Tech media SAMS.

REFERENCES:

1. John Pollock, Javascript - A Beginners Guide, 3rd Edition — Tata McGraw-Hill Edition.
2. Keyur Shah, Gateway to Java Programmer Sun Certification, Tata McGraw Hill, 2002.
3. <http://www.kiv.zcu.cz/~ledvina/vyuka/PSI/literatura/web%20programming%20unleashed.pdf>

BIT404	SOFTWARE ENGINEERING		L	T	P	C
	Total Contact Hours - 45		3	0	0	3
	Prerequisite – Fundamentals of Computing and Programming					
	Course Designed by – Dept of Information Technology					
OBJECTIVES This course is intended to provide the students with an overall view over Software Engineering discipline and with insight into the processes of software development.						
COURSE OUTCOMES (COs)						
CO1	To learn about generic models of software development process.					
CO2	To understand fundamental concepts of requirements engineering and Analysis Modeling.					
CO3	To understand the different design techniques and their implementation.					
CO4	To learn various testing and maintenance measures.					
CO5	An ability to apply knowledge of mathematics, science, and Engineering.					
CO6	An ability to function on multi-disciplinary teams.					

Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1			H			H	M	M	H	H	H	H
	CO2			H			H	M	M	H	H	H	H
	CO3			H			H	M	M	H	H	H	H
	CO4			H			H	M	M	H	H	H	H
	CO5			H			H	M	M	H	H	H	H
	CO6			H			H	M	M	H	H	H	H
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)		Open Elective (OE)			Project/Term Paper/ Seminar/Internship (PR)	
					✓								
4		37 th Meeting of Academic Council, May 2015											

UNIT I SOFTWARE PROCESS AND PROJECT MANAGEMENT 9

Introduction to Software Engineering, Software Process, **Perspective and Specialized Process Models** – Software Project Management: Estimation – LOC and FP Based Estimation, COCOMO Model – Project Scheduling – Scheduling, **Earned Value Analysis - Risk Management**.

UNIT II REQUIREMENTS ANALYSIS AND SPECIFICATION

9Software Requirements: Functional and Non-Functional, User requirements, System requirements, Software Requirements Document – Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis, requirements validation, requirements management-**Classical analysis: Structured system Analysis, Petri Nets**- Data Dictionary.

UNIT III SOFTWARE DESIGN 9

Design process – Design Concepts-Design Model– Design Heuristic – Architectural Design – Architectural styles, Architectural Design, **Architectural Mapping using Data Flow**- User Interface Design: **Interface analysis**, Interface Design –Component level Design: Designing Class based components, **traditional Components**.

UNIT IV TESTING AND IMPLEMENTATION 9

Software testing fundamentals-**Internal and external views of Testing**-white box testing - basis path testing-control structure testing-black box testing- Regression Testing – Unit Testing – Integration Testing – Validation Testing – System Testing And Debugging – **Software Implementation Techniques: Coding practices-Refactoring**.

UNIT V PROJECT MANAGEMENT 9

Estimation – FP Based, LOC Based, Make/Buy Decision, COCOMO II - Planning – Project Plan, Planning Process, RFP Risk Management – Identification, Projection, RMMM - Scheduling and Tracking – Relationship between people and effort, Task Set & Network, Scheduling, EVA - Process and Project Metrics.

TEXT BOOKS:

1. Roger S. Pressman, -Software Engineering – A Practitioner's Approach, Seventh Edition, McGraw-Hill International Edition, 2010.

REFERENCES:

1. Ian Sommerville, -Software Engineering, 9th Edition, Pearson Education Asia, 2011.
2. Rajib Mall, -Fundamentals of Software Engineering, Third Edition, PHI Learning Private Limited, 2009.
3. Pankaj Jalote, -Software Engineering, A Precise Approach, Wiley India, 2010.
4. Kelkar S.A., -Software Engineering, Prentice Hall of India Pvt Ltd, 2007.
5. Stephen R. Schach, -Software Engineering, Tata McGraw-Hill Publishing Company Limited, 2007.
6. http://www.resource.mitfiles.com/IT/II%20year/IV%20sem/Software%20Engineering/books/Pressman_Software_Engineering.pdf

BIT405	DISTRIBUTED SYSTEMS			L	T	P	C
	Total Contact Hours – 45			3	0	0	3
	Prerequisite – Web Technology						
	Course Designed by – Dept of Information Technology						
OBJECTIVES Distributed systems is to examine the fundamental principles of distributed systems, and provide students hands-on experience in developing distributed protocols. While we still look at issues in distributed operating systems, this course will address distributed systems in a broader sense. Emphasis will be placed on communication, process, naming, synchronization, consistency and replication, and fault tolerance.							
COURSE OUTCOMES (COs)							
CO1	Understand the concepts of distributed computing and distributed systems.						
CO2	Be able to identify the key components in distributed systems.						
CO3	Be able to apply Java to build distributed systems.						
CO4	Understand the advantages and limitations of different distributed system architectures.						
CO5	Understand the enabling technologies for building distributed systems.						
CO6	Understand the different components of Web Services.						

Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	H	M								
	CO2		H	H	M								
	CO3		H	H	M								
	CO4		H	H	M								
	CO5		H	H	M								
	CO6		H	H	M								
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
					✓								
4		37 th Meeting of Academic Council, May 2015											

UNIT I INTRODUCTION

9

Introduction – Examples of Distributed Systems–Trends in Distributed Systems Characterization of Distributed Systems-Introduction-Examples-Resource Sharing and the Challenges. System Models-Architectural-Fundamental. Inter process Communication-Introduction-API for Internet protocols-External data representation and marshalling-Client-server communication-Group communication- Case study: Inter process Communication in UNIX.

UNIT II COMMUNICATION IN DISTRIBUTED SYSTEM

10

System Model – Inter process Communication - the API for internet protocols – External data representation and Multicast communication. **Network virtualization:** Overlay networks. **Case study:** MPI **Remote Method Invocation And Objects:** Remote Invocation – Introduction - Request-reply protocols - Remote procedure call - Remote method invocation. **Case study:** Java RMI - Group communication - Publish-subscribe systems - Message queues - Shared memory approaches -Distributed objects - Case study: Enterprise Java Beans -from objects to components

UNIT III PEER TO PEER SERVICES AND FILE SYSTEM

10

Peer-to-peer Systems – Introduction - Napster and its legacy - Peer-to-peer – Middleware - Routing overlays. **Overlay case studies:** Pastry, Tapestry- Distributed File Systems –Introduction - File service architecture – Andrew File system. **File System:** Features-File model -File accessing models - File sharing semantics **Naming:** Identifiers, Addresses, Name Resolution – Name Space Implementation – Name Caches – LDAP.

UNIT IV SYNCHRONIZATION AND REPLICATION

9

Introduction - Clocks, events and process states - Synchronizing physical clocks- Logical time

and logical clocks - Global states – Coordination and Agreement – Introduction - Distributed mutual exclusion – **Elections** – Transactions and Concurrency Control– Transactions -Nested transactions – Locks – Optimistic concurrency control - Timestamp ordering – Atomic Commit protocols -**Distributed deadlocks** – **Replication – Case study – Coda.**

UNIT V PROCESS & RESOURCE MANAGEMENT

9

Process Management: Process Migration: Features, Mechanism - Threads: Models, Issues, Implementation. **Resource Management:** Introduction- Features of Scheduling Algorithms – **Task Assignment Approach – Load Balancing Approach** – Load Sharing Approach.

TEXT BOOK:

1. George Coulouris, Jean Dollimore and Tim Kindberg, -Distributed Systems Concepts and Design, Fifth Edition, Pearson Education, 2012.

REFERENCES:

1. Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, 2007.
2. Tanenbaum A.S., Van Steen M., -Distributed Systems: Principles and Paradigms, Pearson Education, 2007.
3. Liu M.L., -Distributed Computing, Principles and Applications, Pearson Education, 2004.
4. Nancy A Lynch, -Distributed Algorithms, Morgan Kaufman Publishers, USA, 2003.
5. <https://azmuri.files.wordpress.com/2013/09/george-coulouris-distributed-systems-concepts-and-design-5th-edition.pdf>

BIT4L1	SOFTWARE ENGINEERING LABORATORY	L	T	P	C
	Total Contact Hours - 45	0	0	3	2
	Prerequisite – Software Engineering				
	Lab Manual Prepared by – Dept of Information Technology				
OBJECTIVES					
1. To understand the software Engineering methodologies for project development					
2. To gain knowledge about open source tools for Computer Aided Software Engineering					
3. To develop an efficient software using case tools					
COURSE OUTCOMES (COs)					
CO1	Students will be capable to acquire the generic software development skill through various stages of software life cycle.				
CO2	He will also be able to ensure the quality of software through software development with various protocol based environment.				
CO3	After completion of course student will be able to generate test cases for software testing.				
CO4	Students will also be able to handle software development models through rational method				
CO5	Rational Rose Enterprise Edition software is used to serve the objectives				

CO6		The courses contains Basic Structural Modeling, Advance Structural Modeling, Basic Behavioral Modeling, Advance Behavioral Modeling, Architectural Modeling, UML Notation, UML Stranded Elements, Designing Test cases, Test Suits, Rational Unified Process etc.											
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	H		H	M						
	CO2		H	H		H	M						
	CO3		H	H		H	M						
	CO4		H	H		H	M						
	CO5		H	H		H	M						
	CO6		H	H		H	M						
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/Internship (PR)				
						✓							
4		37 th Meeting of Academic Council, May 2015											

LIST OF EXPERIMENTS:

1. Course Registration System
2. Student marks analysing system Railway domain
3. Online ticket reservation system
4. Platform assignment system for the trains in a railway station Medicine domain
5. Expert system to prescribe the medicines for the given symptoms
6. Remote computer monitoring Finance domain
7. ATM system
8. Stock maintenance Human Resource management
9. Quiz System
10. E-mail Client system.

REFERENCE:

<https://www.ida.liu.se/~TDDC88/labs/index.en.shtml>

BIT4L2	OPERATING SYSTEM LABORATORY	L	T	P	C
--------	-----------------------------	---	---	---	---

		Total Contact Hours - 45					0	0	3	2			
		Prerequisite – Operating System											
		Lab Manual Prepared by by – Dept of Information Technology											
OBJECTIVES													
- Understand the basics of operating systems like kernel, shell, types and views of operating systems - Describe the various CPU scheduling algorithms and remove deadlocks. - Explain various memory management techniques and concept of thrashing - Use disk management and disk scheduling algorithms for better utilization of external memory. - Recognize file system interface, protection and security mechanisms. - Explain the various features of distributed OS like Unix, Linux, windows etc													
COURSE OUTCOMES (COs)													
CO1	Understand the basics of operating systems like kernel, shell, types and views of operating systems.												
CO2	Describe the various CPU scheduling algorithms and remove deadlocks.												
CO3	Explain various memory management techniques and concept of thrashing												
CO4	Use disk management and disk scheduling algorithms for better utilization of external memory.												
CO5	Recognize file system interface, protection and security Mechanisms												
CO6	Understand the different channels that the functional at the work place.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	H		H	M						
	CO2		H	H		H	M						
	CO3		H	H		H	M						
	CO4		H	H		H	M						
	CO5		H	H		H	M						
	CO6		H	H		H	M						

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/Seminar/Internship (PR)
					✓				
4		37 th Meeting of Academic Council, May 2015							

LIST OF EXPERIMENTS:

1. Basics of UNIX commands.
2. Shell Programming.
3. Implement the following CPU scheduling algorithms
 - a) Round Robin
 - b) SJF
 - c) FCFS
 - d) Priority
4. Implement all file allocation strategies
 - a) Sequential
 - b) Indexed
 - c) Linked
5. Implement Semaphores
6. Implement all File Organization Techniques
 - a) Single level directory
 - b) Two level
 - c) Hierarchical
 - d) DAG
7. Implement Bankers Algorithm for Dead Lock Avoidance
8. Implement an Algorithm for Dead Lock Detection
9. Implement e all page replacement algorithms
 - a) FIFO
 - b) LRU
 - c) LFU
10. Implement Shared memory and IPC
11. Implement Paging Technique of memory management.
12. Implement Threading & Synchronization Applications

REFERENCE:

1. <http://www.faadooengineers.com/threads/5366-Operating-System-ebook>

BIT4L3	WEB PROGRAMMING LABORATORY	L	T	P	C
	Total Contact Hours - 45	0	0	3	2
	Prerequisite – Internet Programming				
	Lab Manual Prepared by – Dept of Information Technology				
OBJECTIVES					
• Program basic functions in Javascript and DHTML • Use Javascript and DHTML to create web pages with advanced interactivity					

• Use variables, conditionals, and loops in Javascript and DHTML programs • Use Javascript to control browser frames and windows • Use Javascript to create functional forms • Use Cascading Style Sheets (CSS) to design web pages • Use CSS to create web pages with specialized fonts and design elements													
COURSE OUTCOMES (COs)													
CO1	Explain the history of the internet and related internet concepts that are vital in understanding web development.												
CO2	Discuss the insights of internet programming and implement complete application over the web.												
CO3	Demonstrate the important HTML tags for designing static pages and separate design from Content using Cascading Style sheet.												
CO4	Utilize the concepts of JavaScript and Java												
CO5	Use web application development software tools i.e. Ajax, PHP and XML etc. and identify the environments currently available on the market to design web sites.												
CO6	Learning the uses and application of RP to improve pronunciation.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	H		H	M						
	CO2		H	H		H	M						
	CO3		H	H		H	M						
	CO4		H	H		H	M						
	CO5		H	H		H	M						
	CO6		H	H		H	M						
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)			Project/Term Paper/ Seminar/Internship (PR)		
					✓								
4		37 th Meeting of Academic Council, May 2015											

LIST OF EXPERIMENTS:

1. Write a html program for Creation of web site with forms, frames, links, tables etc
2. Design a web site using HTML and DHTML. Use Basic text Formatting, Images,
3. Create a script that asks the user for a name, then greets the user with "Hello" and the user name on the page
4. Create a script that collects numbers from a page and then adds them up and prints them to a blank field on the page.

3. Create a script that prompts the user for a number and then counts from 1 to that number displaying only the odd numbers.
4. Create a script that will check the field in Assignment 1 for data and alert the user if it is blank. This script should run from a button.
7. Using CSS for creating web sites
8. Creating simple application to access data base using JDBC Formatting HTML with CSS.
9. Program for manipulating Databases and SQL.
10. Program using PHP database functions.
11. Write a web application that functions as a simple hand calculator, but also keeps a "paper trail" of all your previous work
12. Install Tomcat and use JSP and link it with any of the assignments above
13. Reading and Writing the files using .Net
14. Write a program to implement web service for calculator application
15. Implement RMI concept for building any remote method of your choice.

REFERENCES:

1. [http:// docsfiles.com/pdf_web_programming_lab_manual.html](http://docsfiles.com/pdf_web_programming_lab_manual.html)

BIT501	DISCRETE MATHEMATICS	L	T	P	C
	Total Contact Hours – 60	4	0	0	4
	Prerequisite – Engineering Mathematics				
	Course Designed by – Dept of Information Technology				
OBJECTIVES					
- To understand and apply the class of functions which transform a finite set into another finite set which relates to input output functions in computer science. - To impart discrete knowledge in computer engineering through finite automata and Context free Grammars.					
COURSE OUTCOMES (COs)					
CO1	Acquire the basic knowledge of matrix, set theory, functions and relations concepts needed for designing and solving problems.				
CO2	Acquire the knowledge of logical operations and predicate calculus needed for computing skill.				
CO3	Able to design and solve Boolean functions for defined problems				
CO4	Apply the acquired knowledge of formal languages to the engineering areas like Compiler Design.				
CO5	Apply the acquired knowledge of finite automata theory and design discrete problems to solve by computers.				
CO6	To appreciate the basic principles of Boolean algebra, Logic, Set theory.				
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low					

1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	M	H								L
	CO2	H	H	M	H								L
	CO3	H	H	M	H								L
	CO4	H	H		H								L
	CO5	H	H	H	H								L
	CO6	H	H	H	H								L
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)		Open Elective (OE)			Project/Term Paper/ Seminar/Internship (PR)	
			✓										
4		37 th Meeting of Academic Council, May 2015											

UNIT I LOGIC AND PROOFS

12

Propositional Logic – Propositional equivalences-Predicates and quantifiers-Nested Quantifiers-Rules of inference-introduction to Proofs-Proof Methods and strategy

UNIT II COMBINATORICS

12

Mathematical inductions-Strong induction and well ordering-The basics of counting-The pigeonhole principle –Permutations and combinations-Recurrence relations-Solving Linear recurrence relations-generating functions-inclusion and exclusion and applications.

UNIT III GRAPHS

12

Graphs and graph models-Graph terminology and special types of graphs-Representing graphs and graph isomorphism -connectivity-Euler and Hamilton paths

UNIT IV ALGEBRAIC STRUCTURES

12

Algebraic systems-Semi groups and monoids-Groups-Subgroups and homomorphisms- Cosets and Lagrange's theorem- Ring & Fields (Definitions and examples)

UNIT V LATTICES AND BOOLEAN ALGEBRA

12

Partial ordering-Posets-Lattices as Posets- Properties of lattices-Lattices as Algebraic systems – Sub lattices –direct product and Homomorphism-Some Special lattices- Boolean Algebra

TEXT BOOKS:

- 1 Kenneth H.Rosen, -Discrete Mathematics and its Applications, Special Indian Edition, Tata McGraw-Hill Pub. Co. Ltd., New Delhi, (2007). (For the units 1 to 3,Sections 1.1 to 1.7 , 4.1 & 4.2, 5.1 to 5.3, 6.1, 6.2, 6.4 to 6.6, 8.1 to 8.5)

- 2 Trembly J.P and Manohar R, -Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw-Hill Pub. Co. Ltd, New Delhi, 30th Re-print(2007).(For units 4 & 5, Sections 2-3.8 & 2-3.9, 3-1, 3-2 & 3-5, 4-1 & 4-2)

REFERENCES:

- 1 .Ralph. P. Grimaldi, -Discrete and Combinatorial Mathematics: An Applied Introduction, Fourth Edition, Pearson Education Asia, Delhi, (2002).
2. Thomas Koshy, |Discrete Mathematics with Applications|, Elsevier Publications, (2006).
3. Seymour Lipschutz and Mark Lipson, |Discrete Mathematics|, Schaum's Outlines, Tata McGraw-Hill Pub. Co. Ltd., New Delhi, Second edition, (2007).
4. <http://www.cse.iitd.ernet.in/~bagchi/courses/discrete-book/fullbook.pdf>

BIT502	SOFTWARE PROJECT MANAGEMENT	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite –Software Engineering				
	Course Designed by – Dept of Information Technology				

OBJECTIVES

- To know of how to do project planning for the software process.
- To learn the cost estimation techniques during the analysis of the project.
- To understand the quality concepts for ensuring the functionality of the software

COURSE OUTCOMES (COs)

CO1	Understand the activities during the project scheduling of any software application.
CO2	Learn the risk management activities and the resource allocation for the projects.
CO3	Can apply the software estimation and recent quality standards for evaluation of the Software projects
CO4	Acquire knowledge and skills needed for the construction of highly reliable software Project
CO5	Able to create reliable, replicable cost estimation that links to the requirements of project Planning and managing.
CO6	Participate in a software development project as a project manager.

Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1						H		H	H	H	H	H
	CO2						H		H	H	H	H	H
	CO3						H		H	H	H	H	H
	CO4						H		H	H	H	H	H
	CO5						H		H	H	H	H	H

	CO6						H		H	H	H	H	H
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)				Project/Term Paper/Seminar/Internship (PR)	
4						✓							
37 th Meeting of Academic Council, May 2015													

UNIT I PROJECT EVALUATION AND PROJECT PLANNING 9

Importance of Software Project Management – Activities Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – **Project portfolio Management – Cost-benefit evaluation technology** – Risk evaluation – Strategic program Management – Stepwise Project Planning.

UNIT II PROJECT LIFE CYCLE AND EFFORT ESTIMATION 9

Software process and Process Models – **Choice of Process models - mental delivery** – Rapid Application development – Agile methods – Extreme Programming – SCRUM – Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – **COSMIC Full function points - COCOMO II A Parametric Productivity Model** - Staffing Pattern.

UNIT III ACTIVITY PLANNING AND RISK MANAGEMENT 9

Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – **Forward Pass & Backward Pass techniques** – Critical path (CRM) method – Risk identification – Assessment – Monitoring – PERT technique – **Monte Carlo simulation** – Resource Allocation – Creation of critical patterns – Cost schedules.

UNIT IV PROJECT MANAGEMENT AND CONTROL 9

Framework for Management and control – Collection of data Project termination – Visualizing progress – Cost monitoring – Earned Value Analysis- Project tracking – Change control- Software Configuration Management – Managing contracts – Contract Management.

UNIT V STAFFING IN SOFTWARE PROJECTS 9

Managing people – Organizational behavior – Best methods of staff selection – Motivation – The Oldham-Hackman job characteristic model – Ethical and Programmed concerns – Working in teams – Decision making – Team structures – Virtual teams – Communications genres – Communication plans.

TEXTBOOK:

1. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management– Fifth Edition, Tata McGraw Hill, New Delhi, 2012.

REFERENCES:

1. Robert K. Wysocki –Effective Software Project Management – Wiley Publication,2011.
2. Walker Royce: —Software Project Management– Addison-Wesley,1998.
3. Gopalaswamy Ramesh, –Managing Global Software Projects– McGraw Hill Education (India), Fourteenth Reprint 2013
4. <http://www.feedforward.com.au/software-engineering-poject-sample.pdf>

BIT503		DATA COMMUNICATION AND COMPUTER NETWORKS								L	T	P	C
		Total Contact Hours - 45								3	0	0	3
		Prerequisite – Computer Networks											
		Course Designed by – Dept of Information Technology											
OBJECTIVES													
Gets the idea of choosing the required functionality at each layer for a given application and trace the flow of information from one node to another node in the network. Then gives the understanding of division of network functionalities in to layers, the component required to build different types of networks and identify the solution for the functionalities in each layer.													
COURSE OUTCOMES (COs)													
CO1		Independently understand basic computer network technology.											
CO2		Understand and explain Data Communications System and its components.											
CO3		Identify the different types of network topologies and protocols.											
CO4		Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.											
CO5		Identify the different types of network devices and their functions within a network											
CO6		Understand and building the skills of sub netting and routing mechanisms.											
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	H		H	M						
	CO2		H	H		H	M						
	CO3		H	H		H	M						
	CO4		H	H		H	M						
	CO5		H	H		H	M						
	CO6		H	H		H	M						
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				

					✓				
4		37 th Meeting of Academic Council, May 2015							

UNIT I APPLICATION LAYER 9

Network Architecture – Layers - HTTP – DNS – E-Mail (SMTP, MIME, POP3, IMAP, WebMail), FTP, **Telnet - SNMP**.

UNIT II TRANSPORT LAYER 9

User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Flow Control – **Congestion Control – Queuing - Discipline** .Introduction to Quality of services (QOS).

UNIT III NETWORK LAYER 9

Circuit Switching - Packet Switching Virtual Circuit Switching – IP – ARP – DHCP – ICMP– Routing – RIP – OSPF – Subnetting – **CIDR – Interdomain Routing – BGP – IPV6 Basic Features** – Inter Domain Multicast – Congestion Avoidance in Network Layer.

UNIT IV DATA LINK LAYER 9

Channel access on links – SDMA – TDMA – FDMA – CDMA – Hybrid Multiple Access Techniques – Issues in the Data Link Layer – Framing - Error correction and detection – Link Level Flow Control – Medium Access – **Ethernet – Token Ring – FDDI – Wireless LAN – Bridges and Switches**.

UNIT V DATA COMMUNICATIONS 9

Data Transmission – Transmission Media – **Signal Encoding Techniques – Multiplexing** –Spread Spectrum.

TEXT BOOKS:

1. James F. Kurose, Keith W. Ross, –Computer Networking, A Top-Down Approach Featuring the Internet, Third Edition, Pearson Education, 2006.
2. Larry L. Peterson, Bruce S. Davie, –Computer Networks: A Systems Approach, Fifth Edition, Morgan Kaufmann Publishers Inc., 2011.
3. William Stallings, –Data and Computer Communications, Eighth Edition, Pearson Education, 2011.

REFERENCES:

1. Nader F. Mir, –Computer and Communication Networks, First Edition, Pearson Education, 2007.
2. Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, Computer Networks: An Open Source Approach –, McGraw Hill Publisher, 2011.
3. Behrouz A. Forouzan, –Data communication and Networking, Tata McGraw-Hill, 2004.
4. <http://iit.qau.edu.pk/books/Data%20Communications%20and%20Networking%20By%20Behrouz%20A.Forouzan.pdf>

BIT504	TCP/IP PRINCIPLES AND ARCHITECTURE	L	T	P	C
---------------	---	----------	----------	----------	----------

		Total Contact Hours – 45						3	0	0	3		
		Prerequisite – Computer Networks											
		Course Designed by – Dept of Information Technology											
OBJECTIVES													
- To provide a solid foundation for understanding the communication process of the Internet - Provide exposure to fundamental concepts of computer networking in the context of the TCP/IP model and protocols.													
COURSE OUTCOMES (COs)													
CO1	To learn The basics of computer communication.												
CO2	About TCP protocol and Functions												
CO3	About UDP protocol and Functions												
CO4	About IP protocol and Functions												
CO5	Various supporting protocols and Functions												
CO6	To analyze and understand different types of routings												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	H		H							
	CO2		H	H		H							
	CO3		H	H		H							
	CO4		H	H		H							
	CO5		H	H		H							
	CO6		H	H		H							
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
					✓								
4		37 th Meeting of Academic Council, May 2015											

Protocols and standards - OSI model - TCP/ IP protocol suite - addressing -Version - Underlying technologies.

UNIT -II IP ADDRESSES, ROUTING, ARP AND RARP 9

Classful addressing - other issues - Subnetting - Supernetting - classless addressing - routing methods - delivery - table and modules - CIDR - ARP package - RARP.

UNIT-III IP, ICMP, TGMP AND UDP 9

Datagram - fragmentation - options - checksum - IP package - ICMP - messages, formats - error reporting - query - checksum - ICMP package - IGMP - messages, operation - encapsulation - IGMP package - UDP - datagram - checksum - operation - uses - UDP package.

UNIT- IV TCP, UNICAST AND MULTICAST ROUTING PROTOCOLS 9

Services - flow, congestion and error control - TCP package and operation - state transition diagram - unicast routing protocols - RIP - OSPF - BGP - multicast routing - trees - protocols - MOSPF - CBT - PIM.

UNIT- V APPLICATION LAYER, SOCKETS 9

Client server model - concurrency - processes - sockets - byte ordering - socket system calls - TCP and UDP client-server programs - BOOTP -DHCP - DNS - name space, resolution - types of records - concept - mode of operation - Rlogin.

TEXT BOOKS:

1. Behrouz A. Forouzan, -TCP/IP Protocol Suite, 4th edition, McGraw Hill, 2013.
2. Douglas E. Comer, -Internetworking with TCP/IP: principles, protocols and architecture (Volume1), 6th Edition, PHI Learning, 2013.

REFERENCES:

1. Douglas E. Comer, David L. Stevens, -Internetworking with TCP/IP, design, implementation and internals Volume 2, 3rd Edition, PHI Learning, 2009.
2. Ed Tittel, Laura Chappell, -TCP/IP, 1st Edition, Cengage Learning, 2008.
3. Dr. SidnieFeit, TCP/IP, architecture, protocols and implementation with IPv6 and IP Security, Tata McGraw-Hill, 2008.
4. <https://www.redbooks.ibm.com/redbooks/pdfs/gg243376.pdf>

BIT5L1	NETWORKS LABORATORY	L	T	P	C
	Total Contact Hours – 45	0	0	3	2
	Prerequisite – TCP/IP Principles and Architectures				
	Lab Manual Prepared by – Dept of Information Technology				
OBJECTIVES • be able to analyse a communication system by separating out the different functions provided by the network; • understand that there are fundamental limits to any communications system;					

- understand the general principles behind multiplexing, addressing, routing, reliable transmission and other stateful protocols as well as specific examples of each; - understand what FEC is and how CRCs work; - be able to compare communications systems in how they solve similar problems; - have an informed view of both the internal workings of the Internet and of a number of common Internet applications and protocols.													
COURSE OUTCOMES (COs)													
CO1	Develop knowledge to implement client server applications.												
CO2	Develop skills in UNIX socket programming.												
CO3	Develop skills to use simulation tools.												
CO4	Analyze the performance of network protocols.												
CO5	Analyze the network traffic.												
CO6	To be familiar with network tools and network programming.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	H		H							
	CO2		H	H		H							
	CO3		H	H		H							
	CO4		H	H		H							
	CO5		H	H		H							
	CO6		H	H		H							
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
					✓								
4		37 th Meeting of Academic Council, May 2015											

LIST OF EXPERIMENTS:

1. PC to PC Communication
2. Parallel Communication using 8 bit parallel cable
3. Serial communication using RS 232C
4. Ethernet LAN protocol

5. To create scenario and study the performance of CSMA/CD protocol through simulation
6. Token bus and token ring protocols
7. To create scenario and study the performance of token bus and token ring protocols through simulation
8. Wireless LAN protocols
9. To create scenario and study the performance of network with CSMA / CA protocol and compare with CSMA/CD protocols.
10. Implementation and study of stop and wait protocol
11. Implementation and study of Goback-N and selective repeat protocols
12. Implementation of distance vector routing algorithm
13. Implementation of Link state routing algorithm
14. Implementation of Data encryption and decryption
15. Transfer of files from PC to PC using Windows / Unix socket processing

REFERENCES:

1. [http:// www.iconscope.net/network-laboratory-manual.pdf](http://www.iconscope.net/network-laboratory-manual.pdf)

BIT5L2	CASE TOOLS LABORATORY	L	T	P	C
	Total Contact Hours – 45	0	0	3	2
	Prerequisite – Case Tools				
	Lab Manual Prepared by – Dept of Information Technology				
OBJECTIVES 1. Outline the history of CASE tools. 2. Explain three different perspectives for CASE tools classification. 3. Outline the cost of using and building CASE tools. 4. Use at least two CASE tools for each software development phase. 5. Evaluate existing CASE Tools. 6. Compare and contrast the fitness of existing CASE Tools to the needs of specific software development context. 7. Construct hybrid CASE tools by integrating existing CASE tools. 8. Design and construct new CASE tools to automate software development activities. 9. Illustrate two different approaches for a CASE tools support to software development processes.					
COURSE OUTCOMES (COs)					
CO1	Outline the history of CASE tools.				
CO2	Explain three different perspectives for CASE tools classification.				
CO3	Outline the cost of using and building CASE tools.				
CO4	Use at least two CASE tools for each software development phase.				

CO5	Evaluate existing CASE Tools.												
CO6	Write test suites for a given software.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	H		H							
	CO2		H	H		H							
	CO3		H	H		H							
	CO4		H	H		H							
	CO5		H	H		H							
	CO6		H	H		H							
3	Category	General (A)	Basic Sciences & Maths (B)	Basic Engg Sciences (C)	Professional Core (D)	Professional Elective (E)	Non-Major Elective (F)	Open Elective (G)	Project/Term Paper/Seminar/Internship (H)				
4		37 th Meeting of Academic Council, May 2015											

LIST OF EXPERIMENTS

1. To develop a problem statement.
2. Identify Use Cases and develop the Use Case model.
3. Identify the conceptual classes and develop a domain model with UML Class diagram.
4. Using the identified scenarios, find the interaction between objects and represent them using UML Sequence diagrams.
5. Draw relevant state charts and activity diagrams.
6. Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
7. Develop and test the Technical services layer.
8. Develop and test the Domain objects layer.
9. Develop and test the User interface layer.

REFERENCES:

1. [http:// www.swethaengg.org/manules/Case-Tools-Lab-Manual-IV-CSE.pdf](http://www.swethaengg.org/manules/Case-Tools-Lab-Manual-IV-CSE.pdf)

BIT5L3	MULTIMEDIA SYSTEMS LABORATORY						L	T	P	C			
	Total Contact Hours - 45						0	0	3	2			
	Prerequisite – Multi Media Systems												
	Lab Manual Prepared by – Dept of Information Technology												
OBJECTIVES													
This course covers contemporary, interactive multimedia technology systems, focusing on types, applications, and theories of operation. In addition to the computer generated media, text, still graphics, and sound, the student will learn how to digitize and manipulate images, voice, video materials, and software computer generated multimedia applications. They will explore the user interface, design and implementation of real multimedia.													
COURSE OUTCOMES (COs)													
CO1	Demonstrate simple 2D animations using animation software.												
CO2	Prepare simple scenes using image editing software.												
CO3	Explain the linking between web and multimedia.												
CO4	Model a simple multimedia application.												
CO5	Demonstrate team work towards the development of multimedia applications.												
CO6	To understand core multimedia technologies and standards												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	H		H							
	CO2		H	H		H							
	CO3		H	H		H							
	CO4		H	H		H							
	CO5		H	H		H							
	CO6		H	H		H							
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
					✓								
4		37 th Meeting of Academic Council, May 2015											

LIST OF EXPERIMENTS:

- Point plotting, line & regular figure algorithms
- Raster scan line & circle drawing algorithms
- Clipping & Windowing algorithms for points, lines & polygons
- 2-D / 3-D transformations
- Simple fractals representation
- Filling algorithms
- Web document creation using Dreamweaver.
- Creating Animation using Flash.

REFERENCE:

1. <http://www.avlib.in/ebook/title/Multimedia-Systems-.html>

BIT8C1	COMPREHENSION I	L	T	P	C
	Total Contact Hours : Test will be conducted at the end of the semester	0	0	0	1
	Prerequisite – All the courses up to fifth semester				
	Course Designed by – Dept. of Information Technology				
OBJECTIVES					
• To provide a complete review of Information Technology topics covered up to fifth semesters, so that a comprehensive understanding is achieved. • It will also help students to face job interviews, competitive examinations and also to enhance the employment potential. • To provide overview of all topics covered and to assess the overall knowledge level up to fifth semester.					

BSS6L1	VALUE EDUCATION & PROFESSIONAL ETHICS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite – Nil				
	Course Designed by – Dept of Management Studies				
OBJECTIVES					
- To teach the philosophy of Life, personal value, social value, mind cultural value and personal health - To teach professional ethical values, codes of ethics, responsibilities, safety, rights and related global issues.					
COURSE OUTCOMES (COs)					

CO1	To learn about philosophy of Life and Individual qualities												
CO2	To learn and practice social values and responsibilities												
CO3	To learn and practice mind culture, forces acting on the body and causes of diseases and their curing												
CO4	To learn more of Engineer as Responsible Experimenter.												
CO5	To learn more of Risk and Safety assessment with case studies.												
CO6	To learn more of Responsibilities and Rights as Professional and facing Global Challenges												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1			M		H		M	H	M	L	L	M
	CO2			M		H		M	H	M	L	L	M
	CO3			M		H		M	H	M	L	L	M
	CO4			H		H		M	H	M	L	L	M
	CO5			H		H		M	H	M	L	L	M
	CO6			H		H		M	H	M	L	L	M
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
		√											
4		37 th Meeting of Academic Council, May 2015											

UNIT I : PHILOSOPHY OF LIFE AND INDIVIDUAL QUALITIES

9

Human Life on Earth - Purpose of Life, Meaning and Philosophy of Life. The Law of Nature – Protecting Nature /Universe. Basic Culture - Thought Analysis - Regulating desire - Guarding against anger - To get rid of Anxiety – The Rewards of Blessing - Benevolence of Friendship - Love and Charity - Self – tranquility/Peace

UNIT II : SOCIAL VALUES (INDIVIDUAL AND SOCIAL WELFARE) 9

Family - Peace in Family, Society, The Law of Life Brotherhood - The Pride of Womanhood – Five responsibilities/duties of Man : - a) to himself, b) to his family, c) to his environment, d) to his society, e) to the Universe in his lives, Thriftiness (Thrift)/Economics. Health - Education - Governance - People's Responsibility / duties of the community, World peace.

UNIT III: MIND CULTURE & TENDING PERSONAL HEALTH 9

Mind Culture - Life and Mind - Bio - magnetism, Universal Magnetism (God –Realization and Self Realization) - Genetic Centre – Thought Action – Short term Memory – Expansiveness – Thought – Waves, Channelizing the Mind, Stages - Meditation, Spiritual Value. Structure of the body - the three forces of the body- life body relation, natural causes and unnatural causes for diseases, Methods in Curing diseases

UNIT IV: ENGINEERING AS SOCIAL EXPERIMENTATION AND ENGINEERS'S RESPONSIBILITIES FOR SAFETY 9

Engineering as Experimentation–Engineer as Responsible Experimenters–Codes of Ethics–The Challenger, case study. Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk – The Three Mile Island and Chernobyl case studies.

UNIT V: ENGINEERS'S RESPONSIBILITIES FOR RIGHTS AND GLOBAL ISSUES 9

Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Whistle Blowing – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development –Engineers as Managers – Consulting Engineers – Engineers as Expert Eye Witnesses and Advisors – Moral Leadership

TEXT BOOKS:

1. Value Education for Health, Happiness and Harmony, The World Community Service, Centre Vethathiri Publications (Unit 1 – III).
2. Mike W Martin and Roland Schinzinger, Ethics In Engineering, Tata Mcgraw Hill, Newyork 2005 (Units IV & V)

REFERENCE:

1. Philosophy of Universal Magnetism (Bio - magnetism, Universal Magnetism) The World Community Service Centre Vethathiri Publications (for Unit III)
2. Thirukkural with English Translation of Rev. Dr. G.U. Pope, Uma Publication, 156, Serfoji Nagar, Medical College Road, Thanjavur 613 004 (for Units I - III)
3. R S Nagaarazan, Textbook On Professional Ethics And Human Values, New Age International Publishers, 2006 (for Units IV-V)
4. Charles D Fledderman, Engineering Ethics, Prentice Hall, New Mexico, 2004 (for Units IV-V)
5. <https://niyatigarg.files.wordpress.com/2011/08/question-bank1.pdf>

BIT603	GRID AND CLOUD COMPUTING	L	T	P	C
---------------	---------------------------------	----------	----------	----------	----------

		Total Contact Hours – 45					3	0	0	3			
		Prerequisite – TCP/IP Principles and Architectures											
		Course Designed by – Dept of Information Technology											
OBJECTIVES													
- Identify the technical foundations of cloud systems architectures. - Analyze the problems and solutions to cloud application problems. - Apply principles of best practice in cloud application design and management. - Identify and define technical challenges for cloud applications and assess their importance.													
COURSE OUTCOMES (COs)													
CO1	Develop private cloud using tools												
CO2	Identify cloud service and its applications												
CO3	Illustrate functions of web service with cloud service.												
CO4	Apply virtualization concepts for real time problems												
CO5	Discuss various security and standard in cloud computing												
CO6	Define distributed systems.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	L	H	H	H	H		H					
	CO2	L	H	H	H	H		H					
	CO3	L	H	H	H	H		H					
	CO4	L	H	H	H	H		H					
	CO5	L	H	H	H	H		H					
	CO6	L	H	H	H	H		H					
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
					✓								
4		37 th Meeting of Academic Council, May 2015											

UNIT I INTRODUCTION 9

Evolution of Distributed computing: Scalable computing over the Internet – Technologies for network based systems – clusters of cooperative computers - Grid computing Infrastructures – cloud computing - service oriented architecture – Introduction to Grid Architecture and standards – Elements of Grid – Overview of Grid Architecture.

UNIT II GRID SERVICES

Introduction to Open Grid Services Architecture (OGSA) – Motivation – Functionality Requirements – Practical & Detailed view of OGSA/OGSI – Data intensive grid service models – OGSA services.

UNIT III VIRTUALIZATION 9

Cloud deployment models: public, private, hybrid, community – Categories of cloud computing: Everything as a service: Infrastructure, platform, software - Pros and Cons of cloud computing – Implementation levels of virtualization – virtualization structure – virtualization of CPU, Memory and I/O devices – virtual clusters and Resource Management – Virtualization for data center automation.

UNIT IV PROGRAMMING MODEL 9

Open source grid middleware packages – Globus Toolkit (GT4) Architecture , Configuration – Usage of Globus – Main components and Programming model - Introduction to Hadoop Framework - Mapreduce, Input splitting, map and reduce functions, specifying input and output parameters, configuring and running a job – Design of Hadoop file system, HDFS concepts, command line and java interface, dataflow of File read & File write.

UNIT V SECURITY 9

rust models for Grid security environment – Authentication and Authorization methods – Grid security infrastructure – Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud, Key privacy issues in the cloud.

TEXT BOOK:

1. Kai Hwang, Geoffery C. Fox and Jack J. Dongarra, -Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet, First Edition, Morgan Kaufman Publisher, an Imprint of Elsevier, 2012.

REFERENCES:

1. Jason Venner, -Pro Hadoop- Build Scalable, Distributed Applications in the Cloud, A Press, 2009
2. Tom White, -Hadoop The Definitive Guide, First Edition. O'Reilly, 2009.
3. Bart Jacob (Editor), -Introduction to Grid Computing, IBM Red Books, Vervante, 2005
4. Ian Foster, Carl Kesselman, -The Grid: Blueprint for a New Computing Infrastructure, 2nd Edition, Morgan Kaufmann.
5. Frederic Magoules and Jie Pan, -Introduction to Grid Computing, CRC Press, 2009. 6. Daniel

Minoli, -A Networking Approach to Grid Computing, John Wiley Publication, 2005.

- 6 Barry Wilkinson, -Grid Computing: Techniques and Applications, Chapman and Hall, CRC, Taylor and Francis Group, 2010.

<http://www.chinacloud.cn/upload/2011-07/11073107539898.pdf>

BIT604	ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS							L	T	P	C		
	Total Contact Hours - 45							3	0	0	3		
	Prerequisite – Data Structure and Algorithm												
	Course Designed by – Dept of Information Technology												
OBJECTIVES													
The primary objective of this course is to introduce the basic principles, techniques, and applications of Artificial Intelligence. Emphasis will be placed on the teaching of these fundamentals, not on providing a mastery of specific software tools or programming environments.													
COURSE OUTCOMES (COs)													
CO1	Describe the modern view of AI as the study of agents that receive percepts from the environment and perform actions												
CO2	Demonstrate awareness of informed search and exploration methods												
CO3	Explain about AI techniques for knowledge representation, planning and uncertainty management												
CO4	Develop knowledge of decision making and learning methods												
CO5	Describe the use of AI to solve English Communication problems												
CO6	Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	H	H	M						L	
	CO2	H	H	H	H	M						L	
	CO3	H	H	H	H	M						L	
	CO4	H	H	H	H	M						L	
	CO5	H	H	H	H	M						L	
	CO6	H	H	H	H	M						L	

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)
					✓				
4		37 th Meeting of Academic Council, May 2015							

UNIT I INTRODUCTION OF AI 12

What is artificial intelligence? - Problems, problem spaces and search - Heuristic Search techniques - Knowledge representation - Knowledge representation issues - Using predicate logic - Representing Knowledge Using Rules.

UNIT II ARTIFICIAL INTELLIGENCE DEPENDENCY 12

Symbolic Reasoning Under Uncertainty- Statistical Reasoning - Weak Slot-And-Filler-Structure - Semantic nets – Frames- Strong Slot-And-Filler Structure-Conceptual Dependency-Scripts-CYC.

UNIT III KNOWLEDGE REPRESENTATION 12

Knowledge Representation Summary – Syntactic –Semantic of Representation – Logic & slot – and – Filler. Game Playing – The Minimal Search – Alpha – Beta Cutoffs – Iterative Deepening Planning – Components of a planning System- Goal Stack planning- Hierarchical Reactive System Understanding – What is understanding ? – What makes understanding hard?

UNIT IV LANGUAGE PROCESSING 12

Natural Language Processing – Syntactic processing , Semantics analysis - Parallel and Distributed AI – Psychological Modeling – Parallelism and Distributed in Reasoning Systems- Learning -Connectionist Models – Hopfield Networks, Neural Networks, Distributed representation

UNIT V AI PERCEPTION 12

Common Sense – Qualitative Physics, Commonsense ontologies – Memory organization - Expert systems –Expert System Shells – Explanation – Knowledge Acquisition - Perception and Action – Real –Time Search – Perception – Action – Robot Architecture

TEXT BOOK:

1. Elaine Rich, Kevin Knight, —Artificial Intelligencel, 3/e, Tata McGraw Hill, 2009.

REFERENCE BOOK:

1. Nilson N.J., ||Principles of Artificial Intelligence||, Morgan Kaufmann. 1980.
2. <http://www.ggu.ac.in/download/Class-Note13/Artificial%20Intelligence%20and%20Expert%20System24.10.13.pdf>

BIT605	FREE/OPEN SOURCE SOFTWARE						L	T	P	C			
	Total Contact Hours - 45						3	0	0	3			
	Prerequisite – Database Management System												
	Course Designed by – Dept of Information Technology												
OBJECTIVES													
- Define open source software - Identify and discuss various software licesning models - Understand the motivation, theory, strengths and weaknesses of open source software.													
COURSE OUTCOMES (COs)													
CO1	Summarize the advantages of open source software over proprietary software.												
CO2	Apply object-oriented programming concepts to develop dynamic interactive Python applications.												
CO3	Design PHP web pages and to develop a database-driven PHP application.												
CO4	Demonstrate the features of non relational database over relational database												
CO5	Develop simple applications in PERL.												
CO6	Implement various applications using build systems.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	H	H	H							
	CO2		H	H	H	H							
	CO3		H	H	H	H							
	CO4		H	H	H	H							
	CO5		H	H	H	H							
	CO6		H	H	H	H							

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)
4					✓				
37 th Meeting of Academic Council, May 2015									

UNIT I INTRODUCTION 9

Introduction to Open sources – Need of Open Sources – Advantages of Open Sources– Application of Open Sources. Open source operating systems: LINUX: Introduction – General Overview – Kernel Mode and user mode – Process – **Advanced Concepts** – Scheduling – Personalities – Cloning – Signals – **Development with Linux.**

UNIT II OPEN SOURCE DATABASE 9

MySQL: Introduction – Setting up account – Starting, terminating and writing your own SQL programs – **Record selection Technology** – Working with strings – Date and Time– **Sorting Query Results** – Generating Summary – Working with metadata – Using sequences – MySQL and Web.

UNIT III OPEN SOURCE PROGRAMMING LANGUAGES 9

PHP: Introduction – Programming in web environment – variables – constants – data; types – operators – Statements – Functions – Arrays – **OOP – String Manipulation and regular expression** – File handling and data storage – PHP and SQL database – PHP and LDAP – PHP Connectivity – **Sending and receiving E-mails** – Debugging and error handling – **Security – Templates.**

UNIT IV PYTHON 9

Syntax and Style – Python Objects – Numbers – Sequences – Strings – Lists and Tuples – Dictionaries – Conditionals and Loops – Files – Input and Output – Errors and Exceptions – Functions – Modules – **Classes and OOP – Execution Environment.**

UNIT V PERL 9

Perl backgrounder – Perl overview – Perl parsing rules – Variables and Data – Statements and Control structures – Subroutines, Packages, and Modules- **Working with Files –Data Manipulation.**

TEXT BOOKS:

1. Remy Card, Eric Dumas and Frank Mevel, —The Linux Kernel BookI, Wiley Publications,2003
2. Steve Suchring, -MySQL Bible, John Wiley, 2002

REFERENCES:

1. Rasmus Lerdorf and Levin Tatroe, -Programming PHP, O'Reilly, 2002
2. Wesley J. Chun, -Core Python Programming, Prentice Hall, 2001
3. Martin C. Brown, -Perl: The Complete Reference, 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
4. Steven Holzner, -PHP: The Complete Reference, 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
5. Vikram Vaswani, -MYSQL: The Complete Reference, 2nd Edition, Tata McGraw- Hill Publishing Company Limited, Indian Reprint 2009.
6. <http://ebooks.cawok.pro/Digital.Press.Open.Source.Software.Implementation.and.Management.Jul.2004.eBook-DDU.pdf>

BIT6L1	GRID AND CLOUD COMPUTING LAB						L	T	P	C			
	Total Contact Hours - 45						0	0	3	2			
	Prerequisite – Grid and Cloud Computing												
	Lab Manual Prepared by – Dept of Information Technology												
OBJECTIVES													
- To understand the concept of cloud and utility computing. - To understand the various issues in cloud computing. - To familiarize themselves with the lead players in cloud. - To appreciate the emergence of cloud as the next generation computing paradigm. - To be able to set up a private cloud.													
COURSE OUTCOMES (COs)													
CO1	Analyze various cloud simulator												
CO2	Apply resource allocation, scheduling algorithms.												
CO3	Implement Energy-conscious model.												
CO4	Create virtual machines from available physical resources.												
CO5	Setup a private cloud.												
CO6	Setup a Grid Cluster.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	H		H							
	CO2		H	H		H							
	CO3		H	H		H							

	CO4		H	H		H							
	CO5		H	H		H							
	CO6		H	H		H							
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
					✓								
4		37 th Meeting of Academic Council, May 2015											

LIST OF EXPERIMENTS:

GRID COMPUTING LAB

Use Globus Toolkit or equivalent and do the following:

1. Develop a new Web Service for Calculator.
2. Develop new OGSA-compliant Web Service.
3. Using Apache Axis develop a Grid Service.
4. Develop applications using Java or C/C++ Grid APIs
5. Develop secured applications using basic security mechanisms available in Globus Toolkit.
6. Develop a Grid portal, where user can submit a job and get the result. Implement it with andwithout GRAM concept.

CLOUD COMPUTING LAB

Use Eucalyptus or Open Nebula or equivalent to set up the cloud and demonstrate.

1. Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time.
2. Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.
3. Install a C compiler in the virtual machine and execute a sample program.
4. Show the virtual machine migration based on the certain condition from one node to the other.
5. Find procedure to install storage controller and interact with it.

REFERENCES:

1. www.cloudbus.org/reports/CLOUDS-Lab-AnnualReport2011.pdf

BIT6L2		MACHINE LEARNING LABORATORY						L	T	P	C		
		Total Contact Hours - 45						0	0	3	2		
		Prerequisite – Database Management System											
		Lab Manual Prepared by – Dept of Information Technology											
OBJECTIVES													
☐ To introduce students to the basic concepts and techniques of Machine Learning.													
☐ To develop skills of using recent machine learning software for solving practical problems.													
☐ To gain experience of doing independent study and research.													
COURSE OUTCOMES (COs)													
CO1		Basic knowledge about the key algorithms and theory that form the foundation of machine learning and computational intelligence											
CO2		Apply resource allocation, scheduling algorithms.											
CO3		Implement Energy-conscious model.											
CO4		Create virtual machines from available physical resources.											
CO5		Implement the virtual machines.											
CO6		A practical knowledge of machine learning algorithms and methods											
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	H		H							
	CO2		H	H		H							
	CO3		H	H		H							
	CO4		H	H		H							
	CO5		H	H		H							
	CO6		H	H		H							

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)
					✓				
4		37 th Meeting of Academic Council, May 2015							

LIST OF EXPERIMENTS:

1. Classification by machine learning: classification vs. prediction, types of classifier, generative vs. discriminative models, supervised training.
2. Document topic classification: bag-of-words representation, evaluation measures, feature selection, model comparison
3. Graphical models: Markov Models, Hidden Markov Models, Gaussian Mixture Models, Conditional Random Fields, Estimation Maximisation, Variational Inference.
4. Spam email filtering: task, adaptive training, semi-structured documents, N-gram language emodels, evaluation
5. Named entity recognition: HMMs vs. CRFs vs. parsing & non-sequential classification, inherent vs. contextual features, feature dependence, partial vs. actively labelled data, evaluation.
6. Support vector machines: maximum margin classifiers, kernel -trick, types of kernel.
7. Relation extraction: sequence vs. tree vs. graph kernel approaches, evaluation.
8. Clustering: factor analysis, singular value decomposition, principal component analysis.
9. Document topic clustering and term clustering: latent semantic indexing/analysis, incremental semantic analysis, evaluation.

REFERENCE:

1. [http:// www.amazon.in/Python-Machine-Learning...ebook/dp/B00YSILNL0](http://www.amazon.in/Python-Machine-Learning...ebook/dp/B00YSILNL0)

BIT6L3	FREE AND OPEN SOURCE SOFTWARE LAB	L	T	P	C
	Total Contact Hours - 45	0	0	3	2
	Prerequisite – Web Programming				
	Lab Manual Prepared by – Dept of Information Technology				
OBJECTIVES					
This course provides an overview of the historical and modern context and operation of free and open source software (FOSS) communities and associated software projects. The practical					

objective of the course is to teach students how they can begin to participate in a FOSS project in order to contribute to and improve aspects of the software that they feel are wrong. Students will learn some important FOSS tools and techniques for contributing to projects and how to set up their own FOSS projects.

COURSE OUTCOMES (COs)

CO1	Demonstrate the Linux OS installation.
CO2	Build the LAMP platform in Linux OS to develop various applications
CO3	Demonstrate the user account creation in MySQL.
CO4	Develop simple applications using Python.
CO5	Develop simple applications using Perl.
CO6	Ability to install and run open-source operating systems.

Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	H		H							
	CO2		H	H		H							
	CO3		H	H		H							
	CO4		H	H		H							
	CO5		H	H		H							
	CO6		H	H		H							
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
					✓								
4		37 th Meeting of Academic Council, May 2015											

LIST OF EXPERIMENTS

- 1) Kernel configuration, compilation and installation
- 2) Virtualization environment
- 3) Compiling from source
- 4) Introduction to packet management system

- 5) Installing various software packages
- 6) Write user space drivers using fuse
- 7) GUI programming
- 8) Version Control System
- 9) Text processing with Perl
- 10) Running PHP
- 11) Running Python
- 12) Set up the complete network interface

REFERENCES:

<https://opensource.com/resources/ebooks>

BIT701	WIRELESS NETWORKS		L	T	P	C
	Total Contact Hours - 45		3	0	0	3
	Prerequisite – Data Communication and Networks					
	Course Designed by – Dept of Information Technology					
OBJECTIVES						
1. Understand the architecture and applications of current and next generation wireless networks						
2. Get a basic introduction to the key concepts and techniques underlying modern physical layer Wireless and mobile communications: radio propagation modeling; performance of digital modulation schemes and coding techniques in fading environments						
3. Learn how to design and analyze various medium access and resource allocation techniques such as power control for fixed-rate and rate-adaptive systems						
4. Learn how to design and analyze network layer routing protocols, along with key component mechanisms, such as link metric estimation and neighborhood table management for proactive and reactive routing protocols, opportunistic routing, backpressure routing, network coding, cooperative routing, routing with mobility and intermittent contacts.						
5. Learn to design and analyze transport layer protocols, with an emphasis on congestion control, including TCP over wireless, congestion sharing mechanisms, explicit and precise rate control, utility optimization-based approaches, and backpressure-based utility optimization.						
COURSE OUTCOMES (COs)						
CO1	Explain the concepts and features of mobile computing and transmission technologies.					
CO2	Describe the architecture and working of wireless communication networks and protocols.					
CO3	To explore the characteristics of different types of Wireless LAN networks.					
CO4	Explain the working of wireless routing protocols.					
CO5	Outline the characteristics of pervasive computing applications.					

CO6		Apply wireless ID technologies, in particular RFID work.											
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	H		H							
	CO2		H	H		H							
	CO3		H	H		H							
	CO4		H	H		H							
	CO5		H	H		H							
	CO6		H	H		H							
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
					✓								
4		37 th Meeting of Academic Council, May 2015											

UNIT I WIRELESS COMMUNICATION

9

systems- Frequency Management and Channel Assignment- types of hand off and their characteristics, **dropped call rates & their evaluation** - MAC – SDMA – FDMA –TDMA – CDMA – Cellular Wireless Networks

UNIT II WIRELESS LAN

9

IEEE 802.11 Standards – Architecture – Services – Mobile Ad hoc Networks- WiFi and WiMAX - **Wireless Local Loop**

UNIT III MOBILE COMMUNICATION SYSTEMS

9

GSM-architecture-Location tracking and call setup- Mobility management- Handover-Security- GSM SMS –International roaming for GSM- call recording functions-subscriber and service data mgt –**Mobile Number portability -VoIP service for Mobile Networks** – GPRS –Architecture- GPRS procedures-attach and detach procedures-PDP context procedure-**combined RA/LA update procedures-Billing**

UNIT IV MOBILE NETWORK AND TRANSPORT LAYERS

9

Mobile IP – Dynamic Host Configuration Protocol-Mobile Ad Hoc Routing Protocols– **Multicast routing-TCP over Wireless Networks** – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit / Fast Recovery – Transmission/Timeout Freezing-Selective Retransmission –

UNIT V APPLICATION LAYER**9**

WAP Model- Mobile Location based services -WAP Gateway –WAP protocols – WAP user agent profile- caching model-wireless bearers for WAP - WML – WMLScripts – WTA - iMode-SyncML

TEXT BOOKS:

1. Jochen Schiller, –Mobile Communications, Second Edition, Pearson Education, 2003.
2. William Stallings, —Wireless Communications and Networks, Pearson Education, 2002.

REFERENCES:

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, –Principles of Wireless Networks, First Edition, Pearson Education, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, –Principles of Mobile Computing, Springer, 2003.
3. C.K.To, –AdHoc Mobile Wireless Networks, First Edition, Pearson Education, 2002.
4. http://www.ece.rutgers.edu/~marsic/books/WN/book-WN_marsic.pdf

BIT702	CRYPTOGRAPHY AND SECURITY		L	T	P	C
	Total Contact Hours - 45		4	0	0	4
	Prerequisite –Discrete Mathematics.					
	Course Designed by – Dept of Information Technology					
OBJECTIVES • To understand the basics of cryptography • learn to find the vulnerabilities in programs and to overcome them, • know the different kinds of security threats in networks and its solution • know the different kinds of security threats in databases and solutions available • learn about the models and standards for security						
COURSE OUTCOMES (COs)						
CO1	Explain security attacks and issues in computer systems and networks					
CO2	Explain the mathematics behind Cryptography					
CO3	Explain the purpose and working of various algorithms related to cryptography, authentication, network security and system security algorithms.					
CO4	Identify the appropriate security mechanism for different computing environment and information systems.					
CO5	Apply appropriate security methods to solve real life applications.					
CO6	To master protocols for security services.					

Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1						H		H				H
	CO2						H		H				H
	CO3						H		H				H
	CO4						H		H				H
	CO5						H		H				H
	CO6						H		H				H
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
					✓								
4		37 th Meeting of Academic Council, May 2015											

UNIT I INTRODUCTION & NUMBER THEORY¹⁰

Services, Mechanisms and attacks-the OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography). **FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields-** Modular arithmetic-Euclid's algorithm-Finite fields- **Polynomial Arithmetic** –Prime numbers-Fermat's and Euler's theorem-**Testing for primality** -The Chinese remainder theorem- Discrete logarithms.

UNIT II BLOCK CIPHERS & PUBLIC KEY CRYPTOGRAPHY¹⁰

Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES-Blowfish-RC5 algorithm. **Public key cryptography:** Principles of public key cryptosystems-The RSA algorithm-Key management - Diffie Hellman Key exchange-**Elliptic curve arithmetic-Elliptic curve cryptography.**

UNIT III HASH FUNCTIONS AND DIGITAL SIGNATURES

8

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC –MD5 - SHA - **HMAC – CMAC** - Digital signature and authentication protocols – DSS – El Gamal – **Schnorr.**

UNIT IV SECURITY PRACTICE & SYSTEM SECURITY

8Authentication applications – **Kerberos – X.509 Authentication services** - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - **SET for E-Commerce Transactions.** Intruder – Intrusion detection

system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security.

UNIT V E-MAIL, IP & WEB SECURITY

9

E-mail Security: Security Services for E-mail-attacks possible through E-mail - establishing keys-privacy-authentication of the source-Message Integrity-Non-repudiation-Pretty Good Privacy-S/MIME. **IPSecurity:** Overview of IPSec - IP and IPv6-Authentication Header-Encapsulation Security Payload(ESP)-Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding). **Web Security:** SSL/TLS Basic Protocol-computing the keys- client authentication-PKI as deployed by SSLAttacks fixed in v3-Exportability-Encoding-Secure Electronic Transaction (SET).

TEXT BOOK

- 1 William Stallings, -Cryptography and Network Security : Principles and Practices, Fifth Edition, Prentice Hall, 2010
- 2 Wade Trappe, Lawrence C Washington, — Introduction to Cryptography with coding theory, 2nd ed, Pearson, 2007.

REFERENCES:

- 1 W. Mao, -Modern Cryptography – Theory and Practice, Pearson Education, Second Edition, 2007.
- 2 Charles P. Pfleeger, Shari Lawrence Pfleeger – Security in computing Third Edition – Prentice Hall of India, 2006
- 3 http://www.inf.ufsc.br/~bosco/ensino/ine5680/material-cripto-seg/2014-1/Stallings/Stallings_Cryptography_and_Network_Security.pdf

BIT703	INTERNET OF THINGS	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – Web Programming, Internet Programming				
	Course Designed by – Dept of Information Technology				
OBJECTIVES 1. To understand the basics of Internet of Things 2. To get an idea of some of the application areas where Internet of Things can be applied 3. To understand the middleware for Internet of Things 4. To understand the concepts of Web of Things 5. To understand the concepts of Cloud of Things with emphasis on Mobile cloud computing 6. To understand the IOT protocols.					
COURSE OUTCOMES (COs)					
CO1	Identify and design the new models for market strategic interaction				
CO2	Design business intelligence and information security for WoB				

CO3		Analyze various protocols for IoT											
CO4		Design a middleware for IoT											
CO5		Analyze and design different models for network dynamics											
CO6		Implement the business intelligence.											
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	F	g	h	i	j	k	l
2	CO1	H	H	H	H								
	CO2	H	H	H	H								
	CO3	H	H	H	H								
	CO4	H	H	H	H								
	CO5	H	H	H	H								
	CO6	H	H	H	H								
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
					✓								
4		37 th Meeting of Academic Council, May 2015											

UNIT I INTRODUCTION

9

Definitions and Functional Requirements –Motivation – Architecture - Web 3.0 View of IoT– Ubiquitous IoT Applications – Four Pillars of IoT – DNA of IoT - The Toolkit Approach for End-user Participation in the Internet of Things. Middleware for IoT: Overview – Communication middleware for IoT –IoT Information Security

UNIT II IOT PROTOCOLS

9

Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols –Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNetProtocol – Modbus – KNX – Zigbee Architecture – Network layer – APS layer – Security

UNIT III WEB OF THINGS

9

Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence. Cloud of Things: Grid/SOA and Cloud Computing –

Cloud Middleware – Cloud Standards – Cloud Providers and Systems – Mobile Cloud Computing – The Cloud of Things Architecture

UNIT IV INTEGRATED

9

Integrated Billing Solutions in the Internet of Things Business Models for the Internet of Things
- Network Dynamics: Population Models – Information Cascades - Network Effects – Network Dynamics: Structural Models - Cascading Behavior in Networks - The Small-World Phenomenon

UNIT V APPLICATIONS

9

The Role of the Internet of Things for Increased Autonomy and Agility in Collaborative Production Environments - Resource Management in the Internet of Things: Clustering, Synchronisation and Software Agents. Applications - Smart Grid – Electrical Vehicle Charging

REFERENCES:

1. The Internet of Things in the Cloud: A Middleware Perspective - Honbo Zhou – CRC Press – 2012
2. Architecting the Internet of Things - Dieter Uckelmann; Mark Harrison; Florian Michahelles- (Eds.) – Springer – 2011
3. Networks, Crowds, and Markets: Reasoning About a Highly Connected World - David Easley and Jon Kleinberg, Cambridge University Press - 2010
4. The Internet of Things: Applications to the Smart Grid and Building Automation by – Olivier Hersent, Omar Elloumi and David Boswarthick - Wiley -2012
5. Olivier Hersent, David Boswarthick, Omar Elloumi , -The Internet of Things – Key applications and Protocols, Wiley, 2012
6. http://www.netduino.com/downloads/books/gsiot/Getting_Started_with_the_Internet_of_Things_LED_Controller.pdf

BIT704	SOFT COMPUTING		L	T	P	C
	Total Contact Hours - 45		3	0	0	3
	Prerequisite – Engineering Mathematics					
	Course Designed by – Dept of Information Technology					
OBJECTIVES						
• To learn the key aspects of Soft computing • To know about the components and building block hypothesis of Genetic algorithm. • To understand the features of neural network and its applications • To study the fuzzy logic components • To gain insight onto Neuro Fuzzy modeling and control. • To gain knowledge in machine learning through Support vector machines						
COURSE OUTCOMES (COs)						
CO1	Discuss about the basics of computational Intelligence and Application areas.					

CO2	Explain the basics of Evolutionary Computation.												
CO3	Illustrate the Genetic Algorithms and Swarm Intelligence Techniques												
CO4	Describe the theory and applications of Neural Networks.												
CO5	Explain about Fuzzy logic and the implementation of Fuzzy systems and performance metrics.												
CO6	Analyze various neural network architectures.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	H								M	
	CO2	H	H	H								M	
	CO3	H	H	H								M	
	CO4	H	H	H								M	
	CO5	H	H	H								M	
	CO6	H	H	H								M	
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
4		37 th Meeting of Academic Council, May 2015											

UNIT I INTRODUCTION

9

Artificial neural network: Introduction, characteristics- learning methods – taxonomy – Evolution of neural networks- basic models - important technologies - applications. Fuzzy logic: Introduction - crisp sets- fuzzy sets - crisp relations and fuzzy relations: cartesian product of relation - classical relation, fuzzy relations, tolerance and equivalence relations, non-iterative fuzzy sets. Genetic algorithm- Introduction - biological background - traditional optimization and search techniques - Genetic basic concepts.

UNIT II NEURAL NETWORKS

9

McCulloch-Pitts neuron - linear separability - hebb network - supervised learning network: perceptron networks - adaptive linear neuron, multiple adaptive linear neuron, BPN, RBF, TDNN- associative memory network: auto-associative memory network, hetero-associative memory network, BAM, hopfield networks, iterative auto associative memory network & iterative associative memory network –unsupervised learning networks: Kohonen self organizing feature maps, LVQ – CP networks, ART network.

UNIT III FUZZY LOGIC**9**

Membership functions: features, fuzzification, methods of membership value assignments-Defuzzification: lambda cuts - methods - fuzzy arithmetic and fuzzy measures: fuzzy arithmetic - extension principle - fuzzy measures - measures of fuzziness -fuzzy integrals - fuzzy rule base and approximate reasoning : truth values and tables, fuzzy propositions, formation of rules-decomposition of rules, aggregation of fuzzy rules, fuzzy reasoning-fuzzy inference systems-overview of fuzzy expert system-fuzzy decision making.

UNIT IV GENETIC ALGORITHM**9**

Genetic algorithm and search space - general genetic algorithm – operators - Generational cycle - stopping condition – constraints - classification - genetic programming – multilevel optimization – real life problem- advances in GA.

UNIT V HYBRID SOFT COMPUTING TECHNIQUES & APPLICATIONS**9**

Neuro-fuzzy hybrid systems - genetic neuro hybrid systems - genetic fuzzy hybrid and fuzzy genetic hybrid systems - simplified fuzzy ARTMAP - Applications: A fusion approach of multispectral images with SAR, optimization of traveling salesman problem using genetic algorithm approach, soft computing based hybrid fuzzy controllers.

TEXT BOOKS:

- 1.J.S.R.Jang, C.T. Sun and E.Mizutani, -Neuro-Fuzzy and Soft Computing, PHI / Pearson Education 2004.
2. S.N.Sivanandam and S.N.Deepa, "Principles of Soft Computing", Wiley India Pvt Ltd, 2011.

REFERENCES:

1. S.Rajasekaran and G.A.Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis & Applications", Prentice-Hall of India Pvt. Ltd., 2006.
2. George J. Klir, Ute St. Clair, Bo Yuan, -Fuzzy Set Theory: Foundations and Applications| Prentice Hall, 1997.
3. David E. Goldberg, -Genetic Algorithm in Search Optimization and Machine Learning| Pearson Education India, 2013.
4. James A. Freeman, David M. Skapura, -Neural Networks Algorithms, Applications, and Programming Techniques, Pearson Education India, 1991.
5. Simon Haykin, -Neural Networks Comprehensive Foundation| Second Edition, Pearson Education, 2005.
6. <http://www.cs.laurentian.ca/julia/courses/cosc4426/lectures/introduction-to-soft-computing.pdf>

BIT7L1	SOFTWARE TESTING LABORATORY	L	T	P	C
	Total Contact Hours - 45	0	0	3	2
	Prerequisite – Software Engineering				
	Lab Manual Prepared by – Dept of Information Technology				
OBJECTIVES					

--	--	--	--	--	--	--	--	--	--	--	--	--	--

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)
					✓				
4		37 th Meeting of Academic Council, May 2015							

LIST OF EXPERIMENTS

1. Write programs in „C“ Language to demonstrate the working of the following a. constructs:
i) do...while ii) while....do iii) if...else iv) switch v) for
2. A program written in „C“ language for Matrix Multiplication fails. Introspect the causes for its failure and write down the possible reasons for its failure.
3. Take any system (e.g. ATM system) and study its system specifications and report the various bugs.
4. Write the test cases for any known application (e.g. Banking application)
5. Create a test plan document for any application (e.g. Library Management System)
6. Study of any testing tool (e.g. Win runner)
7. Study of any web testing tool (e.g. Selenium)
8. Study of any bug tracking tool (e.g. Bugzilla, bugbit)
9. Study of any test management tool (e.g. Test Director)
10. Study of any open source-testing tool (e.g. Test Link)

REFERENCE:

1. <https://conference.eurostarsoftwaretesting.com>

BIT7L2	NETWORK SECURITY LABORATORY	L	T	P	C
	Total Contact Hours - 45	0	0	3	2
	Prerequisite – Cryptography and Network Security				
	Lab Manual Prepared by – Dept of Information Technology				
OBJECTIVES Examiner s should b e able to articulate the key risk element s associated with operating and managing a production network . Good network security start s with a n accurate risk assessment . Accuracy in this case mean s that consideration should b e given to potential risks for each system (internal an d external) an d that all system s should b e inventoried. Change management is critical as is ensuring that hosts are hardened according to corporate guidelines . Remote access also need s to b e manage d to include some for m of monitoring an d logging. Finally, the					

financial institution must be able to articulate a risk mitigation strategy ; this should be reviewed to ensure that new applications and/or systems are treated from a holistic perspective ,and that controls for all systems are re-evaluated for effectiveness periodically.

COURSE OUTCOMES (COs)

CO1	Develop knowledge to implement client server applications.
CO2	Develop skills in UNIX socket programming.
CO3	Develop skills to use simulation tools.
CO4	Analyze the performance of network protocols.
CO5	Analyze the network traffic.
CO6	Undertake routine tasks to secure a network.

Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	H		H							
	CO2		H	H		H							
	CO3		H	H		H							
	CO4		H	H		H							
	CO5		H	H		H							
	CO6		H	H		H							
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Basic Engg Sciences (EC)	Professional Core (PC)	Professional Elective (PE)	Non-Major Elective (NE)	Open Elective (OE)	Project Research (PR)				
						✓							
4		37 th Meeting of Academic Council, May 2015											

LIST OF EXPERIMENTS

1. Implement the following SUBSTITUTION & TRANSPOSITION TECHNIQUES concepts:

- Caesar Cipher
- Playfair Cipher
- Hill Cipher
- Vigenere Cipher
- Rail fence – row & Column Transformation

REFERENCE:

1. www.ekspanzi.com/download-hands-on-information-security-laboratory..

BIT7P3		TERM PAPER								L	T	P	C
		Total Contact Hours – 60								0	0	4	2
		Prerequisite – Professional Courses											
		Lab Manual Prepared by – Dept of Information Technology											
OBJECTIVES													
To teach the student the procedures and methodologies for understanding the literature survey and preparation for research paper.													
COURSE OUTCOMES (COs)													
CO1		To identify the area of research.											
CO2		To prepare list of literatures in the relevant area.											
CO3		Compile the abstract from the literatures.											
CO4		Focus the search to a well defined theme and title.											
CO5		Make and exhaustive report by compiling all the literatures that students surveyed.											
CO6		To prepare a research paper for publications in journal/conference proceedings.											
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	L	H	M	M	M	H	H	H	M	H
	CO2	H	H	M	H	M	H	H	H	H	H	H	H
	CO3	H	H	H	H	L	H	H	H	H	H	H	H
	CO4	M	M	H	M	M	M	M	H	H	H	L	H
	CO5	H	M	H	H	L	H	H	H	H	H	M	H
	CO6	M	M	H	M	M	L	M	H	M	H	H	M

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Basic Engg Sciences (EC)	Professional Core (PC)	Professional Elective (PE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Research (PR)
					✓				
4		37 th Meeting of Academic Council, May 2015							

LIST OF TASKS

1. PREPARING PROPOSAL

Proposed Research Topic

Purposes

Background

Method: (suggested methods – develop your own to suit your research topic)

2. CONDUCTING LITERATURE REVIEW

Exploring and Sharpening your Topic

Evaluating Information

Taking Notes and Keeping Records

3. COMPLETING ANNOTATED BIBLIOGRAPHY

Citing Your Sources and Avoiding Plagiarism

Writing and Annotated Bibliography

4. IDENTIFYING PROBLEM STATEMENT

Meeting the Challenges of Research

Developing New Information

5. COMPLETING OUTLINE FOR THE RESEARCH

Organizing Your Project into an outline

Pick up your critique paper and begin editing and incorporate the suggestions from guide

6. SUBMITTING FIRST DRAFT

Drafting your Project

Entering Conversations and Supporting Your Claims

7. SUBMITTING WORKS CITED

Create the individual citations

Apply the formatting rules

8. SUBMITTING FULL PAPER

Revising, Editing, and Proofreading
Designing and Presenting Your Project
Conducting Research in the Disciplines
Documenting Sources

REFERENCES:

1. Website.
2. Printed Journals.

BIT8C1	COMPREHENSION II	L	T	P	C
	Total Contact Hours : Test will be conducted at the end of the semester	0	0	0	1
	Prerequisite – All the courses upto eighth semester				
	Course Designed by – Dept. of Information Technology				
OBJECTIVES					
• To provide a complete review of Information Technology topics covered up to eighth semesters, so that a comprehensive understanding is achieved. • It will also help students to face job interviews, competitive examinations and also to enhance the employment potential. • To provide overview of all topics covered and to assess the overall knowledge level up to eighth semester.					

BIT8P1	PROJECT WORK		L	T	P	C
	Total Contact Hours –18 hours per week		0	0	18	9
	Prerequisite –Professional Courses					
	Course Designed by – Dept. of Information Technology					
OBJECTIVES						
• Learn to work as a member of a project team. • Understand project management tasks. • Develop a hardware / software solution for a real-time, industry relevant problem.						
COURSE OUTCOMES (COs)						
CO1	Apply knowledge of basic science and engineering to Information Technology and allied areas problems					
CO2	Implement the simple applications and verify using modern simulation tools.					
CO3	Identify, formulate, and model engineering equipment					
CO4	Recognize the real world applications and to solve with core engineering knowledge.					
CO5	Analyze and work on multidisciplinary tasks					
CO6	Choose latest tools, software and equipment to solve real world problems					

CORE ELECTIVE – I

BIT021		PARALLEL COMPUTING								L	T	P	C
		Total Contact Hours - 45								3	0	0	3
		Prerequisite – Computer Architecture											
		Course Designed by – Dept of Information Technology											
OBJECTIVES													
To identify the scope for parallelism in a program, understand the various parallel programming models and the challenges involved in parallel programming, learn the basics of OpenMP and MPI and programming with them, and the programming of heterogeneous systems using CUDA and OpenCL.													
COURSE OUTCOMES (COs)													
CO1		Appreciate the importance of software quality assurance											
CO2		Apply software testing techniques for information systems development											
CO3		Know the inputs and deliverables of testing process											
CO4		Demonstrate activities in software project management.											
CO5		Interpret the importance of software quality assurance											
CO6		Discuss the role of software quality assurance in improving the software development process.											
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1					H				H	M		
	CO2					H				H	M		
	CO3					H				H	M		
	CO4					H				H	M		
	CO5					H				H	M		
	CO6					H				H	M		

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)
						✓			
4		37 th Meeting of Academic Council, May 2015							

UNIT-I PARALLEL COMPUTING MODELS & PROGRAM 9

The state of computing. Multiprocessors & Multi computers, Multi vector & SIMD Computers, PRAM&VLSI Models, Architectural Development Tracks, Conditions of Paralleling Programming, Partitioning & Scheduling, Programming flow mechanism. Systems interconnect Architecture.

UNIT-II PARALLEL COMPUTER PERFORMANCE & HARDWARE TECHNOLOGIES 9

Performance Metrics & Measures, Parallel Processing Application, Speedup performance laws, Scalability analysis & approaches. Processors & memory hierarchy. Advanced processor technology. Superscalar & Vector processes, Memory hierarchy technologies. Virtual Memory Technology.

UNIT-III BUS, CACHE, MEMORY & PIPELINING TECHNIQUES 9

Backup bus system, Cache memory organization. Shared memory organization, Sequence & Weak consistency models. Linear pipeline processes - nonlinear pipeline processes. Instruction pipeline design, arithmetic pipeline design, Superscalar & Super pipeline design.

UNIT-IV MULTIPROCESSORS & MULTI COMPUTERS 9

Multiprocessor system interconnects. Cache coherence & synchronous mechanisms, Three generation of multi computers. Message-passing mechanism. Principles of multithreading, Fine-grained multi' computers, Callable& Multithreaded architecture, Data flows Hybrid architecture.

UNIT-V SOFTWARE FOR PARALLEL PROGRAMMING 9

Parallel programming models, parallel layers & compilers, dependency analysis of data arrays, code optimization & scheduling, Loop parallelization & pipelining, Multiprocessor mix design goals.

TEXTBOOK:

- 1 Kai Hwang, -Advanced Computer Architecture, Parallel Scalability Programmability- Tata McGraw Hill, 2012.
- 2 Parallel computing: theory and practice, Michael Quinn, TMH Edition, 2002.

REFERENCES:

- 1 Ananth Grama, George Karypis, Vipin Kumar and Anshul Gupta, -Introduction to Parallel Computing, Second Edition, Pearson Education Limited, 2003.
- 2 Shameem Akhter and Jason Roberts, -Multi-core Programming, Intel Press, 2006.
- 3 Ian Foster, -Designing and Building Parallel Programs: Concepts and Tools for Parallel Software Engineering, Addison Wesley Longman Publishing Co., USA, 1995.
- 4 David E. Culler, Jaswinder Pal Singh, -Parallel Computing Architecture: A hardware/Software approach, Morgan Kaufmann / Elsevier Publishers, 1999.
- 5 OpenMP Programmer's Manual.
- 6 MPI Programmer's Manual
- 7 <http://www-users.cs.umn.edu/~karypis/parbook/Lectures/GK-CS5451/Chapter%20-%20-%20Parallel%20Programming%20Platforms.pdf>

BIT022	NEURAL NETWORKS		L	T	P	C
	Total Contact Hours - 45		3	0	0	3
	Prerequisite – Artificial Intelligence & Expert Systems					
	Course Designed by – Dept of Information Technology					
OBJECTIVES						
Understand the role of neural networks in engineering, artificial intelligence, and cognitive modeling.						
Provide knowledge of supervised learning in neural networks						
Provide knowledge of computation and dynamical systems using neural networks						
Provide knowledge of reinforcement learning using neural networks.						
Provide knowledge of unsupervised learning using neural networks.						
Provide hands-on experience in selected applications						
COURSE OUTCOMES (COs)						
CO1	The role of neural networks in engineering, artificial intelligence, and cognitive modeling.					
CO2	Feed-forward neural networks of increasing complexity, gradient descent learning and extensions, learning and generalization theory.					
CO3	Hopfield model of content-addressable memory, Hopfield-Tank approach to optimization, resistive networks for vision models, complex dynamical learning models.					
CO4	Generalization and function approximation					
CO5	To have a knowledge of sufficient theoretical background to be able to reason about the behaviour of neural networks.					
CO6	be able to apply neural networks to particular applications, and to know what steps to take to improve performance.					
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						

1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M	H	H				H		
	CO2				M	H	H				H		
	CO3				M	H	H				H		
	CO4				M	H	H				H		
	CO5				M	H	H				H		
	CO6				M	H	H				H		
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
						✓							
4		37 th Meeting of Academic Council, May 2015											

UNIT – I INTRODUCTION TO NEURAL NETWORKS

9

Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Characteristics of ANN, McCulloch-Pitts Model, Historical Developments, Potential Applications of ANN.

UNIT – II ESSENTIALS OF ARTIFICIAL NEURAL NETWORKS

9

Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN – Connectivity, Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules.

UNIT – III SINGLE LAYER FEED FORWARD NETWORKS

9

Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Limitations of the Perceptron Model.

UNIT – IV MULTI- LAYER FEED FORWARD NETWORKS

9

Credit Assignment Problem, Generalized Delta Rule, Derivation of Backpropagation (BP) Training, Summary of Backpropagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

UNIT - V ASSOCIATIVE MEMORIES

9

Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory, Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function. Architecture of Hopfield Network: Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis. Neural network applications: Process identification, control, fault diagnosis.

REFERENCES

1. Laurene Fausett, "Fundamentals of Neural Networks" , Pearson Education, 2004..
2. Simon Haykin, "Neural Networks- A comprehensive foundation", Pearson Education, 2003.
3. S.N.Sivanandam, S.Sumathi, S. N. Deepa "Introduction to Neural Networks using MATLAB6.0", TATA McGraw Hill, 2006.
4. S. Rajasekharan and G. A. Vijayalakshmi pai, "Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications", PHI Publication, 2004.
5. Timothy J. Ross, " Fuzzy Logic With Engineering Applications", Tata McGraw-Hill Inc. 2000.
6. <http://hagan.okstate.edu/NNDesign.pdf>

BIT023	SOFTWARE QUALITY MANAGEMNET						L	T	P	C			
	Total Contact Hours – 45						3	0	0	3			
	Prerequisite – Software Engineering												
	Course Designed by – Dept of Information Technology												
OBJECTIVES - To understand how to choose appropriate quality goals and to select, to plan, and to execute quality assurance activities throughout development and evolution to predictably meet quality and schedule goals. - To study the software quality engineering metrics and models													
COURSE OUTCOMES (COs)													
CO1	Employ software metrics and models in software development												
CO2	select the best quality assurance plan during development												
CO3	Knows and applies quality models to identify and specify the quality attributes a software system must satisfy												
CO4	Understands the mission of a quality system and knows the applicable standards and norms												
CO5	Understands the interrelation between product quality and process quality												
CO6	Knows and applies product and process quality control techniques												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M					M		H	M
	CO2				M					M		H	M

	CO3				M					M		H	M
	CO4				M					M		H	M
	CO5				M					M		H	M
	CO6				M					M		H	M
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
						✓							
4		37 th Meeting of Academic Council, May 2015											

UNIT- I INTRODUCTION 9

Concepts of Quality Control, Quality Assurance, Quality Management - Total Quality Management; Cost of Quality; QC tools - 7 QC Tools and Modern Tools; Other related topics - Business Process Re-engineering - Zero Defect, Six Sigma, Quality Function Deployment, Benchmarking, Statistical process control.

UNIT –II SOFTWARE ENGINEERING PRINCIPLES 9

Software Engineering Principles, Software Project Management, Software Process, Project and Product Metrics, Risk Management.

UNIT -III SOFTWARE QUALITY ASSURANCE MODELS 9

Software Quality Assurance; Statistical Quality Assurance - Software Reliability, Models for Quality Assurance - ISO-9000 - Series, CMM, SPICE, Malcolm Baldrige Award.

UNIT- IV SOFTWARE PROCESSES & TESTING 9

Software Process - Definition and implementation; internal Auditing and Assessments; Software testing - Concepts, Tools, Reviews, Inspections & Walkthroughs; P-CMM.

UNIT- V TQM 9

Total Quality Management - Introduction, Software reuse for TQM, Software testing method for TQM, Defect Prevention and Total Quality Management, Zero Defect Software Development, Clean room Engineering.

TEXT BOOKS

1. Allan Gillies, "Software quality Theory & Management ", Thomson international Press, 2011
2. Amitava Mitra, "Fundamentals of Quality Control and Improvement", Wiley, 2008.

REFERENCES:

1. Roger Pressman, "Software Engineering ", 8th edition, McGraw Hill, 2015.
2. Kim H. Pries, Jon M. Quigley, "Total Quality Management for Software", CRC Press, 2005.

BIT024	OBJECT ORIENTED SOFTWARE ENGINEERING						L	T	P	C			
	Total Contact Hours - 45						3	0	0	3			
	Prerequisite – Software Engineering												
	Course Designed by – Dept of Information Technology												
OBJECTIVES													
This Unit will introduce the Object-Oriented Software Engineering (OOSE) method from Jacobson et al. It will describe the basics of ‘a use case driven approach’. The focus of the Unit is the development of its Requirements Model. It will discuss actors, use cases, interface descriptions and problem domain objects. Relevant notations are drawn from the UML (Unified Modelling Language)													
COURSE OUTCOMES (COs)													
CO1	Understand the fundamental principles underlying Object-Oriented software design.												
CO2	Employ formal methods to produce effective software designs as solutions to specific tasks.												
CO3	Develop structured sets of simple user-defined classes using Object-Oriented principles to achieve overall programming goals.												
CO4	Write simple programs in Java to undertake basic Input/Output and to perform simple data manipulation.												
CO5	Develop error identification and testing strategies for code development.												
CO6	Locate, read and summarise relevant literature, from both traditional and electronic media, to extend your understanding of the topic.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		M		M		H						M
	CO2		M		M		H						M
	CO3		M		M		H						M
	CO4		M		M		H						M
	CO5		M		M		H						M
	CO6		M		M		H						M

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)
						✓			
4		37 th Meeting of Academic Council, May 2015							

UNIT I INTRODUCTION 9

System Concepts – Software Engineering Concepts – Development Activities – Managing Software Development – Unified Modeling Language – Project Organization – Communication

UNIT II ANALYSIS 9

Requirements Elicitation – Concepts – Activities – Management – Analysis Object Model – Analysis Dynamic Models

UNIT III SYSTEM DESIGN 9

Decomposing the system – Overview of System Design – System Design Concepts – System Design Activities – Addressing Design Goals – Managing System Design

UNIT IV OBJECT DESIGN AND IMPLEMENTATION ISSUES 9

Reusing Pattern Solutions – Specifying Interfaces – Mapping Models to Code – Testing

UNIT V MANAGING CHANGE 9

Rationale Management – Configuration Management – Project Management – Software Life Cycle

REFERENCES:

1. Bernd Bruegge, Alan H Dutoit, Object-Oriented Software Engineering, 2nd ed, Pearson Education, 2004.
2. Craig Larman, Applying UML and Patterns, 3rd ed, Pearson Education, 2005.
3. Stephen Schach, Software Engineering 7th ed, McGraw-Hill, 2007.
4. http://www.ucccs.info/ucc/ucc3/ucc_folder/cs3500/books/Prentice%20Object%20Oriented%20Software%20Engineering%20Using%20UML%20Patterns%20and%20Java%203rd%202012.pdf

BIT025	NATURAL LANGUAGE PROCESSING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite – Fundamentals of Computing				

		Course Designed by – Dept of Information Technology											
OBJECTIVES													
This course is designed to introduce some of the problems and solutions of NLP, and their relation to linguistics and statistics.													
COURSE OUTCOMES (COs)													
CO1	Outline Natural Language Processing tasks in syntax semantics and pragmatics.												
CO2	Explain Morphology and Part of Speech Tagging.												
CO3	Show how syntax parsing techniques can be used.												
CO4	Explain the use of semantic analysis methods.												
CO5	Relate a few applications of NLP.												
CO6	You can explain the interaction between rule based and probabilistic methods in language technology.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1						H				H		M
	CO2						H				H		M
	CO3						H				H		M
	CO4						H				H		M
	CO5						H				H		M
	CO6						H				H		M
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
						✓							
4		37 th Meeting of Academic Council, May 2015											

UNIT-I INTRODUCTION

9

Introduction - The issues and difficulties in natural language processing -Linguistics and computational linguistics - Language understanding and generation - Understanding of spoken, written and textual information.

UNIT-II PARSING AND GRAMMAR**9**

Syntactic Parsing - English grammar - Structure of the sentence - words and organization of the lexicon - Context free and context sensitive grammar -Transformational grammar-The role of syntax analysis in semantics ATN's - Definite clause grammar and WASP parsers.

UNIT-III INTERPRETATION**9**

Semantic interpretation - The conceptual dependency model for semantic representation - Semantic network - Frames and scripts - Semantics in the lexicon.

UNIT-IV SEMANTIC NETWORK**9**

Discourses interpretation - The interconnections between pragmatics -Pragmatics in discourse analysis-Speech acts plan-based Theory of speech acts - Semantic network - Frame and scripts - Semantics in the lexicon.

UNIT-V CASE STUDY**9**

Generation - Strategies for generation - Planning English referring expressions -KING, a Natural language generation systems. Typical systems - ELIZA - Baseball - GLJS - PARRY - LADDER - SOPGIE & POET current trends in NLP.

TEXTBOOK

- 1 James Allen Benjamin Cummings, -Natural language understanding, 2nd Edition 1995. Benjamin/Cummins Publishing Company.
- 2 Natural Language Processing by Ela kumar,2011

REFERENCE BOOK

- 1 Windgrad, -Language as a Cognitive Process; Syntax, Addison Wesley Publication.
- 2 F Popov, -Talking with Computer in Natural Language, Springer-Verlag, 1986.
- 3 <http://victoria.lviv.ua/html/fl5/NaturalLanguageProcessingWithPython.pdf>

CORE ELECTIVE-II

BIT026	DISTRIBUTED OPERATING SYSTEM	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite – Operating System				
	Course Designed by – Dept of Information Technology				
OBJECTIVES					
• To provide hardware and software issues in modern distributed systems. • To get knowledge in distributed architecture, naming, synchronization, consistency and replication, fault tolerance, security, and distributed file systems. • To analyze the current popular distributed systems such as peer-to-peer (P2P) systems will also be analyzed.					
COURSE OUTCOMES (COs)					

CO1	Students will learn about distributed systems design and implementation.												
CO2	They will be exposed to various areas of research in distributed systems and mobile computing systems.												
CO3	They will learn about designing and implementing fault tolerant distributed systems.												
CO4	A student completing this course successfully will be able to pursue independent research in distributed systems.												
CO5	To provide hardware and software issues in modern distributed systems.												
CO6	To analyze the current popular distributed systems such as peer-to-peer (P2P) systems will also be analyzed.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M	H	H			H		H	M
	CO2				M	H	H			H		H	M
	CO3				M	H	H			H		H	M
	CO4				M	H	H			H		H	M
	CO5				M	H	H			H		H	M
	CO6				M	H	H			H		H	M
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
4		37 th Meeting of Academic Council, May 2015											

UNIT- I INTRODUCTION

9

Modes of communication, System Process, Interrupt Handling, Handling Systems calls, Protection of resources & Resources Management Micro-Kernel Operating System.

UNIT- II OPERATING SYSTEM COMMUNICATION

9

Review of Network Operating System and Distributed Operating System, Issue in the design of Distributed Operating System, Overview of Computer Networks. Inter process communication, Linux, IPC Mechanism, Remote Procedure calls, RPC exception handling, Security issues, RPC in Heterogeneous Environment (case study Linux RPC)

UNIT -III RESOURCE MANAGEMENT**9**

Clock Synchronization, Logical clocks, Physical clocks, clock synchronization algorithms, Mutual Exclusion, Election Algorithms, Dead locks in Distributed Systems. Thrashing, Heterogeneous DSM, Resource Management (Load Balancing approach, Load Sharing approach), Process Management: process Migration, Thread.

UNIT- IV MEMORAY MANAGEMENT**9**

Overview of shared memory, consistency model, Page based Distributed Shared Memory, Shared –variable Distributed Memory, Object -based Distributed Memory.

UNIT- V FILE PROCESSING**9**

File models, File access, File sharing, file-caching, File Replication, fault Tolerance, Network File System, (Case study, 8NFS on Linux Directory Services, Security in Distributed File system).

TEXT BOOKS:

1. M. Beck et al,|| Linux Kernel Programming||,3rd edition,2002.
2. B.W. Kernighan and R Pide, -The Unix Programming Environment -, Prentice Hall of India-2000.

REFERENCES:

Silberschatz, P.B.Garvin, Gagne,|| Operating System

BIT027	FUZZY AND GENETIC ALGORITHM		L	T	P	C
	Total Contact Hours - 45		3	0	0	3
	Prerequisite – Neural Networks					
	Course Designed by – Dept of Information Technology					
OBJECTIVES						
Students can understand about Fuzzy logic, Fuzzy set and defuzzification methods.						
COURSE OUTCOMES (COs)						
CO1	Learn the unified and exact mathematical basis as well as the general.					
CO2	Principles of various soft computing techniques.					
CO3	Provide detailed theoretical and practical aspects of intelligent					
CO4	Modeling, optimization and control of non-linear systems.					
CO5	Prepare the students for developing intelligent systems through case					
CO6	Learn the unified and exact mathematical basis as well as the general principles of various soft computing techniques.					

Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H		M		H						H
	CO2	H	H		M		H						H
	CO3	H	H		M		H						H
	CO4	H	H		M		H						H
	CO5	H	H		M		H						H
	CO6	H	H		M		H						H
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
						✓							
4		37 th Meeting of Academic Council, May 2015											

UNIT-I INTRODUCTION

9

Uncertainty and Imprecision-Statistics and Random process - Uncertainty in information - Fuzzy sets and Membership - Chance versus ambiguity, classical Sets and Fuzzy Sets : Classical Sets - Fuzzy sets - Sets as points in hypercube, Classical Relations and Fuzzy Relations Cartesian product -Crisp Relations - Fuzzy Relations - Tolerance and Equivalence Relations - Value Assignments.

UNIT-I I MEMBERSHIP FUNCTIONS

9

Membership Functions: Features of Membership function - Standard forms and boundaries - Fuzzification Membership value assignments. Fuzzy to Crisp conversions: Lambda cuts for fuzzy sets - Lambda cuts for fuzzy relations- Defuzzification Methods.

UNIT-III PRINCIPLES OF FUZZY LOGIC

9

Fuzzy Arithmetic, Numbers, Vectors and the Extension Principle: Extension Principle- Fuzzy numbers - Internal analysis in arithmetic - Approximate methods of extension. Classical logic and fuzzy logic: Classical predicate logic - Fuzzy logic - Approximate reasoning - Fuzzy Tautologies - Other forms of the implication & composition operation.

UNIT-IV RULE BASED SYSTEMS

9

Fuzzy Rule Based Systems: Natural language - Linguistic hedges - Rule based systems - Graphical techniques of inference, Fuzzy Nonlinear Simulation: Fuzzy Relational Equations - Partitioning - Nonlinear Simulation using fuzzy rule based systems – FAMs, Fuzzy decision making.

UNIT-V FUZZY CLASSIFICATION**9**

Fuzzy Classification: Classification by equivalence relations- Cluster analysis - Cluster validity - Classification metric - Hardening the fuzzy - Partition, Fuzzy Pattern Recognition : Feature analysis-Partitions of the feature space- Single sample identification - Image processing syntactic recognition.

TEXTBOOKS:

1. Timothy J.Ross, -Fuzzy Logic with Engineering Applications, McGraw Hill International Edition 2000.
2. S. Rajasekaran and G.A.V.Pai, ,Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI, 2011.

REFERENCE:

1. J. Harris, ,An Introduction to Fuzzy Logic Applications, Springer, 2001.
2. https://wiki.sch.bme.hu/images/5/57/Lagyszamitas_jegyzet_2011_fuzzy_lantos.pdf

BIT028	SOFTWARE RELIABILITY AND SOFTWARE TESTING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite – Software Engineering				
	Course Designed by – Dept of Information Technology				
OBJECTIVES					
• The ability to tackle challenging computing problems using a comprehensive knowledge of computer science, while reflecting a commitment to quality, innovation, critical thinking, and continuous improvement. • The ability of analyzing and solving complex technical problems from a broad perspective of computer science, including business, societal, and regulatory issues					
COURSE OUTCOMES (COs)					
CO1	Apply knowledge of computing and of mathematics appropriate to computer science and analyze a problem, and identify and define the computing requirements appropriate to its solution.				
CO2	Design, implement and evaluate a program to meet desired needs and function effectively on multi-disciplinary teams and lead a technical activity.				
CO3	Understand professional, ethical, legal, security and social issues and responsibilities in computing and communicate effectively with a range of audiences.				
CO4	Master attributes and assessment of quality, reliability and security of software,				
CO5	Master principles of software development process,				
CO6	Master process selection regarding software development,				

Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H		H		H						M
	CO2		H		H		H						M
	CO3		H		H		H						M
	CO4		H		H		H						M
	CO5		H		H		H						M
	CO6		H		H		H						M
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
4		37 th Meeting of Academic Council, May 2015											

UNIT I INTRODUCTION TO RELIABILITY ENGINEERING 9

Reliability - Repairable and Non Repairable systems - Maintainability and Availability - Designing for higher reliability - Redundancy - MTBF - MTTF MDT - MTTR- k out of n systems.

UNIT II SOFTWARE RELIABILITY 9

Software reliability - Software reliability Vs Hardware reliability - Failures and Faults - Classification of Failures - Counting - System Configuration - Components and Operational Models - Concurrent Systems - Sequential Systems - Standby Redundant systems

UNIT III SOFTWARE RELIABILITY APPROACHES 9

Fault Avoidance - Passive Fault detection - Active Fault Detection - Fault Tolerance - Fault Recovery - Fault Treatment.

UNIT IV INTRODUCTION TO SOFTWARE TESTING 9

Software testing – Role of software testing – A structural approach to testing – Test strategy – methods for developing test strategy Testing methodologies. Test plan – Requirements testing – Walk through test tool – Risk matrix test tool – Testing for requirements phase and design phase – Design review test tool – Test data and volume test tools.

UNIT V TESTING METHODS 9

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

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

TEXT BOOKS:

1. John D. Musa, "Software Reliability", McGraw Hill, 2004.
2. Patric D. T.O Connor, "Practical Reliability Engineering", 4th Edition, John Wesley & sons, 2003
3. William Perry, -Effective Methods for Software Testing, 3/e, John Wiley & Sons/ Wiley India, 2006.

REFERENCE:

1. <http://www.softwaretestingclass.com/what-is-reliability-testing/>

BIT029	UNIFIED MODELING LANGUAGE						L	T	P	C			
	Total Contact Hours - 45						3	0	0	3			
	Prerequisite – Software Engineering												
	Course Designed by – Dept of Information Technology												
OBJECTIVES • Create a requirements model using UML class notations and use-cases based on statements of user requirements, and to analyze requirements models given to them for correctness and quality. • Create the OO design of a system from the requirements model in terms of a high-level architecture description, and low-level models of structural organization and dynamic behavior using UML class, object, and sequence diagrams. • Comprehend enough Java to see how to create software the implements the OO designs modeled using UML													
COURSE OUTCOMES (COs)													
CO1	Implementation of the diagrams in Unified Modeling Language												
CO2	The Difference between Static and Dynamic Diagrams												
CO3	Create and analyze activity and state diagrams												
CO4	Present the transition from business events to use cases												
CO5	Show the importance of systems analysis and design in solving complex problems.												
CO6	Show how the object-oriented approach differs from the traditional approach to systems analysis and design.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l

2	CO1			H		M	M					H	H
	CO2			H		M	M					H	H
	CO3			H		M	M					H	H
	CO4			H		M	M					H	H
	CO5			H		M	M					H	H
	CO6			H		M	M					H	H
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
						✓							
4		37 th Meeting of Academic Council, May 2015											

UNIT-I INTRODUCTION

9

Importance of Modeling, Principles of Modeling, Object Oriented Modeling, Overview of UML, Conceptual Model of UML. Architecture, Software Development Life Cycle, An example. Basic Structural Modeling Classes, Relationships.

UNIT-II COMMON MECHANISMS AND DIAGRAMS

9

Common Mechanism concepts. Common Modeling Techniques, Diagrams and Class Diagrams.

UNIT-III ADVANCED STRUCTURAL MODELING

9

Advanced Classes, Advanced relationships. Interfaces, Types and Roles, Packages, Instances, Object Diagrams.

UNIT-IV BEHAVIOUAL MODELING

9

Interactions, Use cases, Use case diagrams. Interaction Diagrams, Activity Diagrams, Events and Signals, State Machines, Processes and Threads, Time space.

UNIT-V ARCHITECTURAL MODELING

9

Components, Deployments, Collaborations, Patterns and Frameworks. Component diagrams. Deployment diagrams. System and Models, Applying UML

TEXTBOOKS:

- 1 Grady Booch, James Rumbaugh, Ivan Jacobson, -The Unified Modeling Language User Guidell, Pearson Education, 2005.
- 2 Design Patterns by Erich Gamma, Pearson Education, 2014.

REFERENCE BOOK:

1. Satzinger: Object Oriented analysis and Design,2010.

<http://ftp.bupt.edu.cn/pub/Documents/Programming/UML/O'Reilly%20-%20Learning%20UML.pdf>

BIT030	SPEECH TECHNOLOGY								L	T	P	C	
	Total Contact Hours - 45								3	0	0	3	
	Prerequisite – Engineering Mathematics III and DSP												
	Course Designed by – Dept of Information Technology												
OBJECTIVES													
1. To provide knowledge in fundamentals of speech processing													
2. To get knowledge in speech models.													
COURSE OUTCOMES (COs)													
CO1	give short descriptions of speech from the acoustic, phonetic, and linguistic perspectives												
CO2	explain how computers recognize speech and speakers with statistical methods, and evaluate the recognition results												
CO3	describe and judge different methods used to produce speech with computers												
CO4	analyze speech-driven dialogue systems with respect to application, components, functionality and user aspects												
CO5	give an account of available state-of-the art speech technology and exemplify the current speech research on e.g., mobile systems and IT applications												
CO6	apply the theoretical knowledge in small speech technology projects.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M		H				H		H
	CO2				M		H				H		H
	CO3				M		H				H		H
	CO4				M		H				H		H
	CO5				M		H				H		H
	CO6				M		H				H		H

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/Seminar/Internship (PR)
							✓		
4		37 th Meeting of Academic Council, May 2015							

UNIT- I FUNDAMENTALS OF SPEECH PROCESSING

9

Introduction to Speech processing - applications - Fundamentals of speech processing - Analysis tools - z - Fourier - DFT transforms - FIR - IIR filters - sampling.

UNIT -II SPEECH MODELS

9

Digital models - Vocal tract analog and digital models - Time Domain models - Useful Performance measures - zero - crossings - voiced - unvoiced - pitch periods - correlation Functions - smoothing.

UNIT -III DIGITAL REPRESENTATION AND ANALYSIS

9

Digital representations of speech waveform - Encoding of speech using delta modulation - PCM - differential PCM - other systems - Short-time Fourier analysis - Short term analysis Effects - filter banks - pitch detection - vocoders.

UNIT IV HOMOMORPHIC SPEECH PROCESSING AND LINEAR PREDICTIVE CODING

9

Homomorphic speech processing - Cepstrum - pitch detection - formant estimation - vocoders - Linear predictive coding of speech - LPC methods and parameters - relations between speech parameters.

UNIT -V DIGITAL SPEECH PROCESSING AND RECOGNITION

9

Digital speech processing for man - machine communication by voice - Speech and speaker recognition - voice response systems.

TEXT BOOKS:

- 1.L. R. Rabiner& R. W. Schafer, "Digital Processing of Speech Signals", Prentice Hall, 2008.
- 2.AmyNeustein,||Advances in Speech Recognition||Springer,2010.
- 3.Claudio,Klucio,||Speech Recognition||, Wiley 2008

REFERENCES:

- 1 Wai C. Chu,, ||Speech Coding Algorithms: Foundation and Evolution of Standardized Coders||,John Wiley & Sons,2003.
- 2 JavierRamírez, Juan Manuel Górriz,|| Recent Advances in Robust Speech Recognition Technology||, ,2011.

CORE ELECTIVE-III

BIT031	COMPONENT BASED SYSTEM DESIGN							L	T	P	C		
	Total Contact Hours - 45							3	0	0	3		
	Prerequisite – Internet Programming ,Web Technology												
	Course Designed by – Dept of Information Technology												
OBJECTIVES													
- To introduce the concept of distributed component architectures, including its relationship to the object-oriented programming paradigm. - To demonstrate the importance of reusability and focuses on design pattern and frameworks in distribute component architecture. - To introduce different component frameworks, including Enterprise Java Beans, COM, CORBA, Web Services and discuss interoperability. - Between applications built in different frameworks using .NET. - To present primary issues in component frameworks, including events - Properties, introspection and reflection, persistence, and packaging will be thoroughly reviewed. - To describe software architecture and its evaluation mechanism fo rsupporting components and theoretical foundations of components.													
COURSE OUTCOMES (COs)													
CO1	Graduates will have the conceptual knowledge and background to be able to analyze a problem and identify and define the computing requirements for its solution.												
CO2	Graduates will have the ability to implement a computer-based system, process, component or program.												
CO3	Graduates will have the ability to evaluate, verify, trouble-shoot, test and analyze an existing computer-based system, process, component or program.												
CO4	Graduates will be able to work effectively in teams in designing and implementing software systems and effectively manage conflicts, optimize resources and meet deadlines.												
CO5	Design of software components and management												
CO6	To apply CORBA, COM, EJB technologies												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1			M		M	H						M
	CO2			M		M	H						M

	CO3			M		M	H						M
	CO4			M		M	H						M
	CO5			M		M	H						M
	CO6			M		M	H						M
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
						✓							
4		37 th Meeting of Academic Council, May 2015											

UNIT I BASIC CONCEPTS

9

Software Components - Component models and Component Services-myths in Component Based Technology - Risk Factors - Success Factors, Component Based Software Development.

UNIT- II COMPONENTS, ARCHITECTURE AND PROCESS

9

Component Architecture, Component Frameworks, Component Development, Component distribution and acquisition, Component assembly, markets and components.

UNIT-III DESIGN OF SOFTWARE COMPONENT

9

Software Components and the UML Component Infrastructures - Business Components - Components and Connectors - Designing Models of Modularity & Integration.

UNIT IV MANAGEMENT OF COMPONENT BASED SOFTWARE SYSTEMS

9

Measurement and Metrics for Software Components - Selecting the right Components - Software Component Project Management - Trouble with Testing Components - Configuration Management and Component Libraries - Evolution Maintenance of Management of Component based Systems.

UNIT -V COMPONENT TECHNOLOGIES

9

Overview of the Following Component Models: CORBA, COM+, Enterprise Java Beans, Software Agents.

TEXT BOOKS:

1. Clemens Szyperski, "Component Software - Beyond object oriented programming", Pearson Education, 2nd edition, 2004.
2. George T. Heinemen, William T. Council, "Component Based Software Engineering", 2001.

REFERENCES:

1. Thomas J..Mowbray, William A.Ruh, "Inside CORBA Distributed Object Standards and Applications", Addison - Wesley, 2001.
2. DaleRojerson, "Inside COM", Microsoft Press, 2001.
3. Andreas Vogel, Keith Duddy "Java Programming with CORBA" John Wiley & Sons, 3rd edition,2001.
3. <http://www.ibm.com/developerworks/rational/library/content/03July/2000/2169/2169.pdf>
f

BIT032		BIO INSPIRED ALGORITHMS						L	T	P	C		
		Total Contact Hours - 45						3	0	0	3		
		Prerequisite – Neural Networks											
		Course Designed by – Dept of Information Technology											
OBJECTIVES													
To learn how natural and biological systems influence computational field													
COURSE OUTCOMES (COs)													
CO1	Be able to explain how biological systems exploit natural processes												
CO2	Be able to visualize how complex and functional high-level phenomena can emerge from low-level interactions.												
CO3	Be able to understand how large numbers of agents can self-organize and adapt.												
CO4	Be able to design and implement simple bio-inspired algorithms												
CO5	describe the principles of biologically inspired computing algorithms												
CO6	discuss the rationale for, advantages and limitations of biologically inspired computing												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M		H		H				
	CO2				M		H		H				
	CO3				M		H		H				
	CO4				M		H		H				
	CO5				M		H		H				
	CO6				M		H		H				

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)
						✓			
4		37 th Meeting of Academic Council, May 2015							

UNIT I INTRODUCTION

9

What is Life? - Life and Information - The Logical Mechanisms of Life - What is Computation? Universal Computation and Computability - Computational Beauty of Nature (fractals, L-systems, Chaos) - Bio-inspired computing – Natural computing -Biology through the lens of computer science

UNIT II COMPLEX SYSTEMS & ARTIFICIAL LIFE

9

Complex Systems and Artificial Life - Complex Networks - Self-Organization and Emergent Complex Behavior - Cellular Automata - Boolean Networks - Development and Morphogenesis - Open-ended evolution

UNIT III NATURAL COMPUTATION AND NEURAL NETWORKS

9

Biological Neural Networks- Artificial Neural Nets and Learning – pattern classification & linear separability - single and multilayer perceptrons, backpropagation - associative memory - Hebbian learning - Hopfield networks - Stochastic Networks – Unsupervised learning

UNIT IV EVOLUTIONARY SYSTEMS AND ALGORITHMS

9

Evolutionary Programming: biological adaptation & evolution – Autonomous Agents and Self-Organization: termites, ants, nest building, flocks, herds, and schools. Genetic algorithms: Schema theorem - Reproduction-Crossover-Mutation operators.

UNIT V COMPETITION, COOPERATION AND SWARM INTELLIGENCE

9

Collective Behavior and Swarm Intelligence - Social Insects - Stigmergy and Swarm Intelligence; Competition and Cooperation - zero- and nonzero-sum games - iterated prisoner's dilemma - stable strategies - ecological & spatial models - Communication and Multi-Agent simulation – Immuno computing

REFERENCES

1. Leandro Nunes De Castro, Fernando Jose Von Zuben, -Recent Developments in Biologically Inspired Computing, Idea Group Publishing, 2005.
2. Leandro Nunes De Castro , -Fundamentals of Natural Computing: Basic concepts, Algorithms and Applications, Chapman & Hall/ CRC Computer & Information Science Series, 2006

3. Dario Floreano, Claudio Mattiussi, -Bio-Inspired Artificial Intelligence: Theories, Methods and Technologies, MIT Press, 2008.
4. <http://informatics.indiana.edu/rocha/i-bic/>
5. <http://web.eecs.utk.edu/~mclennan/Courses/420/>
6. <http://www.cs.stir.ac.uk/courses/31YB/>

BIT033	SOFTWARE METRICS							L	T	P	C		
	Total Contact Hours - 45							3	0	0	3		
	Prerequisite – Software Engineering, Probability and Queuing Theory												
	Course Designed by – Dept of Information Technology												
OBJECTIVES													
1. Develop a software metrics program for an organization													
2. Apply various tools and techniques for assessing software life cycle products													
3. Discuss current research trends in software metrics													
COURSE OUTCOMES (COs)													
CO1	Master the understanding of requirements specification documents,												
CO2	Master the role of management in software development,												
CO3	Master working on a team in a moderate-size software development project,												
CO4	Be familiar with formal specification notations,												
CO5	Master the knowledge and comparison of various testing strategies												
CO6	Be familiar with the difficulties of working in teams and use of strategies to overcome those difficulties.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1			M	M		H		H				H
	CO2			M	M		H		H				H
	CO3			M	M		H		H				H
	CO4			M	M		H		H				H
	CO5			M	M		H		H				H
	CO6						H						H

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/Seminar/Internship (PR)
						✓			
4		37 th Meeting of Academic Council, May 2015							

UNIT I INTRODUCTION

9

Quality - Software Quality - Total Quality Management - Software Development Process Models. Fundamentals in Measurement - Basic Measures - Reliability and Validity - Measurement Errors - **Assessing Reliability - Correction for Attenuation**. Software Quality Metrics - Product Quality - **Defect Density -Customer Problems, Satisfaction** - In-Process Quality - Defect Density - Defect Removal - Defect Arrival - Metrics for Software Maintenance.

UNIT II TOOLS IN SOFTWARE DEVELOPMENT

9

Tools in Software Development - Ishikawa's Seven Basic Tools – Checklist - Pareto Diagram – Histogram – Run Charts - Scatter Diagram - Control Chart - Cause-and-Effect Diagram - Relations Diagram. **Defect Removal Effectiveness - Phase-Based - Process Maturity Level**. The Rayleigh Model - Reliability Models – Reliability and Predictive Validity. Exponential Distribution and Reliability Growth Models - Jelinski-Moranda Model - Littlewood Models - **Goel-Okumoto Model - Musa-Okumoto Model** - Model Evaluation.

UNIT III PROCESS METRICS

9

In-Process Metrics for Software Testing - Test Progress S Curve - Testing Defect Arrivals Over Time – Product Size Over Time - CPU Utilization - Effort/Outcome Model. Complexity Metrics and Models - Lines of Code - Halstead's Software Science - Cyclomatic Complexity. - Syntactic Constructs - Structure Metrics. **Metrics for Object-Oriented Projects - Concepts and Constructs** - Design and Complexity Metrics - **Lorenz Metrics and Rules of Thumb - CK OO Metrics Suite** - Productivity Metrics.

UNIT IV METRICS & ASSESSMENTS

9

Availability Metrics - Definition and Measurements - Reliability, Availability, and Defect Rate. Measuring and Analyzing Customer Satisfaction - Surveys - Data Collection - Sampling Methods - **Analyzing Satisfaction Data. Conducting In-Process Quality Assessments** - Preparation - Evaluation - Quantitative Data – Qualitative Data - Evaluation Criteria - Overall Assessment - **Recommendations and Risk Mitigation. Conducting Software Project Assessments** - Audit and Assessment - Process Maturity - Process Assessment Cycle - Assessment Results - Reports.

UNIT V SOFTWARE PROCESS IMPROVEMENT

9

Measuring Process Maturity - Process Capability - Value of Process Improvement - Process Adoption – Process Compliance. Function Point Metrics to Measure Software Process Improvement - Software Process Improvement Sequences - Process Improvement Economics - **Measuring Process Improvements at Activity Levels.**

TEXT BOOKS

1. Stephen H. Kan, -Metrics and Models in Software Quality Engineering, Addison Wesley, 2002
2. Norman E. Fenton, Shari Lawrence Pfleeger, -Software Metrics: A Rigorous and Practical Approach, PWS Pub. Co., 1998

REFERENCE BOOKS

1. Mark Lorenz, Jeff Kidd, -Object-Oriented Software Metrics, Prentice Hall, 2000
2. Robert B. Grady, Deborah L. Caswell, -Software Metrics: Establishing a Company-wide Program, Prentice Hall, 1987
4. <http://www.amazon.com/Software-Metrics-Metrology-Alain-Abram-ebook/dp/B005CDYQMI>

BIT034	SOFTWARE ARCHITECTURE							L	T	P	C		
	Total Contact Hours - 45							3	0	0	3		
	Prerequisite – Software Engineering												
	Course Designed by – Dept of Information Technology												
OBJECTIVES													
The objective of the course is to provide postgraduate students with a sound technical exposure to the concepts, principles, methods, and best practices in software architecture													
COURSE OUTCOMES (COs)													
CO1	Design and motivate software architecture for large scale software systems.												
CO2	Recognize major software architectural styles, design patterns, and frameworks.												
CO3	Describe a software architecture using various documentation approaches												
CO4	Use well-understood paradigms for designing new systems.												
CO5	Assess the quality attributes of a system at the architectural level.												
CO6	Demonstrate an appreciation for the architectural concerns and approach for families of products.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		M	H	M		H	H					M

	CO2		M	H	M		H	H					M
	CO3		M	H	M		H	H					M
	CO4		M	H	M		H	H					M
	CO5		M	H	M		H	H					M
	CO6		M	H	M		H	H					M
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
						✓							
4		37 th Meeting of Academic Council, May 2015											

UNIT-I INTRODUCTION TO SOFTWARE ARCHITECTURE 9

The architecture business cycle - where do architectures come from? Software process and architecture business cycle. "Good" Architecture. Software architecture, Architectural styles, reference models & reference architecture. Other viewpoint, Architectural structures. A-TE : A case study in utilizing Architectural structures.

UNIT-II QUALITY OF ARCHITECTURE 9

Creating and Analyzing architecture - Quality attributes, architectures & Quality attributes. Means for achieving Qualities. Moving from Quality to Architecture: Architectural styles, Introduction, Organization, Refinements of styles, Using styles, Achieving Quality goals.

UNIT-III CASE STUDIES 9

Unit operations - Introduction, Applications, Ramifications of addressing Quality attributes. The World Wide Web: A case study of Interoperability COBRA: A case study of an Industry standard computing Infrastructure.

UNIT-IV ANALYSIS 9

Analyzing development qualities at the architecture level : The software architecture Analysis method. Analyzing software architecture. Overview, Examples of SAAM. Applications, SAAM applied to a financial management system, observations on SAAM architecture reviews Air Traffic Control: A case study in designing for high availability.

UNIT-V VISION OF SOFTWARE ARCHITECTURE 9

Moving from architectures to systems. Architecture description languages, Architecture Based development, Reusing Architectures. Product lines: Reusing architectural assets within an organization. Software architecture in the future,

TEXT BOOKS:

1. Software Architecture in Practice - Len Bass, Paul, Elements, Rick Kazman Set Series in Software Engineering, 2007.
2. Essential Skills for Software Architects, Dave Hendrickson, Addison Wesley 1st edition, 2011.

REFERENCES:

1. Taylor R. N, Medvidovic N, Dashofy E. M, -Software Architecture: Foundations, Theory, and Practice, Wiley, 2009.
2. Len Bass, Paul Clements, Rick Kazman, -Software Architecture in Practice, 3rd edition Pearson, 2013.
3. https://wiki.sch.bme.hu/images/9/98/Sznikak_jegyzet_Pattern-Oriented-SA_vol1.pdf

BIT035	PATTERN RECOGNITION						L	T	P	C			
	Total Contact Hours - 45						3	0	0	3			
	Prerequisite – Artificial Intelligence												
	Course Designed by – Dept of Information Technology												
OBJECTIVES													
Students can understand about Pattern reorganization, perception algorithms and supervised, unsupervised learning.													
COURSE OUTCOMES (COs)													
CO1	Know how to test for assumptions for an analysis and what to do when those assumptions are not correct.												
CO2	Know how to collect data for a particular situation.												
CO3	Know about Bayesian approach.												
CO4	Explain and compare a variety of pattern classification, structural pattern recognition, and pattern classifier combination techniques.												
CO5	Apply performance evaluation methods for pattern recognition, and critique comparisons of techniques made in the research literature.												
CO6	Implement simple pattern classifiers, classifier combinations, and structural pattern recognizers.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M		H	M	H				H
	CO2				M		H	M	H				H

	CO3				M		H	M	H				H
	CO4				M		H	M	H				H
	CO5				M		H	M	H				H
	CO6				M		H	M	H				H
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
						✓							
4		37 th Meeting of Academic Council, May 2015											

UNIT-I PATTERN CLASSIFIER

9

Overview of pattern recognition- Discriminant functions-Supervised teaming – Parametric estimation - Maximum likelihood estimation - Bayesian parameter estimation- perceptron algorithm-LNSE algorithm -Problems with Bayes approach-Pattern classification by distance functions -Minimum distance pattern classifier.

UNIT-II UNSUPERVISED CLASSIFICATION

9

Clustering for unsupervised learning and classification -clustering concept-C- means algorithm - Hierarchical clustering procedures-Graph theoretic approach to pattern clustering-validity of clustering solutions.

UNIT-III STRUCTURAL PATTERN RECOGNITION

9

Elements of formal grammars -string generation as pattern description-recognition of syntactic description - Parsing-Stochastic grammars and applications - Graph based structural representation,

UNIT-IV FEATURE EXTRACTION AND SELECTION

9

Entropy minimization - Karhunen - Loeve transformation -feature selection through functions approximation-Binary feature selection.

UNIT-V RECENT ADVANCES

9

Neural network structures for pattern recognition - Neural network based pattern associators Unsupervised learning in neural pattern recognition -self organizing networks-Fuzzy logic-Fuzzy pattern classifiers -Pattern classification using Genetic Algorithms.

TEXTBOOKS:

1. Robert J. Schalkoff, Pattern Recognition: Statistical, Structural and Neural Approaches, John Wiley & Sons Inc ..New York, 2001.

2. Tou and Gonzales, -Pattern recognition principles, Wesley Publication Company, London, 2004
3. Morton Naider and Eric Smith P., -Pattern Recognition Engineering, John Wiley & Sons, New York, 2003.

REFERENCES:

1. <http://www.rmki.kfki.hu/~banmi/elte/Bishop%20-%20Pattern%20Recognition%20and%20Machine%20Learning.pdf>

NON MAJOR ELECTIVE-I

BET301		PRINCIPLES OF ANALOG AND DIGITAL SYSTEM					L	T	P	C			
		Total Contact Hours – 45					3	0	0	3			
		Prerequisite – Basic Electrical and Electronics											
		Course Designed by – Dept of Electronics Communication Engineering											
OBJECTIVES													
• To familiarize students with the fundamentals of analog and digital communication systems • Provide students with tools for communication signal analysis • To familiarize students with various techniques for amplitude modulation and demodulation of analog signals													
COURSE OUTCOMES (COs)													
CO1	Develop the students‘ ability to determine the effects of receiver frequency and phase errors in synchronous modulation systems.												
CO2	To familiarize students with techniques for generating and demodulating narrow-band and wide-band frequency and phase modulated signals.												
CO3	To familiarize students with basic techniques for generating and demodulating pulse code modulated signals.												
CO4	To familiarize students with issues pertaining to the transmission of digital signals over bandwidth-limited communication channels.												
CO5	Have an understanding of design considerations for multiple access/use spectrum and multiplexing.												
CO6	Have detailed understanding of digital communication basics including matched filters, signal space methods and optimal receiver design												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1			H	M	M	M						H
	CO2			H	M	M	M						H
	CO3			H	M	M	M						H
	CO4			H	M	M	M						H
	CO5			H	M	M	M						H
	CO6			H	M	M	M						H

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)
							✓		
4		37 th Meeting of Academic Council, May 2015							

UNIT I OP-AMP FUNDAMENTALS AND APPLICATIONS

9

Introduction to op-amp : op-amp symbol - terminals - packages - specifications - block diagram representation - ideal op-amp - practical op-amp - open-loop and closed-loop configurations. Practical Limitations of op-amp circuits: Bias and offset currents / offset voltage - frequency compensation and stability - slew rate - CMRR. Op-amp applications: Instrumentation amplifier - clipper and clamper circuits – LP HP BP and BR filters.

UNIT II OP-AMP OSCILLATORS AND DATA CONVERSION DEVICES

9

Op-amp oscillators: positive feedback and Barkhausen criterion - Wien Bridge oscillator - phase shift oscillator - square / triangle / ramp function generator. Single-chip oscillators: VCO and its applications - 555 timer (Astable & Monostable operation) and its applications. Data converters: Performance specifications - D/A conversion circuits(R-2R & inverted R-2R Ladder D/A converters) - A/D conversion circuits (Successive approximation, dual slope and flash A/D converters).

UNIT III DIGITAL DESIGN PRINCIPLES

9

Number systems: Binary codes: Weighted binary codes - non-weighted codes - error-detecting codes - error-correcting codes - alphanumeric codes. Boolean algebra and Logic simplification : Basic theorems and properties of Boolean algebra – DeMorgan's theorems - canonical and standard forms - universal property of NAND & NOR gates - minimization of logic functions, SOPs & POSs representations, minimization of Boolean expressions using algebraic, k-map and tabular methods - minimization of multiple output functions.

UNIT IV COMBINATIONAL & SEQUENTIAL SYSTEM DESIGN

9

Arithmetic functions: Basic adders - subtractors - carry look-ahead adder - decimal adder - magnitude comparator. MSI Logic circuits : Decoders - Encoders - Multiplexers - DeMultiplexers - Code converters - Parity generators/checkers - implementation of combinational functions using MUX, DeMUX, decoders and code converters. Flip-flops: RS flip-flop - T flip-flop - D flip-flop - JK flip-flop - Master-Slave flip-flops - IC flip-flops - their truth table and excitation table. Shift Registers: SISO, SIPO, PISO and PIPO shift registers - bidirectional and universal shift registers. Counters: Asynchronous counter operation - Synchronous counter operation - up/down synchronous counter - ring counter - shift register counter.

UNIT V MEMORY AND PLDS

9

Introduction to memories: Memory types and terminology - general memory operation. Read-only-Memory: ROM architecture - ROM types - ROM timing - ROM applications. Read/Write Memory: RAM architecture - Static RAM - Dynamic RAM - expanding word size and capacity. PLDs: Fundamentals of PLD - SPLDs - PAL - GAL - Introduction to CPLDs and FPGAs

TEXT BOOKS

1. Floyd and Jain, "Digital Fundamentals", Pearson Education, 8th edition, 2007
2. Morris Mano, "Digital Design", Pearson Education 3rd edition.
3. Ramakant A. Gayakwad, "op-amps and Linear Integrated Circuits", Pearson Education, 4th edition

REFERENCE BOOKS

1. John F. Wakerly, "Digital design - Principles and Practices", Prentice Hall International, 3rd edition, 2001
2. Ronald J. Tocci, Neal S. Widmer, "Digital Systems - Principles and Applications", Pearson Education, 8th edition, 2001
3. William I. Fletcher, "An Engineering Approach to Digital Design", Prentice Hall of India, 1980
4. Theodore F. Bogart, Jr, "Introduction to digital circuits", Tata McGraw-Hill International, 1992
5. Coughlin & Driscoll, "Operational Amplifiers & Linear Integrated Circuits", Pearson Education, 6th edition, 2003.
6. [http://www.ie.itcr.ac.cr/mmunoz/Comunicaciones/IISem08/Libros%20y%20Documentaci%C3%B3n/Modern%20Digital%20and%20Analog%20Communication%20\(BP%20Lathi,3rd%20ed\)%20.pdf](http://www.ie.itcr.ac.cr/mmunoz/Comunicaciones/IISem08/Libros%20y%20Documentaci%C3%B3n/Modern%20Digital%20and%20Analog%20Communication%20(BP%20Lathi,3rd%20ed)%20.pdf)

BEC405	LINEAR INTEGRATED CIRCUIT	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – Basic Electrical and Electronics				
	Course Designed by – Dept of Electronics Communication Engineering				
OBJECTIVES Analyze and design differential amplifier and current sources. Enable the students to analyze AC and DC characteristics of operational amplifier. To design and analyze different linear, non-linear and mathematical application circuits using operational amplifier. To introduce the operation and applications of analog multiplier and PLL. To discuss the concept and applications of ADC and DAC.					
COURSE OUTCOMES (COs)					
CO1	Explain the various current mirror circuits and analyze differential amplifier with active load.				
CO2	Describe the characteristics, linear and nonlinear application of operational amplifier.				

CO3		Analyze the internal modules of PLL, Analog Multiplier and review its applications											
CO4		Discuss the different types of data convertor architectures											
CO5		Review the special function ICs and its application.											
CO6		Analyze and deign basic op-amp circuits, particularly various linear and non-linear circuits, active filters, signal generators, and data converters											
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		M		M		H						M
	CO2		M		M		H						M
	CO3		M		M		H						M
	CO4		M		M		H						M
	CO5		M		M		H						M
	CO6		M		M		H						M
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
							✓						
4		37 th Meeting of Academic Council, May 2015											

UNIT-I BIASING CIRCUITS AND OPERATIONAL AMPLIFIER CHARACTERISTICS 9

Current mirror and current sources, Current sources as active loads, Voltage sources, Voltage References, BJT Differential amplifier with active loads, Operational Amplifier-DC characteristics-Frequency response characteristics – Stability – Limitations-Frequency compensation-Slew rate.

UNIT-II APPLICATION OF OPERATIONAL AMPLIFIERS 9

Inverting and Non-inverting amplifiers - Voltage Follower - Summing amplifier - Differential amplifier-Log and antilog amplifier - Instrumentation amplifier - Integrator and Differentiator - Voltage to Current converter - Sinusoidal Oscillators - Active filters (butterworth) - Types-Sample and Hold circuit - Precision diode Half Wave and Full wave rectifiers - . Comparator - Zero crossing detector -Active peak detector, Clipper and Clamper - Square and Triangular waveform generators

UNIT-III PHASE LOCKED LOOP AND ANALOG MULTIPLIERS 9

556 Voltage Controlled Oscillator -Basic principles of PLL - Basic components- Functional Block Schematic-. Derivations of expressions for Lock and Capture ranges- PLL Applications:

Frequency Synthesis - Frequency Translation - AM and FM detection. Analog Multipliers- Variable Transconductance Multiplier- Log Antilog Multiplier- Time Division Multiplier- variable Conductance Multiplier.

UNIT-IV ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTORS 9

Digital to Analog converters - Binary weighed and R-2R Ladder types - Analog to digital converters - Continuous - Counter ramp, successive approximation, single, dual slope and parallel types - DAC/ADC performance characteristics and comparison.

UNIT-V APPLICATION ICs

9

555 Timer Functional block diagram and description - Monostable and Astable operation - Applications - ICL 8038 Function generator IC - IC voltage Regulators: Three terminal Regulator, General purpose regulators-MA780, LM380 Power Amplifier- Isolation Amplifier, Optocoupler ICs

REFERENCES:

1. Roy Choudhury and Shail Jain "Linear Integrated Circuits", New Age Science, 2010.
2. Ramakant A. Gayakwad, "OP - AMP and Linear IC's ", Prentice Hall, 2002.
3. Sonde, B.S, —Introduction to System Design using Integrated Circuits, Second Edition, Wiley Eastern Limited, New Delhi, 1994.
4. Michael Jacob J., "Applications and Design with Analog Integrated Circuits ", Prentice Hall of India, 1996.
5. Robert F Coughlin and Fedrick F Driscoll —Operational amplifiers and linear Integrated Circuits, 6th edition, Prentice Hall of India, New Delhi, 2006.
6. Richard J. Higgins "Electronics with Digital and Analog Integrated Circuits, Prentice Hall of India, New Delhi, 1983.
7. Millman J. and Halkias C.C., " Integrated Electronics ", McGraw Hill, 2001.
8. <http://ishuchita.com/Books/Linear%20Integrated%20Circuits%20%20by%20%20Roy%20chodhary.pdf>

BETE502	SATELLITE COMMUNICATION	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite – TCP/IP Principles and Architectures				
	Course Designed by – Dept of Electronics Communication Engineering				
OBJECTIVES To enable the student to become familiar with satellites and satellite services. Study of satellite orbits and launching. Study of earth segment and space segment components Study of satellite access by various users. Study of DTH and compression standards					
COURSE OUTCOMES (COs)					
CO1	Define orbital mechanics and launch methodologies.				

CO2	Describe satellite subsystems.												
CO3	Design link power budget for satellites.												
CO4	Compare competitive satellite services.												
CO5	Explain satellite access techniques.												
CO6	Describe the satellite distance												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M			M	M	H	M		H
	CO2				M			M	M	H	M		H
	CO3				M			M	M	H	M		H
	CO4				M			M	M	H	M		H
	CO5				M			M	M	H	M		H
	CO6				M			M	M	H	M		H
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
							✓						
4		37 th Meeting of Academic Council, May 2015											

UNIT-I SATELLITE ORBITS

9

Kepler's Laws, Newton's law, orbital parameters, orbital perturbations, station keeping, geostationary and non Geo-stationary orbits – Look Angle Determination- Limits of visibility – eclipse-Sub satellite point –Sun transit outage-Launching Procedures - launch vehicles and propulsion

UNIT-II SPACE SEGMENT AND SATELLITE LINK DESIGN

9

Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control and Propulsion, communication Payload and supporting subsystems, Telemetry, Tracking and command. Satellite uplink and downlink Analysis and Design, link budget, E/N calculation-performance impairments-system noise, inter modulation and interference, Propagation Characteristics and Frequency considerations- System Reliability and design lifetime.

UNIT-III SATELLITE ACCESS

9

Modulation and Multiplexing: Voice, Data, Video, Analog – digital transmission system, Digital video Broadcast, multiple access: FDMA, TDMA, CDMA, Assignment Methods, Spread Spectrum communication, compression – encryption.

UNIT-IV EARTH SEGMENT**9**

Earth Station Technology-- Terrestrial Interface, Transmitter and Receiver, Antenna Systems TVRO, MATV, CATV, Test Equipment Measurements on G/T, C/No, EIRP, Antenna Gain. Case study: Design an Uplink and Downlink for a typical satellite

UNIT-V SATELLITE APPLICATIONS**9**

INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System. Direct Broadcast satellites (DBS)- Direct to home Broadcast (DTH), Digital audio broadcast (DAB)- World space services, Business TV(BTV), GRAMSAT, Specialized services – E –mail, Video conferencing, Internet.

REFERENCES:

1. Dennis Roddy, Satellite Communication_, McGraw Hill international, 4th Edition, 2006.
2. Timothy Pratt, Charles Bostian & Jeremy Allmuti, "Satellite Communications", John Wiley & Sons. Second edition 2008.
3. N.Agarwal, _Design of Geosynchronous Space Craft, Prentice Hall, 1986.
4. Bruce R. Elbert, _The Satellite Communication Applications_ Hand Book, ArtechHouse Boston London, second edition 2004.
5. <http://sedighy.ir/wpcontent/uploads/2014/10/ebooksclub.org Introduction to Satellite Communication Artech House Space Applications .pdf>

BBM055	TELEMEDICINE	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite – TCP/IP Principles and Architectures				
	Course Designed by – Dept of Information Technology				
OBJECTIVES • To introduce telemedicine advancements in telemedicine .Benefits of telemedicine , Functional Block of a telemedicine system, Tele healthcare and E-medicine. • To study Communication infrastructure for telemedicine LAN and WAN technology Satellite communication Mobile hand held devices and mobile communication Internet technology and telemedicine using World Wide Web Video and audio conferencing. • Introduction to Network Configuration, circuit and packet switching. • Introduction Archives Electronic Documentation Business aspects Common Access to Biological Resources and Information (CABRI) Database indexing and search terms Nucleic and genome databases Molecular data base and servers. • To learn Ethical and legal issues of Telemedicine - Confidentiality and the law - Patient rights and consent - Access to medical Records.					
COURSE OUTCOMES (COs)					
CO1	To learn introduce telemedicine advancements in telemedicine .Benefits of tele medicine, Functional Block of a telemedicine system, Tele healthcare.				

CO2	To learn Mobile hand held devices and mobile communication - Internet technology and telemedicine using World Wide Web - Video and audio conferencing.												
CO3	To have a clear view on , medical images diagnosis and treatment - Hospital information - Doctors, paramedics, facilities available.												
CO4	To learn Protein Identification Resource(PIR) - Telemedicine in Neuroscience - Telecardiology – Teledermatology – Teleneurology												
CO5	To learn Telemedicine technology and Health care delivery for rural population - Use of telemedicine technology for clinical diagnostic study.												
CO6	To maintain the server for Hospital Information												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1					M	H		H	H	H		H
	CO2					M	H		H	H	H		H
	CO3					M	H		H	H	H		H
	CO4					M	H		H	H	H		H
	CO5					M	H		H	H	H		H
	CO6						H		H	H	H		H
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
							✓						
4		37 th Meeting of Academic Council, May 2015											

UNIT- I FUNDAMENTALS OF TELEMEDICINE

9

History and advancements in telemedicine - Benefits of telemedicine – Functional Block of a telemedicine system - Tele-healthcare and E-medicine - Use of computers in distance mode of healthcare delivery - Familiarizing with technology of telemedicine – scanner, electro stethoscope - data reception equipment - Scope for telemedicine - Cyber laws related to telemedicine - Telemedicine access to health care services - Limitations of telemedicine.

UNIT- II COMMUNICATION SYSTEMS AND NETWORKS IN TELEMEDICINE

Communication infrastructure for telemedicine - LAN and WAN technology - Satellite communication - Mobile hand held devices and mobile communication - Internet technology and telemedicine using World Wide Web - Video and audio conferencing - Types of information - Audio, Video, Still images, Text and data, fax - Types of communication and network - PSTN, POTS, ANT, ISDN, Internet, Wireless communication - GSM satellite, and Microwave – Signal

Modulation techniques - Data compression and transfer - Capturing Medical Signals - Types of antennas depending on requirements, Integration and operational issues - System integration, store –and - forward operation, Real-time Telemedicine – Remote Sensing.

UNIT- III DATA EXCHANGE, MANAGEMENT, SECURITY AND STANDARDS IN TELEMEDICINE 9

Network Configuration - circuit and packet switching - H. 320 series (Video phone based ISBN) - T. 120, H.324 (Video phone based PSTN) - Encryption - Cryptography - Mechanisms of encryption - phases of Encryption - Protocols - TCP/IP, ISO-OSI Standard - DICOM, HL7 - Medical information storage and management for telemedicine - Patient information medical history - Test reports, medical images diagnosis and treatment - Hospital information - Doctors, paramedics, facilities available - Pharmaceutical information – Information Security and confidentiality of medical records and access control

UNIT IV APPLICATIONS OF TELEMEDICINE 9

Introduction - Archives - Electronic Documentation - Business aspects - Common Access to Biological Resources and Information (CABRI) - Database indexing and search terms - Nucleic and genome databases - Molecular data base and servers - Array express - Gateway to archives - Sequential retrieval system - Protein Identification Resource(PIR) - Telemedicine in Neuroscience - Telecardiology – Teledermatology - Teleneurology - Teleophthalmology – Telepathology – Teleoncology - Telepediatrics – Telepharmacy – Telepsychiatry and mental health – Teleradiology – Telesurgery – Veterinary – Other specialties

UNIT V ETHICAL ASPECTS AND CASE STUDIES IN TELEMEDICINE 9

Ethical and legal issues of Telemedicine - Confidentiality and the law - Patient rights and consent - Access to medical Records - Consent treatment - Jurisdictional Issues - Intellectual property rights - Telemedicine technology and Health care delivery for rural population - Use of telemedicine technology for clinical diagnostic study - Conceptual frame work on home telemedicine.

TEXT BOOKS

1. Olga (EDT) Ferrer – Roca, M.Sosa (EDT) Iudicissa Hand book of Telemedicine IOS press2002.
2. A.C. Norris, Essentials of Telemedicine and Telecare John Sons & Ltd, 2002.
3. Marilyn J. Field, -A Guide to Assessing Telecommunications in Health Care, NATIONALACADEMY PRESS,1996.
4. Bashshur , R. L. , Sanders, J. H and Shannon, G. W.,—Telemedicine: Theory and Practice, Volume 27, Number 2, Springer Netherlands,1999,

REFERENCES

1. Norris, A.C. Essentials of Telemedicine and Telecare. Wiley (ISBN 0 471 53151-0), 2002
2. Wootton, R., Craig, J., Patterson, V. (Eds.), Introduction to Telemedicine. Royal Society of Medicine Press Ltd (ISBN 1853156779), 2006
3. Ferrer-Roca, O., Sosa-Iudicissa, M. (editors), Handbook of Telemedicine. IOS Press (Studies in Health Technology and Informatics, Volume 54). (ISBN 90 5199 413-3), 2002.

- 4 Simpson, W. 2006. Video over IP. A practical guide to technology and applications. Focal Press (Elsevier). ISBN-10: 0-240-80557-7
- 5 Emanuel Fthenakis, _Manual of Satellite Communications_, McGraw Hill Book Co., 1984
- 6 Robert G. Winch, _Telecommunication Transmission Systems_, McGraw-Hill Book Co., second edition 1998.
- 7 <http://ebooks.iospress.nl/volume/current-principles-and-practices-of-telemedicine-and-e-health>

BBR404	GENOMICS AND PROTEOMICS					L	T	P	C				
	Total Contact Hours - 45					3	0	0	3				
	Prerequisite – Biology for Engineers												
	Course Designed by – Dept of Information Technology												
OBJECTIVES • Coding, non-coding chromosomes. • To Applications of Proteome analysis- Proteomics in drug discovery													
COURSE OUTCOMES (COs)													
CO1	Organisation and structure of genomes, Genome Size.												
CO2	Chromosomes Microdissection. Chromosomal mapping techniques.												
CO3	To understand the Functional Genomics.												
CO4	To understand the principle of Mass spectrometry												
CO5	List and discuss the uses of functional genomics and proteomics in agriculture, eco toxicology and human health												
CO6	Apply functional genomics techniques in the laboratory												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M		H		H			L	M
	CO2				M		H		H			L	M
	CO3				M		H		H			L	M
	CO4				M		H		H			L	M
	CO5				M		H		H			L	M
	CO6						H		H			L	M

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/Seminar/Internship (PR)
							✓		
4		37 th Meeting of Academic Council, May 2015							

UNIT I INTRODUCTION TO GENOMICS 9

Organisation and structure of genomes, Genome Size – Genome structure in Viruses and microbes, Coding, non-coding chromosomes and high order structures – Genomes relatedness.

UNIT II PHYSICAL MAPPING TECHNIQUES 9

Chromosomes Microdissection. Chromosomal mapping techniques. Top down and bottom up approach – Linking and jumping of clones – Genome sequencing – Placing small fragments on map – STS assembly – Gap closure – Pooling strategies – Cytogenetic mapping techniques.

UNIT III FUNCTIONAL GENOMICS 9

Gene finding – Annotation – ORF and functional prediction – Subtractive DNA library, screening – DNA sequencing – Hybridization techniques – Differential display and representational difference analysis – SAGE – TOGA., Analysis of RNA expression – Comparative genomics . Bioinformatic tools used in Genomics-

UNIT IV PROTEOMICS TECHNIQUES 9

Proteome – Bridging Genomics and Proteomics - Analysis of Proteome - Protein level estimation – Edman protein microsequencing – Protein cleavage – 2D gel electrophoresis – Metabolic labeling – Detection of proteins on SDS gels – Pattern analysis – Mass spectrometry – Principles of MALDI-TOF – Tandem MS-MS – Peptide mass fingerprinting.

UNIT V PROTEIN PROFILING 9

Post translational modification – Protein-protein interaction – Protein Chips – Applications of Proteome analysis- Proteomics in drug discovery- Phage antibodies as tools – Proteomics in plant genetics and breeding - Glycoprotein analysis – Phosphoprotein analysis- Genomics Vs Proteomics.

TEXT BOOKS

- 1 Primrose, S.B. and Twyman, R.H., -Principles of Genome Analysis and Genomics, Blackwell Publishing Co., 2003.
- 2 Liebler, D.C., -Introduction to Proteomics, Humana Press, 2002

REFERENCES

1. Pennington, S.R. and Dunn, M.J., -Proteomics, BIOS Scientific Publishers, 2001.
2. Hunt, S.P., Livesey, R. and Livesey, F.J., -Functional Genomics: A Practical Approach Oxford University Press, 2000.
3. Suhai S., -Genomics and Proteomics: Functional and Computational Aspects, Springer, 2000.
4. Cantor, C.R. and Smith, C.L., -Genomics: The Science and Technology Behind the Human Genome Project, Wiley and Sons, 1999.
5. Discovering Genomics, Proteomics, & Bioinformatics. Campbell & Heyer (2003) Pearson Education, ISBN:0-8053-4722-4.
6. Bioinformatics, Methods of Biochemical Analysis Series Vol. 43, Baxevanis & Ouellette(2001) John Wiley & Sons, ISBN 0-471-38391-0
7. Computational Molecular Biology. Pevzner, P.A. (2000) MIT Press, ISBN: 0262
8. <http://authors.library.caltech.edu/9665/1/VAIEEECSM04.pdf>

NON MAJOR ELECTIVE-II

BET407	DIGITAL SIGNAL PROCESSING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite – Basic Electrical and Electronics Engineering				
	Course Designed by – Dept of Electronics Communication Engineering				
OBJECTIVES To introduce the concepts and techniques associated with the understanding of signals and systems. To familiarize the concepts of transform based continuous time and discrete time analysis of signals and systems To provide fundamental knowledge about sampling process To provide a foundation to the courses like communication, digital signal processing, control systems, instrumentation, and so on, that deal with signal and system concepts directly or indirectly.					
COURSE OUTCOMES (COs)					
CO1	Understand different types of signals- continuous and discrete, odd and even, periodic and aperiodic etc.				
CO2	Analyze continuous time signals and systems by using appropriate mathematical tools like Fourier Transform.				
CO3	Analyze sampling process and sampling of discrete time signals.				
CO4	Analyze discrete time signals and systems by using appropriate mathematical tools like Fourier Transform.				
CO5	Utilize standard signals such as sine, ramp, exponential to characterize systems.				
CO6	To provide fundamental knowledge about sampling process				
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low					

1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M		H		H				H
	CO2				M		H		H				H
	CO3				M		H		H				H
	CO4				M		H		H				H
	CO5				M		H		H				H
	CO6				M		H		H				H
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
							✓						
4		37 th Meeting of Academic Council, May 2015											

UNIT -I DISCRETE – TIME SIGNALS AND SYSTEMS:

9

Sampling of Analogue signals – aliasing – standard discrete time signals – classification – discrete time systems – Linear time invariant stable casual discrete time systems – classification methods – linear and circular convolution – difference equation representation – DFS, DTFT, DFT – FFT computations using DIT and DIF algorithms. Time response and frequency response analysis of discrete time systems to standard input signals.

UNIT II INFINITE IMPULSE RESPONSE DIGITAL FILTERS:

9

Review of design of analogue Butterworth and Chebyshev Filters, Frequency transformation in analogue domain – Design of IIR digital filters using impulse invariance technique – Design of digital filters using bilinear transform – pre warping – Frequency transformation in digital domain – Realization using direct, cascade and parallel forms.

UNIT III FINITE IMPULSE RESPONSE DIGITAL FILTERS:

9

Symmetric and Antisymmetric FIR filters – Linear phase FIR filters – Design using Frequency sampling technique – Window design using Hamming, Hanning and Blackmann Windows – Concept of optimum equiripple approximation – Realisation of FIR filters – Transversal, Linear phase and Polyphase realization structures.

UNIT IV FINITE WORD LENGTH EFFECTS:

9

Quantization noise – derivation for quantization noise power – Fixed point and binary floating point number representations – Comparison – Overflow error – truncation error – coefficient quantization error – limit cycle oscillations- signal scaling – analytical model of sample and hold operations.

UNIT V SPECIAL TOPICS IN DSP:

9

Discrete Random Signals- Mean, Variance, Co-variance and PSD – Periodiogram Computation – Principle of Multi rate DSP – decimation and Interpolation by integer factors – Time and frequency domain descriptions – Single, Multi stage, polyphase structures – QMF filters – Sub band Coding.

TEXT BOOK:

1. John G. Proakis and Dimitris G. Manolakis, 'Digital Signal Processing, Algorithms and Applications', PHI of India Ltd., New Delhi 3rd Edition 2000.

REFERENCES:

1. Sanjit K. Mitra 'Digital Signal Processing', A Computer Based Approach, Tata McGraw-Hill, New Delhi, 1998. Printing, Prentice Hall of India Pvt. Ltd., New Delhi, 1999.
2. https://users.dimi.uniud.it/~antonio.dangelo/MMS/materials/Guide_to_Digital_Signal_Processing.pdf

BET702		CELLULAR MOBILE COMMUNICATION					L	T	P	C			
		Total Contact Hours - 45					3	0	0	3			
		Prerequisite – TCP/IP Principles and Architectures											
		Course Designed by – Dept of Information Technology											
OBJECTIVES													
To introduce advanced wireless communication systems.													
To learn the wireless channel characteristics and models													
To import knowledge of signal processing techniques for wireless communication.													
To understand the fundamentals of cellular communication system.													
To acquire knowledge of satellite communication system.													
COURSE OUTCOMES (COs)													
CO1		Explain the various standards used Wireless communication.											
CO2		Describe different propagation models											
CO3		Classify different Equalization & diversity techniques used in wireless communication.											
CO4		Apply signal processing for wireless communication.											
CO5		Identify the limitations of conventional Mobile Telephone System; Understand the operation of cellular system.											
CO6		Understand the concept of frequency Reuse channels, Deduce the Co-channel interference reduction factor.											
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M		H		M				H
	CO2				M		H		M				H

	CO3				M		H		M				H
	CO4				M		H		M				H
	CO5				M		H		M				H
	CO6						H		M				H
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
							✓						
4		37 th Meeting of Academic Council, May 2015											

UNIT I INTRODUCTION TO WIRELESS MOBILE COMMUNICATIONS 9

History and evolution of mobile radio systems, Types of mobile wireless services/systems – Cellular, WLL, Paging, Satellite systems, Standard, Future trends in personal wireless systems.

UNIT-II CELLULAR CONCEPT AND SYSTEM DESIGN FUNDAMENTALS 9

Cellular concept and frequency reuse, Multiple Access Schemes, Channel assignment and handoff, Interface and system capacity, Trunking and Erlang capacity calculations.

UNIT-III MOBILE RADIO PROPAGATION 9

Radio wave propagation issues in personal wireless systems, Propagation models, Multipath fading and based and impulse models, Parameters of mobile multipath channels, Antenna systems in mobile radio.

UNIT-IV MODULATION AND SIGNAL PROCESSING 9

Analog and digital modulation techniques, Performance of various modulation techniques – Spectral efficiency, Error rate, Power Amplification, Equalization/Rake receiver concepts, Diversity and Space-time processing, Speech coding and channel coding.

UNIT-V SYSTEM EXAMPLES AND DESIGN ISSUES 9

Multiple Access Techniques – FDMA, TDMA and CDMA systems, Operational systems, Wireless networking, design issues in personal wireless systems.

TEXT BOOK:

1. K. Feher, Wireless Digital Communication, Prentice Hall of India, New Delhi, 1995.

REFERENCES:

1. T.S. Rappaport, Wireless Communication; Principles and Practice, Prentice Hall, NJ, 1996.
2. W.C.Y. Lee, Mobile Communication Engineering; Theory and Application, Second Edition, McGraw-Hill International, 1998.
3. <http://www.wileyindia.com/media/pdf/0471457124.pdf>

BBR 701		BIOSAFETY, BIOETHICS, IPR & PATENTS						L	T	P	C		
		Total Contact Hours – 60						4	0	0	4		
		Prerequisite – Intellectual property rights											
		Course Designed by – Dept of Genetic Engineering											
OBJECTIVES: To enable understanding chemical principles governing biochemical reactions													
COURSE OUTCOMES (COs)													
CO1		Understand Handling of recombinant DNA process and products.											
CO2		Biosafety assessment of biotech pharamaceutical products.											
CO3		Understand the moral status of animal											
CO4		Understand the intellectual property rights.											
CO5		understand the patent registration											
CO6		Advanced updated of IPR											
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M		H		H				
	CO2				M		H		H				
	CO3				M		H		H				
	CO4				M		H		H				
	CO5				M		H		H				
	CO6				M		H						
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
							✓						
4		37 th Meeting of Academic Council, May 2015											

UNIT I: INTRODUCTION TO BIOSAFETY

12

Laboratory associated infections and other hazards, assessment of biological hazards and levels of biosafety, Handling of recombinant DNA processes and products in institutions and industries, biosafety assessment procedures in India and abroad.

UNIT II: BIOETHICS

12

Legality, morality and ethics, the principles of bioethics: autonomy, human rights, beneficence, privacy, justice, equity etc. Transgenic and Bioethics: Ecological safety assessment of recombinant organisms and transgenic crops, case studies of relevance (Eg. Bt cotton). Biosafety assessment of biotech pharmaceutical products such as drugs / vaccines etc.

UNIT III: ANIMAL BIOTECHNOLOGY

12

Chronology of Biotechnological studies on animals – Law & legislation on animal experimentation in India and world Moral status of animals as objects of experiments –Moral responsibility of scientists over animal experiments. Personhood – Abortion – Bioethical issues in reproduction, population explosion and control – Voluntary euthanasia & physician assisted suicide – Organ donation & Transplantation.

UNIT IV: INTELLECTUAL PROPERTY RIGHTS

12

Sovereignty rights, CBD, bioethics and patenting General agreement on trade and tariffs Indian sui-generis system for animal variety and farmer's rights protection act. WTO with reference to biotechnological affairs, TRIPs.

UNIT V: PATENT SYSTEMS

12

General Introduction: Patent claims, the legal decision, Basic Requirements of Patentability: Patentable subject matter, novelty and the public domain, non obviousness Special issues in Biotechnology Patents: Disclosure requirements, Collaborative research, Competitive research, Recent Developments in Patent System and Patentability of biotechnological inventions.

TEXT BOOKS

1. BAREACT, Indian Patent Act 1970 Acts & Rules, Universal Law Publishing Co. Pvt. Ltd., 2007
2. Kankanala C., Genetic Patent Law & Strategy, 1st Edition, Manupatra, Information Solution Pvt. Ltd., 2007
3. S.S. Kanka Entrepreneurship Development, S. Chand and Co, New Delhi 1997

REFERENCE BOOKS

1. Beier, F.K., Crespi, R.S. and Straus, T. Biotechnology and Patent protection-Oxford and IBH Publishing Co. New Delhi.
2. Sasson A, Biotechnologies and Development, UNESCO Publications.
3. Singh K, Intellectual Property rights on Biotechnology, BCIL, New Delhi
4. Regulatory Framework for GMOs in India (2006) Ministry of Environment and Forest, Government of India, New Delhi
5. www.nordicpr.com
6. www.ip-links.de

BBM405	BIOSENSORS AND TRANSDUCER							L	T	P	C		
	Total Contact Hours - 45							3	0	0	3		
	Prerequisite – Basic electrical & electronics engg												
	Course Designed by – Dept of BIO Informatics												
OBJECTIVES													
- Understand the purpose of measurement, the methods of measurements, errors associated with measurements. - Know the principle of transduction, classifications and the characteristics of different transducers and study its biomedical applications. - Know the different display and recording devices.													
COURSE OUTCOMES (COs)													
CO1	Describe the purpose and methods of measurements												
CO2	Explain different display and recording devices for various applications.												
CO3	Know the principle of transduction, classifications and the characteristics of different transducers and study its biomedical applications.												
CO4	Remember and understand the concepts, types, working and practical applications of important biosensors.												
CO5	Know some of the commonly used biomedical transducers												
CO6	The students learn how to theoretically design a biosensor device to solve a critical analytical need.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M		M		H				
	CO2				M		M		H				
	CO3				M		M		H				
	CO4				M		M		H				
	CO5				M		M		H				
	CO6						M						
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
							✓						
4		37 th Meeting of Academic Council, May 2015											

UNIT - I SCIENCE OF MEASUREMENT 9

Units and Standards - calibration methods - statics calibration - classification of errors, error analysis - statistical methods - odds and uncertainty.

UNIT - II CHARACTERISTICS OF TRANSDUCERS 9

Static characteristics - accuracy, precision, sensitivity, linearity etc - mathematical model of transducers - zero first - order and second - order transducers - response to impulse step, ramp and sinusoidal inputs.

UNIT - III VARIABLE RESISTANCE TRANSDUCERS 9

Principle of operation, construction details, characteristics and applications of resistance potentiometers, strain gauges, resistance thermometers, thermistors, hot-wire anemometer, piezoresistive sensors and humidity sensors.

UNIT - IV BIOSENSORS - PHYSIOLOGICAL RECEPTORS - J RECEPTORS 9

Chemoreceptors, Baroreceptors, Touch receptors, Biosensors - Working Principle and Types, Applications.

UNIT - V OTHER TRANSDUCERS 9

Piezoelectric transducers, magnetostrictive transducer, IC sensor digital transducers - smart sensor - fibre optic transducers.

Text Books:

1. Doebelin. E. O, Measurement Systems, McGraw Hill Book Co. 1998
2. Renganathan S, Transducer Engineering, Allied Publishers, Chennai, 2000.

REFERENCE:

1. https://www1.ethz.ch/lbb/Education/Biosensors/Lecture_1_overview.pdf

BIT012	BIOINFORMATICS	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – Biology for Engineers				
	Course Designed by – Dept of BIO Informatics				
OBJECTIVES • To introduce Bioinformatics-Elementary commands and Protocols, ftp, telnet, http. Primer on information theory. • To study Strings-Edit distance two strings-string similarity local alignment gaps-parametric sequence alignments. • To study Introduction to databases-database search-Algorithms issues in database search-sequence database search FASTA-BLAST. • Introduction to Ultrasonic trees-parsimony-Ultrametric problem-perfect phylogeny.					

DNA Mapping and sequencing-Map alignment-Large scale sequencing and alignment.													
COURSE OUTCOMES (COs)													
CO1	To learn bioinformatics and the protocols.												
CO2	To learn Strings-Edit distances two strings-string similarity local alignment gaps-parametric sequence alignments.												
CO3	To have a clear view on Amino acid substitution matrices PAM and BLOSSUM.												
CO4	To learn Ultrasonic trees-parsimony-Ultrametric problem-perfect phylogeny-phylogenetic alignment.												
CO5	To DNA Mapping and sequencing-Map alignment-Large scale sequencing.												
CO6	Students will be able to conduct basic bioinformatics research.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				L		H		M			L	M
	CO2				L		H		M			L	M
	CO3				L		H		M			L	M
	CO4				L		H		M			L	M
	CO5				L		H		M			L	M
	CO6				L		H		M			L	M
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
							✓						
4		37 th Meeting of Academic Council, May 2015											

UNIT – I WHATIS BIOINFORMATICS

9

Scope of Bioinformatics-Elementary commands and Protocols, ftp, telnet, http. **Primer on information theory.**

UNIT – II SEQUENCING ALIGNMENT AND DYNAMIC PROGRAMMING 9

Introduction-Strings-Edit distance two strings-string similarity local alignment gaps-parametric sequence alignments-suboptimal alignments-multiple alignment-common multiple alignment methods.

UNIT – III SEQUENCE DATABASE AND THEIR USE 9

Introduction to databases-database search-Algorithms issues in database search-sequence database search FASTA-BLAST-Amino acid substitution matrices PAM and BLOSSUM.

UNIT – IV EVOLUTIONARY TREES AND PHYLOGENY 9

Ultrasonic trees-parsimony-Ultrametric problem-perfect phylogeny-phylogenetic alignment-connection between multiple alignment and tree construction.

UNIT – V SPECIAL TOPICS IN BIOINFORMATICS 9

DNA Mapping and sequencing-Map alignment-Large scale sequencing and alignment-Shotgun-DNA sequencing-Sequence assembly-Gene predictions-Molecular predictions with DNA strings

TEXT BOOK:

1. R.D.Lele _-Computer in Medicinel Tata McGraw Hill, New York, 1999.

REFERENCES:

1. S.K.Chauhan -PC Organisation, S.K.Kataria and Sons, Delhi 2000.
2. Harold Sackamn —Bio Medical Information Technology, Academic Press, New York.
3. https://www.lehigh.edu/~inbios21/PDF/Fall2008/Lopresti_11142008.pdf

NON MAJOR ELECTIVE-III

BET603	TELECOMMUNICATION SWITCHING SYSTEMS	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – Computer Networks				
	Course Designed by – Dept of Information Technology				
OBJECTIVES To impart knowledge on basics of antenna theory. To study antenna arrays To study aperture antennas To learn special antennas such as frequency independent and broad band antennas. To understand various techniques involved in various antenna parameter measurements.					
COURSE OUTCOMES (COs)					
CO1	Define various antenna parameters				
CO2	Analyze radiation patterns antennas				
CO3	Evaluate antennas for given specifications				
CO4	Illustrate techniques for antenna parameter measurements				
CO5	Discuss radio wave propagation				
CO6	Analyze Performance of spread spectrum communication system.				
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low					

1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M		M			M			L
	CO2				M		M			M			L
	CO3				M		M			M			L
	CO4				M		M			M			L
	CO5				M		M			M			L
	CO6						M			M			L
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
	✓												
4		37 th Meeting of Academic Council, May 2015											

UNIT - I SWITCHING SYSTEMS

9

Introduction-Message switching-Circuit switching-Manual switching-Functions of switching system- Strowger step by step system-Register translator-Senders-Distribution frames-Cross bar systems-General trunking-Electronic switching-Reed electronic systems-Digital switching systems.

UNIT- II TIME DIVISION SWITCHING

9

Introduction-Space and time switching-Time division switching networks-grades of services-Time division switching networks-non blocking networks-synchronization.

UNIT -III TELECOMMUNICATION TRAFFIC

9

Introduction-Unit of traffic-Congestion-Traffic measurement-A mathematical model-Local call systems-Queuing systems.

UNIT -IV TELECOMMUNICATION SIGNALLING

9

Introduction-Customer line signaling- Audio frequency junction and trunk circuits-FDM carrier systems-PCM signaling- Inter register signaling- Common channel signaling principles-CCITT signaling, CCITT signaling, Digital customer line signaling.

UNIT-V TELECOMMUNICATION NETWORKS

9

Introduction-Analog networks-Integrated digital networks-Integrated service digital networks-Cellular radio networks-Intelligent networks-Private networks-numbering-charging-Routing-Network management.

TEXTBOOK:

1. J.E FLOOD, "Telecommunication Switching, Traffic and Networks" Pearson Education.

REFERENCE BOOK:

1. T.V.SWAMINATHAN, Telecommunication Switching System & Networks, PHI.
2. <http://www.newagepublishers.com/samplechapter/000969.pdf>

BET703	TELECOMMUNICATION SYSTEM MODELLING					L	T	P	C				
	Total Contact Hours – 45					3	0	0	3				
	Prerequisite – Probability and Queuing Theory												
	Course Designed by – Dept of Information Technology												
OBJECTIVES To impart knowledge on basics of microwave electron beam devices and their applications in X band frequency. Understand Microwave sources and amplifiers. To study Microwave semiconductor devices & applications To become familiar with the concepts of Microwave Integrated Circuits. To know the concepts of Microwave Measurements													
COURSE OUTCOMES (COs)													
CO1	Describe the various waveguide components.												
CO2	Classify the microwave tubes (Linear beam tubes and Crossed field tubes)												
CO3	Discuss the various microwave semiconductor devices as oscillators for their Performance.												
CO4	Design of waveguide components and microwave transmission lines for a given set of parameters.												
CO5	Identify the measurement techniques for different parameters like VSWR, impedance, frequency, power of microwave sources and loads.												
CO6	Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M		M		M				L
	CO2				M		M		M				L
	CO3				M		M		M				L
	CO4				M		M		M				L
	CO5				M		M		M				L
	CO6				M		M		M				L

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/Seminar/Internship (PR)
							✓		
4		37 th Meeting of Academic Council, May 2015							

UNIT-I INTRODUCTION

9

Simulation of Random Variables and Random Process
Generation of random number and sequences, Gaussian and uniform random numbers, Correlated random sequences, Testing of random numbers generators, Stationary and uncorrelatedness, Goodness of fit test.

UNIT-II MODELING OF COMMUNICATION SYSTEMS

9

Radio frequency and optical sources, Analog and Digital signals, Communication channel and models, Free space channels, Multipath channel and discrete channel noise and interference.

UNIT-III ESTIMATION OF PERFORMANCE MEASURE FOR SIMULATION

9

Quality of estimator, Estimation of SNR, Probability density function and bit error rate, Monte Carlo method, Importance sampling method, Extreme value theory.

UNIT-IV SIMULATION AND MODELING METHODOLOGY

9

Simulation environment, Modeling considerations, Performance evaluation techniques, Error source simulation Validation.

UNIT-V CASE STUDIES

9

Simulations of QAM digital radio link in a fading environment, Light wave communication link and satellite system.

TEXT BOOKS:

- 1 MC.Jeruchim, P.Balaban and K.Samshanmugam, -Simulation of Communication Systems, Plenum press, New York, 1992.
- 2 Averill.M.Law and W.David Kelton, -Simulation Modeling and Analysis, McGraw-Hill, 1991.

REFERENCES:

- 1 Geoffrey Gordon, -System Simulation, Prentice Hall of India, 2nd Edition, 1992.
- 2 W.Turin, -Performance Analysis of Digital Communication Systems, Computer Science Press, New York, 1990.
- 3 Jerry banks and John S.Carson, -Discrete Event System Simulation, Prentice Hall of India, 1984.

BBA001	PRINCIPLES OF MANAGEMENT AND ORGANIZATIONAL BEHAVIOUR	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – Management				
	Course Designed by – Department of Management Studies				
OBJECTIVES					
Familiarize the students with the fundamental concepts of Management and to highlight the approaches in organization behavior					
COURSE OUTCOMES (COs)					
CO1	Understanding the concepts of Management				
CO2	Knowledge on Management Functions				
CO3	Understanding the Organization Theory & Approach.				
CO4	Knowledge on the Concepts of Motivation				
CO5	Clear insight on the factors contributing to discipline				
CO6	In-depth Understanding about the concepts of Group Behavior				

UNIT -I NATURE OF MANAGEMENT

9

Definition – theory and practice – effective management – Management : Science of Art – Management in India. Development of Management thoughts – Taylor’s – Henry Fayol – Hawthorne experiment – Barnard & Social system – Herbert Simon – Peter Drucker – Various approaches – Management thoughts.

UNIT- II MANAGEMENT PROCESS

9

Co-ordination – Functions of management – Managers and environment – External and internal Business Ethics – Planning – Fundamentals – Definitions & Features – Steps in planning – types of planning – Objectives – Concepts and features – Hierarchy of objectives – role – Process of MBO – Policy & Strategy – Decision making process – Individual Vs Group Decisions.

UNIT- III ORGANIZATION STRUCTURE

9

Organizing – Theory & Approach – Authority & Responsibility – Delegation – Centralization & Decentralization – Line & Staff Relationship – Staffing – Fundamentals – System approach – Manpower Planning – Recruitment & Selection – Training and development – Performance appraisal – Direction – Fundamentals Motivation – Theories of Motivation- Maslow’s – Herzberg’s – McClelland’s theory X, Y & Z leadership – Theories and Styles – Communication – Type – Controlling – System and Process.

UNIT- IV ORGANIZATIONAL BEHAVIOUR

9

Definition – Organization – Managerial Role and Functions – Organizational Approaches, Individual behaviour – Causes – Environmental effect – Behaviour and performance, perception – Organizational implications, Personality – Contributing factors – Dimension, Motivation – Need Theories – Process Theories – Job satisfaction, Learning and Behaviour – Learning Curves, Work Design and Approaches.

UNIT -V GROUP BEHAVIOUR**9**

Groups – Contributing factors –Group Norms, types – Causes – Intergroup relations – Conflict and Resolution – Change Process –Resistance to change.

TEXT BOOKS:

1. Herald Knootz and Heinz weihrich, ‘_Essentials of Management’, McGraw Hill Publishing Company, Singapore International Edition, 2004.
2. Ties AF, Stoner and R. Edward Freeman, ‘-Management’ Prentice Hall of India Pvt. Ltd., New Delhi -110011, 1995.

REFERENCE BOOKS :

1. Joseph I. Massie ‘_Essentials of Management’, Prentice Hall of India Pvt. Ltd, New Delhi - 110011, 2004.
2. L.M. Prasad –Principles and Practice of Management, Sultan Chand & Sons.2001
3. Uma Sekaran, ‘-Organizational Behaviour’, Tata McGraw Hill, 2007.
4. <https://www.extension.harvard.edu>

BBM701		DIGITAL AND MEDICAL IMAGE PROCESSING					L	T	P	C			
		Total Contact Hours - 45					3	0	0	3			
		Prerequisite – MATHEMATICS III & DSP											
		Course Designed by – Dept of Information Technology											
OBJECTIVES													
The aim of the courses to show how to extract, model, and analyze information from medical data and application in order to help diagnosis , treatment and monitoring of diseases through computer sciences.													
COURSE OUTCOMES (COs)													
CO1		Have a Fundamental Knowledge of digital image processing with Fourier transforms.											
CO2		Acquire knowledge about the image sampling, Modeling and quantization											
CO3		Have a fundamental knowledge of image enhancement, its process and types of filters used in image processing											
CO4		Have knowledge about image analysis, classification and reconstruction of act and MRI images.											
CO5		Acquire the skills in the transmission of biological images.											
CO6		ability to apply knowledge of mathematics, science and engineering											
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l

2	CO1					M	M				M		H
	CO2					M	M				M		H
	CO3					M	M				M		H
	CO4					M	M				M		H
	CO5					M	M				M		H
	CO6					M	M				M		H
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
							✓						
4		37 th Meeting of Academic Council, May 2015											

UNIT-I DIGITAL IMAGE FUNDAMENTAL

9

Elements of digital image processing systems, Elements of Visual perception, Image formation model, Image sampling and quantization, aliasing, zooming and shrinking of digital images. Monochrome Vision Model, Colour Vision Model. Image transforms –Discrete Fourier transform, Properties of Fourier transform, Fast Fourier transform and inverse fast Fourier transform.

UNIT-II IMAGE FUNDAMENTALS

9

Image sampling and quantization, Matrix and Singular Value representation of discrete images. Image pre-processing, point operation, Histogram modelling, spatial operations, transform operations.

UNIT-III IMAGE ENHANCEMENT

9

Enhancement by point processing –Simple intensity transformation –Histogram processing – Image subtraction –Image averaging. Spatial filtering –Smoothing filters, sharpening filters. Enhancements in frequency domain-Low pass filtering –High pass filtering.

UNIT-IV IMAGE ANALYSIS, CLASSIFICATION AND RECONSTRUCTION OF ACT AND MRI IMAGES

9

Image analysis, Spatial feature extraction, edge detection, Image segmentation. Image reconstruction from projections, Random transform, filter back projection algorithm, reconstruction of CT images, Imaging methods in MF images, fourier reconstruction of MRI.

UNIT-V TRANSMISSION OF MEDICAL IMAGES

9

Medical Image, data compression of transmission, transform coding, pixel Coding, predictive coding, Interference coding.

TEXT BOOKS:

- 1 Kavyan Najarian and Robert Splerstor||Biomedical Signals and Image Processing||, CRC– Taylor and Francis, New York, 1991.
- 2 John L. Semmlow, –Biosignal and Biomedical Image Processing Matlab Based applications| Marcel Dekker Inc., New York, 2004.

REFERENCE:

1. <http://www.cs.uu.nl/docs/vakken/ibv/reader/readerINFOIBV.pdf>

BBM054	MEDICAL INFORMATICS							L	T	P	C		
	Total Contact Hours - 45							3	0	0	3		
	Prerequisite – Biology for Engineers												
	Course Designed by – Dept of BIO Informatics												
OBJECTIVES													
To learn about the historical information of hospitality and recent trends in the Hospital information system.													
COURSE OUTCOMES (COs)													
CO1		Have Knowledge about the historical information of hospital.											
CO2		Have a well-founded knowledge of overview of computer hardware used in the Hospital Information system											
CO3		Have a fundamental knowledge of Hospital Information system.											
CO4		Have a skills about the visual programming and multimedia information.											
CO5		Acquire the skills integrated medical information system.											
CO6		understanding and appreciating the range of academic disciplines that constitute the interdisciplinary field of medical informatics, and comprehending their relationships in this field of study;											
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	H	I	j	k	l
2	CO1				H			M	H			L	M
	CO2				H			M	H			L	M
	CO3				H			M	H			L	M
	CO4				H			M	H			L	M
	CO5				H			M	H			L	M
	CO6				H			M	H			L	M

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)
							✓		
4		37 th Meeting of Academic Council, May 2015							

UNIT-I BIOMEDICAL INFORMATION SYSTEM 9

Historical Highlights of health care information system-Biomedical information system-problems and pitfalls-History and evolution of Electronic resources, Multimedia components.

UNIT-II OVERVIEW OF COMPUTER HARDWARE 9

Motherboard and its logic-Memory and I/O interfacing/memory and input output mapping-I/O peripherals and Add-on cards.

UNIT-III HOSPITAL INFORMATION SYSTEM 9

Concept of HIS its position in hospital-introduction of a computerized HIS Automation of medical record-cost and Benefits of HIS-Modems and Networking in Hospitals.

UNIT-IV VISUAL PROGRAMMING AND MULTIMEDIA INFORMATION 9

Visual Basic Principles and Programming-Design, Production and Testing of Multimedia based HIS.

UNIT-IV INTEGRATED MEDICAL INFORMATION SYSTEM 9

Integration of inter and intra hospital information system. Role of expert systems-web based Multimedia information system-Video-conferencing-PowerPoint Presentation.

TEXT BOOK:

1. R.D.Lele _-Computer in Medicine| Tata McGraw Hill, New York, 1999.

REFERENCES:

1. S.K.Chauhan -PC Organisation|, S.K.Kataria and Sons, Delhi 2000.
 2. Harold Sackamn —Bio Medical Information Technology|, Academic Press, New York. 3
- <http://www2.hawaii.edu/~nreed/ics691BMI2/discpapers/handbookMICH7.pdf>

OPEN ELECTIVE-I

BIT036	SEMANTIC WEB	L	T	P	C
---------------	---------------------	----------	----------	----------	----------

		Total Contact Hours - 45					3	0	0	3			
		Prerequisite – Web Programming											
		Course Designed by – Dept of Information Technology											
OBJECTIVES - To understand the fundamentals of ontologies. To know about the Semantic Web and the different languages used in the context of semantic web. - To learn the methodologies used for ontology learning for semantic web. - To know about ontology management and tools used for Ontology annotation. - To comprehend the role of semantics in web services and to discuss some of the security issues.													
COURSE OUTCOMES (COs)													
CO1	On successful completion of the module students should be able to:												
CO2	understand the rationale behind Semantic Web.												
CO3	model ontologies using Resource Description Framework (RDF).												
CO4	design RDF Schemas for ontologies.												
CO5	model and design ontologies using Web Ontology Language (OWL).												
CO6	query ontologies using SPARQL.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	L
2	CO1			H		H	M			H			
	CO2			H		H	M			H			
	CO3			H		H	M			H			
	CO4			H		H	M			H			
	CO5			H		H	M			H			
	CO6			H		H	M			H			
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
					✓								
4		37 th Meeting of Academic Council, May 2015											

UNIT I INTRODUCTION

9

Components – Types – Ontological Commitments – Ontological Categories – Philosophical Background - Knowledge Representation Ontologies – Top Level Ontologies – Linguistic Ontologies – Domain Ontologies – Semantic Web – Need – Foundation – Layers – Architecture.

UNIT II LANGUAGES FOR SEMANTIC WEB AND ONTOLOGIES

10

Web Documents in XML – RDF - Schema – Web Resource Description using RDF- RDF Properties – Topic Maps and RDF – Overview – Syntax Structure – Semantics – Pragmatics - Traditional Ontology Languages – LOOM- OKBC – OCML - Flogic Ontology Markup Languages – SHOE – OIL - DAML + OIL- OWL

UNIT III ONTOLOGY LEARNING FOR SEMANTIC WEB

10

Taxonomy for Ontology Learning – Layered Approach – Phases of Ontology Learning – Importing and Processing Ontologies and Documents – Ontology Learning Algorithms - Evaluation

UNIT IV ONTOLOGY MANAGEMENT AND TOOLS

9

Overview – need for management – development process – target ontology – ontology mapping – skills management system – ontological class – constraints – issues. Evolution – Development of Tools and Tool Suites – Ontology Merge Tools – Ontology based Annotation Tools.

UNIT V APPLICATIONS

7Web

Services – Semantic Web Services - Case Study for specific domain – Security issues – current trends.

TEXT BOOKS:

1. Asuncion Gomez-Perez, Oscar Corcho, Mariano Fernandez-Lopez, -Ontological Engineering: with examples from the areas of Knowledge Management, e-Commerce and the Semantic Web| Springer, 2004
2. Grigoris Antoniou, Frank van Harmelen, -A Semantic Web Primer Cooperative Information Systems|, The MIT Press, 2004

REFERENCES:

1. Alexander Maedche, -Ontology Learning for the Semantic Web|, Springer; 1 edition, 2002
2. John Davies, Dieter Fensel, Frank Van Harmelen, -Towards the Semantic Web: Ontology – Driven Knowledge Management|, John Wiley & Sons Ltd., 2003.
3. Dieter Fensel (Editor), Wolfgang Wahlster, Henry Lieberman, James Hendler, -Spinning the Semantic Web: Bringing the World Wide Web to Its Full Potential|, The MIT Press, 2002
4. Michael C. Daconta, Leo J. Obrst, Kevin T. Smith, -The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management|, Wiley, 2003
5. Steffen Staab (Editor), Rudi Studer, -Handbook on Ontologies (International Handbooks on Information Systems)|, Springer 1st edition, 2004
- 6 [http://www.ebooks-for-all.com/ .. /detail/Semantic-Web](http://www.ebooks-for-all.com/.. /detail/Semantic-Web)

BBA002	ENTREPRENEURSHIP DEVELOPMENT							L	T	P	C		
	Total Contact Hours - 45							3	0	0	3		
	Prerequisite – Value Education and Professional Ethics												
	Course Designed by – Dept of Information Technology												
OBJECTIVES													
- To learn about types of entrepreneurship. - To study about major motivation methods. - To study about government policies for small scale industries.													
COURSE OUTCOMES (COs)													
CO1	To learn the difference between entrepreneur and intreprenuer.												
CO2	To learn about entrepreneurship development programs.												
CO3	To study about economic feasibility methods												
CO4	To learn about taxation.												
CO5	To study about corrective measures methods.												
CO6	To know about the Factors Affecting Entrepreneurial Growth												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H		M			H		M				
	CO2				M			H			M		
	CO3												H
	CO4					H						M	
	CO5		H							M			
	CO6				M		H				H		M

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)
							✓		
4		37 th Meeting of Academic Council, May 2015							

UNIT I ENTREPRENEURSHIP

8

Entrepreneur- Types of Entrepreneurs - Difference Between Entrepreneur and Interpreneur- Role of Entrepreneurship in Economic Growth- Women and Rural Entrepreneurship - Factors Affecting Entrepreneurial Growth.

UNIT II MOTIVATION

8

Major Motives Influencing Entrepreneur – Achievement Motivation Training, Self Rating – Business Game – Thematic Apperception Test – Stress Management – Entrepreneurship Development Programs – Need, Objectives.

UNIT III BUSINESS

9

Small Enterprise – Definition, Classification – Characteristics- Ownership Structure – Project Formulation – Steps Involved in Setting up a Business – Identifying, Selecting a Good Business Opportunity- Market Survey and Research, Techno Economic Feasibility Assessment – Preparation of Preliminary Project Reports- Project Appraisal- Sources of Information- Classification of Needs and Agencies.

UNIT IV FINANCING AND ACCOUNTING

10

Need – Sources of Finance- Terms Loans, Capital Structure- Financial Institutions, Management of Working Capital, Costing, Break Even Analysis, Network Analysis Techniques of PERT/ CPM –Taxation – Income Tax – Excise Duty – Sales Tax.

UNIT V SUPPORT TO ENTREPRENEURS

10

Sickness in Small Business- Concept, Magnitude, Causes and Consequences, Corrective Measures- Government Policy for Small Scale Enterprises- Growth Strategies in Small Industry – Expansion- Diversification, Joint Venture, Merger, Sub Contracting.

TEXT BOOKS:

- 1 S.S.Khanka, -Entrepreneurial Development, S. Chand & Co. Ltd., Ram Nagar, New Delhi, 1999.
- 2 Hisrich RD and Peters MP, -Entrepreneurship, 5th Edition, Tata McGraw Hill, 2002.

REFERENCES:

- 1 Rabindra Kanungo, –Entrepreneurship and Innovation, Sage Publications, New Delhi
- 2 <http://www.iibms.org/pdf/Ebooks/Management%20and%20Entrepreneurship.pdf>

	HACKING TECHNIQUES						L	T	P	C			
	Total Contact Hours - 45						3	0	0	3			
	Prerequisite – Cryptography and Security												
	Course Designed by – Dept of Information Technology												
OBJECTIVES This course teaches students the underlying principles and many of the techniques associated with the cyber security practice known as penetration testing or ethical hacking. Students will learn about the entire penetration testing process including planning, reconnaissance, scanning, exploitation, post-exploitation, and result reporting. The course will provide the fundamental information associated with each of the methods employed and insecurities identified. In all cases, remedial techniques will be explored. Students will develop an excellent understanding of current cyber security issues and ways that user, administrator, and programmer errors can lead to exploitable insecurities.													
COURSE OUTCOMES (COs)													
CO1	Defend a computer against a variety of different types of security attacks using a number of hands-on techniques.												
CO2	Defend a LAN against a variety of different types of security attacks using a number of hands-on techniques.												
CO3	Practice and use safe techniques on the World Wide Web.												
CO4	Prepare to take the CompTIA Security+ certification exam.												
CO5	To Understand the Cyber Security issues.												
CO6	About Google Hacking												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1			M		M	H					L	L
	CO2			M		M	H					L	L
	CO3			M		M	H					L	L
	CO4			M		M	H					L	L
	CO5			M		M	H					L	L

	CO6			M		M	H				L	L
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)			
								✓				
4		37 th Meeting of Academic Council, May 2015										

UNIT I ETHICAL HACKING

9

Introduction, Networking & Basics, Foot Printing, Google Hacking, Scanning, Windows Hacking, Linux Hacking, Trojans & Backdoors, Virus & Worms, Proxy & Packet Filtering, Denial of Service, Sniffer, Social Engineering,

UNIT II NETWORK SECURITY

9

Introduction to Computer Systems and Networks , information systems and networks (including wireless networks) and their role in industry business and society, System and Network Vulnerability and Threats to Security , various types of attack and the various types of attackers in the context of the vulnerabilities associated with computer and information systems.

UNIT III HACKING TECHNIQUES

9

Networks Physical Security, Steganography, Cryptography, Wireless Hacking, Firewall & Honeypots, IDS & IPS, Vulnerability, Penetration Testing, Session Hijacking, Hacking Web Servers, SQL Injection, Cross Site Scripting, Exploit Writing, Buffer Overflow, Reverse Engineering, Email Hacking, Incident Handling & Response, Bluetooth Hacking, Mobile sPhone Hacking

UNIT IV ETHICAL HACKING

9

An introduction to basic ethical hacking tools and usage of these tools in a professional environment in a form of project

UNIT V PROFESSIONAL INTEGRITY

9

An introduction to the particular legal, professional and ethical issues likely to face the domain of ethical hacking. ethical responsibilities, professional integrity and making appropriate use of the tools and techniques associated with ethical hacking.

BIT039	MOBILE COMMUNICATION	L	T	P	C
	Total Contact Hours - 45	3	0	0	3

		Prerequisite – TCP/IP Principles and Architecture											
		Course Designed by – Dept of Information Technology											
OBJECTIVES													
- To provide an overview of Wireless Communication networks area and its applications in communication engineering. - To appreciate the contribution of Wireless Communication networks to overall technological growth. - To understand the various terminology, principles, devices, schemes, concepts, algorithms and different methodologies used in Wireless Communication Networks.													
COURSE OUTCOMES (COs)													
CO1		To understand the basics of Wireless Communication Networks.											
CO2		To motivate the students to pursue research in the area of wireless communication.											
CO3		Apply statistical models of multipath fading.											
CO4		Understand the multiple radio access techniques.											
CO5		Understand the multiuser detection techniques.											
CO6		Understand the information and coding theory for wireless/mobile networks.											
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		M		M		H		M	M			H
	CO2		M		M		H		M	M			H
	CO3		M		M		H		M	M			H
	CO4		M		M		H		M	M			H
	CO5		M		M		H		M	M			H
	CO6						H		M	M			H

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)
							✓		
4		37 th Meeting of Academic Council, May 2015							

UNIT I WIRELESS COMMUNICATION 9

Cellular systems- Frequency Management and Channel Assignment- types of handoff and their characteristics, dropped call rates & their evaluation -MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks

UNIT II WIRELESS NETWORKS 9

Wireless LAN – IEEE 802.11 Standards – Architecture – Services – Mobile Ad hoc Networks- WiFi and WiMAX - Wireless Local Loop

UNIT III MOBILE COMMUNICATION SYSTEMS 9

GSM-architecture-Location tracking and call setup- Mobility management- Handover- Security- GSM SMS –International roaming for GSM- call recording functions-subscriber and service data mgt —Mobile Number portability -VoIP service for Mobile Networks – GPRS –Architecture- GPRS procedures-attach and detach procedures-PDP context procedure-combined RA/LA update procedures-Billing

UNIT IV MOBILE NETWORK AND TRANSPORT LAYERS 9

Mobile IP – Dynamic Host Configuration Protocol-Mobile Ad Hoc Routing Protocols–Multicast routing-TCP over Wireless Networks – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit / Fast Recovery – Transmission/Timeout Freezing-Selective Retransmission – Transaction Oriented TCP- TCP over 2.5 / 3G wireless Networks

UNIT V APPLICATION LAYER 9

WAP Model- Mobile Location based services -WAP Gateway –WAP protocols – WAP user agent profile- caching model-wireless bearers for WAP - WML – WMLScripts - WTA - iMode-SyncML

TEXT BOOKS:

- 1 Jochen Schiller, -Mobile Communications], Second Edition, Pearson Education, 2000, UNIT III
- 2 William Stallings, —Wireless Communications and Networks], Pearson Education,2002.

REFERENCES:

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, -Principles of Wireless Networks, First Edition, Pearson Education, 200UNIT III
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, -Principles of Mobile Computing, Springer, 200UNIT III
3. C.K.Toth, -AdHoc Mobile Wireless Networks, First Edition, Pearson Education, 2002.
4. <https://leaksource.files.wordpress.com/2014/08/hacking-the-art-of-exploitation.pdf>

BIT040		HIGH SPEED NETWORKS								L	T	P	C
		Total Contact Hours - 45								3	0	0	3
		Prerequisite – TCP/IP Principles and Architecture											
		Course Designed by – Dept of Information Technology											
OBJECTIVES													
This course gives an overview of High speed computer networks and TCP/IP protocols. It also discusses the security and network management aspects.													
COURSE OUTCOMES (COs)													
CO1		To learn High speed networks, Traffic and congestion management.											
CO2		To understand resource allocation and service management approaches.											
CO3		Apply statistical models of multipath fading.											
CO4		Understand the multiple radio access techniques.											
CO5		Understand the multiuser detection techniques.											
CO6		Understand the information and coding theory for wireless/mobile networks.											
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M		H			M		L	M
	CO2				M		H			M		L	M
	CO3				M		H			M		L	M
	CO4				M		H			M		L	M
	CO5				M		H			M		L	M
	CO6				M		H			M		L	M

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)
								✓	
4		37 th Meeting of Academic Council, May 2015							

UNIT-I HIGH SPEED NETWORKS

9

Introduction-frame relay networks –ATM protocol architecture-ATM logical connection –ATM cells-ATM service categories -AAL- high speed LANS: the emergence of high speed LANS-Ethernets-fiber channel-wireless LAN.

UNIT-II CONGESTION CONTROL

9

Congestion control in data networks and internets-link level flow and error control TCP Traffic - congestion control in ATM networks- Interior routing protocols.

UNIT-III QOS AND SWITCHING

9

Integrated service architecture-queuing discipline -random early detection differentiated services protocol for QOS support- RSVP- Multiprotocol Label switching - Real time transport protocol- IP v6.

UNIT-IV WIRELESS LAN

9

Local broad band and Ad hoc networks. Introduction to wireless LANS-IEEE 802.11 WLAN- WATM-HIPERLAN-Ad hoc networking and WPAN.

UNIT-V NETWORK MANAGEMENT AND APPLICATION

9

Network management- choosing a configuration method-MIB-SNMP-XMLCORBA-COPS-VPNS-MobileIP-voice over IP

TEXTBOOKS:

1. Williams Stallings, ||High Speed networks And Internet Performance and Quality Of Service||, Pearson Second Edition, 2002.
2. Kaven Pahlavan And Prashant Krishnamoorthy, -Principles Of Wireless Network||, Prentice Hall Of India, 2010
3. Adrian Farrel,|| The Internet And Its Protocols||, Elsevier Publications, 2011.

REFERENCES:

1. Behrouz A. Forouzan, -Data Communication and Computer Networking||, 4th edition, 2011.
2. Larry L. Peterson and Bruce S.Davie, |Computer Networks||, Third edition, Elsevier Publications, 2003.

3. <http://www.kiv.zcu.cz/~ledvina/vyuka/PDS/PDS-tut/HighSpeedNetworks/hsn0101.pdf>

OPEN ELECTIVE-II

BBA003	MARKETING MANAGEMENT						L	T	P	C			
	Total Contact Hours – 45						3	0	0	3			
	Prerequisite – Value Education and Professional Ethics												
	Course Designed by – Dept of Management												
OBJECTIVES													
Marketing objectives are goals set by a business when promoting its products or services to potential consumers that should be achieved within a given time frame. In other words, marketing objectives are the marketing strategy set in order to achieve the overall organizational objectives. A company's marketing objectives for a particular product might include increasing product awareness among targeted consumers, providing information about product features and reducing consumer resistance to buying the product.													
COURSE OUTCOMES (COs)													
CO1	Mastery in analysing and synthesising marketing research												
CO2	Foster critical strategic marketing thinking												
CO3	Perform marketing functions (digital, luxury, media, services, branding, etc.)												
CO4	Evaluate, analyse and implement key performance indicators												
CO5	Conduct global marketing strategies												
CO6	Implement the marketing Environment												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H								M		
	CO2			M					H				
	CO3				H			M					
	CO4						H			M			
	CO5					M					H		
	CO6	H										H	M

3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)
								✓	
4		37 th Meeting of Academic Council, May 2015							

UNIT I INTRODUCTION 9

Definition- Marketing Process- Dynamics- Needs- Wants and demands-Marketing Concepts- Environment- Mix- Types- Philosophies- Selling Vs Marketing- **Organizational- Industrial Vs Consumer Marketing**- Consumer Goods- Industrial Goods- Product Hierarchy.

UNIT II BUYING BEHAVIOUR & MARKET SEGMENTATION 9

Cultural- Demographic Factors- Motives- Types- Buying Decisions- Segmentation factors- Demographic- **Psychographic & Geographic Segmentation**- Process- Patterns.

UNIT III PRODUCT PRICING AND MARKETING RESEARCH 9

Objectives- Pricing- Decisions & Pricing Methods- Pricing Management- **Introduction- Uses- Process of Marketing Research.**

UNIT IV MARKETING PLANNING AND STRATEGY FORMULATION 9

Components of marketing plan- Strategy formulation and marketing process- Implementation- Portfolio analysis- **BCG- GEC grids.**

UNIT- V ADVERTISING, SALES PROMOTION AND DISTRIBUTION 9

Characteristics- Impact- Goals- Types- Sales promotion- Point of Purchase- **Unique selling proposition- Characteristics- Whole selling**- Retailing- Channel Design- Logistics- Modern trends in retailing.

TEXT BOOKS:

1. Ramasamy and Nama Kumari, -Marketing Environment: Planning, implementation and control the Indian context, 2002
2. Govindarajan.M, -Industrial marketing management, Vikas Publishing Pvt. Ltd, 2003

REFERENCES:

1. Philip Kotler, Marketing Management, Analysis, Planning, Implementation and control, 1998.
2. Khanna O.P. – Industrial Engineering and Management, Khanna Publishers, New Delhi, 2000.
3. Green Paul.E and Donald Tull, -Research for marketing decisions, Prentice Hall of India. 1995
4. Donald S. Tull and Hawkins, -Marketing Research, Prentice Hall of India- 1997

5. http://socioline.ru/files/5/283/kotler_keller_-_marketing_management_14th_edition.pdf

BA008	TOTAL QUALITY MANAGEMENT							L	T	P	C		
	Total Contact Hours – 45							3	0	0	3		
	Prerequisite – Professional Courses												
	Course Designed by – Dept of Mechanical Engineering												
OBJECTIVES													
1 To introduce to the student about the basic terms related to quality and concepts of quality management 2 To familiarize the student about the basic principles of total quality management 3 To acquaint the student with the basic statistical tools used in process control 4 To introduce to the student about the various tools used in implementing and checking total quality management 5 To familiarize the student about the different quality systems used in auditing the quality of a company/industry/organization													
COURSE OUTCOMES (COs)													
CO1	By understanding about various quality terms, it will be helpful for the student to maintain quality in his/her organization												
CO2	The student will be able to formulate new plans/procedures to be implemented to achieve the desired quality status by knowing about the various principles of quality management												
CO3	The student will be able to analyze the periodical data in quality control using statistical tools												
CO4	The total quality management tools will help the student to understand the procedures in measuring the quality of the organization/process and will also enable him/her to identify the parameters that are improving/depriving the quality												
CO5	By knowing about the quality ISO systems, the student will be maintain processes/documentation properly so that the quality maintained by his/her organization gets recognized												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M		H		M	M		H	H
	CO2				M		H		M	M		H	H
	CO3				M		H		M	M		H	H
	CO4				M		H		M	M		H	H
	CO5				M		H		M	M		H	H
	CO6				M		H		M	M		H	H

3	Category	Humanities & Social Studies	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/Seminar/ Internship (PR)
								✓	
4		37 th Meeting of Academic Council, May 2015							

UNIT I INTRODUCTION

9

Definition of Quality, Dimensions of Quality, Quality Planning, Quality costs – Analysis Techniques for Quality Costs, Basic concepts of Total Quality Management, Historical Review, Principles of TQM, Leadership – Concepts, Role of Senior Management, Quality Council, Quality Statements, Strategic Planning, Deming Philosophy, Barriers to TQM Implementation

UNIT II TQM PRINCIPLES

9

Customer satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement – Motivation, Empowerment, Teams, **Recognition and Reward, Performance Appraisal, Benefits, Continuous Process Improvement** – Juran Trilogy, PDCA Cycle, 5S, Kaizen, Supplier Partnership –Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures – Basic Concepts, Strategy, Performance Measure.

UNIT III STATISTICAL PROCESS CONTROL (SPC)

9

The seven tools of quality, **Statistical Fundamentals – Measures of central Tendency and Dispersion**, Population and Sample, Normal Curve, Control Charts for variables and attributes, Process capability, Concept of six sigma, New seven Management tools.

UNIT IV TQM TOOLS

9

Benchmarking – Reasons to Benchmark, Benchmarking Process, Quality Function Deployment (QFD) – House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) – Concept, Improvement Needs, and FMEA –Stages of FMEA.

UNIT V QUALITY SYSTEMS

9

Need for ISO 9000 and Other Quality Systems, ISO 9000:2000 Quality System –Elements, **Implementation of Quality System, Documentation, Quality Auditing, TS16949**, ISO 14000 – Concept, Requirements and Benefits

Text Books:

1. Dale H. Besterfield, et al., -Total Quality Management, Pearson Education, Inc.2003. (Indian reprint 2004). ISBN 81-297-0260-6.

Reference Books:

1. Evans. J. R. & Lindsay. W,M -The Management and Control of Quality, (5th Edition),South-Western (Thomson Learning), 2002 (ISBN 0-324-06680-5).
2. Feigenbaum.A.V. -Total Quality Management, McGraw-Hill, 1991.
3. Oakland.J.S. -Total Quality Management, Butterworth Heinemann Ltd., Oxford, 1989.
4. Narayana V. and Sreenivasan, N.S. -Quality Management – Concepts and Tasks, New Age International 1996.
5. Zeiri. -Total Quality Management for Engineers, Wood Head Publishers, 1991.

BBA009	INTELLECTUAL PROPERTY RIGHTS						L	T	P	C			
	Total Contact Hours - 45						3	0	0	3			
	Prerequisite – Value Education and Professional Ethics												
	Course Designed by – Dept of Information Technology												
OBJECTIVES													
Strong intellectual property rights (IPR) protection is crucial to fostering trade, and achieving the goals and benefits of global integration. Countries with high standards of IPR protection tend to attract more investment, stimulate more innovation, thereby developing more rapidly. Countries with inadequate protection are often vulnerable to infringements of intellectual property rights that hinder trade flow and economic development.													
COURSE OUTCOMES (COs)													
CO1	Understand the principles, function and basic legal rules of IP Law.												
CO2	Recognize the relevant criteria for generating and protecting intellectual works.												
CO3	Recognize the intellectual property likely to be produced in the academic and professional environment.												
CO4	Demonstrate appreciation and critical awareness of pertinent IP issues in the academic and professional lives.												
CO5	Understand the relevance and impact of IP Law on academic/scientific works/studies.												
CO6	Understand the different forms of infringement of intellectual property rights.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M		M		H			M	H
	CO2				M		M		H			M	H
	CO3				M		M		H			M	H
	CO4				M		M		H			M	H
	CO5				M		M		H			M	H

	CO6				M		M		H			M	H
3	Category	Humanities & Social Studies	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
								✓					
4		37 th Meeting of Academic Council, May 2015											

UNIT I TYPES OF PROPERTIES

9

Introduction – Invention and Creativity – Intellectual Property (IP) – Importance – Protection of IPR – Basic types of property (i). Movable Property ii. Immovable Property and iii. Intellectual Property.

UNIT II PATENTS AND TRADE MARKS

9

IP – Patents – Copyrights and related rights – Trade Marks and rights arising from Trademark registration – Definitions – Industrial Designs and Integrated circuits – Protection of Geographical Indications at national and International levels – Application Procedures..

UNIT III INTERNATIONAL CONVENTION

9

International convention relating to Intellectual Property – Establishment of WIPO – Mission and Activities – History – General Agreement on Trade and Tariff (GATT).

UNIT IV INDIAN IPR LEGISLATIONS

9

Indian Position Vs WTO and Strategies – Indian IPR legislations – commitments to WTO-Patent Ordinance and the Bill – Draft of a national Intellectual Property Policy – Present against unfair competition.

UNIT V CASE STUDIES

9

Case Studies on – Patents (Basmati rice, turmeric, Neem, etc.) – Copyright and related rights – Trade Marks – Industrial design and Integrated circuits – Geographic indications – Protection against unfair competition.

TEXT BOOKS:

1. Subbaram N.R. -Handbook of Indian Patent Law and Practice -, S. Viswanathan Printers and Publishers Pvt. Ltd., 1998.

REFERENCES:

1. Eli Whitney, United States Patent Number: 72X, Cotton Gin, March 14, 1794.
2. Intellectual Property Today: Volume 8, No. 5, May 2001, [www.iptoday.com].
3. Using the Internet for non-patent prior art searches, Derwent IP Matters, July 2000.
4. www.ipmatters.net/features/000707_gibbs. html.

BBA006	INDIAN CONSTITUTION AND SOCIETY								L	T	P	C	
	Total Contact Hours - 45								3	0	0	3	
	Prerequisite – Professional Courses												
	Course Designed by – Department of Management studies												
OBJECTIVES													
To know about Indian constitution. To know about central and state government functionalities in India. To know about Indian society.													
COURSE OUTCOMES (COs)													
CO1	To understand the historical background and fundamental rights												
CO2	To understand the structure and functions of governments												
CO3	To understand the Indian social structure												
CO4	To gain knowledge in Indian federal system												
CO5	To gain knowledge Indian social structure												
CO6	To gain knowledge the right of women, children and SC&ST												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M		H		H			H	H
	CO2				M		H		H			H	H
	CO3				M		H		H			H	H
	CO4				M		H		H			H	H
	CO5				M		H		H			H	H
	CO6				M		H		H			H	H
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
								✓					
4		37 th Meeting of Academic Council, May 2015											

UNIT I HISTORY

9

Historical Background – Constituent Assembly of India – Philosophical foundations of the Indian Constitution – Preamble – Fundamental Rights – Directive Principles of State Policy – Fundamental Duties – Citizenship – Constitutional Remedies for citizens.

UNIT II CENTRAL STRUCTURE**9**

Union Government – Structures of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review.

UNIT III STATE STRUCTURE**9**

State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts.

UNIT IV PARLIAMENTARY SYSTEM**9**

Indian Federal System – Center – State Relations – President's Rule – Constitutional Amendments – Constitutional Functionaries - Assessment of working of the Parliamentary System in India.

UNIT V SOCIAL STRUCTURE**9**

Society : Nature, Meaning and definition; Indian Social Structure; Caste, Religion, Language in India; Constitutional Remedies for citizens – Political Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections.

TEXT BOOKS:

1. Durga Das Basu, - Introduction to the Constitution of India -, Prentice Hall of India, New Delhi.
2. R.C.Agarwal, - (1997) Indian Political System -, S.Chand and Company, New Delhi.

REFERENCE:

1. Sharma, Brij Kishore, -Introduction to the Constitution of India:, Prentice Hall of India, New Delhi.
2. U.R.Gahai, -(1998) Indian Political System -, New Academic Publishing House, Jalaendhar.
3. R.N. Sharma, -Indian Social Problems -, Media Promoters and Publishers Pvt. Ltd.
4. Yogendra Singh, -(1997) Social Stratification and Change in India -, Manohar, New Delhi
5. Maciver and Page, -Society: An Introduction Analysis -, Mac Milan India Ltd., New Delhi.
6. K.L.Sharma, - (1997) Social Stratification in India: Issues and Themes -, Jawaharlal Nehru University, New Delhi.

BBA007	ENGINEERING ECONOMICS AND COST ANALYSIS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite – Value Education and Professional Ethics				
	Course Designed by – Dept of Management Studies				
OBJECTIVES The main objective of this course is to make the Civil Engineering student know about the basic law of economics, how to organize a business, the financial aspects related to business, different methods of appraisal of projects and pricing techniques. At the end of this course the student shall have the knowledge of how to start a construction business, how to get finances,					

how to account, how to price and bid and how to assess the health of a project.													
COURSE OUTCOMES (COs)													
CO1	Be able to perform and evaluate present worth, future worth and annual worth analyses on one of more economic alternatives.												
CO2	Be able to perform and evaluate payback period and capitalized cost on one or more economic alternatives.												
CO3	Be able to carry out and evaluate benefit/cost, life cycle and Breakeven analyses on one or more economic alternatives.												
CO4	Read engineering economic text and submit assigned problems For instructor evaluation of teacher/student performance.												
CO5	Exams (projects) assigned to measure student knowledge of Engineering economic analyses and ability to make decisions on Project alternatives.												
CO6	Be able to outline the past history, present position and expected performance of a company engaged in engineering practice or in the computer industry.												
Mapping of Course Outcomes with Program outcomes(POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low													
1	Cos/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				M		M		H			H	H
	CO2				M		M		H			H	H
	CO3				M		M		H			H	H
	CO4				M		M		H			H	H
	CO5				M		M		H			H	H
	CO6				M		M		H			H	H
3	Category	Humanities & Social Studies (HS)	Basic Sciences & Maths (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)				
								✓					
4		37 th Meeting of Academic Council, May 2015											

UNIT I INTRODUCTION TO ECONOMICS

9

Introduction to Economics- Flow in an economy, Law of supply and demand, Concept of Engineering Economics – Engineering efficiency, Economic efficiency, Scope of engineering economics- Element of costs, Marginal cost, Marginal Revenue, Sunk cost, Opportunity cost, Break-even analysis- V ratio, Elementary economic Analysis – Material selection for product Design selection for a product, Process planning.

UNIT II VALUE ENGINEERING

9

Make or buy decision, Value engineering – Function, aims, Value engineering procedure. Interest formulae and their applications –Time value of money, Single payment compound amount factor, Single payment present worth factor, Equal payment series sinking fund factor,

Equal payment series payment Present worth factor- equal payment series capital recovery factor-Uniform gradient series annual equivalent factor, Effective interest rate, Examples in all the methods.

UNIT III CASH FLOW

9

Methods of comparison of alternatives – present worth method (Revenue dominated cash flow diagram), Future worth method (Revenue dominated cash flow diagram, cost dominated cash flow diagram), Annual equivalent method (Revenue dominated cash flow diagram, cost dominated cash flow diagram), rate of return method, Examples in all the methods.

UNIT IV REPLACEMENT AND MAINTENANCE ANALYSIS

9

Replacement and Maintenance analysis – Types of maintenance, types of replacement problem, determination of economic life of an asset, Replacement of an asset with a new asset – capital recovery with return and concept of challenger and defender, Simple probabilistic model for items which fail completely.

UNIT V DEPRECIATION

9

Depreciation- Introduction, Straight line method of depreciation, declining balance method of depreciation-Sum of the years digits method of depreciation, sinking fund method of depreciation/ Annuity method of depreciation, service output method of depreciation-Evaluation of public alternatives- introduction, Examples, Inflation adjusted decisions – procedure to adjust inflation, Examples on comparison of alternatives and determination of economic life of asset.

TEXT BOOKS:

1. Panneer Selvam, R, -Engineering Economics, Prentice Hall of India Ltd, New Delhi, 2001.
2. Suma Damodaran, — Managerial Economics, Oxford University Press, 2006.

REFERENCES:

1. Chan S.Park, -Contemporary Engineering Economics, Prentice Hall of India, 2002.
2. Donald.G. Newman, Jerome.P.Lavelle, -Engineering Economics and analysis Engg. Press, Texas, 2002
3. Degarmo, E.P., Sullivan, W.G and Canada, J.R, -Engineering Economy, Macmillan, New York, 1984
4. Grant.E.L., Ireson.W.G., and Leavenworth, R.S, -Principles of Engineering Economy, Ronald Press, New York, 1976.
5. Smith, G.W., -Engineering Economy, Iowa State Press, Iowa, 1973.
6. Truett & Truett, — Managerial economics- Analysis, problems & cases — Wiley India 8th edition 2004.
7. Luke M Froeb / Brian T Mccann, — Managerial Economics – A problem solving approach Thomson learning 2007.
8. <http://www.sasurieengg.com/e-course-material/MECH/IV-Year%20Sem%208/MG2451%20EECA.pdf>