St. Martin's Engineering College

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Dhulapally, Secunderabad-500 100

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DEPARTMENT OF INFORMATION TECHNOLOGY

I YEAR I SEMESTER

S. No.	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1	MA101BS	Linear Algebra and Calculus	3	1	0	4	30	70	100
2	CH102BS	Engineering Chemistry	3	1	0	4	30	70	100
3	EE106ES	Basic Electrical Engineering	3	0	0	3	30	70	100
4	ME107ES	Engineering Workshop	1	0	3	2.5	30	70	100
5	EN103HS	Professional English	2	0	0	2	30	70	100
6	CH104BS	Engineering Chemistry Lab	0	0	3	1.5	30	70	100
7	EN105HS	English Language and Communication Skills Lab	0	0	2	1	30	70	100
8	EE108ES	Basic Electrical Engineering Lab	0	0	2	1	30	70	100
		Total	**12**	**2**	**10**	**19**	**240**	**560**	**800**
Mandatory Course (Non-Credit)									
9	*TS109	Technical Seminar	0	0	2	-	100	-	100
		Induction Programme							

***MC – Satisfied/Unsatisfied**

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DEPARTMENT OF INFORMATION TECHNOLOGY

I YEAR II SEMESTER

S. No.	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1	MA201BS	Advanced Calculus	3	1	0	4	30	70	100
2	AP202BS	Applied Physics	3	1	0	4	30	70	100
3	CS205ES	Programming for Problem Solving	3	1	0	4	30	70	100
4	ME206ES	Engineering Graphics	1	0	4	3	30	70	100
5	AP203BS	Applied Physics Lab	0	0	3	1.5	30	70	100
6	CS207ES	Programming for Problem Solving Lab	0	0	3	1.5	30	70	100
Total			**10**	**3**	**10**	**18**	**180**	**420**	**600**

Mandatory Course (Non-Credit)									
7	*ES204BS	Environmental Science	3	0	0	-	100	-	100
8	*MP209	Micro Project -1	0	0	2	-	100	-	100

***MC – Satisfied/Unsatisfied**

St. Martin's Engineering College

DEPARTMENT OF INFORMATION TECHNOLOGY

II YEAR I SEMESTER

S. No.	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1	IT301PC	Python Programming	3	0	0	3	30	70	100
2	MA302BS	Computer Oriented Statistical Methods	3	1	0	4	30	70	100
3	BE304MS	Business Economics and Financial Analysis	3	0	0	3	30	70	100
4	CS304PC	Data Structures using C	3	0	0	3	30	70	100
5	EC305ES	Analog and Digital Electronics	3	0	0	3	30	70	100
6	IT306PC	Python Programming lab	0	0	3	1.5	30	70	100
7	CS307PC	Data Structures Lab using C	0	0	3	1.5	30	70	100
8	EC308ES	Analog and Digital Electronics Lab	0	0	2	1	30	70	100
9	CS309PC	IT Workshop Lab	0	0	2	1	30	70	100
Total			**15**	**1**	**10**	**21**	**270**	**630**	**900**

Mandatory Course (Non-Credit)									
10	*GS309MC	Gender Sensitization Lab	0	0	2	0	100	-	100

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II YEAR II SEMESTER

S. No.	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1	CS401PC	Operating Systems	3	0	0	3	30	70	100
2	IT402PC	Database Management Systems	3	1	0	4	30	70	100
3	CS403PC	Java Programming	3	1	0	4	30	70	100
4	IT404PC	Computer Organization and Microprocessor	3	0	0	3	30	70	100
5	CS405PC	Discrete Mathematics	3	0	0	3	30	70	100
6	CS406PC	Operating Systems Lab	0	0	3	1.5	30	70	100
7	IT407PC	Database Management Systems Lab	0	0	3	1.5	30	70	100
8	CS408PC	Java Programming Lab	0	0	2	1	30	70	100
		Total	**15**	**2**	**8**	**21**	**240**	**560**	**800**

Mandatory Course (Non-Credit)									
9	*IT409MP	Micro Project – 2	0	0	3	0	100	-	100

***MC – Satisfied/Unsatisfied**

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DEPARTMENT OF INFORMATION TECHNOLOGY

III YEAR I SEMESTER

S. No.	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1	CS501PC	Formal Languages & Automata Theory	3	0	0	3	30	70	100
2	CS502PC	Software Engineering	3	0	0	3	30	70	100
3	IT503PC	Data Communication & Computer Networks	3	1	0	4	30	70	100
4	IT504PC	Web Programming	2	0	0	2	30	70	100
5		Professional Elective – I / MOOCs	3	0	0	3	30	70	100
6		Professional Elective – II	3	0	0	3	30	70	100
7	CS505PC	Software Engineering lab	0	0	3	1.5	30	70	100
8	IT506PC	Computer Networks & Web Programming Lab	0	0	3	1.5	30	70	100
9	EN507HS	Advanced Communication Skills Lab	0	0	2	1	30	70	100
		Total	**17**	**1**	**8**	**22**	**270**	**630**	**900**

Mandatory Course (Non-Credit)									
10	*IP508MC	Intellectual Property Rights	3	0	0	0	100		100

***MC – Satisfied/Unsatisfied**

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DEPARTMENT OF INFORMATION TECHNOLOGY

III YEAR II SEMESTER

S. No.	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1	IT601PC	Big Data Analytics	3	0	0	3	30	70	100
2	IT602PC	Principles of Compiler Construction	3	0	0	3	30	70	100
3	IT603PC	Algorithm Design and Analysis	3	0	0	3	30	70	100
4	IT604PC	Embedded Systems & Internet of Things	3	0	0	3	30	70	100
5		Professional Elective –III / MOOCs	3	0	0	3	30	70	100
6		Open Elective-I	3	0	0	3	30	70	100
7	IT605PC	Embedded Systems & Internet of Things Lab	0	0	3	1.5	30	70	100
8	IT606PC	Compiler Construction Lab	0	0	3	1.5	30	70	100
9	IT607PC	Design and Analysis of Algorithms Lab	0	0	2	1	30	70	100
		Total	**18**	**0**	**8**	**22**	**270**	**630**	**900**

Mandatory Course (Non-Credit)									
10	*BS604HS	Environmental Science	3	0	0	0	100	-	100

***MC – Satisfied/Unsatisfied**

Note:-Environmental Science should be registered by lateral entry students only

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DEPARTMENT OF INFORMATION TECHNOLOGY

IV YEAR I SEMESTER

S. No.	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1	IT701PC	Information Security	3	0	0	3	30	70	100
2	IT702PC	Machine Learning	2	0	0	2	30	70	100
3		Professional Elective – IV	3	0	0	3	30	70	100
4		Professional Elective – V	3	0	0	3	30	70	100
5		Open Elective – II	3	0	0	3	30	70	100
6	IT703PC	Information Security Lab	0	0	2	1	30	70	100
7	IT704PC	Industry Oriented Mini Project/Summer Internship	0	0	0	2*	-	100	100
8	IT705PC	Project Stage -1	0	0	6	3	100	-	100
9	IT706PC	Seminar	0	0	2	1	100	-	100
		Total	**14**	**0**	**10**	**21**	**380**	**520**	**900**

Mandatory Course (Non-Credit)									
10	*CI707MC	Constitution of India	3	0	0	0	100	-	100

***MC – Satisfied/Unsatisfied**

Note: - Industrials oriented Mini Project / Summer Internship is to be carried out during the summer vacation between 6th and 7th Semesters. Students should submit report of Industrial oriented MiniProject / Summer Internship for evaluation.

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DEPARTMENT OF INFORMATION TECHNOLOGY

IV YEAR II SEMESTER

S. No.	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1	SM801MS	Organizational Behaviour	3	0	0	3	30	70	100
2		Open Elective – III	3	0	0	3	30	70	100
3		Professional Elective – VI	3	0	0	3	30	70	100
4	IT802PC	Project Stage -2	0	0	14	7	30	70	100
		Total	**9**	**0**	**14**	**16**	**120**	**280**	**400**

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LINEAR ALGEBRA AND CALCULUS

I B. TECH- I SEMESTER (R20)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
MA101BS	**B. Tech**	**3**	**1**	**0**	**4**	**30**	**70**	**100**

COURSE OBJECTIVES

To learn

1. Types of matrices and theirproperties.
2. Concept of a rank of the matrix which is used to know the consistency of system of linear equations.
3. Concept of Eigen values and eigenvectors and to reduce the quadratic form tocanonicalform.
4. Determine the maxima and minima of functions of several variables by using partial differentialcoefficients.
5. Evaluation of improper integrals using Beta and Gammafunctions.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Write the matrix representation of a set of linear equations and to analyze the solution of the system ofequations.
2. Find the Eigen values and Eigen vectors, reduce the quadratic form to canonical formusing orthogonaltransformations.
3. Apply the Mean value theorems for the single variablefunctions.
4. Apply maxima and minima for functions of several variables and Lagrange's method of multipliers.
5. Evaluate the improper integrals using Beta and Gammafunctions.

UNIT-I	MATRICES	Classes: 12

Matrices: Types of Matrices, Symmetric, Hermitian, Skew-symmetric, Skew-Hermitian, orthogonal matrices, Unitary Matrices, rank of a matrix by Echelon form and Normal form, Inverse of Non-singular Matrices by Gauss-Jordan method, System of linear equations, solving system of Homogeneous and Non- Homogeneous equations. Gauss elimination method, Gauss SeidelIteration Method.

UNIT-II	EIGEN VALUES AND EIGEN VECTORS	Classes:12

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Linear Transformation and Orthogonal Transformation, Eigen values and Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by OrthogonalTransformation.

UNIT-III	MEAN VALUE THEOREMS	Classes:12

Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean Value Theorem. Taylor's Series. Applications: Finding areas, volumes of revolutions of curves (Only in Cartesian coordinates)

UNIT-IV	FUNCTIONS OF SEVERAL VARIABLES	Classes: 12

Definitions of Limit and continuity. Partial Differentiation; Euler's Theorem; Total derivative, Jacobian; Functional dependence & independence, Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers. Application: Errors and approximations.

UNIT-V	FIRST ORDER PARTIAL DIFFERENTIAL EQUATIONS AND SPECIAL FUNCTIONS	Classes: 12

First Order linear and non linear Partial Differential Equations, Method of separation of variables. Beta and Gamma functions, properties, relation between Beta and Gamma functions, evaluation of integrals using Beta and Gamma functions.

TEXT BOOKS

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43rdEdition.
2. Erwin kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley &Sons, 2017.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi,11thReprint, 2010.

REFERENCE BOOKS

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint,2010.
2. B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint,2002.

WEB REFERENCES

1. https://www.efunda.com/math/gamma/index.cfm
2. https://ocw.mit.edu/resources/#Mathematics
3. https://www.sosmath.com/
4. https://www.mathworld.wolfram.com/

E -TEXT BOOKS

1. https://www.e-booksdirectory.com/listing.php?category=4
2. https://www.e-booksdirectory.com/details.php?ebook=10830

MOOCS COURSE

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL

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ENGINEERING CHEMISTRY

I B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CH102BS	B. Tech	3	1	0	4	30	70	100

COURSE OBJECTIVES

To learn

1. To provide basic knowledge on atomic, molecular orbitals and the bonding interaction between atoms
2. To analyse the impact of water hardness and its various methods for removal of hardness of water, numerical problems to calculate the hardness of water in agivensample
3. To discover the importance of electrical energy which originates from chemical reactions essential for industrialneeds
4. To understand the basic concepts of spectroscopy and drug molecules to extrapolate their chemical knowledge in day to daylife
5. To enable the students to understand the use of engineering materials such as polymers, lubricants and study the industrial applications in the field of engineeringandtechnology

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Achieve the basic concepts of atomic, molecular and electronic changes related to molecular bonding andmagnetism
2. Familiarize with fundamentals of treatment technologies and considerations for its design and implementation in water treatmentplants
3. To extrapolate the knowledge of cell, electrode, electrolysis, electromotive force. To analyse and develop a technical solution to corrosion problems related to engineeringmaterials
4. Acquire the significant knowledge about basic concepts of spectroscopy and synthesis of drug molecules would be known to thestudents
5. Comprehended and explore engineering applications of polymers andlubricants

UNIT-I	MOLECULAR STRUCTURE AND THEORIES OF BONDING	Classes: 10

Introduction to VBT, Postulates and draw backs of VBT- Atomic and Molecular orbitals, Linear Combination of Atomic Orbitals (LCAO), Introduction to Crystal Field Theory (CFT): Salient features of CFT- Crystal Field Splitting of transition metal ion d-orbitals in tetrahedral, octahedral and square planar geometries. Applications of CFT- color and magnetic properties.

Postulates of MOT, molecular orbitals of diatomic molecules-molecular orbital energy level diagrams of N_2, O_2 and CO molecules.

UNIT-II	WATER AND ITS TREATMENT	Classes: 12

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Introduction-hardness of water-causes of hardness. Types of harness: Temporary and Permanent. Expression and units of hardness. Estimation of hardness of water by complexometric method (EDTA method), Numerical problems. Boiler troubles- scales, sludges, carryover and caustic embrittlement. Internal treatment- Calgon conditioning, phosphate conditioning and colloidal conditioning. External treatment of water- Ion exchange process. Desalination of brackish water- Reverse osmosis. Potable water and its specifications. Steps involved in the treatment of water by chlorination and ozonization.

UNIT-III	ELECTROCHEMISTRY AND CORROSION	Classes: 14

Electrochemical cells- electrode potential, standard electrode potential, Galvanic cell, Nernst equation- Applications. EMF of a cell. Types of electrodes- standard hydrogen electrode, calomel and glass electrode- construction and working. Numerical problems.

Batteries - Primary (Lithium cell) and secondary batteries (Lithium ion, Lead acid storage cell)- Applications.

Corrosion: Introduction, Causes and effects of corrosion- theories of chemical and electrochemical corrosion- mechanism of electrochemical corrosion. Corrosion control methods- Cathodic protection- sacrificial anode and impressed current cathodic methods. Metallic coatings- Methods of preparation of surface- Hot dipping- Galvanization and tinning. Electro plating and electroless plating.

UNIT-IV	SPECTROSCOPY AND SYNTHESIS OF DRUG MOLECULES	Classes: 08

Spectroscopy- Introduction, electromagnetic spectrum, principles of UV-visible, IR spectroscopy- selection rules and applications. Basic concepts of Nuclear magnetic resonance spectroscopy, chemical shift, spin-spin splitting. Magnetic resonance imaging.

Structure, synthesis and pharmaceutical applications of Paracetamol and Aspirin.

UNIT-V	MATERIAL CHEMISTRY	Classes: 12

Polymers: Introduction, Classification of polymers with examples. Types of polymerization: Addition and Condensation polymerization with examples.

Plastics: Introduction, Characteristics. Thermoplastic and thermosetting plastics. Compounding and fabrication of plastics (compression and injection molding). Preparation, properties and engineering applications of PVC, Teflon and Bakelite.

Lubricants: Introduction, Characteristics, mechanism-thick film, thin film, extreme pressure lubrication, properties- flash point, fire point, cloud point, pour point, mechanical stability and their significance- applications oflubricants.

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TEXT BOOKS

1. P. C. Jain and M. Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company Ltd.,New Delhi,18th edition(2018)
2. Prasanta Rath, B. Rama Devi, Ch. Venkataramana Reddy, S. Chakrovarthy, "A Text book of Engineering Chemistry", Cengage publications(2019)
3. Shashi Chawla, "Engineering Chemistry", Dhanpat Rai & Co. Publishers., New Delhi,15th edition (2015)
4. C.N. Banwell, "Fundamentals of MolecularSpectroscopy"

REFERENCE BOOKS

1. B. H. Mahan, "University Chemistry", Narosa Publishing house, New Delhi, 3rd edition(2013)
2. B.R.Puri,L.R.SharmaandM.S.Pathania,"PrinciplesofPhysicalChemistry",S.NaginChand & Company Ltd., 46th edition(2013)
3. J.D. Lee, "Concise Inorganic Chemistry", Willey Publications, 5th edition(2008)
4. P.W. Atkins, J.D. Paula, "Physical Chemistry", Oxford, 8th edition(2006)
5. G. L. David Krupadanam, D. Vijaya Prasad, K. Varaprasad Rao, K.L.N. Reddy and C. Sudhakar, "Drugs", Universities Press (India) Limited, Hyderabad(2007)

WEB REFERENCES

1. Chemistry: foundations and applications. J. J. Lagowski, editor in chief. New York, Macmillan Reference USA, c2004.4v
2. Polymer data handbook. Edited by James E. Mark. 2nd ed. Oxford, New York, Oxford University Press, 2009
3. https://www.wyzant.com/resources/lessons/science/chemistry
4. http://www.chem1.com/acad/webtext/virtualtextbook.html

E -TEXT BOOKS

1. Krishnamurthy, N., Vallinayagam, P., Madhavan, D., Engineering Chemistry,ISBN: 9789389347005, eBook ISBN: 9789389347012, Edition: FourthEdition
2. Vijayasarathy, P. R., Engineering Chemistry, Print Book ISBN : 9789387472778, eBookISBN : 9789387472785, Edition : Third Edition

MOOCS COURSE

1. https://onlinecourses-archive.nptel.ac.in
2. https://www.mooc-list.com/tags/chemistry

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BASIC ELECTRICALENGINEERING

I B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
EE106ES	B. Tech	3	0	0	3	30	70	100

COURSEOBJECTIVES

To learn

1. To introduce the concepts of electrical circuits and itscomponents
2. To understand magnetic circuits, DC circuits and AC single phase &threephase circuits
3. To study and understand the different types of DC/AC machines andTransformers.
4. To import the knowledge of various electricalinstallations.
5. To introduce the concept of power, power factor and itsimprovement.

COURSEOUTCOMES

Upon successful completion of the course, the student is able to

1. To analyse and solve electrical circuits using networklaws.
2. To analyse and solve electrical circuits usingtheorems.
3. To understand and analyse basic Electric and Magneticcircuits.
4. To study the working principles of ElectricalMachines.
5. To introduce components of Low Voltage ElectricalInstallations.

UNIT-I	D.C.CIRCUITS	Classes:15

Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation. Superposition, The venin's and Norton's Theorems.

Time-domain analysis of first-order RL and RC circuits.

UNIT-II	A.C.CIRCUITS	Classes:10

Representationofsinusoidalwaveforms,peakandrmsvalues,phasorrepresentation,realpower, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L,C,RL,RC,RLCcombinations(seriesandparallel),resonanceinseriesRL-Ccircuit.

UNIT-III	TRANSFORMERS	Classes:15

Ideal and practical transformer, EMF equation, operation on no load and on load, OC and SC tests, phasor diagrams equivalent circuit, losses in transformers, regulation, Efficiency and condition for maximum efficiency, Auto-transformer.

UNIT-IV	ELECTRICALMACHINES	Classes:15

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Generation of rotating magnetic fields, Construction and working of a three-phase induction Motor, Significance of torque-slip characteristics. Loss components and efficiency. Construction, working, Torque-speed characteristics of separately excited, shunt, series, compound dc motors.

UNIT-V	ELECTRICALINSTALLATIONS	Classes:10

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, electrical Safety precautions in handling electrical appliances, electric shock, first aid for electric shock, safety rules.

TEXTBOOKS

1. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, 3rd edition 2010,Tata, McGrawHill.
2. D.C. Kulshreshtha, "Basic Electrical Engineering", McGrawHill,2009.
3. L.S.Bobrow,FundamentalsofElectricalEngineering",OxfordUniversityPress,2011
4. Electrical and Electronics Technology, E. Hughes, 10th Edition,Pearson,2010

REFERENCEBOOKS

1. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, PrenticeHallIndia,1989.
2. P. V. Prasad, S. Sivanagaraju, R. Prasad, "Basic ElectricalandElectronics Engineering" Cengage Learning, 1stEdition,2013.
3. V. D. Toro, – Electrical Engineering Fundamentals Prentice HallIndia,1989.

WEBREFERENCES

1. https://www.electrical4u.com/
2. http://www.basicsofelectricalengineering.com/
3. https://www.khanacademy.org/science/physics/circuits-topic/circuits-
4. resistance/a/ee-voltage-and-current
5. https://circuitglobe.com/

E –TEXTBOOKS

1. https://easyengineering.net/basic-electrical-engineering-by-wadhwa/
2. https://easyengineering.net/objective-electrical-technology-by-mehta/

MOOCSCOURSE

1. https://nptel.ac.in/courses/108108076/1
2. https://nptel.ac.in/courses/108102146/
3. https://nptel.ac.in/courses/108108076/35

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ENGINEERING WORKSHOP

I B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
ME107ES	B.Tech	1	0	3	2.5	30	70	100

COURSE OBJECTIVES

To learn

1. To Study of different hand operated power tools, uses and theirdemonstration.
2. To gain a good basic working knowledge required for the production of variousengineering products.
3. Toprovidehandson experienceabout useofdifferent engineeringmaterials,tools, equipment's and processes those are common in the engineeringfield.
4. To develop a right attitude, team working, precision and safety atworkplace.
5. Itexplainstheconstruction,function,useandapplicationofdifferentworkingtools, equipment andmachines.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Study and practice on machine tools and theiroperations
2. Practice on manufacturing of components using workshop tradesincludingFitting, Carpentry, Foundry, Tin-smithy, House Wiring and Welding.
3. Identify and apply suitable tools for different trades of Engineering processesincluding drilling, material removing, measuring,chiseling.
4. Apply basic electrical engineering knowledge for house wiringpractice.

LIST OF EXPERIMENTS

TRADES FOR EXERCISES (Any two exercises from each trade)

1. Tin-Smithy – (Square Tin, Cone andCylinder)
2. Carpentry – (T-Lap Joint, Planning Sawing & DovetailJoint)
3. Welding Practice – (Arc Welding-Butt Joint, Lap Joint&T-Joint)
4. Black Smithy – (Round to Square, S-Hook&U-Clamp)
5. Foundry – (Mould using Single Piece and SplitPattern)
6. Fitting – (V-Fit, Square Filing & Semi-circularfit)
7. House-wiring – (Two-way Switch and one-way switch inseries)

TRADES FOR DEMONSTRATION

8. Plumbing, Machine Shop, Power tools in construction, Wood turning lathe and Casting Process.

Note: At least perform 10 Exercises out of 14 Exercises.

TEXT BOOKS

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1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ ScitechPublishers.
2. Workshop Manual / Venkat Reddy/ BS Publications/SixthEdition
3. Workshop Technology byChapman
4. A Textbook Of Workshop Technology : Manufacturing Processes/J. KGUPTA

REFERENCE BOOKS

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/SciTech
2. Workshop Manual / Venkat Reddy/BSP
3. Workshop Technology byHazra-Chowdhary
4. Production Engineering byR.K.Jain

WEB REFERENCES

1. https://nptel.ac.in/courses/112105126/
2. https://nptel.ac.in/downloads/112105127/
3. https://nptel.ac.in/courses/112107145/
4. https://nptel.ac.in/courses/122104015/

E -TEXT BOOKS

1. http://103.135.169.82:81/fdScript/RootOfEBooks/MED/Introduction Workshop%20Technology
2. https://www.quora.com/Download-free-mechanical-engineering-ebooks-sites

MOOCS Course

1. http://www.nits.ac.in/workshops/Workshop_on_MOOCS_26082017.pdf
2. https://www.nitttrc.ac.in/swayam/index.html

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PROFESSIONAL ENGLISH

I B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
EN103HS	B. Tech	2	0	0	2	30	70	100

COURSE OBJECTIVES:

To enable students

1. To enhance their vocabulary and basic grammar rules for communicative competence.
2. To hone their comprehensive skills through various readingtechniques.
3. Todevelop theprofessional writing withthepracticeofformalletters,e-mails, reports, resumes,etc.
4. To use various sentence structures effectively in formal and informalcontexts.
5. To improve scientific and technical communication skills throughtechnical vocabulary and appropriate prosetexts.

COURSE OUTCOMES:

Upon successful completion of the course, the students are able to

1. Use vocabulary effectively andsyntactically.
2. Translate the reading techniques and apply them in literarytexts.
3. Demonstrate enhanced competence in standard WrittenEnglish.
4. Develop the competence in writing professionaldocuments.
5. Exhibit appropriate communicative approaches to suit variouscontexts.

UNIT-I	THE RAMAN EFFECT	Classes:7

Vocabulary: Word Formation, Use of affixes,
Grammar: Articles, Prepositions
Writing: Paragraph Writing, Organizing principles of Paragraphs in documents

UNIT-II	THE LOST CHILD	Classes:9

Vocabulary: Synonyms and Antonyms
Grammar: Noun – Pronoun Agreement and Concord
Reading: Significance & Techniques of reading; Skimming – Reading for the gist of a text; Scanning– Reading for specific information; Intensive; Extensive reading; SQ3R Technique; Reading Comprehension;
Reading Poetry -The Road Not Taken
Writing: Narrative Writing

UNIT-III	SATYA NADELLA'S EMAIL TO HIS EMPLOYEES	Classes:10

Vocabulary: Homonyms-Homophones-Homographs
Grammar: Tenses
Writing : Significance & Effectiveness of Writing; Writing Descriptions; Letter writing; E-mail writing

UNIT-IV	WHAT SHOULD YOU BE EATING?	Classes:10
Vocabulary: Technical vocabulary; Words from Foreign Languages; abbreviations and acronyms Grammar: Misplaced Modifiers; Redundancies and Cliches Writing: Information Transfer, Note Making, Writing an Abstract and Report Writing		
UNIT-V	**HOW A CHINESE BILLIONAIRE BUILT HER FORTUNE**	**Classes:9**
Vocabulary: Words often Confused; Idioms and Phrasal verbs, One- word Substitutes; Grammar: Conditional Sentences; Degrees of Comparison; Simple-Complex-Compound Sentences and Common errors Writing: Essay writing		

TEXTBOOKS:

1. Sudarshana, N.P. and Savitha, C. (2018). EnglishforEngineers. Cambridge UniversityPress.
2. Education for Life and Work – English Workbook prepared by English Faculty of St. Martin's EngineeringCollege.

REFERENCE BOOKS:

1. Swan, M. (2016). Practical English Usage. Oxford UniversityPress.
2. Kumar, S and Lata, P. (2018). Communication Skills. Oxford UniversityPress.
3. Zinsser, William. (2001). On Writing Well. Harper ResourceBook.

WEB REFERENCES:

1. www.edufind.com
2. www.myenglishpages.com
3. http://grammar.ccc.comment.edu
4. http://owl.english.prudue.edu

E –TEXTBOOKS:

1. http://bookboon.com/en/communication-ebooks-zip
2. http://learningenglishvocabularygrammar.com/files/idiomsandphraseswithmeaningsandexamlespdf.pdf

MOOCS COURSE:

1. https://mooec.com/courses/grammar-guru-1
2. https://mooec.com/courses/learning-styles

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ENGINEERING CHEMISTRY LABORATORY

I B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CH104BS	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

To learn

1. Estimationofhardnessandchloridecontentinwatertocheckitssuitabilityfordrinking purpose
2. To find the concentration of ions present in an unknownsolution
3. To know the handling procedure of colorimetric and conductometricinstruments
4. The fundamentals of drugsynthesis
5. The measurement of physical properties like surface tension, viscosity and acidvalue

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Understand the total dissolved salts present in a sample ofwater
2. Determine the concentration of ions existing in asolution
3. Find the strength of an acid by conductometricmethods
4. Acquirebasicknowledgeonthechemicalreactionusedtosynthesizedrugmolecules like aspirin andParacetamol
5. Select lubricants for various purposes such as to reduce the friction betweentwo movable surfaces and to determine the surface tension of a givenliquid

LIST OF EXPERIMENTS

Volumetric Analysis

1. Determination of total hardness of water by complexometric method usingEDTA.
2. Determination of chloride content of water byArgentometry.
3. Determination of acid value of coconutoil.

Potentiometry

4. Determination of Fe^{2+} ions present in the given sample by Potentiometrictitration.

Conductometry

5. Estimation of HCl by conductometrictitration.
6. Estimation of acetic acid by conductometrictitration.

Colorimetry

7. Estimation of Copper by colorimetricmethod.

Synthesis of Drugs

8. Synthesis of aspirin andParacetamol.

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Physical constants

9. Determination of viscosity of the given sample byusing Ostwald'sViscometer.
10. Determination of surface tension of a given liquid usingstalagmometer.

TEXT BOOKS

1. Senior practical physical chemistry, B. D. Khosla, A. Gulati and V. Garg (R. Chand and Co., Delhi)
2. Prasanta Rath, B. Rama Devi, Ch. Venkataramana Reddy, S. Chakrovarthy, "A Text book of Engineering Chemistry", Cengage publications(2019)
3. An introduction to practical; chemistry, K.K. Sharma and D. S. Sharma (Vikaspublishing, NewDelhi)
4. Vogel's text book of practical organic chemistry, 5edition
5. S. S. Dhara, Text book on experiments and calculations in engineering chemistry, B.S Publications

REFERENCE BOOKS

1. G. H. Jeffery, J. Bassett, J. Mendham and R. C. Denney, "Vogel's Text Book of Quantitative ChemicalAnalysis"
2. O. P. Vermani& Narula, "Theory and Practice in Applied Chemistry", New Age InternationalPublishers
3. Gary D. Christian, "Analytical chemistry", 6th Edition, WileyIndia

WEB REFERENCES

1. PhillipE.Savage,Industrial& EngineeringChemistry: At theForefront ofChemical Engineering Research since 1909, *Ind. Eng.Chem.Res.*20195811
2. Elias, AI. Sundar Manoharan S. and Raj, H. "Laboratory Experiments for General Chemistry", I.I.T. Kanpur,1997

E -TEXT BOOKS

1. Payal B Joshi, Experiments In Engineering Chemistry, Edition: First, ISBN:978-93- 85909-13-9, Publisher: I.K. International Publishing House Pvt.Ltd
2. Mohapatra, Ranjan Kumar, Engineering Chemistry With Laboratory Experiments, ISBN: 978- 81-203-5158-5, PHI Learning PrivateLimited

MOOCS COURSE

1. https://sce.ethz.ch/en/programmes-and-courses/suche-angebote.html?polycourseId=1299
2. https://www.classcentral.com/course/open2study-chemistry-building-blocks-of-the- world-1297

St. Martin's Engineering College

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY

I B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
EN105HS	B. Tech	0	0	2	1	30	70	100

COURSE OBJECTIVES:

To train students

1. Touseaccurateandappropriatepronunciationthroughthepracticeofphonetic sounds, symbols, word accent and intonation.
2. ToimprovetheirfluencyinspokenEnglishandneutralizetheirmothertongue influence through JAM Sessions, Role-play,etc.
3. To comprehend the speech of people of various regions through Listening practice exercises.
4. To enable students to transfer information verbally with the right usage of Body language through individual and groupactivities.
5. TounderstandnuancesofEnglishlanguagebypracticingvariousexercisesat Multi-medialab.

COURSEOUTCOMES:

Upon successful completion of the course, student will be able to

1. DifferentiatethespeechsoundsinEnglishanddemonstrateaccuratepronunciation.
2. Communicate with others in clear and confidentmanner.
3. Improve their effective and empathetic listeningability.
4. ShowthezealtoparticipateinPublicSpeakingSessions.
5. Neutralize the Mother tongue influence in daytocommunication.

LIST OF EXPERIMENTS:

EXERCISE: I

CALL LAB:

Introduction to Phonetics – Speech sounds - vowels and consonants

ICS LAB:

Ice-breaking Activity – Non-verbal Communication

EXERCISE: II

CALL LAB:

Minimal Pairs – Consonant Clusters – Past Tense Marker and Plural Marker Rules

ICS LAB:

Role Play – Expressions in various Situations – Making Requests and Seeking Permissions

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EXERCISE: III

CALL LAB:

Structure of Syllables – Word Accent –Stress shift–Intonation

ICS LAB:

Telephone Communication –Etiquette

EXERCISE: IV

CALL LAB:

Listening Comprehension Tests

ICS LAB:

Presentations Skills & JAM Session

EXERCISE: V

CALL LAB:

Mother Tongue Interference – Differences in British and American Pronunciation

ICS LAB:

Interview Skills – Mock Interviews

TEXTBOOKS:

1. ELCS Lab Manual prepared by English faculty of St. Martin's EngineeringCollege.
2. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford UniversityPress.

REFERENCE BOOKS:

1. T Balasubramanian. A Textbook of English Phonetics for Indian Students,Macmillan,2008
2. J Sethiet al. A Practical Course in English Pronunciation, Prentice Hall India,2005.
3. Priyadarshi Patnaik. Group Discussions and Interviews, Cambridge UniversityPress PvtLtd2011.
4. Arun Koneru, Professional Speaking Skills, Oxford UniversityPress,2016.

WEB REFERENCES:

1. https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589935321&section=Refere nces
2. Argyle, Michael F., Alkema, Florisse, & Gilmour, Robin. "The communication of friendly and hostile attitudes: Verbal and nonverbal signals." European Journal of Social Psychology, 1, 385-402:1971
3. Blumer, Herbert. Symbolic interaction: Perspective and method. Engle wood Cliffs; NJ: PrenticeHall.1969

E –TEXTBOOKS:

1. Mc corry Laurie Kelly Mc Corry Jeff Mason, Communication Skills forthe Healthcare Professional, 1st edition, ISBN:1582558140, ISBN-13:9781582558141
2. Robert E Owens, Jr, Language Development, 9th edition, ISBN:0133810364,9780133810363

MOOCS Course:

1. https://www.coursera.org/specializations/improve-english
2. https://www.edx.org/professional-certificate/upvalenciax-upper-intermediate-english

St. Martin's Engineering College

BASIC ELECTRICAL ENGINEERING LABORATORY

I B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
EE108ES	B. Tech	0	0	2	1	30	70	100

COURSEOBJECTIVES:

To learn

1. To analyse a given network by applying various electricallaws
2. To analyse a given network by applying various networktheorems
3. To know the response of electrical circuits for differentexcitations
4. To calculate, measure and know the relation between basic electricalparameters.
5. To analyse the performance characteristics of DC and AC electricalmachines

COURSEOUTCOMES:

Upon successful completion of the course, the student is able to

1. Get an exposure to basic electricallaws.
2. Understand the response of different types of electricalcircuits
3. Understand the response of different types of electricalTheorems
4. Understand different types ofExcitations.
5. Understand the basic characteristics of transformers and electricalmachines.

LIST OFEXPERIMENTS

PART-A

1. Verification of OhmsLaw
2. Verification of KVL andKCL
3. Transient Response of Series RL and RC circuits using DCexcitation
4. Transient Response of RLC Series circuit using DCexcitation
5. Resonance in series RLCcircuit.
6. Verification of Super positiontheorem.
7. Verification of Thevenin'sTheorem.
8. Verification of Norton'sTheorem.

PART-B

9. O.C. & S.C. Tests on Single PhaseTransformer.
10. Load Test on Single Phase Transformer (Calculate Efficiency andRegulation).
11. Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor.
12. Torque-Speed Characteristics of a Separately/Self Excited DCShunt/Compound Motor.
13. Performance Characteristics of a Three-phase InductionMotor
14. Torque-Speed Characteristics of a Three-phase InductionMotor

*Note: Any five experiments from Part-A and Part-B.

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TEXTBOOKS

1. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, 3rdedition2010,Tata
2. McGrawHill.
3. D.C. Kulshreshtha, "Basic Electrical Engineering", McGrawHill,2009.
4. L.S.Bobrow,FundamentalsofElectricalEngineering",OxfordUniversityPress,2011
5. Electrical and Electronics Technology, E. Hughes, 10th Edition,Pearson,2010

REFERENCEBOOKS

1. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition,PrenticeHall India,1989.
2. P.V.Prasad,S.sivanagaraju,R.Prasad,"BasicElectricalandElectronics Engineering" Cengage Learning, 1st Edition,2013.
3. V. D. Toro, – Electrical Engineering Fundamentals Prentice HallIndia,1989.

WEBREFERENCES

1. https://www.electrical4u.com/
2. http://www.basicsofelectricalengineering.com/
3. https://www.khanacademy.org/science/physics/circuits-topic/circuits-resistance/a/ee-voltage-and-current
4. https://circuitglobe.com/

E –TEXTBOOKS

1. https://easyengineering.net/basic-electrical-engineering-by-wadhwa/
2. https://easyengineering.net/objective-electrical-technology-by-mehta/

MOOCSCourse

1. https://nptel.ac.in/courses/108108076/1
2. https://nptel.ac.in/courses/108102146/
3. https://nptel.ac.in/courses/108108076/35

St. Martin's Engineering College

ADVANCED CALCULUS

I B. TECH- II SEMESTER (R20)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
MA201BS	**B. Tech**	**3**	**1**	**0**	**4**	**30**	**70**	**100**

COURSE OBJECTIVES

To learn

1. Methods of solving the differential equations of first and higherorder
2. Evaluation of multiple integrals and theirapplications
3. The physical quantities involved in engineering field related to vectorvalued functions
4. The basic properties of vector valued functions and theirapplications
5. Vector point functions and scalar pointfunctions

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Identify whether the given differential equation of first order is exact ornot.
2. Solve higher order differential equation and apply the concept of differential equation to realproblems.
3. Evaluatethemultiple integralsandapplytheconcepttofindareasandvolumes.
4. Is able to find gradient, directional derivative, divergence andcurl.
5. Evaluate the line, surface and volume integrals and converting them from oneto another.

UNIT- I	FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS	Classes: 10

Exact, linear and Bernoulli's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type, Applications: Newton's law of cooling, Law of natural growth and decay, Simple Harmonic Motion

UNIT- II	ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDER	Classes: 12

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Secondorderlineardifferentialequationswithconstantcoefficients:Non-Homogeneoustermsofthe type e^{ax}, sinax, cosax, polynomial in a^m, $a^{ax}a(x)$ and xV(x),method of variation of parameters, Applications: LCRCircuit.

UNIT-III	MULTIPLE INTEGRATION	Classes:12

Evaluation of Double Integrals (Cartesian and polar coordinates), change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals. Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals)

UNIT-IV	VECTOR DIFFERENTIATION	Classes: 12

Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoidal and Irrotational vectors

UNIT-V	VECTOR INTEGRATION	Classes: 12

Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications

TEXT BOOKS

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition,Pearson, Reprint,2002.

REFERENCE BOOKS

1. Paras Ram, Engineering Mathematics, 2nd Edition, CBSPublishes
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India,1984.

WEB REFERENCES

1. https://www.efunda.com/math/gamma/index.cfm
2. https://ocw.mit.edu/resources/#Mathematics
3. https://www.sosmath.com/
4. https://www.mathworld.wolfram.com/

E -TEXT BOOKS

1. https://www.e-booksdirectory.com/listing.php?category=4
2. https://www.e-booksdirectory.com/details.php?ebook=10830

MOOCS COURSE

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL

St. Martin's Engineering College

APPLIED PHYSICS

I B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
AP202BS	B. Tech	3	1	0	4	30	70	100

COURSE OBJECTIVES

To learn

1. The fundamental postulates of quantummechanics.
2. The concepts related tosemiconductors.
3. The concepts related to PN Junction diode and itsapplications.
4. The basic concepts of laser and optical fiber and its applications.
5. The fundamentals of dielectrics and magneticmaterials.

COURSE OUTCOMES

Upon successful completion of the course, the student will be ableto

1. DemonstratethefundamentalconceptsonQuantumbehaviourofmatterinitsmicrostate.
2. Understand the knowledge of fundamentals of Semiconductorphysics.
3. Design and explain the characteristics of Optoelectronicdevices.
4. Analyse the properties of Laser and Optical Fibers and its application in engineeringfields.
5. Design, characterize and prepare new materials for various engineering applications by using dielectric and magneticmaterials.

UNIT-I	QUANTUM MECHANICS	Classes: 12

Introduction to quantum physics, Black body radiation, Planck's Law, Photoelectric effect, Compton effect, de-Broglie's hypothesis, Wave-particle duality, Davisson and Germer experiment, Heisenberg's Uncertainty principle, Born's interpretation of the wave function, Schrodinger's time independent wave equation, Particle in one dimensionalbox.

UNIT-II	SEMICONDUCTOR PHYSICS	Classes: 14

Intrinsic and Extrinsic semiconductors, Carrier Concentration in Intrinsic and Extrinsic semiconductors Dependence of Fermi level on Temperature, Carrier generation and recombination, Carrier transport: diffusion and drift, Hall effect, p-n junction diode, Zener diode and their V-I Characteristics.

UNIT-III	OPTOELECTRONICS	Classes: 10

Radiative and non-radiative recombination mechanisms in semiconductors and LED: Device structure, Materials, Characteristics and figures of merit, Semiconductor photo detectors: Solar cell, PIN and Avalanche and their structure, Materials, working principle and Characteristics.

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UNIT-IV	LASERS AND FIBRE OPTICS	Classes: 12

Lasers: Introduction to interaction of radiation with matter, Characteristics, Principle and working of Laser, Population inversion, Pumping, Types of Lasers: Ruby laser, He-Ne laser and Semiconductor laser, Applications of laser. FibreOptics: Introduction, Total internal reflection, Acceptance angle, Acceptance cone and Numerical aperture, Step and Graded index fibres, Losses associated with optical fibres, Applications of optical fibres in Communication System andSensors.

UNIT-V	Dielectric and Magnetic Properties of Materials	Classes: 12

Introduction to Dielectrics, Polarization, Permittivity and Dielectric constant, Types of Polarization (Qualitative), Internal fields in a solid, Clausius-Mossotti equation, Ferroelectrics and Piezoelectric. Magnetization, permeability and susceptibility, Classification of magnetic materials, Ferromagnetism and Domain theory of ferromagnetism – Hysteresis curve based on domain theory, Applications of magnetic materials.

TEXT BOOKS

1. Engineering Physics, B.K. Pandey, S. Chaturvedi – CengageLearning.
2. Halliday and Resnick,Physics-Wiley.
3. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar-S.Chand.
4. Introduction to Solid State Physics by Charles Kittel (Publishers: JohnWiley&Sons)

REFERENCE BOOKS

1. Richard Robinett ,QuantumMechanics.
2. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hillinc.(1995).
3. OnlineCourse:"Optoelectronics MaterialsandDevices"byMonicaKatiyarandDeepakGupta NPTEL.

WEB REFERENCES

1. Introductory QuantumMechanics:https://nptel.ac.in/courses/115104096/
2. Fundamental concepts of semiconductors:https://nptel.ac.in/courses/115102025/
3. SemiconductorOptoelectronics:https://nptel.ac.in/courses/115102103/
4. FibreOptics:https://nptel.ac.in/courses/115107095/

E -TEXT BOOKS

1. library genesis: https://libgen.is/

MOOCS COURSE

1. Swayam:https://swayam.gov.in/nd1_noc19_ph13/preview
2. Alison:https://alison.com/courses?&category=physics

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PROGRAMMING FOR PROBLEM SOLVING

I B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS205ES	B. Tech	3	1	0	4	30	70	100

COURSE OBJECTIVES

1. To learn the fundamentals ofcomputers.
2. To understand the various steps in programdevelopment.
3. To learn the syntax and semantics of C programminglanguage.
4. To learn the usage of structured programming approach in solvingproblems.

COURSE OUTCOMES

Upon successful completion of the course, the student is able

1. To write algorithms and to draw flowcharts for solvingproblems.
2. To convert the algorithms/flowcharts to CPrograms.
3. To code and test, a given logic in C programminglanguage.
4. To decompose a problem into functions and to develop modular reusablecode.
5. To use arrays, pointers, strings and structures to write Cprograms
6. Searching and sortingproblems

UNIT-I	INTRODUCTION TO C PROGRAMMING LANGUAGE	Classes: 16

Introduction to components of a computer system: disks, primary and secondary memory, processor operating system, compilers, creating, compiling and executing a program etc., Number systems
Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm Flowchart/Pseudo code with examples, Program design and structuredprogramming.
Introduction to C Programming Language: I/O: Simple input and output with scanf and printf, variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code, Operators, expressions and precedence, Expression evaluation, typeconversion

UNIT-II	CONDITIONAL BRANCHING, LOOPS, ARRAY AND STRINGS	Classes: 14

Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do- while loops.
Arrays: one- and two-dimensional arrays, creating, accessing and manipulating elements of arrays.
Strings: Introduction to strings, handling strings as array of characters, basicstringfunctions available in C (strlen, strcat, strcpy, strstr etc.), arrays ofstrings.

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UNIT-III	STRUCTURE AND POINTER	Classes:10

Structures: Defining structures, initializing structures, unions, Array of structures.
Pointers: Idea of pointers, defining pointers, Pointers to Arrays and Structures, Use of Pointers in self referential structures, usage of self referential structures in linked list (no implementation), Enumeration datatype.
Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data types

UNIT-IV	FUNCTION AND STORAGE CLASSES	Classes: 12

Functions: Designing structured programs, declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value Passing arrays to functions passing pointers to functions, idea of call by reference, Some C standard functions and libraries
Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions
Storage classes (auto, extern, static and register)

UNIT-V	FILES AND PRE-PROCESSOR	Classes: 12

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef.
Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions

TEXT BOOKS

1. The C Programming Language by Dennis M Ritchie, Brian W. Kernigham, 1988,PHI
2. Computer System & Programming in C by S Kumar & S Jain, Nano Edge Public publications,Meerut.
3. Fundamentals of Computing and C Programming, R. B. Patel, Khanna Publications, 2010, New Delhi.

REFERENCE BOOKS

1. Computer Fundamentals and Programming in C, ReemaTheraja,Oxford
2. Information technology, Dennis P. Curtin, Kim Foley, Kunal Sen, Cathleen Morin, 1998,TMH
3. Theory and problem of programming with C, Byron CGottfried,TMH

WEB REFERENCES

1. https://www.tutorialspoint.com/cprogramming/
2. https://www.tutorialspoint.com/cplusplus/
3. https://www.cprogramming.com/tutorial/c-tutorial.html

E -TEXT BOOKS

1. https://fresh2refresh.com/c-programming/
2. https://beginnersbook.com/2014/01/c-tutorial-for-beginners-with-examples/
3. https://www.sanfoundry.com/simple-c-programs/

MOOCS Course

1. nptel.ac.in/courses/106105085/4
2. https://www.quora.com/Are-IIT-NPTEL-videos-good-to-learn-basic-C-programming

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ENGINEERING GRAPHICS

I B. TECH- II SEMESTER (R20)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
ME206ES	**B.Tech**	**1**	**0**	**4**	**3**	**30**	**70**	**100**

COURSE OBJECTIVES

To learn
The course aims at empowering the students with drafting skills and enhancing their visualization capacity in order to draw different views of the given object.
To develop in students, graphic skills for communication of concepts, ideas and design of engineering products.
To expose them to existing national standards related to technical drawings.
To impart knowledge about standard principles of orthographic projection of objects.
It will help students to use the techniques, skills, and modern engineering tools and communicate effectively.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to Familiarize with the fundamentals and standards of Engineering graphics Project orthographic projections of lines and plane surfaces.
Convert orthographic views to isometric views and vice-versa and know the basics of AutoCAD.
Preparing working drawings to communicate the ideas and information.
Know and use common drafting tools with the knowledge of drafting standards.

UNIT-I	INTRODUCTION TO ENGINEERING DRAWING	Classes: 15

Introduction to Engineering Graphics: Principles of Engineering Graphics and their significance, Usage of Drawing instruments, lettering, Conic sections including Rectangular Hyperbola (General method only); Cycloid, Epicycloids and Involutes.

Scales: Plain & Diagonal Scales.

UNIT-II	ORTHOGRAPHIC PROJECTIONS	Classes:15

Projections of points: Principles of orthographic projections – conventions – first and third angle projections. Projection of points in all quadrants.

Projection Of Lines – lines inclined to single plane, lines inclined to both the planes.

Projection of Planes: Projection of regular planes – planes inclined to one plane, planes inclined to both planes.

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UNIT-III	PROJECTION OF SOLIDS & SECTION OF SOLIDS	Classes:12

Projection of Solids: Projections of regular solids like cube, prism, pyramid, cylinder and cone. Axis inclined to both the reference planes.

Section of Solids: Sectioning of above solids in simple vertical position with the cutting plane is inclined to the one plane and perpendicular to the other –true shape of section.

UNIT-IV	DEVELOPMENT OF SURFACES & ISOMETRIC PROJECTIONS	Classes: 15

Development of Surfaces: Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones.

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions –Plane Figures, Simple and Compound Solids.

UNIT-V	TRANSFORMATION OF PROJECTIONS & INTRODUCTION AUTO CAD	Classes: 15

Transformation of Projections: Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects.

Introduction to Auto CAD: Introduction, Salient features of AutoCAD software, Basic Commands, construction, editing and dimensioning, two dimensional drawings.

TEXT BOOKS

1 Engineering Drawing - N.D. Bhatt & V.M. Panchal, 50th edition, 2013-Charotar Publishing House, Gujarat.
2 Basant Agarwal and Agarwal C.M., “Engineering Drawing”, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
3 K.L.Narayana, P. Kannaiah, “Engineering Drawing”, SciTech Publishers. 2nd Edition, 2013
4 Shah M.B., and Rana B.C., “Engineering Drawing”, Pearson, 2nd Edition,2009.

REFERENCE BOOKS

1 Venugopal K. and Prabhu Raja V., “Engineering Graphics”, New Age International (P) Limited,2011.
2 K. V. Natarajan, “A text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai,2015.
3 Gopalakrishna K.R., “Engineering Drawing” (Vol. I&II combined), SubhasStores, Bangalore,2007.
4 Trymbaka Murthy, “Computer Aided Engineering Drawing", I.K. internationalPublishing House, 3rd Edition, 2011.

WEB REFERENCES

1 http://freevideolectures.com/Course/3420/Engineering-Drawing
2 https://www.slideshare.net/search/slideshow?searchfrom=header&q=engineering+drawing
3 https://www.wiziq.com/tutorials/engineering-drawing
4 http://road.issn.org/issn/2344-4681-journal-of-industrial-design-and-engineering-graphics

E -TEXT BOOKS

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1. http://www.techdrawingtools.com/12/l1201.htm
MOOCS Course
1 https://nptel.ac.in/course.php 2 https://swayam.gov.in/explorer

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APPLIED PHYSICS LAB

I B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
AP203BS	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

1. To study semiconductordevices.
2. To verify the Biot –Savart law.
3. To experience resonancephenomena.
4. To compare the experimental results with the class roomlearning.
5. The basic experimental skills which are very essential for an engineeringstudent.

COURSE OUTCOMES

Upon successful completion of the course, the student will be ableto:

1. Learn the working principles of PN Junctiondiode.
2. Examine the electrical and magnetic properties ofmaterials.
3. Determine the characteristics of Opto-Electronic devices.
4. Understand the basic principles of OpticalFibers.
5. Analyse the basic electroniccircuits.

LIST OF EXPERIMENTS

1. **Energy gap of P-N junction diode**: To determine the energy gap of a semiconductordiode.
2. **Solar Cell**: To study the V-I Characteristics of solarcell.
3. **Light emitting diode**: Plot V-I and P-I characteristics of light emittingdiode.
4. **Stewart – Gee's experiment**: Determination of magnetic field along axis of the current carryingcoil.
5. **Hall Effect**: To determine Hall co-efficient of givensemiconductor.
6. **Photoelectric effect**: To determine work function of a givenmaterial.
7. **LASER**: To study the characteristics of LASERsources.
8. **Optical Fibre**: To determine the Numerical aperture and bending losses of opticalfibres.
9. **LCR Circuit**: To determine the Quality factor of LCRcircuit.
10. **RC Circuit**: To determine the Time constant of RCcircuit.

NOTE: Any 8 experiments are to be performed

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TEXT BOOKS
1. Engineering Physics, B.K. Pandey, S. Chaturvedi –CengageLearning. 2. Halliday and Resnick,Physics-Wiley. 3. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar-S.Chand.
REFERENCE BOOKS
1. Main, I. G., Vibrations and Waves in Physics. 2nd. edition. CambridgeUniversity Press,1984. 2. Eugene Hecht, "Optics" , 5thEdition,AdelphiUnioversity,2016
WEB REFERENCES
1. Fundamental concepts of semi conductors:https://nptel.ac.in/courses/115102025/ 2. Semi conductor Optoelectronics:https://nptel.ac.in/courses/115102103/
E -TEXT BOOKS
1. http://www.lehman.edu/faculty/kabat/F2019-166168.pdf 2. https://www.scribd.com/doc/143091652/ENGINEERING-PHYSICS-LAB-MANUAL
MOOCS COURSE
1. Swayam:https://swayam.gov.in/nd1_noc19_ph13/preview 2. Alison:https://alison.com/courses?&category=physics

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PROGRAMMING FOR PROBLEM SOLVING LAB

I B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS207ES	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

1. To learn the fundamentals ofcomputers.
2. To understand the various steps in programdevelopment.
3. To learn the syntax and semantics of C programminglanguage.
4. To learn the usage of structured programming approach in solvingproblems

COURSE OUTCOMES

Upon successful completion of the course, the student is able

1. To write algorithms and to draw flowcharts for solvingproblems.
2. To convert the algorithms/flowcharts to Cprograms.
3. To code and test a given logic in C programminglanguage.
4. To decompose a problem into functions and to develop modular reusablecode.
5. To use arrays, pointers, strings and structures to write Cprograms.
6. Searching and sortingproblems

LIST OF EXPERIMENTS

1. Write a simple program that prints the results of all the operators available inC
2. Write a simple program to convert the temperature from Fahrenheit toCelsius
3. Writeaprogramforfindthemaxandminfromthethreenumbersusingifelsestatement
4. Write a C program to find the roots of a Quadraticequation.
5. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators+,-,*, /, % and use Switch Statement)
6. Write a program that finds if a given number is a primenumber
7. Write a C program to find the sum of individual digits of a positive integer and test given number ispalindrome.
8. Write a C program to generate the Fibonacci sequence ofnumbers.
9. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by theuser.
10. Write a C program to find the minimum, maximum and average in an array of integers
11. Writea C program that uses functions to perform the following:1) Additionof Two Matrices 2) Multiplication of TwoMatrices
12. Write a C program to determine if the given string is a palindrome or not (Spelled same in bothdirectionswithorwithoutameaninglikemadam,civic,noon,abcba,etc.)

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13. Write a C program to count the lines, words and characters in a giventext.
14. Define a structure student to store the details like Roll Number, Name, and Marks in three subjects of a student and display thesame.
15. Write a C program to perform specified operation on complexnumbers.
16. Write a C program to store the information about threestudents.
17. Write a C Program to illustrate the use of nestedstructures.
18. Write a C Program to perform arithmetic operations usingpointers.
19. Write a C Program to display the array elements in reverse order usingpointer.
20. Write a C Program to tofind factorial of a number usingfunctions.
21. Write a C Program to find factorial of a number using recursivefunctions.
22. Write a C Program to implement call by value and call byreference.
23. Write a C Program to copy the data from one file toanother
24. Write a C Program to append data to thefile
25. Write a C Program to merge the twofiles
26. Write a C Program to display the file content on reverseorder.
27. Write a C Program to count number of vowels, consonants, digits, words in a given file

TEXT BOOKS

1. TheCProgrammingLanguagebyDennisMRitchie,BrianW.Kernigham,1988,PHI Publications, 2010,NewDelhi.
2. Computer System &Programming in C by SKumar&SJain, NanoEdgePublic publications,Meerut.
3. 3 Fundamentals of Computing and C Programming, R. B. Patel,Khanna

REFERENCE BOOKS

1. Computer Fundamentals and Programming in C, Reema Theraja,Oxford
2. Information technology, Dennis P.Curtin, KimFoley,KunalSen,CathleenMorin,1998,TMH
3. Theory and problem of programming with C, Byron C Gottfried,TMH.

TEXT BOOKS

1. https://www.tutorialspoint.com/cprogramming/
2. https://www.w3schools.in/c-tutorial/
3. https://www.cprogramming.com/tutorial/c-tutorial.html
4. www.studytonight.com/c/

REFERENCE BOOKS

1. http:///programming-with-c
2. https://developerinsider.co/best-c-programming-book-for-beginners/
3. https://nptel.ac.in/courses/106105085/4
4. https://www.coursera.org/courses?query=c%20programming

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ENVIRONMENTAL SCIENCE

I B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
*ES204BS	B. Tech	3	0	0	-	100	-	100

COURSE OBJECTIVES

To learn

1. Analyse the inter relationship between living organism andenvironment
2. Describe various types of natural resources available on theearthsurface
3. Identify the values, threats of biodiversity, endangered and endemic species of India along with the conservation ofbiodiversity
4. Explain the causes, effects and control measures of various types of environmentalpollutions
5. Understand the importance of environment by assessing its impact on the humanworld

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Differentiate between various biotic and abiotic components ofecosystem
2. Describe the various types of naturalresources
3. Examine the values, threats of biodiversity, the methods of conservation, endangered and endemic species ofIndia
4. Illustratecauses,effects,andcontrolmeasuresofvarioustypesofenvironmentalpollutions
5. Understand technologies on the basis of ecological principles environmental regulations which in turn helps in sustainabledevelopment

UNIT-I	ECOSYSTEMS	Classes: 8

Definition, Scope, and Importance of ecosystem. Classification, structure and function of an ecosystem, food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification.

UNIT-II	NATURAL RESOURCES	Classes: 8

Classification of Resources: Living and Non-Living resources.
Waterresources:useandoverutilizationofsurfaceandgroundwater,floodsanddroughts,Dams:benefits andproblems.
Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources
Land resources: Forest resources.
Energy resources: growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

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UNIT-III	BIODIVERSITY AND BIOTIC RESOURCES	Classes: 7
Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic, optional values and hotspots of biodiversity. Endangered and endemic species of India, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation.		
UNIT-IV	**ENVIRONMENTAL POLLUTION**	**Classes: 9**
Types of pollution, Causes, effects and prevention and control measures of air, water, soil, noise and thermal pollution. Solid waste and e-waste management.		
UNIT-V	**ENVIRONMENTAL POLICY AND SUSTAINABLE DEVELOPMENT**	**Classes: 10**
Concept of sustainable development: Sustainable development goals. Threats to sustainability: Population explosion- crazy consumerism. Green building concept. Water conservation, Rainwater harvesting, watershed management. Environmental Policies and Legislations: Environment Protection Act,Air(PreventionandControlofPollution)Act,Forest(conservation)Act,1980.WildlifeProtectionAct.		

TEXT BOOKS

1. Textbook of Environmental Studies for Undergraduate Courses by ErachBharuchafor University GrantsCommission
2. Environmental Studies by R. Rajagopalan, Oxford UniversityPress.
3. Textbook of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BSPublications
4. Dr. P. D Sharma, "Ecology and Environment", Rastogi Publications, New Delhi,12 Edition, 2015

REFERENCE BOOKS

1. Environmental Studies by AnubhaKaushik, 4 Edition, New ageinternationalpublishers
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Pvt. Ltd, NewDelhi
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHL Learning Pvt. Ltd, NewDelhi
4. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIAedition

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WEB REFERENCES

1. https://www.britannica.com/science/ecosystem
2. https://ocw.mit.edu/resources/#EnvironmentandSustainability

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E -TEXT BOOKS
1. P N Palanisamy Environmental Science ISBN:9788131773253, eISBN:97899332509771 Edition: Second edition 2. Environmental Studies. Author, Dr. J. P. Sharma. Publisher, Laxmi Publications, 2009 ISBN, 8131806413, 9788131806418.
MOOCS COURSE
1. https://nptel.ac.in/courses/122103039/38 2. https://nptel.ac.in/courses/106105151/12

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PYTHON PROGRAMMING

II B. TECH- I SEMESTER(R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT301PC	B.Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Learn Syntax and Semantics and create Functions in Python.
2. Understand Lists, Dictionaries and Regular expressions in Python.
3. Handle Strings and Files in Python.
4. Implement Object Oriented Programming and graphics concepts in Python.
5. Build GUI Application and Database Programming in Python.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
2. Demonstrate proficiency in handling Strings and File Systems.
3. Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
4. Interpret the concepts of Object-Oriented Programming and graphics as used in Python.
5. Implement exemplary applications related to GUI and Databases in Python.

UNIT-I	PYTHON BASICS	Classes: 12

Python Basics, Objects- Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types Numbers - Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions, Related Modules Sequences - Strings, Lists, and Tuples, Mapping and Set Types.

UNIT-II	FILES AND OOPS CONCEPTS	Classes: 12

Features of Object oriented programming system (OOPS) – Classes and Objects, Encapsulation, Abstraction, Inheritance, Polymorphism.
Classes and Objects: Creating a class, The Self variable, Constructor, Types of Variable, Namespaces, Types of Methods,
FILES: File Objects, File Built-in Function [open()], File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules, Related Modules Exceptions: Exceptions in Python, Detecting and Handling Exceptions, Context Management, Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions.

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UNIT-III	FUNCTIONS & REGULAR EXPRESSIONS	Classes: 10
Defining a function, calling a function, returning multiple values from a function, functions are first class objects, formal and actual arguments, positional arguments, recursive functions. Regular Expressions: Introduction, Special Symbols and Characters, Res and Python Multithreaded Programming: Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock, Thread Module, Threading Module, Related Modules.		
UNIT-IV	**GUI PROGRAMMING**	**Classes: 12**
GUI Programming: Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs WEB Programming: Introduction, Wed Surfing with Python, Creating Simple Web Clients, Advanced Web Clients, CGI-Helping Servers Process Client Data, Building CGI Application Advanced CGI, Web (HTTP) Servers.		
UNIT-V	**DATABASE PROGRAMMING**	**Classes: 12**
Database Programming: Introduction, Python Database Application Programmer's Interface (DB-API), Object Relational Managers (ORMs), Related Modules.		

TEXT BOOKS

1. Core Python Programming, Wesley J. Chun, Second Edition,Pearson.
2. R Nageswara Rao, ―Core Python Programming‖, Dreamtech press, 2017Edition.
3. DustyPhilips,―Python3ObjectOrientedProgramming‖,PACKTPublishing,2ndEdition,2015.

REFERENCE BOOKS

1. Introduction to Computation and Programming Using Python. John V. Guttag, The MITPress.
2. James Payne, Beginning Python using Python 2.6 and Python 3, Wroxpublishing.
3. Paul Gries, Practical Programming: An Introduction to Computer Science using Python 3,The Pragmatic Bookshelf, 2nd edition (4 Oct.2013).
4. Charles Dierach, Introduction to Computer Science usingPython

WEB REFERENCES

1. https://www.ibiblio.org/swaroopch/byteofpython/read/features-of-python.html
2. https://www.zeolearn.com/magazine/features-of-python

E -TEXT BOOKS

1. https://stackabuse.com/the-best-python-books-for-all-skill-levels/
2. https://opensource.com/article/18/9/python-programming-book-list

MOOCS COURSES

1. https://nptel.ac.in/courses/106106145/
2. https://www.digimat.in/nptel/courses/video/106106182/L01.html

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COMPUTER ORIENTED STATISTICAL METHODS

II B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
MA302BS	B.Tech	3	1	0	4	30	70	100

COURSE OBJECTIVES

To learn

1. The ideas of random variables and various discrete and continuous probability distributions and their properties.
2. The basic ideas of statistics including measures of central tendency.
3. The statistical methods of studying data samples.
4. The idea of Characteristics of queuing system.
5. The idea of Classification of Random processes.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. After learning the contents of this paper the student must be able to Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.
2. Students can solve estimation problems.
3. Students can able to understand the concept of hypothesis.
4. Students able to solve pure Birth-Death process problems.
5. After learning the contents of this paper the student must be able to solve examples of Markov chains, stochastic matrix.

UNIT-I	RANDOM VARIABLE AND DISTRIBUTIONS	Classes: 12

Random variables: Discrete and continuous random variables, Expectation of Random Variables, Variance of random variables, Binomial, Poisson, evaluation of statistical parameters for these distributions. Continuous random variables and their properties, distribution functions and densities, Normal distributions.

UNIT-II	SAMPLING DISTRIBUTION AND ESTIMATION	Classes: 12

Population and samples, Sampling Distribution of mean, Proportions, difference of means, Estimation: Point and Interval, Bayesian estimations.

UNIT-III	TESTING OF HYPOTHESIS	Classes: 10

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Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means; Test for single mean, difference of means for small samples, test for ratio of variances for small samples.		
UNIT-IV	**QUEUING THEORY**	**Classes: 12**
Structure of a queuing system, Operating Characteristics of queuing system –Transient and steady states, Terminology of Queuing systems ,Arrival and service process-pure Birth-Death process Deterministic queuing models-M/M/1 Model of infinite queue M/M/1 model of finite queue.		
UNIT-V	**STOCHASTIC PROCESS**	**Classes: 12**
Introduction to Stochastic Processes-Classification of Random processes, Methods of description of random processes, stationary and non stationary random processes, average values of single random process and two or more random processes. Markov process, Markov chain, classification of states – examples of Markov chains, stochastic matrix.		

TEXT BOOKS

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, keying Ye, Probability and statistics for engineers and scientists, 9thEdition, PearsonPublications
2. Fundamentals of Mathematical Statistics, Khanna Publications, S C Gupthaand V.K.Kapoor
3. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khannapublications.
4. S. D. Sharma, Operations Research, Kedarnath and Remnant Publishers, Meerut,Delhi

REFERENCE BOOKS

1. T.T. Soong, Fundamentals of Probability and Statistics For Engineers, John Wiley &Sons Ltd, 2004.
2. Sheldon M Ross, Probability and statistics for Engineers and scientists, AcademicPress.

WEB REFERENCES

1. https://www.efunda.com/math/gamma/index.cfm
2. https://ocw.mit.edu/resources/#Mathematics
3. https://www.sosmath.com/
4. https://www.mathworld.wolfram.com/

E -TEXT BOOKS

1. https://www.e-booksdirectory.com/listing.php?category=4
2. https://www.e-booksdirectory.com/details.php?ebook=10830

MOOCS COURSES

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL

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BUSINESS ECONOMICS AND FINANACIAL ANALYSIS

II B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
BE304MS	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To learn the basic Business types, impact of the Economy on Business and Firms specifically.
2. To analyze the Business from the Financial Perspective.
3. To Plan production and cost concepts for maximizing profit.
4. To construct financial statement in accordance with generally accepted accounting Principles.
5. To analyze the financial performance of business through Ratios.
6. To Estimate investment proposals through Capital Budgeting Methods.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Understand Business with the use of economic theories and business structure.
2. Learn Production and cost concepts for maximizing profit.
3. Construct financial statement in accordance with generally accepted accounting principles.
4. Analyze the Financial performance of business through Ratios.
5. Estimate investment proposals through Capital Budgeting Methods.

UNIT-I	INTRODUCTION TO BUSINESS AND ECONOMICS	Classes: 13

Business: Characteristic features of Business, Features and evaluation of Private Enterprises and Public Enterprises. Economics: Significance of Economics, types, Concepts and Importance of National Income, Inflation, Nature and Scope of Business Economics. Demand Analysis: Demand Definition, Types, Demand Function, Law of Demand, Elasticity of Demand, Types, Demand Forecasting Methods.

UNIT-II	PACKAGES AND FILE HANDLING	Classes: 13

Theory of Production and Cost Analysis: Theory of Production: Factors of Production, Production Function, Production Function with one variable input, two variable inputs (ISO Quants and ISO Costs), Scale of Production with Law of Returns, Cobb-Douglas Production Function.
Cost Analysis: Types of Costs, Short run and Long run Cost Functions, Break Even Analysis.

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UNIT-III	MARKET STRUCTURES, PRICING & FINANCIAL ACCOUNTING	Classes: 12

Market Structures, Pricing & Financial Accounting: Market Structures, Pricing: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, and Monopolistic Competition, Types of Pricing. Financial Accounting: Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, Elements of Financial Statements, and Preparation of Final Accounts.

UNIT-IV	FINANCIAL ANALYSIS THROUGH RATIOS	Classes: 11

Financial Analysis Through Ratios : Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Capital Structure Ratios and Profitability Ratios, (simple problems), Cash Flow Statement (simple problems) and Funds Flow Statement (simple problems).

UNIT-V	CAPITAL BUDGETING	Classes: 10

Capital, significance, Types of Capital, Methods and sources of raising finance.
Nature of Capital Budgeting features of Capital Budgeting proposals, Methods of Capital Budgeting: Pay Back Period Method (PBP), Accounting Rate of Return (ARR), Net Present Value Method (NPV) simple problems.

TEXT BOOKS

1. D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd.2013.
2. Dhanesh K Khatri, Financial Accounting, Tata Mc –Graw Hill,2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics,2e,
4. Tata Mc Graw Hill Education Pvt. Ltd.2012.

REFERENCE BOOKS

1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press,2015.
2. S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari,Financial
3. Accounting, 5e, Vikas Publications,2013

WEB REFERENCES

1. https://nptel.ac.in/courses/110106050/17
2. https://nptel.ac.in/courses/110106050/39
3. https://nptel.ac.in/courses/110106050/38

E -TEXT BOOKS

1. https://www.sciencedirect.com/book/9780750644549/business-economics
2. http://www.freebookcentre.net/Business/Economics-Books.html

MOOCS COURSES

1. https://nptel.ac.in/courses/110106050/
2. https://nptel.ac.in/courses/110106050/11

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DATA STRUCTURES USING C

II B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS304PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

1. To learn Exploring basic data structures such as stacks and queues and linked list.
2. Introduces a variety of data structures such as Dictionary, hash tables, search trees, tries, heaps, graphs.
3. Introduces sorting and pattern matching algorithms.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Ability to select the data structures that efficiently model the information in a problem.
2. Ability to assess efficiency trade-offs among different data structure implementations.
3. Implement and know the application of algorithms for sorting and pattern matching.
4. Design programs using a variety of data structures, including hash tables, binary and general Tree structures, search trees, tries, heaps, graphs, and AVL-trees.

UNIT-I	INTRODUCTION TO DATA STRUCTURES	Classes: 13

Introduction to Data Structures: Abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Double & Circular linked list implementations, Stack ADT & Stacks-Operations, array and linked representations of stacks & applications, Queue ADT & Queues-operations, array and linked representations, types of Queue, Applications of Queue.

UNIT-II	DICTIONARIES	Classes: 12

Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching. Hash Table Representation: hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, and rehashing, and extendible hashing. Applications of Dictionary Data structures.

UNIT-III	SEARCH TREES	Classes: 10

Nonlinear data structures tree, Binary trees, representations ,traversals and implementations, Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Rotations, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees.

Introduction to Red –Black trees and Splay Trees, B-Trees-B-Tree of order m, height of a B-Tree,

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insertion, deletion and searching, Comparison of Search Trees.		
UNIT-IV	**GRAPHS**	**Classes: 11**
Graphs: Definition & terminologies, types of graph, Graph implementation methods, Graph traversal Methods. Sorting: Insertion sort, Selection sort, Quick sort, Bucket sort, Heap Sort, External Sorting-Model for external sorting, Merge Sort.		
UNIT-V	**PATTERN MATCHING AND TRIES**	**Classes: 12**
Pattern Matching and Tries: Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.		

TEXT BOOKS

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahniand Susan Anderson Freed, UniversitiesPress.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.

REFERENCE BOOKS

1. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B.A. Forouzan, CengageLearning

WEB REFERENCES

1. https://learntocodewith.me/posts/data-structures/
2. http://cgm.cs.mcgill.ca/~godfried/teaching/algorithms-web.html
3. https://www.javatpoint.com/data-structure-tutorial
4. https://www.geeksforgeeks.org/data-structures/

E -TEXT BOOKS

1. https://www.freetechbooks.com/algorithms-and-data-structures-f11.html
2. https://opendatastructures.org/

MOOCS COURSES

1. https://nptel.ac.in/courses/106102064/
2. https://swayam.gov.in/explorer?searchText=data+structures

St. Martin's Engineering College

ANALOG AND DIGITAL ELECTRONICS

II B. TECH- I SEMESTER(R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
EC305ES	B.Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To introduce components such as diodes, BJTs and FETs.
2. To know the applications of components.
3. To give understanding of various types of amplifier circuits.
4. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
5. To understand the concepts of combinational logic circuits and sequential circuits.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. **Identify** and characterize diodes and their applications
2. **Analyze** the BJT characteristics and biasing circuits
3. **Understand** the operation of FET and know about the logic families and realization of logic gates.
4. **Learn** Postulates of Boolean algebra and to minimize combinational logic functions.
5. **Design** and analyze sequential circuits.

UNIT-I	DIODES AND APPLICATIONS	Classes: 14

Junction diode characteristics: Open circuited p-n junction, p-n junction as a rectifier, V-I characteristics, Effect of temperature, Diode resistance, Transition capacitance, Diffusion capacitance, Zener diode, Tunnel diode, Photo diode, LED.
Diode Applications - Clipping circuits, Comparators, Half wave rectifier, Full wave rectifier, Rectifier with capacitor filter.

UNIT-II	BJTS	Classes: 15

Transistor characteristics: The junction transistor, transistor as an amplifier, BJT Operation, BJT Symbol, BJT Hybrid Model, Determination of h-parameters from Transistor Characteristics CB, CE, CC configurations, comparison of transistor configurations, the operating point, self-bias or Emitter bias, bias compensation, thermal runaway and stability.

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UNIT-III	FETS AND DIGITAL CIRCUITS	Classes:13

FETs: JFET, V-I characteristics, MOSFET, (Construction, principle of operation, symbol), Characteristics in Enhancement and Depletion modes.
Digital Circuits: Digital (binary) operations of a system, OR gate, AND gate, NOT, EXCLUSIVE OR gate, De Morgan Laws, NAND and NOR DTL & TTL gates, output stages, RTL and DCTL, CMOS, Comparison of logic families.

UNIT-IV	COMBINATIONAL LOGIC CIRCUITS	Classes: 13

Basic Theorems and Properties of Boolean algebra, Canonical and Standard Forms, Digital Logic Gates, The Map Method, Product-of-Sums Simplification, Don't-Care Conditions, NAND and NOR Implementation, Exclusive-OR Function, Binary Adder-Subtractor, Magnitude Comparator, Decoders, Encoders, Multiplexers, Demultiplexer.

UNIT-V	SEQUENTIAL LOGIC CIRCUITS	Classes: 12

Sequential Circuits, Storage Elements: Latches and flip flops, Design of Clocked Sequential Circuits, State Reduction and Assignment, Shift Registers, Ripple Counters, Synchronous Counters, Random-Access Memory, Read-Only Memory.

TEXT BOOKS

1. Integrated Electronics: Analog and Digital Circuits and Systems, 2/e, JaccobMillman, Christos Halkias and Chethan D. Parikh, Tata McGraw-Hill Education, India,2010.
2. Digital Design, 5/e, Morris Mano and Michael D. Cilette, Pearson,2011.
3. Switching and Finite Automata Theory- ZviKohavi&Niraj K. Jha, 3rdEdition,Cambridge.

REFERENCE BOOKS

1. Electronic Devices and Circuits, Jimmy J Cathey, Schaum's outline series,1988.
2. Digital Principles, 3/e, Roger L. Tokheim, Schaum's outline series,1994.
3. Switching Theory and Logic Design – AAnand Kumar, 3rd Edition, PHI,2013.
4. Modern Digital electronics RP Jain 4th Edition, McGrawHill
5. **Electronic Devices and Circuits Paperback – 2008 by DavidBell**

WEB REFERENCES

1. http://nptel.ac.in/video.php?subjectId=117103063
2. http://www.nptelvideos.in/2012/12/basic-electronics-drchitralekha-mahanta.html
3. http://www.iitg.ac.in/engfac/chitra/
4. https://lecturenotes.in/subject/203/switching-theory-and-logic-design-stld
5. http://www.infocobuild.com/education/audio-video-courses/electronics/DigitalCircuitsSystems

E -TEXT BOOKS

1. SIGNALS &SYSTEMS 2nd Edition Paperback – 1 Jul 2017by H Hsu (Author), R Ranjan(Author)
2. Signals andSystems 2nd edition 2nd Edition (English, Paperback, Alan V. Oppenheim, Alan S. Willsky, S. Hamid Nawab)

MOOCS Course:

1. http://www.onlinevideolecture.com/electronics-engineering
2. https://swayam.gov.in/courses/1392-digital-circuits-and-systems

Sri Vasavi Engineering College

PYTHON PROGRAMMING LAB

II B. TECH- I SEMESTER(R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT306PC	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

To learn

1. To write, test, and debug simple Python programs.
2. To implement Python pattern programs with conditionals and loops.
3. Use functions for structuring Python programs, Read and write data from/to files in Python.
4. To represent compound data using Python lists, tuples, and dictionaries.
5. To design Gaming.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Write, test, and debug simple Python programs.
2. Implement Python pattern programs with conditionals and loops.
3. Develop Python programs step-wise by defining functions and calling them, Read and write data from/to files in Python.
4. Use Python lists, tuples, dictionaries for representing compound data.
5. Design a gaming.

LIST OF EXPERIMENTS

1. Write a python program to compute the GCD of two numbers.
2. Write a python program to find the square root of a number (Newton's method).
3. Write a python program to exponentiation (power of a number).
4. Write a python program to find the maximum of a list of numbers.
5. Write a python program to print a hollow diamond pattern.
6. Write a python program to print the arrow pattern.
7. Write a python program to print zigzag pattern.
8. (a).Write a python program for linear search.
   (b).Write a python program for Binary search.
9. (a).Write a python program for Selection sort.
   (b).Write a python program for Insertion sort.
   (c).Write a python program for Merge sort.
10. Write a python program to find first n prime numbers.
11. Write a python program for multiply matrices.
12. Write a python program to take command line arguments (word count).
13. Write a python program to find the most frequent words in a text read from a file.
14. Write a python program to simulate elliptical orbits in Pygame.
15. Write a python program for simulate bouncing ball in Pygame.

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TEXT BOOKS
1. Core Python Programming, Wesley J. Chun, Second Edition,Pearson. 2. RNageswaraRao,—CorePythonProgramming‖,Dreamtechpress,2017Edition. 3. DustyPhilips,—Python3ObjectOrientedProgramming‖,PACKTPublishing,2ndEdition, 2015.
REFERENCE BOOKS
1. Introduction to Computation and Programming Using Python. John V. Guttag, The MITPress. 2. James Payne, Beginning Python using Python 2.6 and Python 3, Wroxpublishing.
WEB REFERENCES
1. https://pythonbooks.revolunet.com/ 2. https://www.digitalocean.com/community/tutorials/digitalocean-ebook-how-to-code-in-python
E -TEXT BOOKS
1. https://www.java67.com/2017/05/top-7-free-python-programming-books-pdf-online-download.html 2. http://freecomputerbooks.com/langPythonBooks.html
MOOCS COURSES
1. https://www.mooc-list.com/tags/python-programming 2. https://www.udacity.com/course/introduction-to-python--ud1110

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DATA STRUCTURES LAB USING C

II B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS307PC	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

To learn

1. Exploring basic data structures such as stacks and queues and linked list.
2. Introduces a variety of data structures such as Dictionary, hash tables, search trees, tries, Heaps, graphs
3. Introduces sorting and pattern matching algorithms.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Ability to select the data structures that efficiently model the information in a problem.
2. Ability to assess efficiency trade-offs among different data structure implementations or combinations.
3. Implement and know the application of algorithms for sorting and pattern matching.
4. Design programs using a variety of data structures, including hash tables, binary and general Tree structures, search trees, tries, heaps, graphs, and AVL-trees

LIST OF EXPERIMENTS

1. Write a program that uses functions to perform the following operations on singly linked list. i) Creation ii) Insertion iii) Deletion iv)Traversal
2. Write a program that uses functions to perform the following operations on doublylinkedlist. i) Creation ii) Insertion iii) Deletion iv)Traversal
3. Write a program that uses functions to perform the following operations on circular linked list. i) Creation ii) Insertion iii) Deletion iv)Traversal
4. Write a program that implement stack (its operations) using i) Arrays ii) Pointers.
5. Write a program that implement Queue (its operations) using i) Arrays ii)Pointer
6. Write a program that implement Circular Queue (its operations) using i) Arrays ii) Pointers
7. Write a program that implements the following sorting methods to sort a given list of integers in ascending order i) Bubble sort ii) Selection sort iii) Insertion sort
8. Write a program that uses both recursive and non-recursive functions to perform the following searching operations for a Key value in a given list of integers: i) Linear search ii) Binary search
9. Write a program to implement pre order, in order and post order traversal methods.
10. Write a program to implement i) DFS ii) BFS methods.

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TEXT BOOKS	
1	Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, UniversitiesPress.
2	Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.
REFERENCE BOOKS	
1	Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B.A.Forouzan, CengageLearning
WEB REFERENCES	
1	https://www.javatpoint.com/singly-linked-list
2	https://www.programiz.com/dsa/circular-queue.
E -TEXT BOOKS	
1	"Data Structures and Algorithms Made Easy: Data Structures and Algorithmic Puzzles" by NarasimhaKarumanchi.
2	Data Structures & Algorithms in Java, 2e bylafore
MOOCS COURSE	
1	https://www.mooc-list.com/tags/data-structures
2	https://www.coursera.org/specializations/data-structures-algorithms

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ANALOG AND DIGITAL ELECTRONICS LAB

II B. TECH- I SEMESTER(R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
EC308ES	B. Tech	0	0	2	1	30	70	100

COURSE OBJECTIVES

To learn

1. To introduce components such as diodes, BJTs and FETs.
2. To know the applications of components.
3. To give understanding of various types of amplifier circuits
4. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
5. To understand the concepts of combinational logic circuits and sequential circuits.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Know the characteristics of various components.
2. Understand the utilization of components.
3. Design and analyze small signal amplifier circuits.
4. Postulates of Boolean algebra and to minimize combinational functions
5. Design and analyze combinational and sequential circuits.
6. Known about the logic families and realization of logic gates.

LIST OF EXPERIMENTS

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator
3. Full Wave Rectifier with & without filters
4. Common Emitter Amplifier Characteristics
5. Common Base Amplifier Characteristics
6. Input and Output characteristics of FET in CS Configuration
7. Realization of Boolean Expressions using Gates
8. Design and realization logic gates using universal gates
9. Generation of clock using NAND / NOR gates
10. Design a 4 – bit Adder /Subtractor
11. Design and realization a Synchronous and Asynchronous counter using flip-flops
12. Realization of logic gates using DTL, TTL, ECL,etc.

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TEXT BOOKS
1. Integrated Electronics: Analog and Digital Circuits and Systems, 2/e, JaccobMillman, Christos Halkias and Chethan D. Parikh, Tata McGraw-Hill Education, India,2010. 2. Digital Design, 5/e, Morris Mano and Michael D. Cilette, Pearson,2011.
REFERENCE BOOKS
1. Electronic Devices and Circuits, Jimmy J Cathey, Schaum's outline series,1988. 2. Digital Principles, 3/e, Roger L. Tokheim, Schaum's outline series,1994.
WEB REFERENCES
1. Hands-On Electronics: A Practical Introduction to Analog and Digital Circuits by Daniel M.aplanand Christopher G. White | 15 May2003 2. Foundations of Analog and Digital Electronic Circuits by Agarwal | 24 SeptembeR2005
E -TEXT BOOKS
1. https://www.analog.com/en/education/education-library/tutorials.html 2. "Analysis and Design of Digital Integrated Circuits" by D A Hodges and H GJackson
MOOCS COURSES
1. https://www.mooc-list.com/tags/digital-electronics 2. https://www.coursera.org/courses?query=electronics

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IT WORKSHOP LAB

II B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS309PC	B. Tech	0	0	2	1	30	70	100

COURSE OBJECTIVES

To learn

1. To nurture the students to identify the basic components of a computer.
2. To demonstrate the process of assembling and disassembling of computer parts.
3. To explain the installation of operating systems.
4. To make the students develop applications like spread sheet, documents, presentation using the software like MS office, LATEX.
5. To illustrate the usage of internet.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Identify various components and its functions.
2. Apply the knowledge of computer peripherals in assembling, disassembling and
3. Troubleshooting of personal computer.
4. Experiment with installation of operating system and make the computer ready to use.
5. Prepare word documents; excel sheets and power point presentation.
6. Develop Latex documents to handling equations and images effectively and make use of internet to enhance their technical skills.

LIST OF EXPERIMENTS

1. Identification of peripherals of a computer: Block diagram of the CPU along with the configuration of the each peripheral and its functions.
2. System Assembling and Disassembling: Disassembling the components of a PC and assemble them back to working condition.
3. Installation of softwares: Installation of operating Systems: Windows, Linux along with necessary Device Drivers, Installation of application softwares and Tools.
4. Troubleshooting (Demonstration): Hardware Troubleshooting: Identification of a problem and fixing a defective PC Software Troubleshooting: Identification of a problem and fixing the PC for any software issues.
5. Network Configuration and Internet: Configuring TCP/IP, proxy and firewall settings, Internet and World Wide Web-Search Engines, Types of search engines, netiquette, and cyber hygiene.
6. MS-Office / Open Office:
   a. Word - Formatting, Page Borders, Reviewing, Equations, symbols

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b. Spread Sheet - organize data, usage of formula, graphs and charts.
c. Power point - features of power point, guidelines for preparing an effective Presentation.
d. Access- creation of database, validate data.

7. LaTeX: LaTeX - basic formatting, handling equations and images.

TEXT BOOKS

1. Textbook Of Workshop Technology Rs KhurmiJk Gupta,

REFERENCE BOOKS

1. Computer Hardware, Installation, Interfacing, Troubleshooting And Maintenance, K.L. James,Eastern EconomyEdition.
2. Microsoft Office 2007: Introductory Concepts And Techniques, Windows XP Edition By Gary B. Shelly, Misty E. Vermaat And Thomas J. Cashman (2007,Paperback).

WEB REFERENCES

1. LATEX- User's Guide and Reference Manual, Leslie Lamport, Pearson, Second Edition LPE.

E -TEXT BOOKS

1. Foundations of Information Technology Coursebook 9: Windows 7 and MS Office 2007 (With MS Office 2010 Updates)-Sangeeta Panchal,Alka Sabharwal
2. Dell Ms Office 2003-DianeKoers

MOOCS COURSES

1. https://store.self-publish.in › products › a-textbook-of-workshop-technology

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GENDER SENSITIZATION LAB
(An Activity-based Course)

II B. TECH- I SEMESTER(R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
*GS309MC	B.Tech	0	0	2	0	100	-	100

COURSE OBJECTIVES

To learn

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions about sex, gender, and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. To develop students' sensibility with regard to issues of gender incontemporary India.
2. To provide a critical perspective on the socialization of menand women.
3. To introduce students to information about some key biological aspects of genders.
4. To expose the students to debates on the politics and economics of work.
5. To help students reflect critically on gender violence.
6. To expose students to more egalitarian interactions between men and women.

UNIT-I	UNDERSTANDING GENDER	Classes: 10

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men Preparing for Womanhood. Growing up Male. First lessons in Caste.

UNIT-II	GENDER ROLES AND RELATIONS	Classes: 8

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Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles- Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences- Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary		
UNIT-III	**GENDER AND LABOUR**	**Classes:10**
Division and Valuation of Labor-Housework: The Invisible Labor- "My Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work. - Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming.		
UNIT-IV	**GENDER - BASED VIOLENCE**	**Classes: 8**
The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No! -Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading:"*Chupulu".* Domestic Violence: Speaking Out Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."		
UNIT-V	**GENDER AND CULTURE**	**Classes: 8**
Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks-The Brave Heart.		

REFERENCE BOOKS	
1	Gender Sensitisation Hardcover – 2012 by Dr. Tanuja Trivedi(Author)
WEB REFERENCES	
1	http://www.unesco.org/new/en/communication-and-information/resources/publications-and-communication-materials/publications/full-list/gender-sensitivity-a-training-manual-for-sensitizing-education-managers-curriculum-and-material-developers-and-media-professionals-to-gender-concerns/
E -TEXT BOOKS	
1	http://www.himpub.com/documents/Chapter1951.pdf
MOOCS COURSES	
1	https://www.humanrightscareers.com/magazine/free-online-course-on-gender-equality-and-sexual-diversity-sign-up-now/
2	https://www.mooc-list.com/tags/gender-equality

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OPERATING SYSTEMS

II B. TECH- II SEMESTER(R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS401PC	B.Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn
1. To understand the OS role in the overall computer system
2. To study the operations performed by OS as a resource manager
3. To understand the scheduling policies of OS
4. To understand the different memory management techniques
5. To understand process concurrency and synchronization
6. To understand the concepts of input/output, storage and file management
7. To understand the goals and principles of protection.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to
1. Apply optimization techniques for the improvement of system performance.
2. Ability to design and solve synchronization problems.
3. Learn about minimization of turnaround time, waiting time and response time and also maximization of throughput by keeping CPU as busy as possible.
4. Ability to change access controls to protect files.
5. Ability to compare the different operating systems

UNIT-I	INTRODUCTION TO OPERATING SYSTEM	Classes: 12

Operating System - Introduction, Structures - Simple Batch, Multiprogrammed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls.

UNIT-II	PROCESS AND CPU SCHEDULING	Classes: 12

Process and CPU Scheduling - Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads, and Interposes Communication, Scheduling Criteria, Scheduling Algorithms, Multiple -Processor Scheduling.
System call interface for process management-fork, exit, wait, waitpid, exec.

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UNIT-III	DEADLOCKS	Classes:10

Deadlocks - System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock
Process Management and Synchronization - The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors
Interprocess Communication Mechanisms: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory.

UNIT-IV	MEMORY MANAGEMENT AND VIRTUAL MEMORY	Classes: 12

Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Replacement, Page Replacement Algorithms.

UNIT-V	FILE SYSTEM INTERFACE AND OPERATIONS	Classes: 12

File System Interface and Operations -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management. Usage of open, create, read, write, close, lseek, stat, ioctl system calls.
Case Study-Linux: Linux History, Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File Systems, Input and Output, Inter-process Communication.

TEXT BOOKS

1. Operating System Concepts by Abraham Silberschatz, Peter B. Galvin, Greg Gagne, 9th Edition, Wiley, 2016 India Edition

REFERENCE BOOKS

1. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition,PHI
2. Operating Systems: A concept-based Approach, 2nd Edition, D.M. Dhamdhere,TMH.
3. Principles of Operating Systems, B. L. Stuart, Cengage learning, IndiaEdition.
4. An Introduction to Operating Systems, P.C.P. Bhatt,PHI.
5. 5. Principles of Operating systems, Naresh Chauhan, Oxford UniversityPress

WEB REFERENCES

1. Operating System Principles by Silberschatz, Galvin, Gagne
2. Operating Systems: Internals and Design Principles, 7e byStallings

E -TEXT BOOKS

1. http://www.freebookcentre.net/ComputerScience-Books-Download/Operating-Systems-and-Middleware-Supporting-Controlled-Interaction.html
2. http://www.freebookcentre.net/ComputerScience-Books-Download/Operating-System-by-Gopi-Sanghani.html

MOOCS COURSES

1. https://www.mooc-list.com/tags/os
2. https://nptel.ac.in/courses/106106144/2

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DATABASE MANAGEMENT SYSTEMS

II B. TECH- II SEMESTER(R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT402PC	B.Tech	3	1	0	4	30	70	100

COURSE OBJECTIVES

To learn
1. To understand the basic concepts and the applications of database systems.
2. To master the basics of SQL and construct queries using SQL.
3. Topics include data models, database design, relational model, relational algebra, transaction Control, concurrency control, storage structures and access techniques.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to
1. Gain knowledge of fundamentals of DBMS, database design and normal forms
2. Master the basics of SQL for retrieval and management of data.
3. Be acquainted with the basics of transaction processing and concurrency control.
4. Familiarity with database storage structures and access techniques

UNIT-I	DATABASE SYSTEM APPLICATIONS	Classes: 12

Database System Applications: A Historical Perspective, File Systems versus a DBMS, view of data, data abstraction instances and schema, the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS
Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design With the ER Model, Database languages-DDL,DML,DCL,TCL.

UNIT-II	INTRODUCTION TO THE RELATIONAL MODEL	Classes: 12

Introduction to the Relational Model: Integrity constraint over relations, enforcing integrity Constraints, querying relational data, logical data base design, introduction to views, destroying/altering tables and views. Relational Algebra-selection and projection set operations-renaming-joins-divisions, Relational calculus**,** Tuple relational Calculus, Domain relational calculus.

UNIT-III	SQL: QUERIES, CONSTRAINTS, TRIGGERS	Classes:10

SQL: QUERIES, CONSTRAINTS, TRIGGERS: form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active data bases. Schema Refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms,

BCNF, lossless join decomposition, multi-valued dependencies, FOURTH normal form, FIFTH normal form.

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UNIT-IV	TRANSACTION CONCEPT	Classes: 12
Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity, Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions.		
UNIT-V	**DATA ON EXTERNAL STORAGE**	**Classes: 12**
Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning, Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.		

TEXT BOOKS

1. Fundamentals of Data Base Management Systems by Dr. P. Santosh Kumar Patra, Sri Krishna Publishing Company Pvt.Ltd.
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, Vedition.

REFERENCE BOOKS

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7thEdition.
2. Fundamentals of Database Systems, ElmasriNavrate, *PearsonEducation*
3. Introduction to Database Systems, C. J. Date, *PearsonEducation*
4. Oracle for Professionals, The X Team, S.Shah and V. Shah,*SPD.*
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah,*PHI.*
6. Fundamentals of Database Management Systems, M. L. Gillenson, *Wiley Student*Edition.

WEB REFERENCES

1. http://www.freebookcentre.net/Database/Free-Database-Systems-Books-Download.html
2. https://www.gatevidyalay.com/transaction-states-in-dbms/

E -TEXT BOOKS

1. http://www.ebooks-for-all.com/bookmarks/detail/Database-Management-Systems/onecat/0.html
2. http://freecomputerbooks.com/dbSystemsBooks.html

MOOCS COURSES

1. https://swayam.gov.in/nd2_cec19_cs05/preview
2. https://swayam.gov.in/nd2_nou19_lb03/preview

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JAVA PROGRAMMING

II B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS403PC	B. Tech	3	1	0	4	30	70	100

COURSE OBJECTIVES

To learn

1. Language programming using a module's approach which gives emphasize to small programs.
2. To define exceptions and use I/O streams.
3. TointroducethedesignofGraphicalUserInterfaceusingappletsandswingcontrols.
4. To develop a java application with threads and generics classes.
5. To design and build simple Graphical User Interface.
6. Learn how to write moderately complex Java programs efficiently.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Knowing essential concepts, principles and theories of Java technology relating to the web applications.
2. Develop real-world programming problems and applications efficiently using the advanced JAVA library.
3. Develop Java applications with threads and generics classes.
4. Able to develop multithreaded applications with synchronization and applets for web applications.
5. Build Java applications using exceptions and I/O streams and interactive Java programs using swings

UNIT-I	OBJECT-ORIENTED THINKING AND INHERITANCE	Classes: 13

Object-Oriented Thinking- A way of viewing world – Agents and Communities, messages and methods, Responsibilities, Classes and Instances, Class Hierarchies- Inheritance, Method binding, Overriding and Exceptions, Summary of Object-Oriented concepts. Java buzzwords, An Overview of Java, Data types, Variables and Arrays, operators, expressions, control statements, Introducing classes, Methods and Classes, String handling.

Inheritance– Inheritance concept, Inheritance basics, Member access, Constructors, Creating Multilevel hierarchy, super uses, using final with inheritance, Polymorphism-ad hoc polymorphism, pure polymorphism, method overriding, abstract classes, Object class, forms of inheritance-specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance.

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UNIT-II	PACKAGES AND STREAM BASED I/O	Classes: 12

Packages - Defining a Package, CLASSPATH, Access protection, importing packages. Interfaces - defining an interface, implementing interfaces, Nested interfaces, applying interfaces, variables in interfaces and extending interfaces.

Stream based I/O (java.io) – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and writing Files, Random access file operations, The Console class, Serialization, Enumerations, auto boxing, generics.

UNIT-III	EXCEPTION HANDLING AND GENERIC CLASSES	Classes: 12

Exception handling - Fundamentals of exception handling, Exception types, Termination or resumptive models, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built- in exceptions, creating own exception sub classes. Multithreading- Differences between thread-based multitasking and process-based multitasking, Java thread model, creating threads, thread priorities, synchronizing threads; inter thread communication

Generic classes – generic methods – Bounded Types – Restrictions and Limitations.

UNIT-IV	COLLECTIONS FRAMEWORK AND INTERFACES	Classes: 12

The Collections Framework (java.util)- Collections overview, Collection Interfaces, The Collection classes- Array List, Linked List, Hash Set, Tree Set, Priority Queue, Array Deque. Accessing a Collection via an Iterator, Using an Iterator, The For-Each alternative, Map Interfaces and Classes, Comparators, Collection algorithms, Arrays, The Legacy Classes and Interfaces- Dictionary, Hashtable ,Properties, Stack, Vector More Utility classes, String Tokenizer, Bit Set, Date, Calendar, Random, Formatter, Scanner.

UNIT-V	GUI PROGRAMMING WITH SWING	Classes: 13

GUI Programming with Swing – Introduction, limitations of AWT, MVC architecture, components, containers. Understanding Layout Managers, Flow Layout, Border Layout, Grid Layout, Card Layout, Grid Bag Layout. Event Handling- The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes, Inner classes, Anonymous Inner classes.

A Simple Swing Application, Applets – Applets and HTML, Security Issues, Applets and Applications, passing parameters to applets. Creating a Swing Applet, Painting in Swing, A Paint example, Exploring Swing Controls- JLabel and Image Icon, JText Field, The Swing Buttons- JButton, JToggle Button, JCheck Box, JRadio Button, JTabbed Pane, JScroll Pane, JList, JCombo Box, Swing Menus, Dialogs.

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TEXT BOOKS

1. Java The complete reference, 11th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd,2018.
2. Cay S. Horstmann, Gary cornell, ―Core Java Volume –I Fundamentals‖, 11th Edition, Prentice Hall, 2018.Think Python First Edition, by Allen B. Downey, Oriellypublishing.

REFERENCE BOOKS

1. Steven Holzner, ―Java 2 Black book‖, Dreamtechpress,2011.
2. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley &sons.
3. Timothy Budd, ―Understanding Object-oriented programming with Java,Updated
4. Edition, Pearson Education,2000.
5. Java Programming and Object-oriented Application Development, R. A. Johnson, CengageLearning.

WEB REFERENCES

1. http://www.developer.com/icom_includes/feeds/developer/dev-25.xml
2. http://www.ibm.com/developerworks/views/java/rss/libraryview.jsp
3. http://www.javaworld.com/rss/index.html
4. http://feeds.feedburner.com/DevxLatestJavaArticles

E -TEXT BOOKS

1. HTTPProgrammingRecipesforJavaBotsbyJeffHeaton-HeatonResearch,Inc.
2. Java Distributed Computing by Jim Farley - O'ReillyMedia
3. JavaPreciselybyPeterSestoft-ITUniversityofCopenhagen
4. JavaforAbsoluteBeginners:LearntoProgramtheFundamentalstheJava9+Way
5. Fundamentals of the Java Programming Language, Java SE6
6. JAVA: Easy Java Programming for Beginners, Your Step-By-StepGuide to
7. Learning JavaProgramming
8. AndroidAppDevelopmentinAndroidStudio:Java+AndroidEditionforBeginners

MOOCS COURSES

1. https://www.mooc-list.com › tags ›java-programming
2. https://www.mooc-list.com › tags ›java
3. https://www.edx.org › learn ›java
4. https://www.quora.com ›What-are-the-best-MOOCs-for-learning-Java
5. https://www.udacity.com › course ›java-programming-basics--ud282
6. https://www.futurelearn.com › courses ›begin-programming.

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COMPUTER ORGANIZATION AND MICROPROCESSOR

II B. TECH- II SEMESTER(R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT404PC	B.Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn
1. To understand basic components of computers.
2. To understand the architecture of 8086processor.
3. To understand the instruction sets, instruction formats and various addressing modes of8086.
4. To understand the representation of data at the machine level and how computations are performed at machine level.
5. To understand the memory organization and I/O organization.
6. To understand the parallelism both in terms of single and multiple processors.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to
1. Able to understand the basic components and the design of CPU, ALU and Control Unit.
2. Ability to understand memory hierarchy and its impact on computer cost/performance.
3. Ability to understand the advantage of instruction level parallelism and pipelining for high performance Processor design.
4. Ability to understand the instruction set, instruction formats and addressing modes of8086.
5. Ability to write assembly language programs to solve problems

UNIT-I	DIGITAL COMPUTERS	Classes: 12

Digital Computers: Introduction of Computer, Computer Types, Functional units of Computer, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt, Complete Computer Description. Micro Programmed Control: Control memory, Address sequencing, micro program example, design of control unit.

UNIT-II	CENTRAL PROCESSING UNIT	Classes: 12

Central Processing Unit: Features of 8085 microprocessor, Differences between 8085 and 8086 processor, Pin diagram of 8086 processor. The 8086 Processor Architecture, Register organization, Physical memory organization, General Bus Operation, I/O Addressing Capability, Special Processor Activities, Minimum and Maximum mode system and timings.

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8086 Instruction Set and Assembler Directives-Machine language instruction formats, Addressing modes, Instruction set of 8086, Assembler directives and operators.

UNIT-III	ASSEMBLY LANGUAGE PROGRAMMING WITH 8086	Classes:10

Assembly Language Programming with 8086- Machine level programs, Machine coding the programs, Programming with an assembler, Assembly Language example programs, Interrupts and Interrupt service routines, Interrupt cycle of 8086, Interrupt programming, Passing parameters to procedures, Macros, Timings and Delays.

UNIT-IV	COMPUTER ARITHMETIC	Classes: 12

Computer Arithmetic: Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating - point Arithmetic operations.
The Memory System: Basic concepts semi-conductor RAM memories, Read only memories(ROM) Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP),Intel 8089 IOP.

UNIT-V	MEMORY ORGANIZATION	Classes: 12

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.
Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors, Multiprocessor and Multicomputer, IPC.

TEXT BOOKS

1. Computer System Architecture, M. Moris Mano, Third Edition,Pearson.
2. Advanced Microprocessors and Peripherals, K M Bhurchandi, A.K Ray, 3rd edition, McGraw Hill India Education PrivateLtd.

REFERENCE BOOKS

1. Computer Organization and Architecture, William Stallings, 9th Edition,Pearson.
2. David A. Patterson, John L. Hennessy: Computer Organization and Design – The Hardware/ Software Interface ARM Edition, 4th Edition, Elsevier,2009.

E -TEXT BOOKS

1. A Text Book Of Computer Organization & Architecture Paperback – 2016 by Prof. Jatinder Singh (Author), Er. Amardeep Singh(Author)
2. .Microprocessor Architecture, Programming and Applications with the 8085 6/e Paperback 1Oct 2013by Ramesh Gaonkar(Author)

MOOCS COURSES

1. https://www.edx.org/course/computation-structures-3-computer-mitx-6-004-3x-0
2. https://www.mooc-list.com/tags/microprocessors

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DISCRETE MATHEMATICS

II B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS405PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Introduces the elementary discrete mathematics for computer science and engineering.
2. Topics include formal logic notation, methods of proof, induction, sets, relations, graph theory, Permutations and combinations, counting principles; recurrence relations and generating functions.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Ability to understand and construct precise mathematical proofs.
2. Ability to use logic and set theory to formulate precise statements.
3. Ability to analyze and solve counting problems on finite and discrete structures.
4. Ability to describe and manipulate sequences.
5. Ability to apply graph theory in solving computing problems.

UNIT-I	INTRODUCTION TO THE FOUNDATIONS	Classes: 11

The Foundations: Logic and Proofs: Propositional Logic, Applications of Propositional Logic, Propositional Equivalence, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference, Introduction to Proofs, Proof Methods and Strategy.

UNIT-II	SET'S, FUNCTIONS AND SEQUENCES	Classes: 12

Basic Structures, Sets, Functions, Sequences, Sums, Matrices and Relations Sets, Functions, Sequences & Summations, Cardinality of Sets and Matrices Relations, Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings.

UNIT-III	ALGORITHMS	Classes: 10

Algorithms, Induction and Recursion: Algorithms, The Growth of Functions, Complexity of Algorithms Induction and Recursion: Mathematical Induction, Strong Induction and Well-Ordering,

Recursive Definitions and Structural Induction, Recursive Algorithms, Program Correctness.

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UNIT-IV	DISCRETE PROBABILITY AND ADVANCED COUNTING	Classes: 11
Discrete Probability and Advanced Counting Techniques: An Introduction to Discrete Probability, Probability Theory, Bayes' Theorem, Expected Value and Variance Advanced Counting Techniques: Recurrence Relations, Solving Linear Recurrence Relations, Generating functions, function of sequence, Calculating Coefficients of generating functions.		
UNIT-V	**GRAPHS**	**Classes: 12**
Graphs: Graphs and Graph Models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Coloring. Trees: Introduction to Trees, Applications of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Trees.		

TEXT BOOKS

1. Discrete Mathematics and its Applications with Combinatorics and Graph Theory- Kenneth H Rosen, 7th Edition, TMH.

REFERENCE BOOKS

1. Discrete Mathematical Structures with Applications to Computer Science-J.P. Tremblayand R. Manohar, TMH.
2. Discrete Mathematics for Computer Scientists & Mathematicians: Joe L. Mott, Abraham. Kandel, Teodore P. Baker, 2nd ed, PearsonEducation.
3. Discrete Mathematics- Richard Johnsonbaugh, 7Th Edn., PearsonEducation.
4. Discrete Mathematics with Graph Theory- Edgar G. Goodaire, Michael M.Parmenter.
5. Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P. Grimald, 5th edition, Pearson Education.

WEB REFERENCES

1. "Discrete Mathematics and its Applications" by Kenneth HRosen
2. "Elements of Discrete Mathematics" by C LLiu
3. "Discrete Mathematics" by Norman LBiggs
4. "Discrete Mathematics for Computer Science" by Kenneth Bogart and Robert L Drysdale
5. "Discrete Mathematics with Applications" by Thomas Koshy
6. "Discrete Mathematics (Schaum's Outlines)" by Seymour Lipschutz and MarcLaras Lipson

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E -TEXT BOOKS
1. Combinatorics And Graph Theory Sarkar, Bikash Kanti , Chakraborty, Swapan Ku Discrete Mathematics Chandrasekaran, N., Umaparvathi, M.Mar 2. Discrete Mathematics And Graph Theory Biswal, PurnaChandra 3. Advanced Discrete Mathematics Rajput, Uday Singh
MOOCS COURSES
1. https://www.mooc-list.com › tags ›discrete-mathematics 2. https://www.mooc-list.com › tags ›discrete-mathematics 3. https://www.mooc-list.com › course ›discrete-mathematics-coursera 4. https://www.coursera.org › learn ›discrete-mathematics

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OPERATING SYSTEMS LAB

II B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS406PC	B. Tech	0	0	2	1	30	70	100

COURSE OBJECTIVES

To learn

1. To understand the OS role in the overall computer system
2. To study the operations performed by OS as a resource manager
3. To understand the scheduling policies of OS
4. To understand the different memory management techniques
5. To understand process concurrency and synchronization
6. To understand the concepts of input/output, storage and file management
7. To understand the goals and principles of protection
8. Introduce system call interface for file andprocess management
9. To study different OS and compare their features.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Apply optimization techniques for the improvement of system performance.
2. Ability to design and solve synchronization problems.
3. Learn about minimization of turnaround time, waiting time and response time and also maximization of throughput by keeping CPU as busy as possible.
4. Ability to change access controls to protect files.
5. Ability to compare the different operating systems

Recommended Systems/Software Requirements:

1. Intel based desktop PC with minimum of 166 MHZ or faster processor with at least 64 MB RAM and 100MB free diskspace.
2. Ubuntu OS

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LIST OF EXPERIMENTS

1. Write C programs to simulate the following CPU Scheduling algorithms
   a) FCFS b) SJF c) Round Robin d) priority
2. Write programs using the I/O system calls of UNIX/LINUX operating system (open, read, write, close, fcntl, seek, stat, opendir, readdir)
3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.
4. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.
5. Write C programs to illustrate the following IPC mechanisms
   a) Pipes b) FIFOs c) Message Queues d) Shared Memory
6. Write C programs to simulate the following memory management techniques
   a) Paging b) Segmentation
7. Write c programs to implement IPC between two process using
   a) Message Queues b) shared memory
8. Write a c program to stimulate multilevel queue scheduling algorithms considering the following scenario. All the processes in the system are divided into two categories – system process and user process. System processes are to be given higher priority than user processes. Use FCFS scheduling for the process in each queue.

TEXT BOOKS

1. An Introduction to Operating Systems, P.C.P Bhatt, 2nd edition,PHI.
2. Unix System Programming Using C++, Terrence Chan,PHI/Pearson.
3. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition,PHI

REFERENCE BOOKS

1. "Arch "Data Integrity in Pharmaceutical and Medical Devices Regulation Operations: Best Practices Guide to Electronic Records Compliance" by Orlando Lopez itecting the Internet of Things" by Dieter Uckelmann and Mark Harrison

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WEB REFERENCES

1. "TestFrame: An Approach to Structured Testing" by Chris CSchotanus
2. "Logistic Core Operations with SAP: Inventory Management, Warehousing, Transportation, and Compliance" by Jens Kappauf and BerndLauterbach
3. "Supply Chain Management Based on SAP Systems: Order Management in Manufacturing Companies (SAP Excellence)" by Gerhard F Knolmayer and PeterMertens

E -TEXT BOOKS

1. Operating System: From 0 to 1 by Tu, Do Hoang - Github ,2017
2. Operating Systems Tata McGraw-HillE
3. Introducing Windows 8: An Overview for IT Professionals by Jerry Honeycutt - Microsoft Press , 2012 education,1997
4. Microsoft Windows Server System Deployment Guide for Midsize Businesses - Microsoft Press ,2005

MOOCS COURSES

1. https://www.classcentral.com › tag ›operating-systems
2. https://www.my-mooc.com › mooc›introduction-to-operating-systems--u.
3. https://www.computersciencezone.org ›computer-science-education-free-.
4. https://www.classcentral.com › tag ›operating-systems.

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DATABASE MANAGEMENT SYSTEMS LAB

II B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT407PC	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

To learn

1 Introduce ER data model, database design and normalization
2 Learn SQL basics for data definition and data manipulation

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Design database schema for a given application and apply normalization
2. Acquire skills in using SQL commands for data definition and data manipulation.
3. Develop solutions for database applications using procedures, cursors and triggers.

LIST OF EXPERIMENTSDRDRDSSSUESURESH

1. Concept design with E-RModel
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
7. Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8. Triggers (Creation of insert trigger, delete trigger, update trigger)
9. Develop a program using BEFORE and AFTER triggers, row and statement triggers and instead of triggers.
10. Develop a program using creation of procedures, passing parameters IN and OUT of Procedure.
11. Develop a program using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and cursor VARIABLES.

TEXT BOOKS

1. Fundamentals of DataBase Management Systems by Dr. P.Santosh Kumar Patra, Sri Krishna Publishing Company Pvt.Ltd
2. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill,3rd Edition
3. Database System Concepts, Silberschatz, Korth, McGraw Hill, Vedition

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REFERENCE BOOKS
1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel7th Edition. 2. Fundamentals of Database Systems, ElmasriNavrate, PearsonEducation 2. Introduction to Database Systems, C.J. Date, PearsonEducation 3. Oracle for Professionals, The X Team, S. Shah and V. Shah,SPD. 4. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah,PHI. 5. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley StudentEdition.
WEB REFERENCES
1. http://www.freebookcentre.net/Database/Free-Database-Systems-Books-Download.html 2. https://www.gatevidyalay.com/transaction-states-in-dbms/
E -TEXT BOOKS
1. http://www.ebooks-for-all.com/bookmarks/detail/Database-Management-Systems/onecat/0.html 2. http://freecomputerbooks.com/dbSystemsBooks.html
MOOCS COURSES
1. https://swayam.gov.in/nd2_cec19_cs05/preview 2. https://swayam.gov.in/nd2_nou19_lb03/preview

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JAVA PROGRAMMING LAB

II B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS408PC	B. Tech	0	0	2	1	30	70	100

COURSE OBJECTIVES

To learn

1. To build software development skills using java programming for real-world applications.
2. To understand and apply the concepts of classes, packages, interfaces, array list, exception handling and file processing.
3. To write programs using abstract classes.
4. To write programs for solving real world problems using java collection frame work and multithreaded programs.
5. To write GUI programs using swing controls in Java.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Abletowriteprogramsforsolvingrealworldproblemsusingjavacollectionframework.
2. Able to write programs using abstract classes.
3. Able to write multithreaded programs.
4. Able to write GUI programs using swing controls in Java

LIST OF EXPERIMENTS

1. Use Eclipse or Net bean platform and acquaint with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.

2. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.

3. a) Develop an applet in Java that displays a simple message.

   b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute " is clicked.

4. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

5. Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of

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cube of the number.

6. Write a Java program for the following:
   a) create a doubly linked list of elements.
   b) delete a given element from the above list.
   c) Display the contents of the list after deletion.
7. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop " or "Ready" or "Go" should appear above the buttons in selected color. Initially, there is no message shown.
8. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.
9. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Labels in Grid Layout.
10. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).
11. Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).
12. Write a Java program that correctly implements the producer – consumer problem using the concept of interthread communication.
13. Write a Java program to list all the files in a directory including the files present in all its subdirectories.
14. Write a Java program that implements Quick sort algorithm for sorting a list of names in ascending order.
15. Write a Java program that implements Bubble sort algorithm for sorting in descending order and also shows the number of interchanges occurred for the given set of integers.
16. Write a java program to design a registration form for creating a new eMail account.

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TEXT BOOKS

1. Arnold Ken, Gosling J, "The Java Programming Language", AddisonWesley.
2. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition Pearsoneducation.
3. Thinking in Java, Bruce Eckel, PearsonEducation.
4. Java Programming, D. S. Malik and P. S. Nair, CengageLearning.

REFERENCE BOOKS

1. "The Java Programming Language" byArnold
2. "Java: The Complete Reference" by HerbertSchildt
3. "Core Java: An Integrated Approach, New: Includes All Versions upto Java 8" by R Nageswara Rao and DT EditorialServices
4. "Java Programming Interviews Exposed (WROX)" by NoelMarkham
5. "Advanced Java Programming" by UttamRoy
6. "Cracking the C, C++ and Java Interview" by S G Ganesh and K Usubhash

WEB REFERENCES

1. Head First Java: A Brain-Friendly Guide 2nd Edition,Kindle Edition by KathySierra.
2. Effective Java: A Programming Language Guide (Java Series) 2nd Edition, Kindle Edition by JoshuaBloch.
3. AI Algorithms, Data Structures, and Idioms in Prolog, Lisp, and JavaPaperback – Import, 25 Aug 2008 by George F. Luger (Author), William A Stubblefield(Author).

E -TEXT BOOKS

1. Introduction to Java Programming and Data Structures, Comprehensive Version (11th Edition) 11th Edition by Y. DanielLiang.
2. Java How to Program, Early Objects (11th Edition) (Deitel: How to Program) 11th Edition by Paul J. Deitel(Author), Harvey Deitel(Author).

MOOCS COURSES

1. https://www.mooc-list.com › tags ›java-programming
2. https://www.mooc-list.com › tags ›java
3. https://www.edx.org › learn ›java
4. https://www.quora.com › What-are-the-best-MOOCs-for-learning-Java

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MICRO PROJECT - 2

II B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
* IT409MP	B. Tech	0	0	3	0	100	-	100

COURSE OBJECTIVES

To learn

1. Mini Project serves as a kind of road map for future Mini/Major Projects/Products.
2. Capable of carrying out mathematical, empirical or design research
3. Capable of writing a report on a research project
4. Capable of working independently
5. Capable of giving a presentation on a piece of research

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Write, analyze, review, and rewrite programs, using workflow chart and diagram, and applying knowledge of computer capabilities, subject matter, and symbolic logic.
2. Correct errors by making appropriate changes and rechecking the program to ensure that the desired results are produced.
3. Understand detailed workflow charts and diagrams that describe input, output, and logical operation and convert them in to a series of instructions coded in a computer language
4. Compile and write documentation of program development and subsequent revisions,
5. Inserting comments in the coded instructions so others can understand the program

LIST OF EXPERIMENTS

Need to identify the following activities:

1. The student can specify a subject that is suitable for research in the specific area.
2. The student can determine the aim of the research.
3. The student can demarcate the subject.
4. The student can formulate a problem statement.
5. The student can collect and process relevant literature.
    a. The student can identify the technical object of concern from the problem definition.
    b. The student can identify models, methods and techniques to be used.
    c. The student can identify the steps in the development process and their relationships (methodology).
    d. The student can perform the steps according to the methodology, which should result in

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specifications or prototype

6. The student can structure a report logically (logical layout of chapters, sections, appendices and footnotes and a logical buildup of the text within these sections).
7. The student can attune his style (complexity, exactness, compactness of information, vivacity, and involvement) to his purpose and his target audience.
8. The student can present arguments for his statements.
9. The student can make a report readable and accessible by writing introductions, tips for the reader and summaries.
10. The student can make a report readable and accessible by adding functional visual aids (layout, illustrations).

To accept a specific final project. To check the following.

Evaluation of Mini Project

- **Formalization**
  This activity results in project plan and a supervisors committee, which are the formal requirements for officially starting a final project;
- Preparation(Requirement Analysis & Design)
  In this activity the most important background information for the project is studied and the project plan is refined;
- Development
  In this activity the bulk of the development work is performed;
- Reporting
  This activity results in a Master thesis;
- Presentation preparation
  This activity results in the delivery of the final presentation.
- Exploration

This activity is performed before the official start of the project, and results in a decision.

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FORMAL LANGUAGES & AUTOMATA THEORY

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS501PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To provide introduction to some of the central ideas of theoretical computer science from the perspective of formal languages.
2. To introduce the fundamental concepts of formal languages, grammars and automata theory.
3. Classify machines by their power to recognize languages.
4. Employ finite state machines to solve problems in computing.
5. To understand the differences between decidability and undecidability

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Able to understand the concept of abstract machines and their power to recognize the languages.
2. Able to employ finite state machines for modeling and solving computing problems.
3. Able to design context free grammars for formal languages.
4. Able to distinguish between decidability and undecidability.
5. Able to gain proficiency with mathematical tools and formal methods.

UNIT-I	FINITE AUTOMATA	Classes: 15

Introduction to Finite Automata: Structural Representations, Automata and Complexity, the Central Concepts of Automata Theory – Alphabets, Strings, Languages, Problems.

Deterministic Finite Automata: Definition of DFA, How A DFA Process Strings, The language of DFA, Conversion of NFA with €-transitions to NFA without €-transitions. Conversion of NFA to DFA, Moore and Melay machines.

Nondeterministic Finite Automata: Formal Definition, an application, Text Search, Finite Automata with Epsilon-Transitions.

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UNIT-II	REGULAR EXPRESSIONS AND REGULAR LANGUAGES	Classes: 11

Regular Expressions: Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions, Conversion of Finite Automata to Regular Expressions.

Pumping Lemma for Regular Languages, Statement of the pumping lemma, Applications of the Pumping Lemma.

Closure Properties of Regular Languages: Closure properties of Regular languages, Decision Properties of Regular Languages, Equivalence and Minimization of Automata.

UNIT-III	CONTEXT FREE GRAMMAR AND AUTOMATA	Classes: 10

Context-Free Grammars: Definition of Context-Free Grammars, Derivations Using a Grammar, Leftmost and Rightmost Derivations, the Language of a Grammar, Sentential Forms, Parse Tress, Applications of Context-Free Grammars, Ambiguity in Grammars and Languages. Push Down Automata: Definition of the Pushdown Automaton, the Languages of a PDA, Acceptance by final state, Acceptance by empty stack, Deterministic Pushdown Automata. Equivalence of PDA's and CFG's, From CFG to PDA, From PDA to CFG.

UNIT-IV	PROPERTIES OF CFG AND TURING MACHINES	Classes: 11

Normal Forms for Context- Free Grammars: Eliminating useless symbols, Eliminating €-Productions. Chomsky Normal form Griebech Normal form.

Pumping Lemma for Context-Free Languages: Statement of pumping lemma, Applications Closure Properties of Context-Free Languages: Closure properties of CFL's, Decision Properties of CFL's

Turing Machines: Introduction to Turing Machine, Formal Description, Instantaneous description, The language of a Turing machine.

UNIT-V	UNDECIDABILITY	Classes: 11

Turing machines and halting problems

Undecidability: Undecidability, A Language that is Not Recursively Enumerable, An Undecidable Problem That is RE, Undecidable Problems about Turing Machines, Recursive languages, Properties of recursive languages, Post's Correspondence Problem, Modified Post Correspondence problem, Other Undecidable Problems, Counter machines.

TEXT BOOKS

1. Introduction to Automata Theory, Languages, and Computation, 3nd Edition, John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.
2. Theory of Computer Science – Automata languages and computation, Mishra and

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Chandrashekaran, 2nd edition, PHI.

REFERENCE BOOKS

1. Introduction to Languages and the Theory of Computation, John C Martin, TMH.
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
3. A Text book on Automata Theory, P. K. Srimani, Nasir S. F. B, Cambridge University Press.
4. Introduction to the Theory of Computation, Michael Sipser, 3rd edition, Cengage Learning.
5. Introduction to Formal languages Automata Theory and Computation, Kamala Krithivasan, Rama R, Pearson.

WEB REFERENCES

1. https://www.ics.uci.edu/~goodrich/teach/cs162/notes/
2. http://www.cse.iitd.ac.in/~sak/courses/toc/2011-12.index.html
3. https://web.cs.hacettepe.edu.tr/~ilyas/Courses/BBM401/

E -TEXT BOOKS

1. https://www.cis.upenn.edu/~cis262/notes/tcbook-u.pdf
2. http://people.math.sc.edu/mlevet/Lecture_Notes.pdf
3. https://www.cs.utexas.edu/~ear/cs341/automatabook/AutomataTheoryBook.pdf

MOOCS COURSES

1. https://www.udemy.com/course/formal-languages-and-automata-theory/
2. https://nptel.ac.in/courses/106/106/106106049/
3. https://www.udemy.com/course/theory-of-automata/

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SOFTWARE ENGINEERING

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS502PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. The aim of the course is to provide an understanding of the working knowledge of the techniques for estimation, design, testing and quality management of large software development projects.
2. Topics include process models, software requirement, software design, software testing, software process/product metrics, risk management ,quality management and UML Diagrams

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Ability to translate end-user requirement into system and software requirement using e.g. UML, and structure the requirement in a software requirement s Document(SDR)
2. Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
3. Will have experience and /or awareness of testing problems and will be able to develop a simple testing report

UNIT-I	INTRODUCTION TO SOFTWARE ENGINEERING	Classes: 12

Introductionto Software Engineering: The evolving role of software, changing nature of software, software myths. A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI), process patterns, process assessment, personal and team process models.

Process models: The waterfall model, incremental process models, evolutionary process models, the Unified process,

Agility and Agile Process model, Extreme Programming, Other process models of Agile

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Development and Tools

UNIT-II	SOFTWARE REQUIREMENTS	Classes: 11

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document. Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.
System models: Context Models, Behavioural models, Data models, Object models, structured methods. UML Diagrams.

UNIT-III	DESIGN ENGINEERING	Classes: 12

Design Engineering: Design process and Design quality, Design concepts, the design model. Creating an architectural design: Software architecture, Data design, Architectural styles and patterns, Architectural Design. Object-Oriented Design: Objects and object classes, An Object-Oriented design process, Design evolution. Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

UNIT-IV	TESTING	Classes: 12

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.
Product metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.
Metrics for Process and Products: Software Measurement, Metrics for software quality.

UNIT-V	RISK MANAGEMENT	Classes: 11

Risk management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.
Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, The ISO 9000 quality standards.

TEXT BOOKS

1. Software Engineering A practitioner‘s Approach, Roger S Pressman, 6th edition. McGraw Hill International Edition.
2. Software Engineering, Ian Sommerville, 7th edition, Pearson education.

REFERENCE BOOKS

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1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
4. Software Engineering1: Abstraction and modelling, Diner Bjorner, Springer International edition, 2006.
5. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition 2006.
6. Software Engineering Principles and Practice, Hans Van Vliet, 3rd edition, John Wiley & Sons Ltd.
7. Software Engineering3: Domains, Requirements, and Software Design, D. Bjorner, Springer International Edition. 8. Introduction to Software Engineering, R. J. Leach, CRC Press.

WEB REFERENCES

1. https://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fwww.tutorialspoint.com%2Fsoftware_engineering%2Fsoftware_engineering_tutorial.pdf&clen=3241146&chunk=true
2. https://www.geektonight.com/software-engineering-notes/

E -TEXT BOOKS

1. https://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fengineering.futureuniversity.com%2FBOOKS%2520FOR%2520IT%2FSoftware-Engineering-9th-Edition-by-Ian-Sommerville.pdf&clen=5397464&chunk=true
2. https//efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fwww.mlsu.ac.in%2Fecontents%2F16_EBOOK7th_ed_software_engineering_a_practitioners_approach_by_roger_s._pressman_.pdf&clen=21023620&chunk=true

MOOCS COURSES

1. https://www.geeksforgeeks.org/software-engineering
2. https://nptel.ac.in/courses/106105087/pdf/m01L01.pdf
3. https://onlinecourses.nptel.ac.in/noc21_cs13/preview.
4. https://www.tutorialspoint.com/software_engineering/index.htm
5. https://www.javatpoint.com/software-engineering-tutorial

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DATA COMMUNICATION & COMPUTER NETWORKS

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT503PC	B. Tech	3	1	0	4	30	70	100

COURSE OBJECTIVES

To learn

1. To introduce the fundamental various types of computer networks.
2. To demonstrate the TCP/IP and OSI models with merits and demerits.
3. To explore the various layers of OSI Model.
4. To introduce UDP and TCP Models.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Students should be understand and explore the basics of Computer Networks and various protocols. She/he will be in a position to understand the World Wide Webconcepts.
2. Students will be in a position to administrate a network and flow of informationfurther he/she can understand easily the concepts of network security, Mobile and adhoc networks.

UNIT-I	DATA COMMUNICATIONS	Classes: 14

Data Communications: Internet history and administration, Protocols and Standards Components – Direction of Data flow – Networks – Components and Categories – Types of Connections – Topologies –Protocols and Standards – ISO / OSImodel, Example Networks such as ATM, Frame Relay, ISDN Physical layer: Transmission modes, Multiplexing, Transmission Media, Switching, Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

UNIT-II	DATA LINK LAYER	Classes: 12

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Data link layer: Bridges, repeaters, hubs, bridges routers and gateways, Framing, and Error – Detection and Correction – Parity – LRC– CRC Hamming code, Flow and Error Control, Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocols. 111 Medium Access sub layer: ALOHA, CSMA/CD, LAN– Ethernet IEEE 802.3, IEEE 802.5 – IEEE 802.11, Random access, Controlled access, Channelization.

UNIT-III	NETWORK LAYER	Classes: 10

Network layer: Logical Addressing, Internetworking, Tunnelling, Address mapping, ICMP,IGMP, ARP, RARP, DHCP, Forwarding, Uni-Cast Routing Protocols, Multicast Routing Protocols.

UNIT-IV	TRANSPORT LAYER	Classes: 12

Transport Layer: Process to Process Delivery, UDP and TCP protocols, Data Traffic,Congestion, Congestion Control, QoS, Integrated Services, Differentiated Services, QoS inSwitched Networks.

UNIT-V	APPLICATION LAYER	Classes: 12

Application Layer: Introduction ,providing services, Domain name space, DNS in internet, electronic mail, SMTP, FTP,WWW, HTTP, SNMP,SSH.

TEXT BOOKS

1. Data Communications and Networking, Behrouz A. Forouzan , Fourth Edition TMH,2006.
2. Computer Networks, Andrew S Tanenbaum, 4th Edition. Pearson Education, PHI.

REFERENCE BOOKS

1. Data communications and Computer Networks, P.C .Gupta, PHI.
2. An Engineering Approach to Computer Networks, S. Keshav, 2nd Edition, PearsonEducation.
3. Understanding communications and Networks, 3rd Edition, W.A. Shay, CengageLearning.
4. Computer Networking: A Top-Down Approach Featuring the Internet. James F.Kurose&
5. Keith W. Ross, 3 rd Edition, Pearson Education.
6. Data and Computer Communication, William Stallings, Sixth Edition, PearsonEducation, 2000.

WEB REFERENCES

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1. https://www.networkstraining.com/best-computer-networks-textbooks/
2. https://www.mbit.edu.in/wp-content/uploads/2020/05/Computer-Networks-5th-Edition.pdf

E -TEXT BOOKS

1. http://index-of.es/Varios-2/Computer%20Networks%205th%20Edition.pdf
2. http://intronetworks.cs.luc.edu/

MOOCS COURSES

1. https://www.geeksforgeeks.org/what-is-Computer-Networks/
2. https://searchsecurity.techtarget.com/definition/Computer-Networks-infosec
3. https://www.cisco.com › Products & Services › Networks
4. https://www.coursera.org › ... › Computer Science › Computer Networks

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WEB PROGRAMMING

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT504PC	B. Tech	2	0	0	2	30	70	100

COURSE OBJECTIVES

To learn

1. To introduce PHP language for server side scripting
2. To introduce XML and processing of XML Data with Java
3. To introduce Server side programming with Java Servlets and JSP
4. To introduce Client side scripting with Javascript and AJAX.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. gain knowledge of client side scripting, validation of forms and AJAX programming
2. have understanding of server side scripting with PHP language
3. have understanding of what is XML and how to parse and use XML Data with Java
4. To introduce Server side programming with Java Servlets and JSP

UNIT-I	SCRIPTING	Classes: 15

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. Introduction to PHP

Declaring variables, Data types, arrays, string operations, control structures, functions, Connecting to database(MySQL), executing simplequeries, handling results.

UNIT-II	JAVA	Classes: 11

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Introduction to object-oriented programming-Features of Java – Data types, variables andarrays – Operators – Control statements – Classes and Methods – Inheritance. Packages andInterfaces – Exception Handling – Multithreaded Programming –Input/Output– Files– UtilityClasses– StringHandling.

UNIT-III	JDBC	Classes: 10

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	Classes: 11

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 –Interface(Common Gate Way CGI) ,life cycle of a servlet. The Servlet API, Handling HTTP Request and Response, using Cookies, Session Tracking. Introduction to JSP.

UNIT-V	XML AND WEBSERVICES	Classes: 11

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

Parsing XMLData: DOM and SAX in Java

TEXT BOOKS

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill

REFERENCE BOOKS

1. Web Programming, building internet applications, Chris Bates 2nd edition, Wiley Dreamtech
2. Java Server Pages –Hans Bergsten, SPD O'Reilly
3. Java Script, D. Flanagan, O'Reilly,SPD.
4. Beginning Web Programming-Jon Duckett WROX.
5. Programming World Wide Web, R. W. Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

WEB REFERENCES

1. https://www.w3schools.com/whatis/
2. https://www.tutorialspoint.com/internet_technologies/websites_development.htm

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E -TEXT BOOKS
1. http://www.freebookcentre.net/web-books-download/PHP-Reference-Beginner-to-Intermediate-PHP-5.html 2. http://www.freebookcentre.net/web-books-download/Fundamentals-of-XML.html
MOOCS COURSES
1. https://www.coursera.org/learn/html 2. http://intro-webdesign.com/ 3. https://www.coursera.org/learn/angular 4. https://www.coursera.org/learn/html-css-javascript-for-web-developers

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SOFTWARE ENGINEERING LAB

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS505PC	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

To learn

1. To have hands on experience in developing a software project by using various software engineering principles and methods in each of the phases of software development

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Ability to translate end-user requirements into system and software requirements
2. Ability to generate a high-level design of the system from the software requirements
3. Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

LIST OF EXPERIMENTS

Dothefollowing8exercisesforanytwoprojectsgiveninthelistofsampleprojectsoranyother projects:

1) Development of problemstatement.
2) PreparationofSoftwareRequirementSpecificationDocumentDesignDocumentsandTesting Phase relateddocuments.
3) PreparationofSoftwareConfigurationManagementandRiskManagementrelateddocuments.
4) Study and usage of any Design phase CASEtool
5) Performing the Design by using any Design phase CASEtools.
6) Develop test cases for unit testing and integrationtesting
7) Develop test cases for various white box and black box testingtechniques.

Sample Projects:

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1. Passport automationSystem
2. BookBank
3. Online Exam Registration
4. Stock MaintenanceSystem
5. Online course reservationsystem
6. E-ticketing
7. Software Personnel ManagementSystem
8. Credit CardProcessing
9. E-book managementSystem.
10. Recruitmentsystem

TEXT BOOKS

1. Software Engineering A practitioner‘s Approach, Roger S Pressman, 6th edition. McGraw Hill International Edition.
2. Software Engineering, Ian Sommerville, 7th edition, Pearson education.

REFERENCE BOOKS

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
4. Software Engineering1: Abstraction and modelling, Diner Bjorner, Springer International edition, 2006.
5. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition 2006.
6. Software Engineering Principles and Practice, Hans Van Vliet, 3rd edition, John Wiley & Sons Ltd.
7. Software Engineering3: Domains, Requirements, and Software Design, D. Bjorner, Springer International Edition. 8. Introduction to Software Engineering, R. J. Leach, CRC Press.

WEB REFERENCES

1. https://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fwww.lnjpitchapra.in%2Fwp-content%2Fuploads%2F2020%2F04%2Ffile_5e96ddefac5f3.pdf&clen=1732938&chunk=true

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E -TEXT BOOKS

1. https://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=http%3A%2F%2Fseu1.org%2Ffiles%2Flevel4%2FIT-242%2FSE%2520Book.pdf&clen=4862906&chunk=true
2. https://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=http%3A%2F%2Fengineering.futureuniversity.com%2FBOOKS%2520FOR%2520IT%2FSoftware-Engineering-9th-Edition-by-Ian-Sommerville.pdf&clen=5397464&chunk=true

MOOCS COURSES

1. https://www.udemy.com/course/formal-languages-and-automata-theory/
2. https://www.geeksforgeeks.org/software-engineering
3. https://nptel.ac.in/courses/106105087/pdf/m01L01.pdf
4. https://onlinecourses.nptel.ac.in/noc21_cs13/preview.
5. https://www.tutorialspoint.com/software_engineering/index.htm
6. https://www.javatpoint.com/software-engineering-tutorial

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COMPUTER NETWORKS & WEB PROGRAMMING LAB

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT506PC	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

To learn

1. To understand the working principle of various communication protocols.
2. To understand the network simulator environment and visualize a network topology and observe its performance
3. To analyze the traffic flow and the contents of protocol frames

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Implement data link layer farming methods
2. Analyze error detection and error correction codes.
3. Implement and analyze routing and congestion issues in network design.
4. Implement Encoding and Decoding techniques used in presentation layer
5. To be able to work with different network tool

LIST OF EXPERIMENTS

Computer Networks Experiments

1. Implement the data link layer framing methods such as character, character-stuffing and bit stuffing.
2. Write a program to compute CRC code for the polynomials CRC-12, CRC-16 and CRC CCIP
3. Develop a simple data link layer that performs the flow control using the sliding window protocol, and loss recovery using the Go-Back-N mechanism.
4. Implement Dijsktra's algorithm to compute the shortest path through a network
5. Take an example subnet of hosts and obtain a broadcast tree for the subnet.
6. Implement distance vector routing algorithm for obtaining routing tables at each node.
7. Implement data encryption and data decryption

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8. Write a program for congestion control using Leaky bucket algorithm.
9. Write a program for frame sorting technique used in buffers.
10. Wireshark
    i. Packet Capture Using Wire shark
    ii. Starting Wire shark
    iii. Viewing Captured Traffic
    iv. Analysis and Statistics & Filters.
11. How to run Nmap scan
12. Operating System Detection using Nmap
13. Do the following using NS2 Simulator

    i. NS2 Simulator-Introduction
    ii. Simulate to Find the Number of Packets Dropped
    iii. Simulate to Find the Number of Packets Dropped by TCP/UDP
    iv. Simulate to Find the Number of Packets Dropped due to Congestion
    v. Simulate to Compare Data Rate& Throughput.
    vi. Simulate to Plot Congestion for Different Source/Destination
    vii. Simulate to Determine the Performance with respect to Transmission of Packets

Web Programming Experiments

1. Install the following on the local machine
    - Apache Web Server (if not installed)
    - Tomcat Application Server locally
    - Install MySQL (if not installed)
    - Install PHP and configure it to work with Apache web server and MySQL (if not already configured)
2. Write a PHP script to print prime numbers between 1-50.
3. PHP script to
    a. Find the length of a string.
    b. Count no of words in a string.
    c. Reverse a string.
    d. Search for a specific string.
4. Write a PHP script to merge two arrays and sort them as numbers, in descending order.
5. Write a PHP script that reads data from one file and write into another file.

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6. Write an HTML page including javascript that takes a given set of integer numbers and shows them after sorting in descending order.
7. Develop static pages (using Only HTML) of an online book store. The pages should resemble: www.amazon.com. The website should consist the following pages.
    a) Home page
    b) Registration and user Login
    c) User Profile Page
    d) Books catalog
    e) Shopping Cart
    f) Payment By credit card
    g) Order Conformation
8. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.
9. Create and save an XML document on the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.
10. Install TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.
11. Redo the previous task using JSP by converting the static web pages of assignments 2 into dynamic web pages. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the website.

TEXT BOOKS

1. WEB TECHNOLOGIES: A Computer Science Perspective, Jeffrey C. Jackson, Pearson Education
2. A.S. Tanenbaum, Computer Networks (2003), 4thed, Pearson Education/ PHI. New Delhi, India.

REFERENCE BOOKS

1. Deitel H.M. and Deitel P.J., "Internet and World Wide Web How to program", Pearson International, 2012, 4th Edition.
2. J2EE: The complete Reference By James Keogh, McGraw-Hill
3. Bai and Ekedhi, The Web Warrior Guide to Web Programming, Thomson

4. Paul Dietel and Harvey Deitel," Java How to Program", Prentice Hall of India, 8th Edition
5. Web technologies, Black Book, Dreamtech press.
6. Gopalan N.P. and Akilandeswari J., "Web Technology", Prentice Hall of India
7. Micheal A Gallo, Bill Hancock, (2001), Computer Communications and Networking Technologies, Thomson Fitz Gerald, Dennis (2009), Business Data Communications & Networking, 10 ed, john willeysons, USA.
8. William Stallings (2006), Cryptography and network security, 4thedition, Pearson Education, India.
9. Behrouz A. Ferozen (2006), Data communication and Networking, Tata McGraw-Hill, India.

WEB REFERENCES

1. https://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fwww.gopalancolleges.com%2Fgcem%2Fcourse-material%2Fcomputer-science%2Flab-manual%2Fsem-Vll%2Fnetworks-laboratory.pdf&clen=999865&chunk=true

E -TEXT BOOKS

1. http://www.freebookcentre.net/web-books-download/PHP-Reference-Beginner-to-Intermediate-PHP-5.html
2. http://www.freebookcentre.net/web-books-download/Fundamentals-of-XML.html

MOOCS COURSES

1. https://www.coursera.org/learn/html
2. http://intro-webdesign.com/
3. https://www.coursera.org/learn/angular
4. https://www.coursera.org/learn/html-css-javascript-for-web-developers
5. https://searchsecurity.techtarget.com/definition/Computer-Networks-infosec

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ADVANCED COMMUNICATION SKILLS LAB

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
EN507HS	B. Tech	0	0	2	1	30	70	100

INTRODUCTION

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. Atthis stage, the students need to prepare themselves for their careers which may require them to listento, read, speak and write in English both for their professional and interpersonal communication in theglobalized context.

The proposed course should be a laboratory course to enable students to use 'good' English andperform the following:

- Gathering ideas and information to organize ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

OBJECTIVES

This Lab focuses on using multi-media instruction for language development to meet the followingtargets:

1. To improve the students' fluency in English, through a well-developed vocabulary and enablethem to listen to English spoken at normal conversational speed by educated English speakersand respond appropriately in different socio-cultural and professional contexts.
2. Further, they would be required to communicate their ideas relevantly and coherently in writing.
3. To prepare all the students for their placements.

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SYLLABUS

The following course content to conduct the activities is prescribed for the Advanced English Communication Skills (AECS) Lab:

1. Activities on Fundamentals of Inter-personal Communication and Building Vocabulary - Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

2. Activities on Reading Comprehension –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading& effective googling.

3. Activities on Writing Skills – Structure and presentation of different types of writing – letter writing/Resume writing/ e-correspondence/Technical report writing/ – planning for writing – improving one's writing.

4. Activities on Presentation Skills – Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/ emails/assignments etc.

5. Activities on Group Discussion and Interview Skills – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

MINIMUM REQUIREMENT:

The Advanced English Communication Skills (AECS) Laboratory shall have the following infrastructural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics.
- Round Tables with movable chairs

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- Audio-visual aids
- LCD Projector
- Public Address system
- P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

SUGGESTED SOFTWARE:

The software consisting of the prescribed topics elaborated above should be procured and used.

- Oxford Advanced Learner's Compass, 7th Edition
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dream tech
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

TEXT BOOKS

1. Effective Technical Communication by M Asharaf Rizvi. McGraw Hill Education (India) Pvt. Ltd.2nd Edition.
2. Academic Writing: A Handbook for International Students by Stephen Bailey, Routledge, 5th Edition.

REFERENCE BOOKS

1. Learn Correct English – A Book of Grammar, Usage and Composition by Shiv K. Kumar and Hemalatha Nagarajan. Pearson 2007
2. Professional Communication by ArunaKoneru, McGraw Hill Education (India) Pvt. Ltd, 2016.
3. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
4. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi
5. English Vocabulary in Use series, Cambridge University Press 2008
6. Handbook for Technical Communication by David A. McMurrey& Joanne Buckley. 2012. Cengage Learning.
7. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
8. Job Hunting by Colm Downes, Cambridge University Press 2008.
9. English for Technical Communication for Engineering Students, AyshaVishwamohan, Tata Mc Graw-Hill 2009.

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WEB REFERENCES:

1. https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589935321&section=References
2. Argyle,MichaelF.,Alkema,Florisse,&Gilmour,Robin."Thecommunicationof friendly and hostile attitudes: Verbal and nonverbal signals." European Journalof Social Psychology, 1, 385-402:1971
3. Blumer, Herbert. Symbolic interaction: Perspective and method. Engle wood Cliffs; NJ: PrenticeHall.1969

E –TEXTBOOKS:

1. Mc corry Laurie Kelly Mc Corry Jeff Mason, Communication Skills forthe Healthcare Professional, 1st edition,ISBN:1582558140, ISBN-13:9781582558141
2. RobertEOwens,Jr,LanguageDevelopment, 9th edition, ISBN:0133810364,9780133810363

MOOCS Course:

1. https://www.coursera.org/specializations/improve-english
2. https://www.edx.org/professional-certificate/upvalenciax-upper-intermediate-english

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INTELLECTUAL PROPERTY RIGHTS

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
*IP508MC	B. Tech	3	0	0	0	100	-	100

COURSEOBJECTIVES:

1. To acquaint the learners with the basic concepts of Intellectual Property Rights.
2. To develop expertise in the learners in IPR related issues and sensitize the learners with the emerging issues in IPR and the rationale for the protection of IPR.

COURSEOUTCOMES:

Upon successful completion of the course

1. Gain knowledge on Intellectual Property assets and generate economic wealth.
2. Assist individuals and organizations in capacity building and work as a platform for development, promotion, protection, compliance, and enforcement of Intellectual Property & knowledge.
3. Gather knowledge about Intellectual Property Rights which is important for students of engineering in particular as they are tomorrow's technocrats and creator of new technology.
4. Discover how IPR are regarded as a source of national wealth and mark of an economic leadership in context of global market scenario.
5. Study the national & International IP system.
6. Summarize that it is an incentive for further research work and investment in R & D, leading to creation of new and better products and generation of economic and social

UNIT-I	INTELLECTUAL PROPERTY ACT AND LAW	Classes: 7

Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT-II	INTRODUCTION TO TRADE MARK	Classes: 8

Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT-III	INTRODUCTION TO COPY RIGHTS	Classes: 6

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Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.
Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT-IV	INTRODUCTION TO PATENT LAW	Classes: 7

Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.
Unfair competition: Misappropriation right of publicity, false advertising.

UNIT-V	INTRODUCTION TO TRANSACTIONAL LAW	Classes: 12

New developments in trade mark law; copy right law, patent law, intellectual property audits. International overview on intellectual property, international – trade mark law, copy right law, international patent law and international development in trade secrets law

TEXT BOOKS

1. Intellectual property right, Deborah. E. Bouchoux, Cengage learning.
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tata McGraw Hill Publishing company ltd.

REFERENCE BOOKS

1. R Radha Krishnan & S Balasubramanian, "Intellectual PropertyRights", 1st Edition,Excel Books, 2012.
2. M Ashok Kumar &mohd Iqbal Ali, "Intellectual PropertyRights", 2nd Edition, Serial publications, 2011.

WEB REFERENCES

1. http://libgen.rs/book/index.php?md5=C4A6559ECCAEFC767CE71BD91A1BAD41
2. http://libgen.rs/book/index.php?md5=6463CAD16544B347B19335FB19D6917C

E -TEXT BOOKS

1. http://libgen.rs/book/index.php?md5=13C4B3A45B1C95B4A388F94729CCCFBC
2. https://maklaw.in/intellectual-property-rights/?gclid=EAIaIQobChMIsprsv_WI7QIVilVgCh29HwPzEAAYASAAEgK5YvD_BwE

MOOCS COURSES

1. https://nptel.ac.in/courses/110/105/110105139/
2. https://nptel.ac.in/courses/109/106/109106137/

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BIG DATA ANALYTICS

III B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT601PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1.To introduce the terminology, technology and its applications
2.To introduce the concept of Analytics and Visualization
3.To demonstrate the usage of various Big Data tools and Data Visualization tools.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Compare various file systems and use an appropriate file system for storing different types of data.
2. Demonstrate the concepts of Hadoop ecosystem for storing and processing of unstructured data.
3. Apply the knowledge of programming to process the stored data using Hadoop tools and generatereports.
4. Connect to web data sources for data gathering, Integrate data sources with hadoop components to process streamingdata.
5. Tabulate and examine the results generated using hadoopcomponents

UNIT-I	INTRODUCATION TO BIG DATA	Classes: 13

Data and its importance, Big Data - definition, implications of Big Data, addressing Big Data implications using Hadoop, Hadoop Ecosystem

HADOOP ARCHITECTURE:

HadoopStorage : HDFS
Hadoop Processing: Map ReduceFramework

Hadoop Server Roles: Name Node, Secondary Name Node and Data Node, Job Tracker, TaskTracker

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HDFS-HADOOP DISTRIBUTED FILE SYSTEM: Design of HDFS, HDFS Concepts HDFS Daemons,HDFS High Availability, Block Abstraction, FUSE: File System in UserSpace. HDFS Command Line Interface (CLI), Concept of File Reading and Writing in HDFS.		
UNIT-II	**MAPREDUCE PROGRAMMING MODEL**	**Classes: 12**
Introduction to Map Reduce Programmingmodel to process Big Data, key features of Map Reduce, Map Reduce Job skeleton, Introduction to Map Reduce API, Hadoop Data Types, Develop Map Reduce Job using Eclipse, bulit a Map Reduce Job export it as a java archive(.jar file). MAPREDUCE JOB LIFE CYCLE: Understanding Mapper, Combiner, Partitioner, Shuffle & Sort and Reduce phases of Map Reduce Application, Developing Map Reduce Jobs basedon the requirement using given datasets like weather dataset.		
UNIT-III	**INTRODUCTION TO PIG**	**Classes: 12**
INTRODUCTION TO PIG: Understanding pig and pig Platform, introduction to Pig Latin Language and Execution engine, running pig in different modes, Pig Grunt Shell and its usage. PIG LATIN LANGUAGE –SEMANTICS –DATA TYPES IN PIG: Pig Latin Basics, Key words, Pig Data types, Understanding Pig relation, bag, tuple and writing pig relations or statements using Grunt Shell, expressions, Data processing operators, using Built in functions. WRITING PIG SCRIPTS USING PIG LATIN: Writing pig scripts and saving them text editor, running pig scripts from command line.		
UNIT-IV	**INTRODUCTION TO HIVE**	**Classes: 11**
INTRODUCATION TO HIVE: Understanding Hive Shell, Running Hive, Understanding Schema on read and Schema on write. HIVE QL DATA TYPES, SEMANTICS: Introduction to Hive QL (Query Language Language semantics,Hive Data Types. HIVE DDL, DML AND HIVE SCRIPTS: Hive Statements, Understanding and workingwith Hive DataDefinition Languages and Manipulation Language statements, Creating Hive Scripts and running them from hive terminal and command line.		
UNIT-V	**SQOOP**	**Classes: 12**
Introduction to Sqoop tool, commands to connect databases and list databases and tables, command to import data from RDBMS into HDFS, Command to export data from HDFS into required tables of RDBMS. FLUME: Introduction to Flume agent, understanding Flume components Source, Channel and Sink. OOZIE: Introduction to Oozie, Understanding work flow Management.		

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TEXT BOOKS
1. Hadoop: The Definitive Guide, 4th Edition - O'Reilly Media 2. Chris Eaton, Dirk deroos et al. , “Understanding Big data ”, McGraw Hill, 2012. 3. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.
REFERENCE BOOKS
1. Michael Berthold, David J. Hand, "Intelligent Data Analysis”, Springer, 2007. 2. Paul Zikopoulos ,Dirk DeRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles , David Corigan , "Harness the Power of Big Data The IBM Big Data Platform ", Tata McGraw Hill Publications, 2012.
WEB REFERENCES
1. www.edufind.com 2. https://lecturenotes.in/subject/884/big-data-analysis-bda/note
E -TEXT BOOKS
1. http://bookboon.com/en/communication-ebooks-zip 2. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fmu.ac.in%2Fwp-content%2Fuploads%2F2021%2F01%2FBIG-DATA-ANALYTICS.pdf&clen=4649352&chunk=true
MOOCS COURSES
1. https://nptel.ac.in/noc/ 2. https://www.mooc.org/ 3. https://swayam.gov.in/nc_details/NPTEL

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PRINCIPLES OF COMPILER CONSTRUCTION

III B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT602PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To understand the various phases in the design of a compiler.
2. To study various data structures used
3. To understand the design of top-down and bottom-up parsers.
4. To understand syntax directed translation schemes.
5. To introduce lex and yacc tools.
6. To learn intermediate languages
7. To learn to develop algorithms to generate code for a target machine.
8. To learn how to optimize machine code

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Ability to design, develop, and implement a compiler for any language.
2. Able to use lex and yacc tools for developing a scanner and a parser.
3. Able to design and implement LL and LR parsers.
4. Able to design algorithms to perform code optimization in order to improve the performance of a program in terms of space and time complexity.
5. Ability to design algorithms to generate machine code

UNIT-I	INTRODUCTION	Classes: 12

Introduction: Phases of compiler, Groping of phases.

Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical-Analyzer Generator LEX, Finite Automata, From Regular Expressions to Automata.

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UNIT-II	SYNTAX ANALYSIS	Classes: 12
Syntax Analysis: Introduction, Context-Free Grammars, Writing a Grammar, Top-Down Parsing, Bottom-Up Parsing, Introduction to LR Parsing: Simple LR, More Powerful LR Parsers.		
UNIT-III	**SYNTAX-DIRECTED TRANSLATION**	**Classes: 12**
Syntax-Directed Definitions, Construction of syntax trees, Bottom-up evaluation of S-attributed definitions, L-attributed definitions, Top down translation, Bottom-up evaluation of inherited attributes. **Type checking**: Type systems, Specification of a simple type checker, Equivalence of type expressions. Intermediate-Code Generation: Intermediate languages, Declarations.		
UNIT-IV	**CODE GENERATION**	**Classes: 11**
Run-Time Environments: Storage organization, Storage allocation strategies, Symbol tables. **Code Generation**: Issues in the Design of a Code Generator, The Target Machine, Basic Blocks and Flow Graphs, A Simple Code Generator, Register Allocation and Assignment, Generation of DAGs, Generating code from DAGs.		
UNIT-V	**MACHINE-INDEPENDENT OPTIMIZATIONS**	**Classes: 12**
Machine-Independent Optimizations: Introduction**,** The Principal Sources of Optimization, **Introduction to Data-Flow Analysis**, Foundations of Data-Flow Analysis.		

TEXT BOOKS

1. Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, Pearson.

REFERENCE BOOKS

1.Compiler Construction-Principles and Practice, Kenneth C Louden, CengageLearning.
2.ModerncompilerimplementationinC,AndrewWAppel,Revisededition,CambridgeUniversity Press.
3.The Theory and Practice of Compiler writing, J. P. Tremblay and P. G. Sorenson,TMH
4.Writing compilers and interpreters, R. Mak, 3rd edition, Wiley studentedition.
5.lex&yacc – John R. Levine, Tony Mason, Doug Brown,O'reilly

WEB REFERENCES

1.https://www.tutorialspoint.com/compiler_design/
2. https://www.geeksforgeeks.org/introduction-of-compiler-design/

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E -TEXT BOOKS
1.http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fholub.com%2Fgoodies%2Fcompiler%2FcompilerDesignInC.pdf&clen=19148153&chunk=true 2.http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=http%3A%2F%2F160592857366.free.fr%2Fjoe%2Febooks%2FShareData%2FModern%2520Compiler%2520Design%25202e.pdf&clen=4355556&chunk=true
MOOCS COURSES
1. https://onlinecourses-archive.nptel.ac.in 2. https://swayam.gov.in/ 3.https://swayam.gov.in/NPTEL

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ALGORITHM DESIGN AND ANALYSIS

III B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT603PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Introduces the notations for analysis of the performance ofalgorithms.
2. Introduces the data structure disjointsets.
3. Describes major algorithmic techniques (divide-and-conquer, backtracking, dynamic programming, greedy, branch and bound methods) and mention problems for which each technique isappropriate;
4. Describes how to evaluate and compare different algorithms using worst-, average-, andbest- caseanalysis.
5. Explains the difference between tractable and intractable problems, and introduces the problems that are P, NP and NPcomplete.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Ability to analyze the performance ofalgorithms
2. Ability to choose appropriate data structures and algorithm design methods for a specified application
3. Ability to understand how the choice of data structures and the algorithm design methods impact the performance ofprograms

UNIT-I	NOTATION	Classes: 12

Introduction: Algorithm, Performance Analysis-Space complexity, Time complexity,Asymptotic Notations- Big oh notation, Omega notation, Theta notation and Little ohnotation.

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort,

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Strassen's matrix multiplication.		
UNIT-II	**DISJOINT SETS AND BACKTRACKING**	**Classes: 12**
Disjoint Sets: Disjoint set operations, union and find algorithms Backtracking: General method, applications, n-queen's problem, sum of subsets problem, graph coloring.		
UNIT-III	**DYNAMIC PROGRAMMING**	**Classes: 10**
Dynamic Programming: General method, applications- Optimal binary search trees, 0/1 knapsack problem, all pairs shortest path problem, Traveling sales person problem, Reliability design.		
UNIT-IV	**GREEDY METHOD**	**Classes: 10**
Greedy method: General method, applications-Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem		
UNIT-V	**BRANCH AND BOUND AND NP-HARD AND NP-COMPLETE PROBLEMS**	**Classes: 12**
Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem - LC Branch and Bound solution,FIFO Branch and Bound solution NP-Hard and NP-Complete problems: Basic concepts, ,non-deterministic algorithms, NP – Hard and NP-Complete classes, Cook's theorem		
TEXT BOOKS		
1.Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharan, University Press.		
REFERENCE BOOKS		
1.Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education. 2.Introduction to Algorithms, second edition, T. H. Cormen, C.E. Leiserson, R. L. Rivest, and C. Stein, PHI Pvt. Ltd./ Pearson Education. 3.Algorithm Design: Foundations, Analysis and Internet Examples, M.T. Goodrich and R. Tamassia, John Wiley and sons		
WEB REFERENCES		
1.https://www.geeksforgeeks.org/data-structures/ 2.https://www.cet.edu.in/noticefiles/278_DAA%20Complete.pdf		
E -TEXT BOOKS		
1.https://design-analysis-algorithms-2e-dave/dp/8131799433 2.https://www.e-booksdirectory.com/details.php?ebook=10830		

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MOOCS COURSES
1.https://swayam.gov.in/ 2.https://swayam.gov.in/NPTEL

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EMBEDDED SYSTEMS & INTERNET OF THINGS

III B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT604PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To provide an overview of principles of Embedded System
2. To provide a clear understanding of role of firmware, operating systems in correlation with hardware systems.
3. To introduce the terminology, technology and its applications
4. To introduce the concept of M2M (machine to machine) with necessary protocols
5. To introduce the Raspberry PI platform, that is widely used in IoT applications and the implementation of web-based services on IoT devices.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Expected to understand the selection procedure of processors in the embedded domain.
2. Design procedure of embedded firm ware and to visualize the role of real time operating systems in embedded systems
3. Interpret the impact and challenges posed by IoT networks leading to new architectural models.
4. Compare and contrast the deployment of smart objects and the technologies to connect them to network.
5. Appraise the role of IoT protocols for efficient network communication and the need for Data Analytics and Security in IoT.

UNIT-I	INTRODUCTION	Classes: 15

Introduction to Embedded Systems: Definition of Embedded System, Embedded Systems Vs General Computing Systems, Classification of Embedded Systems, Major application areas, Purpose of Embedded Systems, Characteristics of Embedded Systems

The Typical Embedded System: Core of the Embedded System, Memory, Sensors and

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Actuators, Communication Interfaces, Other System components.		
UNIT-II	**EMBEDDED FIRMWARE DESIGN AND DEVELOPMENT**	**Classes: 12**
Definition of Embedded Firmware, Embedded Firmware Design, Embedded Firmware Development Languages, Programming in Embedded C, The Integrated Development Environment (IDE), Types of files generated on Cross-Compilation, Disassembler /Decompiler, Simulators, Emulators and Debugging, Target Hardware Debugging. **RTOS Based Embedded System Design:** Operating System basics, Types Operating Systems, Tasks, Process, Threads, Multiprocessing and Multi-tasking		
UNIT-III	**INTRODUCTION TO INTERNET OF THINGS**	**Classes: 12**
Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT Communicationmodels, IoT Communication APIs IoT enabled Technologies–Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health andLifestyle		
UNIT-IV	**IOT NETWORKING PROTOCOLS AND RASPBERRY PI –INTERFACES**	**Classes: 11**
IoTandM2M–Softwaredefinednetworks, network function virtualization, difference betweenSDN and NFV for IoT Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, and SNMP NETOPEER. IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming–Python program with Raspberry PI with focus of interfacing external gadgets.		
UNIT-V	**IOT PHYSICAL SERVERS AND CLOUD OFFERINGS**	**Classes: 12**
IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Web server – Web server for IoT, Cloud for IoT, Python web application framework designing a RESTful web API		
TEXT BOOKS		
1. Shibu K V, "Introduction to Embedded Systems", Second Edition, Mc Graw Hill 2. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madisetti, Universities Press, 2015, ISBN:9788173719547		
REFERENCE BOOKS		
1.Rajkamal, Embedded Systems Architecture, Programming and Design, TATAMcGraw-Hill		

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2.Frank Vahid and Tony Givargis, “Embedded Systems Design” - A Unified Hardware/Software Introduction, JohnWileyLyla, “Embedded Systems”–Pearson
3.David E.Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.
5. Getting Started with Raspberry Pi, Matt Richardson &Shawn Wallace, O'Reilly (SPD), 2014, ISBN:9789350239759

WEB REFERENCES

1.http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Flibrary.oapen.org%2Fbitstream%2F20.500.12657%2F46817%2F1%2F2021_Book_EmbeddedSystemDesign.pdf

E -TEXT BOOKS

1.http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fannamalaiuniversity.ac.in%2Fstudport%2Fdownload%2Fengg%2FCSE_Engg%2Fresources%2FEMBEDDED%2520CONTROL%2520SYSTEMS%2520%26%2520IOT%2520Class%2520notes.pdf&clen=3710376&chunk=true
2.http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fassets.markallengroup.com%2F%2Farticleimages%2F67055%2FEMS%2520White%2520Paper.pdf&clen=1108212&chunk=true

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1.https://onlinecourses-archive.nptel.ac.in
2.https://swayam.gov.in/
3.https://swayam.gov.in/NPTEL

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EMBEDDED SYSTEMS & INTERNET OF THINGS LAB

III B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT605PC	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

To learn

1. To provide hands-on experience on web technologies
2. To develop client-server application using web technologies
3. To introduce server-side programming with Java servlets and JSP
4. To understand the various phases in the design of a compiler.
5. To understand the design of top-down and bottom-up parsers.
6. To understand syntax directed translation schemes.
7. To introduce lex and yacc tools.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Design and develop interactive and dynamic web applications using HTML, CSS, JavaScript and XML Apply client-server principles to develop scalable and enterprise web applications
2. Ability to design, develop, and implement a compiler for any language.
3. Able to use lex and yacc tools for developing a scanner and a parser.
4. Able to design and implement LL and LR parsers.

LIST OF EXPERIMENTS

1. Functional Testing of Devices

Flashing the OS on to the device into a stable functional state by porting desktop environment withnecessary packages.

2.Exporting Display on To Other Systems

Making use of available laptop/desktop displays as a display for the device using SSH client & X11display server.

3. GPIO Programming

Programming of available GPIO pins of the corresponding device using native programming language. Interfacing of I/O devices like LED/Switch etc., and testing the

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functionality.

4. Bluetooth with Raspberry PI

Interfacing Bluetooth Module with Raspberry pi and sending the information either message/voice with Bluetooth.

5. ON/OFF Control Based On Light Intensity

Using the light sensors, monitor the surrounding light intensity & automatically turn ON/OFF the high intensity LED's by taking some pre-defined threshold light intensity value.

6. Battery Voltage Range Indicator

Monitor the voltage level of the battery and indicating the same using multiple LED's (for ex: for 3V battery and 3 led's, turn on 3 led's for 2-3V, 2 led's for 1-2V, 1 led for 0.1-1V & turn off all for 0V)

7. Dice Game Simulation

Instead of using the conventional dice, generate a random value similar to dice value and display the same using a 16X2 LCD. A possible extension could be to provide the user with option of selecting

single or double dice game.

8. Displaying RSS News Feed On Display Interface

Displaying the RSS news feed headlines on a LCD display connected to device. This can be adaptedto other websites like twitter or other information websites. Python can be used to acquire data from theinternet.

9. Porting Openwrt To the Device

Attempt to use the device while connecting to a wifi network using a USB dongle and at the same time providing a wireless access point to the dongle.

10. Hosting a website on Board

Building and hosting a simple website(static/dynamic) on the device and make it accessible online.

There is a need to install server(eg: Apache) and thereby host the website.

11. Webcam Server

Interfacing the regular usb webcam with the device and turn it into fully functional IP webcam & test the functionality.

12. Controlling of light source using web page

With the help of web page a light source is made ON/OFF by using Raspberry PI

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TEXT BOOKS
1. Shibu K V, "Introduction to Embedded Systems", Second Edition, Mc Graw Hill 2.Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madisetti, Universities Press, 2015, ISBN:9788173719547
REFERENCE BOOKS
1. Rajkamal, Embedded Systems Architecture, Programming and Design, TATAMcGraw-Hill 2. Frank Vahid and Tony Givargis, "Embedded Systems Design" - A Unified Hardware/Software Introduction, JohnWiley
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1. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fannamalaiuniversity.ac.in%2Fstudport%2Fdownload%2Fengg%2FCSE_Engg%2Fresources%2FEMBEDDED%2520CONTROL%2520SYSTEMS%2520%26%2520IOT%2520Class%2520notes.pdf&clen=3710376&chunk=true 2. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fassets.markallengroup.com%2F%2Farticleimages%2F67055%2FEMS%2520White%2520Paper.pdf&clen=1108212&chunk=true
MOOCS COURSES
1. https://onlinecourses-archive.nptel.ac.in 2. https://swayam.gov.in/ 3.https://swayam.gov.in/NPTEL

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COMPILER CONSTRUCTION LAB

III B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT606PC	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

To learn

1. To provide hands-on experience on web technologies
2. To develop client-server application using web technologies
3. To introduce server-side programming with Java servlets and JSP
4. To understand the various phases in the design of a compiler.
5. To understand the design of top-down and bottom-up parsers.
6. To understand syntax directed translation schemes.
7. To introduce lex and yacc tools.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Design and develop interactive and dynamic web applications using HTML, CSS, JavaScript and XML Apply client-server principles to develop scalable and enterprise web applications
2. Ability to design, develop, and implement a compiler for any language.
3. Able to use lex and yacc tools for developing a scanner and a parser.
4. Able to design and implement LL and LR parsers.

LIST OF EXPERIMENTS

1. Compiler Design Experiments
2. Write a LEX Program to scan reserved word and Identifiers of C Language
3. Implement Predictive Parsing algorithm
4. Write a C program to generate three address code.
5. Implement SLR(1) Parsing algorithm
6. Design LALR bottom up parser for the given language ::= ::= < | <= | == | >= | > | != ::= + | - ::= | ::= * | / ::= | | [ ] | ( ) ::= | ::= | ::= | ::= a|b|c|d|e|f|g|h|i|j|k|l|m|n|o|p|q|r|s|t|u|v|w|x|y|z ::= 0|1|2|3|4|5|6|7|8|9 has the obvious meaning Comments (zero or more characters enclosed between the standard C/Java-style comment brackets /*...*/) can be inserted. The language has rudimentary support

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for 1-dimensional arrays.

The declaration int a[3] declares an array of three elements, referenced as a[0], a[1] and a[2].Note also that you should worry about the scoping of names. A simple program written in this language is: { int a[3],t1,t2; t1=2; a[0]=1; a[1]=2; a[t1]=3; t2=-(a[2]+t1*6)/(a[2]-t1); if t2>5 then print(t2); else { int t3; t3=99; t2=-25; print(-t1+t2*t3); /* this is a comment on 2 lines */ } endif.

TEXT BOOKS

1.Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, Pearson.

REFERENCE BOOKS

1. Compiler Construction-Principles and Practice, Kenneth C Louden, Cengage Learning.
2. Modern compiler implementation in C, Andrew WAppel, Revised edition, Cambridge University Press.
3. The Theory and Practice of Compiler writing, J. P. Tremblay and P. G. Sorenson, TMH
4. Writing compilers and interpreters, R. Mak, 3rd edition, Wiley student edition.
5. lex&yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly

WEB REFERENCES

1.http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Flibrary.oapen.org%2Fbitstream%2F20.500.12657%2F46817%2F1%2F2021_Book_EmbeddedSystemDesign.pdf

E -TEXT BOOKS

1. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fannamalaiuniversity.ac.in%2Fstudport%2Fdownload%2Fengg%2FCSE_Engg%2Fresources%2FEMBEDDED%2520CONTROL%2520SYSTEMS%2520%26%2520IOT%2520Class%2520notes.pdf&clen=3710376&chunk=true
2. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fassets.markallengroup.com%2F%2Farticleimages%2F67055%2FEMS%2520White%2520Paper.pdf&clen=1108212&chunk=true

MOOCS COURSES

1.https://onlinecourses-archive.nptel.ac.in
2.https://swayam.gov.in/
3.https://swayam.gov.in/NPTEL

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DESIGN AND ANALYSIS OF ALGORITHMS LAB

III B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT607PC	B. Tech	0	0	2	1	30	70	100

COURSE OBJECTIVES

To learn

1. To write programs in java to solve problems using divide and conquer strategy.
2. To write programs in java to solve problems using backtracking strategy.
3. To write programs in java to solve problems using greedy and dynamic programming techniques.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Ability to write programs in java to solve problems using algorithm design techniques suchas Dividean & Conquer, Greedy, Dynamic programming,and Backtracking

LIST OF EXPERIMENTS

1. Write a java program to implement Quicksort algorithm for sorting a list of integers in ascending order
2. Writeajavaprogramtoimplement Mergesortalgorithmforsortingalistofintegersin ascending order.
3. i)Write a java program to implement the dfs algorithm for a graph.
4. ii)Write a.java program to implement the bfs algorithm for a graph.
5. Write a javaprogram to implement back tracking algorithm for the N-queens problem.
6. Write a java program to implement the back tracking algorithm for the sum of sub sets problem.
7. Write a java program to implement the back tracking algorithm for the Hamiltonian Circuits problem.
8. Write a java program to implement greedy algorithm for jobsequencing with deadlines.
9. Write a javaprogram to implement Dijkstra's algorithm for the Single source shortest path problem.

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10. Write a java program that implements Prim's algorithm to generate minimum costspanning tree.
11. Write a java program thatimplements Kruskal's algorithm to generate minimum costspanning tree.
12. Write a java program to implement Floyd's algorithm fort heal pairs hortest path problem.
13. Write a java program to implement Dynamic Programming algorithm for the 0/1 Knapsack problem.
14. Write a java program to implement Dynamic Programming algorithm for the Optimal Binary Search Tree Problem.

TEXT BOOKS

1. Datastructures,AlgorithmsandApplicationsinjava,2ndEdition,S.Sahani,Universities Press.
2. DatastructuresandAlgorithmsinjava,3rdedition,A.Drozdek,CengageLearning.
3. DatastructureswithJava,J.R.Hubbard,2ndedition,Schaum'sOutlines,TMH.

REFERENCE BOOKS

1. DatastructuresandalgorithmsinJava,2ndEdition,R.Lafore,PearsonEducation.
2. DataStructuresusingJava,D.S.MalikandP.S.Nair,CengageLearning

WEB REFERENCES

1. https://www.geeksforgeeks.org/data-structures/
2. https://www.cet.edu.in/noticefiles/278_DAA%20Complete.pdf

E -TEXT BOOKS

1. https://design-analysis-algorithms-2e-dave/dp/8131799433
2. https://www.e-booksdirectory.com/details.php?ebook=10830

MOOCS COURSES

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2. https://swayam.gov.in/
3. https://swayam.gov.in/NPTEL

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ENVIRONMENTAL SCIENCE

III B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
*BS604HS	B. Tech	3	0	0	0	100	-	100

COURSE OBJECTIVES

To learn

1. Analyze the inter relationship between living organism and environment
2. Describe various types of natural resources available on the earthsurface
3. Identify the values, threats of biodiversity, endangered and endemic species of India along with the conservation ofbiodiversity
4. Explain the causes, effects and control measures of various types of environmental pollutions
5. Understand the importance of environment by assessing its impact on the human world

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Differentiate between various biotic and abiotic components ofecosystem
2. Describe the various types of natural resources
3. Examine the values, threats of biodiversity, the methods of conservation, endangered and endemic species of India
4. Illustratecauses,effects,andcontrolmeasuresofvarioustypesofenvironmentalpollutions
5. Understand technologies on the basis of ecological principles environmental regulations which in turn helps in sustainable development

UNIT-I	ECOSYSTEMS	Classes: 8

Definition, Scope, and Importance of ecosystem. Classification, structure and function of an ecosystem, food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification.

UNIT-II	NATURAL RESOURCES	Classes: 8

Classification of Resources: Living and Non-Living resources. Waterresources: use and over utilization of surface and ground water, floods and droughts, Dams:

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benefits andproblems.

Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources

Land resources: Forest resources.

Energy resources: growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

UNIT-III	BIODIVERSITY AND BIOTIC RESOURCES	Classes: 7

Introduction, Definition, genetic, species and ecosystemdiversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic, optional values and hotspots of biodiversity. Endangered and endemic species of India, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity:

In-Situ and Ex-situ conservation.

UNIT-IV	ENVIRONMENTAL POLLUTION	Classes: 9

Types of pollution, Causes, effects and prevention and control measures of air, water, soil, noise and thermal pollution. Solid waste and e-waste management.

UNIT-V	ENVIRONMENTAL POLICY AND SUSTAINABLE DEVELOPMENT	Classes: 10

Concept of sustainable development: Sustainable development goals. Threats to sustainability: Population explosion- crazy consumerism. Green building concept. Water conservation, Rainwater harvesting, watershed management. Environmental Policies and Legislations:

EnvironmentProtectionAct,Air(PreventionandControlofPollution)Act,Forest(conservation) Act, 1980. Wildlife ProtectionAct.

TEXT BOOKS

1. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University GrantsCommission
2. Environmental Studies by R. Rajagopalan, Oxford UniversityPress.
3. Textbook of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications
4. Dr. P. D Sharma, “Ecology and Environment”, Rastogi Publications, New Delhi,12 Edition, 2015

REFERENCE BOOKS

1. Environmental Studies by Anubha Kaushik, 4 Edition, New age internationalpublishers
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL

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Learning Pvt. Ltd, NewDelhi

3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHL Learning Pvt. Ltd, NewDelhi

4. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA Edition

WEB REFERENCES

1.https://www.britannica.com/science/ecosystem

2.https://ocw.mit.edu/resources/#EnvironmentandSustainability

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1. PN Palanisamy Environmental Science ISBN:9788131773253, eISBN:97899332509771 Edition: Second edition

2. Environmental Studies. Author, Dr. J. P. Sharma. Publisher, Laxmi Publications, 2009 ISBN, 8131806413, 9788131806418.

MOOCS COURSES

1. https://nptel.ac.in/courses/122103039/38
2. https://nptel.ac.in/courses/106105151/12

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INFORMATION SECURITY

IV B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT701PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To understand the fundamentals of Cryptography
2. To understand various key distribution and management schemes
3. To understand how to deploy encryption techniques to secure data in transit across data networks

To apply algorithms used for secure transactions in real world applications

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Demonstrate the knowledge of cryptography, network security concepts and applications.
2. Ability to apply security principles in system design.

UNIT-I	SECURITY ATTACKS	Classes: 15

Security Attacks (Interruption, Interception, Modification and Fabrication),Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security. Classical Encryption Techniques, DES, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles and Modes of operation, Blowfish, Placement of Encryption Function, Traffic Confidentiality, key Distribution, Random Number Generation.

UNIT-II	PUBLIC KEY CARTOGRAPHY PRINCIPLES	Classes: 11

Public key Cryptography Principles, RSA algorithm, Key Management, Diffie-Hellman Key Exchange, Elliptic Curve Cryptography. Message authentication and Hash Functions, Authentication Requirements and Functions, Message Authentication, Hash Functions and MACs Hash and MAC Algorithms SHA-512, HMAC.

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UNIT-III	DIGITAL SIGNATURE	Classes: 10
Digital Signatures, Authentication Protocols, Digital signature Standard, Authentication Applications, Kerberos, X.509 Directory Authentication Service. Email Security: Pretty Good Privacy (PGP) S/MIME,		
UNIT-IV	**IP SECURITY OVERVIEW**	**Classes: 11**
IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management. Web Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).		
UNIT-V	**UNDECIDABILITY**	**Classes: 11**
Intruders, Viruses and Worms Intruders, Viruses and related threats Firewalls: Firewall Design Principles, Trusted Systems, Intrusion Detection Systems.		

TEXT BOOKS

1. Cryptography and Network Security (principles and approaches) by William Stallings Pearson Education, 4th Edition.

REFERENCE BOOKS

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education
2. Principles of Information Security, Whitman, Thomson. Krithivasan, Rama R, Pearson.

WEB REFERENCES

1. https://people.scs.carleton.ca/~paulv/5900wBooks.html
2. https://thelanguageofcybersecurity.com/references /

E -TEXT BOOKS

1. https://www.cybok.org/media/downloads/cybok_version_1.0.pdf /
2. https://www.nisc.go.jp/security-site/campaign/files/aj-sec/handbook-all_eng.pdf /

MOOCS COURSES

1. https://www.mooc-list.com/tags/cybersecurity
2. https://www.cybersecurityeducationguides.org/moocs/

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MACHINE LEARNING

IV B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT702PC	B. Tech	2	0	0	2	30	70	100

COURSE OBJECTIVES

To learn

1. This course explains machine learning techniques such as decision tree learning, Bayesian learning etc.
2. To understand computational learning theory.
3. To study the pattern comparison techniques.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Understand the concepts of computational intelligence like machine learning
2. Ability to get the skill to apply machine learning techniques to address the real time problems in different areas
3. Understand the Neural Networks and its usage in machine learning application.

UNIT-I	INTRODUCTION TO MACHINE LEARNING	Classes: 12

Introduction - Well-posed learning problems, designing a learning system, Perspectives and issues in machine learning

Concept learning and the general to specific ordering – introduction, a concept learning task, concept learning as search, find-S: finding a maximally specific hypothesis, version spaces and the candidate elimination algorithm, remarks on version spaces and candidate elimination, inductive bias**.**

Decision Tree Learning – Introduction, decision tree representation, appropriate problems for decision tree learning, the basic decision tree learning algorithm, hypothesis space search in decision tree learning, inductive bias in decision tree learning, issues in decision tree learning.

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UNIT-II	Artificial Neural Networks	Classes: 11

Artificial Neural Networks-1– Introduction, neural network representation, appropriate problems for neural network learning, perceptions, multilayer networks and the back-propagation algorithm.

Artificial Neural Networks-2- Remarks on the Back-Propagation algorithm, Anillustrative example: face recognition, advanced topics in artificial neural networks.

Evaluation Hypotheses – Motivation, estimation hypothesis accuracy, basics of sampling theory, a general approach for deriving confidence intervals, difference in error of two hypotheses, comparing learning algorithms.

UNIT-III	Bayesian learning	Classes: 12

Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum Likelihood and least squared error hypotheses, maximum likelihood hypotheses for predicting probabilities, minimum description length principle, Bayes optimal classifier, Gibs algorithm, Naïve Bayes classifier, an example: learning to classify text, Bayesian belief networks, the EM algorithm.

Computational learning theory – Introduction, probably learning an approximately correct hypothesis, sample complexity for finite hypothesis space, sample complexity for infinite hypothesis spaces, the mistake bound model of learning.

Instance-Based Learning- Introduction, *k*-nearest neighbour algorithm, locally weighted regression, radial basis functions, case-based reasoning, remarks on lazy and eager learning.

UNIT-IV	Genetic Algorithms	Classes: 12

Genetic Algorithms – Motivation, Genetic algorithms, an illustrative example, hypothesis space search, genetic programming, models of evolution and learning, parallelizing genetic algorithms.

Learning Sets of Rules – Introduction, sequential covering algorithms, learning rule sets: summary, learning First-Order rules, learning sets of First-Order rules: FOIL, Induction as inverted deduction, inverting resolution.

Reinforcement Learning – Introduction, the learning task, *Q*–learning, non- deterministic, rewards and actions, temporal difference learning, generalizing from examples, relationship to dynamic programming.

UNIT-V	Analytical Learning	Classes: 11

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Analytical Learning-1- Introduction, learning with perfect domain theories: PROLOG-EBG, remarks on explanation-based learning, explanation-based learning of search control knowledge.

Analytical Learning-2-Using prior knowledge to alter the search objective, using prior knowledge to augment search operators.

Combining Inductive and Analytical Learning – Motivation, inductive-analytical approaches to learning, using prior knowledge to initialize the hypothesis.

TEXT BOOKS

1. Machine Learning – Tom M. Mitchell, - MGH.

REFERENCE BOOKS

1. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis

WEB REFERENCES

https://www.tutorialspoint.com/machine_engineering/index.htm

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1. https://www.geeksforgeeks.org/Machine Learning

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2. https://onlinecourses.nptel.ac.in/noc21_cs13/preview.

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INFORMATION SECURITY LAB

IV B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT703PC	B. Tech	0	0	2	1	30	70	100

COURSE OBJECTIVES

To learn

1. To write programs in c or Java to solve problems using DES algorithm.
2. To write programs in c or Java solve problems using SHA-1.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Demonstrate the knowledge of cryptography, network security concepts and applications.
2. Ability to apply security principles in system design

LIST OF EXPERIMENTS

1. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should XOR each character in this string with 0 and displays the result.

2. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should AND or and XOR each character in this string with 127 and display the result.

3. Write a Java program to perform encryption and decryption using the following algorithms
   A . Ceaser cipher B. Substitution cipher C.Hill Cipher

4. Write a C/JAVA program to implement the DES algorithm logic.

5. Write a C/JAVA program to implement the Blowfish algorithm logic.

6. Write a C/JAVA program to implement the Rijndael algorithm logic.

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7. Write the RC4 logic in Java Using Java cryptography; encrypt the text "Hello world" using Blowfish. Create your own key using Java key tool.

8. Write a Java program to implement RSA algorithm.

9. Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript.

10. Calculate the message digest of a text using the SHA-1 algorithm in JAVA.

11. Calculate the message digest of a text using the MD5 algorithm in JAVA

TEXT BOOKS

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education
2. Principles of Information Security, Whitman, Thomson.

REFERENCE BOOKS

1. https://nptel.ac.in/courses/112105126/
2. https://nptel.ac.in/downloads/112105127/
3. https://nptel.ac.in/courses/112107145/
4. https://nptel.ac.in/courses/122104015/, R. J. Leach, CRC Press.

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1. https://www.srmvalliammai.ac.in/qb/IT/VII%20Semester/IT8761-Security%20Lab%20Manual.pdf
2. https://www.scribd.com/document/293765082/Lab-Programs-for-Information-security-lab

E -TEXT BOOKS

1. https://www.srmvalliammai.ac.in/qb/IT/VII%20Semester/IT8761-Security%20Lab%20Manual.pdf
2. https://www.scribd.com/document/293765082/Lab-Programs-for-Information-security-lab

MOOCS COURSES

1. https://www.mooc-list.com/tags/cybersecurity
2. https://www.cybersecurityeducationguides.org/moocs/

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CONSTITUTION OF INDIA

IV B. TECH I SEMESTER(R20)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
***CI707MC**	**B.Tech**	3	0	0	0	100	-	100

COURSE OBJECTIVES

To learn

Objective of the constitution of India is very well written in its preamble and that is to create a state which will be This Course deals with Fundamentals and Structures of Indian Government; itis specifically designed to give a complete overview and in-depth knowledge regarding the concerns and challenges faced by the modern constitutional governments and elaborately discusses the structure, procedures, powers and duties of governmental institutions. The Course analyses in detail the basic functions of a written constitution. Also, the theories and concepts relating to constitutionalism, federalism, judicial review, constitutional interpretation, etc. are reviewed. All the discussions in the Course are updated according to the latest position and the modifications made by judicial intervention

1. Sovereign -independent to conduct internal as well as external affairs
2. Socialist - preventing concentration of wealth into few hands
3. Secular - respecting all religions equally
4. Democratic- government by the people, of the people, for the people
5. Republic - Head of the state will be elected not hereditary

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. To understand the basic concepts of democracy, republicanism, constitutionalism and to know about the constitutional theories, virtues and constitutional interpretation
2. To study and analyse the quasi-federal nature of Indian Constitution and the basic function of a written constitution regarding the allocation of State power, the functions, powers and limits of the organs of state
3. To analyse elaborately regarding the emergency and amendment procedures; the need for granting of special status or special provisions to some states
4. To know about Panchayats, Municipalities, Scheduled and Tribal areas
5. To utilize Judiciary System of India

UNIT-I	**INTERDUCTION TO INDIAN CONSTITUTION**	**Classes: 6**
Meaning and importance of Constitution, Making of Indian Constitution, Salient features and the Preamble, Fundamental rights, Fundamental duties, Directive Principles.		
UNIT-II	**THE AMENDMENT OF THE CONSTITUTION**	**Classes: 6**

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Need for Amendment, Types of Amendment, Judicial Review of Constituent Power, Doctrine of Basic Structure, Major Amendments and their Constitutional Values.		
UNIT-III	**UNION & STATE EXECUTIVE AND LEGISLATURE**	**Classes:8**
Lok Sabha & Rajya Sabha (Composition, Powers & Functions), President & Prime Minister (Powers, Functions, position), Supreme Court-Composition, Powers & Functions, The President: Powers, Functions and Procedure for Impeachment, Judicial Review of Presidents Actions, Governor: Powers, Functions ,Legislative Power of the Executive – Ordinance, Parliament and State Legislature ,Privileges of Legislature ,Council of Ministers - Prime Minister.		
UNIT-IV	**MAJOR FUNCTIONARIES & EMERGENCY POWERS**	**Classes: 6**
Union Public Service Commission , Election Commission, Planning Commission (NITI) , Significance of Emergency Powers , National Emergency – Grounds – Suspension of Fundamental Rights ,State Emergency – Grounds – Judicial Review , Financial Emergency.		
UNIT-V	**INDIAN JUDICIARY**	**Classes: 6**
Supreme Court of India – Appointment of Judges – Composition , Jurisdiction: Original, Appellate and Writ Jurisdiction , Prospective Overruling and Judge - Made Laws in India (Art. 141), Review of Supreme Court Decision , High Courts – Judges - Constitution , Jurisdiction: Original, Appellate, Writ Jurisdiction and Supervisory Jurisdiction.		

TEXT BOOKS

1. H.M. Seervai: Constitutional Law of India
2. M.P. Jain: Indian Constitutional Law
3. Mahendra P. Singh: V. N. Shukla's Constitution of India
4. Granville Austin: The Indian Constitution: Cornerstone of a Nation

REFERENCE BOOKS

1. An Introduction to the Constitution of India by Dr.Durga Das Basu
2. An Introduction to the Constitution of India by M.V.Pylee
3. Indian Constitutional Law by M.P. Jain
4. A. Sarveswarareddy, K. Sathish, K. Sudha, Constitution of India, M/S Spectrum Publications, First Edition 2021

WEB REFERENCES

1. https://www.wdl.org/en/item/2672/
2. https://nptel.ac.in/courses/109103135/24

E -TEXT BOOKS

1. https://iasexamportal.com/ebook/the-constitution-of-india
2. https://www.india.gov.in/my-government/documents/e-books

MOOCS COURSE

1. http://nludelhi.ac.in/images/moocs/moocs-courses.pdf
   2.https://www.classcentral.com/tag/constitutional-law

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ORGANIZATIONAL BEHAVIOUR

IV B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
SM801MS	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To provide the students with the conceptual framework and the theories underlying Organisational Behaviour.

COURSE OUTCOMES

1. Analyse the behaviour of individuals and groups in organizations in terms of the key factors that influence organizational behaviour.
2. Assess the potential effects of organizational level factors (such as structure, culture and change) on organizational behaviour.
3. Critically evaluate the potential effects of important developments in the external environment (such as globalization and advances in technology) on organizational behaviour.
4. Analyse organizational behavioural issues in the context of organizational behaviour theories, models and concepts.

UNIT-I	INTRODUCTION TO OB	Classes: 12

Definition, Nature and Scope –Environmental and organizational context – Impact of IT, globalization, Diversity, Ethics, culture, reward systems and organizational design on Organisational Behaviour. Cognitive Processes-I: Perception and Attribution: Nature and importance of Perception – Perceptual selectivity and organization - Social perception – Attribution Theories – Locus of control –Attribution Errors –Impression Management.

UNIT-II	COGNITIVE PROCESSES-II	Classes: 14

Personality and Attitudes - Personality as a continuum – Meaning of personality - Johari Window and Transactional Analysis - Nature and Dimension of Attitudes – Job satisfaction and organisational commitment-Motivational needs and processes- Work-Motivation Approaches

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Theories of Motivation- Motivation across cultures- Positive organizational behaviour: Optimism – Emotional intelligence – Self-Efficacy.

UNIT-III	DYNAMICS OF OB-I	Classes: 10

Communication – types - interactive communication in organizations –barriers to communication and strategies to improve the follow of communication – Decision Making: Participative decision-making techniques – creativity and group decision making.

Dynamics of OB –II Stress and Conflict: Meaning and types of stress –Meaning and types of conflict - Effect of stress and intra-individual conflict - strategies to cope with stress and conflict.

UNIT-IV	DYNAMICS OF OB –III POWER AND POLITICS	Classes: 12

Meaning and types of power – empowerment -Groups Vs. Teams – Nature of groups –dynamics of informal groups – dysfunctions of groups and teams – teams in modern work place.

UNIT-V	LEADING HIGH PERFORMANCE	Classes: 12

Job design and Goal setting for High performance- Quality of Work Life- Socio technical Design and High-performance work practices – Behavioural performance management: reinforcement and punishment as principles of Learning –Process of Behavioural modification - Leadership theories - Styles, Activities and skills of Great leaders.

TEXT BOOKS

1. Fred Luthans, Organizational Behavior, McGraw-Hill Education; 12th edition, 2018.
2. Stephen P. Robbins, Organizational Behaviour, Pearson, 18th Edition, 2018.
3. Stephen P. Robbins, Timothy A. Judge, Essentials of Organizational Behavior, Pearson, 14th Edition, 2019.

REFERENCE BOOKS

1. Schermerhorn: Organizational Behaviour 9/e, Wiley, 2008.
2. Hitt: Organizational Behaviour, Wiley, 2008
3. Aswathappa: OrganisationalBehaviour, Himalaya, 2009
4. Mullins: Management and Organisational Behaviour, Pearson, 2008.
5. McShane, Glinow: Organisational Behaviour--Essentials, TMH, 2009.
6. Ivancevich: Organisational Behaviour and Management, 7/e, TMH, 2008.

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WEB REFERENCES

1. Organizational Behaviour: https://nptel.ac.in/courses/110/105/110105034/
2. Organizational culture: https://nptel.ac.in/courses/110/105/110105033/

E -TEXT BOOKS

1. library genesis: http://libgen.rs/book/index.php?md5=59EC38CD4DD8DB8517CF966E11C4F910
2. http://libgen.rs/book/index.php?md5=1122D0A4E660BF20DC7D77AF5B1BFEF8
3. http://libgen.rs/book/index.php?md5=C3F143F3AB18FDB3655D4F16EE19D718
4. http://libgen.rs/book/index.php?md5=6B8A4D77E54A79489DD71D5D2DEC49C5

MOOCS COURSE

1. https://nptel.ac.in/courses/110/106/110106145/
2. https://nptel.ac.in/courses/110/105/110105154/
3. https://nptel.ac.in/courses/110/105/110105033/

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Professional Elective – I

IT511PE	Biometrics
CS512PE	Advanced Computer Architecture
CS513PE	Data Analytics
CS514PE	Image Processing
CS515PE	Principles of Programming Languages

Professional Elective – II

IT521PE	Database Security
IT522PE	Data Warehousing and Mining
IT524PE	Pattern Recognition
CS521PE	Computer Graphics
IT525PE	Blockchain Technology

Professional Elective –III

IT611PE	Ethical Hacking
CS612PE	Network Programming
CS613PE	Scripting Languages
CS614PE	Mobile Application Development
CS615PE	Software Testing Methodologies

Professional Elective –IV

IT711PE	Web Security
IT712PE	High Performance Computing
CS713PE	Artificial Intelligence
CS714PE	Cloud Computing
CS715PE	Ad-hoc & Sensor Networks

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Professional Elective – V

IT721PE	Intrusion Detection Systems
CS722PE	Real Time Systems
CS723PE	Soft Computing
IT724PE	Distributed Databases
CS725PE	Software Process & Project Management

Professional Elective – VI

IT811PE	Natural Language Processing
IT812PE	IT Enabled Services
CS813PE	Neural Networks & Deep Learning
CS814PE	Human Computer Interaction
CS815PE	Cyber Forensics

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BIOMETRICS (Professional Elective-I)

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT511PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Will learn the biometric technologies.
2. Learn the computational methods involved in the biometric systems.
3. Learn methods for evaluation of the reliability and quality of the biometric systems

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Identify the various Biometric technologies.
2. Design of biometric recognition for the organization.
3. Develop simple applications for privacy.
4. Understand the watermarking techniques of biometrics.
5. Understand the research on biometric techniques

UNIT-I	INTRODUCTION & HANDWRITTEN CHARACTER RECOGNITION	Classes: 15

Introduction, history, type of Biometrics, General Architecture of Biometric Systems, Basic Working of biometric Matching, Biometric System Error and performance Measures, Design of Biometric Systems, Applications of Biometrics, Benefits of Biometrics Versus Traditional Authentication Methods, character Recognition, System Overview, Gesture Extraction for character Recognition, Neura; Network for handwritten Character Recognition, Multilayer Neural Network for Handwritten Character Recognition, Devanagari Numeral Recognition, Isolated Handwritten Devanagari
Character Recognition suing Fourier Descriptor and Hidden markov Model.

UNIT-II	FACE BIOMETRICS & RETINA AND IRIS BIOMETRICS	Classes: 15

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Introduction, Background of Face Recognition, Design of Face Recognition System,Neural Network for Face Recognition, Face Detection in Video Sequences, Challenges in Face Biometrics, Face Recognition Methods, Advantages and Disadvantages, Performance of Biometrics, Design of Retina Biometrics, Iris Segmentation Method, Determination of Iris Region, Experimental Results of Iris Localization, Applications of Iris Biometrics, Advantages and Disadvantages. Vein and Fingerprint Biometrics & Biometric Hand Gesture Recognition For Indian Sign Language. Biometrics Using Vein Pattern of Palm, Fingerprint Biometrics, Fingerprint Recognition System, Minutiae Extraction, Fingerprint Indexing, Experimental Results, Advantages and Disadvantages, Basics of Hand Geometry, Sign Language, Indian Sign Language, SIFT Algorithms- Practical Approach Advantages and Disadvantages.

UNIT-III	**PRIVACY ENHANCEMENT USING BIOMETRICS & BIOMETRIC CRYPTOGRAPHY AND MULTIMODAL BIOMETRICS**	**Classes: 11**

Introduction, Privacy Concerns Associated with Biometric Developments, Identity and Privacy, Privacy Concerns, Biometrics with Privacy Enhancement, Comparison of Various Biometrics in Terms of Privacy, Soft Biometrics - Introduction to Biometric Cryptography, General Purpose Cryptosystem, Modern Cryptography and Attacks, Symmetric Key Ciphers, Cryptographic Algorithms, Introduction to Multimodal Biometrics, Basic Architecture of Multimodal Biometrics, Multimodal Biometrics Using Face and Ear, Characteristics and Advantages of Multimodal Biometrics Characters,
AADHAAR : An Application of Multimodal Biometrics.

UNIT-IV	**WATERMARKING TECHNIQUES &BIOMETRICS : SCOPE AND FUTURE**	**Classes: 11**

Introduction, Data Hiding Methods, Basic Framework of Watermarking, Classification of Watermarking, Applications of Watermarking, Attacks on Watermarks, Performance Evaluation, Characteristics of Watermarks, General Watermarking Process, Image Watermarking Techniques, Watermarking Algorithm, Experimental Results, Effect of Attacks on Watermarking Techniques, Scope and Future Market of Biometrics, Biometric Technologies, Applications of Biometrics -Biometrics, and Information Technology Infrastructure, Role of Biometrics in Enterprise Security, Role of Biometrics in Border Security, Smart Card Technology and Biometric, Radio Frequency Identification Biometrics, DNA Biometrics, Comparative Study of Various Biometrics Techniques.

UNIT-V	**IMAGE ENHANCEMENT TECHNIQUES & BIOMETRICS STANDS**	**Classes: 13**

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Introduction, current Research in image Enhancement Techniques, Image Enhancement, Frequency Domain Filters, Databases and Implementation, Standard Development Organizations, Application Programming Interface, Information Security and Biometric Standards, Biometric Template Interoperability.

TEXT BOOKS

1. G RSinha and Sandeep B. Patil, Biometrics: concepts and applications, Wiely, 2013.
2. Paul Reid, Biometrics for Network Security, Pearson Education.

REFERENCE BOOKS

1. Samir Nanavathi, MichealThieme and Raj Nanavathi, Biometrics, Identity verification in a networked world, Wiley, dream Tech.
2. John D. Woodward and Jr. Wiley Dreamtech, Biometrics, The Ultimate Reference

WEB REFERENCES

1. https://www.biometricsinstitute.org
2. https://www.tutorialspoint.com/biometrics/biometrics_quick_guide.htm

E -TEXT BOOKS

1. https://books.google.co.in/books/about/Introduction_to_Biometrics.html?id=ZPt2xrZFtzkC&redir_esc=y
2. https://onlinelibrary.wiley.com/journal/15410420

MOOCS COURSES

1. http://nptel.ac.in
2. https://www.coursera.org

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ADVANCED COMPUTER ARCHITECTURE (Professional Elective-I)

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS512PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To impart the concepts and principles of parallel and advanced computer architectures.
2. To develop the design techniques of Scalable and multithreaded Architectures.
3. To Apply the concepts and techniques of parallel and advanced computer architectures to design modern computer systems

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Computational models and Computer Architectures.
2. Concepts of parallel computer models.
3. Scalable Architectures, Pipelining, Superscalar processors, multiprocessors

UNIT-I	INTRODUCTION	Classes: 15

Theory of Parallelism, Parallel computer models, The State of Computing, Multiprocessors and Multicomputers, Multivector and SIMD Computers, PRAM and VLSI models, Architectural development tracks, Program and network properties, Conditions of parallelism, Program partitioning and Scheduling, Program flow Mechanisms, System interconnect Architectures.

UNIT-II	PARALLEL PROCESSING APPLICATIONS	Classes: 12

Principals of Scalable performance, Performance metrics and measures, Parallel Processing applications, Speed up performance laws, Scalability Analysis and Approaches, Hardware Technologies, Processes and Memory Hierarchy, Advanced Processor Technology, Superscalar and Vector Processors, Memory Hierarchy Technology, Virtual Memory Technology.

UNIT-III	MEMORY ORGANIZATION	Classes: 12

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Bus Cache and Shared memory, Backplane bus systems, Cache Memory organizations, Shared- Memory Organizations, Sequential and weak consistency models, Pipelining and superscalar techniques, Linear Pipeline Processors, Non-Linear Pipeline Processors, Instruction Pipeline design, Arithmetic pipeline design, superscalar pipeline design.

UNIT-IV	MULTIPROCESSORS AND MULTICOMPUTERS	Classes: 11

Parallel and Scalable Architectures, Multiprocessors and Multicomputers, Multiprocessor system interconnects, cache coherence and synchronization mechanism, Three Generations of Multicomputers, Message-passing Mechanisms, Multivetor and SIMD computers, Vector Processing Principals, Multivector Multiprocessors, Compound Vector processing, SIMD computer Organizations, The connection machine CM-5,

UNIT-V	MULTITHREADED	Classes: 12

Scalable, Multithreaded and Dataflow Architectures, Latency-hiding techniques, Principals of Multithreading, Fine-Grain Multicomputers, Scalable and multithreaded Architectures, Dataflow and hybrid Architectures.

TEXT BOOKS

1. Advanced Computer Architecture Second Edition, Kai Hwang, Tata McGraw Hill Publishers.

REFERENCE BOOKS

1. Computer Architecture, Fourth edition, J. L. Hennessy and D.A. Patterson. ELSEVIER.Advanced Computer Architectures, S.G. Shiva, Special Indian edition, CRC, Taylor &Francis.
2. Introduction to High Performance Computing for Scientists and Engineers, G.Hager and G. Wellein, CRC Press, Taylor & Francis Group.
3. Advanced Computer Architecture, D. Sima, T. Fountain, P. Kacsuk, Pearson education.
4. Computer Architecture, B. Parhami, Oxford Univ. Press

WEB REFERENCES

1. http://www.gcekjr.ac.in/pdf/lectures/2020/6292All_5th%20Semester_Computer%20Science%20And%20Engineering.pdf
2. http://abit.edu.in/wp-content/uploads/2019/11/ADVANCED-COMPUTER-ARCHITECTURE-1-1.pdf

E -TEXT BOOKS

1. http://www.freebookcentre.net/ComputerScience-Books-Download/Advanced-Computer-Architecture-(PDF-76P).html

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MOOCS COURSES
1. http://nptel.ac.in 2. https:/ /www.coursera.org

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DATA ANALYTICS (Professional Elective-I)

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS513PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To explore the fundamental concepts of data analytics.
2. To learn the principles and methods of statistical analysis
3. Discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.
4. To understand the various search methods and visualization techniques

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Understand the impact of data analytics for business decisions and strategy
2. Carry out data analysis/statistical analysis
3. To carry out standard data visualization and formal inference procedures
4. Design Data Architecture
5. Understand various Data Sources

UNIT-I	DATA MANAGEMENT	Classes: 15

Design Data Architecture and manage the data for analysis, understand varioussourcesofDatalikeSensors/Signals/GPSetc.DataManagement,DataQuality(noise,outliers,missingvalues,duplicate data)and Data Processing&Processing

UNIT-II	DATA ANALYTICS	Classes: 12

Introduction to Analytics, Introduction to Tools and Environment, Application of Modeling in Business, Databases & Types of Data and variables, Data Modeling Techniques, Missing Imputations etc. Need for Business Modeling.

UNIT-III	REGRESSION AND LOGISTIC REGRESSION	Classes: 12

Regression– Concepts,Bluepropertyassumptions,LeastSquareEstimation,VariableRationalization,andModelBuilding etc.

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Logistic Regression: Model Theory, Model fit Statistics, Model Construction, Analytics applications tovariousBusinessDomainsetc.

UNIT-IV	OBJECT SEGMENTATION AND TIME SERIES METHODS	Classes: 11

Object Segmentation: Regression Vs Segmentation – Supervised and Unsupervised Learning, Tree Building – Regression, Classification, Overfitting, Pruning and Complexity, Multiple Decision Trees etc. Time Series Methods: Arima, Measures of Forecast Accuracy, STL approach, Extract features from generated model as Height, Average Energy etc and Analyze for prediction

UNIT-V	DATA VISUALIZATION	Classes: 12

Data Visualization: Pixel-Oriented Visualization Techniques, Geometric Projection Visualization Techniques, Icon-Based Visualization Techniques, Hierarchical Visualization Techniques, Visualizing Complex Data and Relations..

TEXT BOOKS

1. Student's Handbook for Associate Analytics – II, III.
2. Data Mining Concepts and Techniques, Han, Kamber, 3rd Edition, Morgan Kaufmann Publishers.

REFERENCE BOOKS

1. Introduction to Data Mining, Tan, Steinbach and Kumar, AddisionWisley, 2006.
2. Data Mining Analysis and Concepts, M. Zaki and W. Meira
3. Mining of Massive Datasets, Jure Leskovec Stanford Univ. AnandRajaramanMilliway Labs Jeffrey D Ullman Stanford Univ.

WEB REFERENCES

1. https://www.datasciencecentral.com/profiles/blogs/top-10-big-data-and-analytics-references
2. https://www.oracle.com/data-science/

E -TEXT BOOKS

1. https://analyticsindiamag.com/top-10-free-ebooks-to-learn-data-science/

MOOCS COURSES

1. http://nptel.ac.in
2. https://www.coursera.org

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IMAGE PROCESSING (Professional Elective-I)

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS514PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Provide a theoretical and mathematical foundation of fundamental Digital Image Processing concepts.
2. The topics include image acquisition; sampling and quantization; preprocessing; enhancement; restoration; segmentation; and compression.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Demonstrate the knowledge of the basic concepts of two-dimensional signal acquisition, sampling, and quantization.
2. Demonstrate the knowledge of filtering techniques.
3. Demonstrate the knowledge of 2D transformation techniques.
4. Demonstrate the knowledge of image enhancement, segmentation, restoration and compression techniques

UNIT-I	DIGITAL IMAGE FUNDAMENTALS	Classes: 15

Digital Image through Scanner, Digital Camera. Concept of Gray Levels. Gray Level to Binary Image Conversion. Sampling and Quantization. Relationship between Pixels. Imaging Geometry. 2D Transformations-DFT, DCT, KLT and SVD.

UNIT-II	IMAGE ENHANCEMENT	Classes: 12

Image Enhancement in Spatial Domain Point Processing, Histogram Processing, Spatial Filtering, Enhancement in Frequency Domain, Image Smoothing, Image Sharpening.

UNIT-III	IMAGE RESTORATION	Classes: 12

Image Restoration Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT-IV	IMAGE SEGMENTATION	Classes: 11

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Image Segmentation Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region Oriented Segmentation.

UNIT-V	IMAGE COMPRESSION	Classes: 12

Image Compression Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Source Encoder and Decoder, Error Free Compression, Lossy Compression.

TEXT BOOKS

1. Digital Image Processing: R.C. Gonzalez & R. E. Woods, Addison Wesley/ Pearson Education, 2nd Ed, 2004.

REFERENCE BOOKS

1. Fundamentals of Digital Image Processing: A. K. Jain , PHI.
2. Digital Image Processing using MAT LAB: Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins: Pearson Education India, 2004.
3. Digital Image Processing: William K. Pratt, John Wilely, 3rd Edition, 2004.

WEB REFERENCES

1. https://www.ijert.org/image-processing-using-web-2-0-2
2. https://iopscience.iop.org/article/10.1088/1742-6596/1087/5/052024/pdf
3. https://en.wikipedia.org/wiki/Digital_image_processing

E -TEXT BOOKS

1. http://sdeuoc.ac.in/sites/default/files/sde_videos/Digital%20Image%20Processing%203rd%20ed.%20-%20R.%20Gonzalez%2C%20R.%20Woods-ilovepdf-compressed.pdf
2. https://sisu.ut.ee/imageprocessing/book/1

MOOCS COURSES

1. http://nptel.ac.in
2. https://www.coursera.org2.

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PRINCIPLES OF PROGRAMMING LANGUAGES (Professional Elective-I)

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS515PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Introduce important paradigms of programming languages
2. To provide conceptual understanding of high-level language design and implementation
3. Topics include programming paradigms; syntax and semantics; data types, expressions and statements; subprograms and blocks; abstract data types; concurrency; functional and logic programming languages; and scripting languages

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Acquire the skills for expressing syntax and semantics in formal notation
2. Identify and apply a suitable programming paradigm for a given computing application
3. Gain knowledge of and able to compare the features of various programming Languages

UNIT-I	PRELIMINARY CONCEPTS AND SYNTAX AND SEMANTICS	Classes: 15

Preliminary Concepts: Reasons for Studying Concepts of Programming Languages, Programming Domains, Language Evaluation Criteria, Influences on Language Design, Language Categories, Language Design Trade-Offs, Implementation Methods, Programming Environments

Syntax and Semantics: General Problem of Describing Syntax and Semantics, Formal Methods of Describing Syntax, Attribute Grammars, Describing the Meanings of Programs

UNIT-II	NAMES, BINDINGS, AND SCOPES	Classes: 12

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Names, Bindings, and Scopes: Introduction, Names, Variables, Concept of Binding, Scope, Scope and Lifetime, Referencing Environments, Named Constants
Data Types: Introduction, Primitive Data Types, Character String Types, User Defined Ordinal Types, Array, Associative Arrays, Record, Union, Tuple Types, List Types, Pointer and Reference Types, Type Checking, Strong Typing, Type Equivalence
Expressions and Statements: Arithmetic Expressions, Overloaded Operators, Type Conversions, Relational and Boolean Expressions, Short Circuit Evaluation, Assignment Statements, Mixed-Mode Assignment
Control Structures – Introduction, Selection Statements, Iterative Statements, Unconditional Branching, Guarded Commands.

UNIT-III	SUBPROGRAMS AND BLOCKS	Classes: 12

Subprograms and Blocks:undamentals of Sub-Programs, Design Issues for Subprograms, Local Referencing Environments, Parameter Passing Methods, Parameters that Are Subprograms, Calling Subprograms Indirectly, Overloaded Subprograms, Generic Subprograms, Design Issues for Functions, User Defined Overloaded Operators, Closures, Coroutines
Implementing Subprograms: General Semantics of Calls and Returns, Implementing Simple Subprograms, Implementing Subprograms with Stack-Dynamic Local Variables, Nested Subprograms, Blocks, Implementing Dynamic Scoping
Abstract Data Types: The Concept of Abstraction, Introductions to Data Abstraction, Design Issues, Language Examples, Parameterized ADT, Encapsulation Constructs, Naming Encapsulations

UNIT-IV	CONCURRENCY	Classes: 11

Introduction, Introduction to Subprogram Level Concurrency, Semaphores, Monitors, Message Passing, Java Threads, Concurrency in Function Languages, Statement Level Concurrency. Exception Handling and Event Handling: Introduction, Exception Handling in Ada, C++, Java, Introduction to Event Handling, Event Handling with Java and C#.

UNIT-V	FUNCTIONAL PROGRAMMING LANGUAGES	Classes: 12

Functional Programming Languages: Introduction, Mathematical Functions, Fundamentalsof Functional Programming Language, LISP, Support for Functional Programming inPrimarily Imperative Languages, Comparison of Functional and Imperative Languages Logic Programming Language: Introduction, an Overview of Logic Programming, BasicElements of Prolog, Applications of Logic Programming.
Scripting Language: Pragmatics, Key Concepts, Case Study: Python – Values and Types, Variables, Storage and Control, Bindings and Scope, Procedural Abstraction, Data

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Abstraction, Separate Compilation, Module Library. (Text Book 2)

TEXT BOOKS

1. Concepts of Programming Languages Robert. W. Sebesta 10/E, Pearson Education.
2. Programming Language Design Concepts, D. A. Watt, Wiley Dreamtech, 2007.

REFERENCE BOOKS

1. Programming Languages, 2nd Edition, A.B. Tucker, R. E. Noonan, TMH.
2. Programming Languages, K. C. Louden, 2nd Edition, Thomson, 2003

WEB REFERENCES

1. https://www.sanfoundry.com/best-reference-books-principles-programming-languages/
2. https://www.geeksforgeeks.org/principles-of-programming-languages-gq/

E -TEXT BOOKS

1. https://www.cs.bgu.ac.il/~mira/ppl-book-full.pdf

MOOCS COURSES

1. https://onlinecourses-archive.nptel.ac.in
2. https://swayam.gov.in/
3. https://swayam.gov.in/NPTEL

St. Martin's Engineering College

DATABASE SECURITY (Professional Elective-II)

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT521PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To learn the security of databases
2. To learn the design techniques of database security
3. To learn the secure software design

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Ability to carry out a risk analysis for large database.
2. Ability to set up, and maintain the accounts with privileges and roles.

UNIT-I	INTRODUCTION	Classes: 15

Introduction to Databases Security Problems in Databases Security Controls Conclusions Security Models -1: Introduction Access Matrix Model Take-Grant Model Acten Model PN Model Hartson and Hsiao's Model Fernandez's Model Bussolati and Martella's Model for Distributed databases

UNIT-II	SECURITY MECHANISMS	Classes: 12

Security Models -2: Bell and LaPadula's Model Biba's Model Dion's Model Sea View Model Jajodia and Sandhu's Model The Lattice Model for the Flow Control conclusion Security Mechanisms: Introduction User Identification/Authentication Memory Protection Resource Protection Control Flow Mechanisms Isolation Security Functionalities in Some Operating Systems Trusted Computer System Evaluation Criteria

UNIT-III	SECURITY SOFTWARE DESIGN	Classes: 12

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Security Software Design: Introduction A Methodological Approach to Security Software Design Secure Operating System Design Secure DBMS Design Security Packages Database Security Design Statistical Database Protection & Intrusion Detection Systems: Introduction Statistics Concepts and Definitions Types of Attacks Inference Controls evaluation Criteria for Control Comparison. Introduction IDES System RETISS System ASES System Discovery

UNIT-IV	MODELS FOR THE PROTECTION OF NEW GENERATION DATABASE SYSTEMS -1	Classes: 11

Models for the Protection of New Generation Database Systems -1: Introduction A Model for the Protection of Frame Based Systems A Model for the Protection of Object-Oriented Systems SORION Model for the Protection of Object-Oriented Databases

UNIT-V	MODELS FOR THE PROTECTION OF NEW GENERATION DATABASE SYSTEMS -2	Classes: 12

Models for the Protection of New Generation Database Systems -2: A Model for the Protection of New Generation Database Systems: the Orion Model ajodia and Kogan's Model A Model for the Protection of Active Databases Conclusions

TEXT BOOKS

1. Database Security by Castano Pearson Edition (lie) Database Security and Auditing: Protecting Data Integrity and Accessibility, 1st Edition, Hassan Afyouni, THOMSON Edition..

REFERENCE BOOKS

1. Database security by Alfred basta, melissazgola, CENGAGE learning

WEB REFERENCES

1. https://www.computer-pdf.com/tutorials-database-security
2. https://pdfcoffee.com/alfred-basta-melissa-zgola-database-security-cengage-learning-2011-pdf-pdf-free.html

E -TEXT BOOKS

1. https://download.oracle.com/database/oracle-database-security-primer.pdf
2. http://samples.jbpub.com/9781284056945/DBICHAP8.pdf

MOOCS COURSES

St. Martin's Engineering College

1. https://onlinecourses-archive.nptel.ac.in
2. https://swayam.gov.in/
3. https://swayam.gov.in/NPTEL

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DATA WAREHOUSING AND MINING (Professional Elective-II)

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT522PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. The student should be made to: x Be familiar with the concepts of data warehouse and data mining, x Be acquainted with the tools and techniques used for Knowledge Discovery in Databases.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. After completing this course, the student will be able to: x Apply data mining techniques and methods to large data sets. x Use data mining tools x Compare and contrast the various classifiers.

UNIT-I	DATA WAREHOUSING INTRODUCTION	Classes: 14

System Architecture Types, Distributed Operating Systems, Issues in Distributed Operating Systems, Communication Primitives. Theoretical Foundations: Inherent Limitations of a Distributed System, Lamport's Logical Clocks, Vector Clocks, Causal Ordering of Messages, Termination Detection.

UNIT-II	BUSINESS ANALYSIS	Classes: 12

Reporting and Query tools and Applications – Tool Categories – The Need for Applications – Cognos Impromptu – Online Analytical Processing (OLAP) – Need – Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multirelational OLAP – Categories of Tools – OLAP Tools and the Internet.

UNIT-III	DATA MINING	Classes: 10

Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues –Data Preprocessing.

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UNIT-IV	ASSOCIATION RULE MINING AND CLASSIFICATION	Classes: 12

Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction – Basic Concepts – Decision Tree Induction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction.

UNIT-V	CLUSTERING AND TRENDS IN DATA MINING	Classes: 12

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

TEXT BOOKS

1.Alex Berson and Stephen J.Smith, "Data Warehousing, Data Mining and OLAP", Tata McGraw – Hill Edition, Thirteenth Reprint 2008.

2. Jiawei Han and MichelineKamber, "Data Mining Concepts and Techniques", Third Edition, ElsevieR2012.

REFERENCE BOOKS

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to Data Mining", Person Education, 2007.

2. K.P. Soman, ShyamDiwakar and V. Aja, "Insight into Data Mining Theory and Practice", Eastern

3. G. K. Gupta, "Introduction to Data Mining with Case Studies", Eastern Economy Edition, Prentice Hall of India, 2006.

4. Daniel T.Larose, "Data Mining Methods and Models", Wiley-Interscience, 2006

WEB REFERENCES

1. https://www.javatpoint.com/data-mining-cluster-vs-data-warehousing
2. https://www.tutorialspoint.com/dwh/dwh_overview.htm

E -TEXT BOOKS

1. https://bookauthority.org/books/beginner-Data Mining-ebooks

MOOCS COURSES

1. https://data-mining.tmcnet.com/

2. https://www.salesforce.com/in/learning-centre/tech/Data Mining/

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PATTERN RECOGNITION (Professional Elective-II)

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT524PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. This course introduces fundamental concepts, theories, and algorithms for pattern recognition and machine learning.
2. Topics include: Pattern Representation, Nearest Neighbor Based Classifier, Bayes Classifier, Hidden Markov Models, Decision Trees, Support Vector Machines, Clustering, and an application of hand-written digit recognition.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Understand the theory, benefits, inadequacies and possible applications of various machine learning and pattern recognition algorithms
2. Identify and employ suitable machine learning techniques in classification, pattern recognition, clustering and decision problems.

UNIT-I	INTRODUCTION	Classes: 15

What is Pattern Recognition, Data Sets for Pattern Recognition, Different Paradigms for Pattern Recognition. Representation: Data Structures for Pattern Representation, Representation of Clusters, Proximity Measures, Size of Patterns, Abstractions of the Data Set, Feature Extraction, Feature Selection, Evaluation of Classifier, Evaluation of Clustering.

UNIT-II	NEAREST NEIGHBOR BASED CLASSIFIER	Classes: 12

NearestNeighborAlgorithm,VariantsoftheNNAlgorithmuseoftheNearestNeighborAlgorithmforTransactionDatabases,EfficientAlgorithms,DataReduction,Prototype Selection. Bayes Classifier: Bayes Theorem, Minimum Error Rate Classifier, Estimation ofProbabilities,ComparisonwiththeNNC,NaïveBayesClassifier,Bayesian BeliefNetwork.

UNIT-III	HIDDEN MARKOV MODELS	Classes: 12

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Markov Models for Classification, Hidden Morkov Models, Classification using HMMs. Decision Trees: Introduction, Decision Tree for Pattern Classification, Construction of Decision Trees, Splitting at the Nodes, Overfitting and Pruning, Examples of Decision Tree Induction.

UNIT-IV	SUPPORT VECTOR MACHINES	Classes: 11

Introduction, Learning the Linear Discriminant Functions, Neural Networks, SVM for Classification. Combination of Classifiers: Introduction, Methods for Constructing Ensembles of Classifiers, Methods for Combining Classifiers.

UNIT-V	CLUSTERING	Classes: 12

Why is Clustering Important, Hierarchical Algorithms, Partitional Clustering, Clustering Large Data Sets. An Application-Hand Written Digit Recognition: Description of the Digit Data, Preprocessing of Data, Classification Algorithms, Selection of Representative Patterns, Results.

TEXT BOOKS

1. Pattern Recognition: An Algorithmic Approach: Murty, M. Narasimha, Devi, V. Susheela, Spinger Pub,1st Ed.

REFERENCE BOOKS

1. Machine Learning - McGraw Hill, Tom M. Mitchell.
2. Fundamentals Of Speech Recognition: Lawrence Rabiner and Biing- Hwang Juang. Prentice- Hall Pub.

WEB REFERENCES

1. https://www.cet.edu.in/noticefiles/273_PATTERN%20RECOGNITION.pdf
2. https://cds.cern.ch/record/998831/files/9780387310732_TOC.pdf

E -TEXT BOOKS

1. https://www.microsoft.com/en-us/research/uploads/prod/2006/01/Bishop-Pattern-Recognition-and-Machine-Learning-2006.pdf
2. https://nptel.ac.in/content/storage2/courses/117108048/module1/Lecture1.pdf
3. https://darmanto.akakom.ac.id/pengenalanpola/Pattern%20Recognition%204th%20Ed.%20(2009).pdf

MOOCS COURSES

1. https://onlinecourses-archive.nptel.ac.in
2. https://swayam.gov.in/
3. https://swayam.gov.in/NPTEL

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COMPUTER GRAPHICS (Professional Elective-II)

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS521PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. The aim of this course is to provide an introduction of fundamental concepts and theory of computer graphics.
2. Topics covered include graphics systems and input devices; geometric representations and 2D/3D transformations; viewing and projections; illumination and color models; animation; rendering and implementation; visible surface detection;

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Acquire familiarity with the relevant mathematics of computer graphics.
2. Be able to design basic graphics application programs, including animation
3. Be able to design applications that display graphic images to given specifications

UNIT-I	INTRODUCTION	Classes: 15

Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

Output primitives: Points and lines, line drawing algorithms (Bresenham's and DDA Algorithm), mid- point circle and ellipse algorithms

Polygon Filling: Scan-line algorithm, boundary-fill and flood-fill algorithms

UNIT-II	2-D GEOMETRICAL TRANSFORMS	Classes: 12

2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems

2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland algorithms,

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Sutherland –Hodgeman polygon clipping algorithm.

UNIT-III	3-D OBJECT REPRESENTATION	Classes: 12

Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.

UNIT-IV	3-D GEOMETRIC TRANSFORMATIONS:	Classes: 11

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

UNIT-V	COMPUTER ANIMATION	Classes: 12

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications Visible surface detection methods: Classification, back-face detection, depth-buffer, BSP-tree methods and area sub-division methods

TEXT BOOKS

1. "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson Education
2. "Computer Graphics Principles & practice", second edition in C, Foley, Van Dam, Feiner and Hughes, Pearson Education.
3. Computer Graphics, Steven Harrington, TMH

REFERENCE BOOKS

1. Machine Learning - McGraw Hill, Tom M. Mitchell.
2. Fundamentals Of Speech Recognition: Lawrence Rabiner and Biing- Hwang Juang. Prentice- Hall Pub.

WEB REFERENCES

1. Procedural elements for Computer Graphics, David F Rogers, Tata McGraw hill, 2nd edition.
2. Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
3. Principles of Computer Graphics, ShaliniGovil, Pai, 2005, Springer.

E -TEXT BOOKS

1. http://www.freebookcentre.net/CompuScience/Free-Computer-Graphics-Books-Download.html

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MOOCS COURSES
1. https://www.mooc-list.com/course/interactive-computer-graphics-coursera 2. https://nptel.ac.in/noc.

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BLOCKCHAIN TECHNOLOGY (Professional Elective-II)

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT525PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To enable the student to understand and appreciate, the importance of fundamentals ofblockchain technology and application of cryptography inblockchain.
2. To gain the awareness about the concepts of various implementations of blockchaintechnology such as bitcoin, Ethereum, andHyperledger

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. To understand the fundamentals of blockchaintechnology.
2. Apply knowledge of implementations of Bitcoin, Ethereum and Hyperledger to develop solutions in the appropriatedomains.

UNIT-I	INTRODUCTION TO BLOCKCHAIN TECHNOLOGY	Classes: 15

Distributed systems – The history of blockchain– Introduction to blockchain – CAP theorem and blockchain – Benefits and limitations ofblockchain – Decentralization using blockchain - Methods of decentralization – Routes to Decentralization

UNIT-II	CRYPTOGRAPHY IN BLOCKCHAIN	Classes: 12

Introduction – cryptographic primitives – Assymetriccryptography – public and private keys -line interface – Bitcoin improvement proposals(BIPs) – Consensus Algorithms.

UNIT-III	BITCOIN	Classes: 12

Introduction – Transactions – Structure - Transactions types – The structure of ablock– The genesis block – The bitcoin network– Wallets and its types– Bitcoin payments–Bitcoin investment and buying and selling bitcoins – Bitcoin installation –

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Bitcoinprogramming and the command-line interface – Bitcoin improvement proposals (BIPs).

UNIT-IV	ETHEREUM	Classes: 11

Ethereumblockchain- Elements of the Ethereumblockchain– Precompiled contracts – Accounts and its types – Block header- Ether – Messages – Mining - Clients andwallets – Trading and investment – The yellow paper - The Ethereum network - Applications developed on Ethereum - Scalability and securityissues.

UNIT-V	SMART CONTRACT AND HYPERLEDGER	Classes: 12

History of Smart Contract – Ricardian contracts – TheDAO. Hyperledger projects - Hyperledger as a protocol – Fabric - Hyperledger Fabric -Sawtooth lake – Corda Architecture.

TEXT BOOKS

1. I. Bashir, Mastering Blockchain: Distributed ledger technology, decentralization, andsmart contracts explained, 2nd Edition, 2nd Revised edition edition. Birmingham:Cryptography in BlockchainPackt Publishing,2018.

REFERENCE BOOKS

1. A. M. Antonopoulos, Mastering bitcoin, First edition. Sebastopol CA: O'Reilly,2015.
2. Z. Zheng, S. Xie, H. Dai, X. Chen, and H. Wang, "An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends," in 2017 IEEE International Congress on Big Data (BigData Congress), 2017, pp.557–564.

WEB REFERENCES

1. Procedural elements for Computer Graphics, David F Rogers, Tata McGraw hill, 2nd edition.
2. Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
3. Principles of Computer Graphics, ShaliniGovil, Pai, 2005, Springer.

E -TEXT BOOKS

1. https://www.buffalo.edu/content/dam/www/ubblockchain/files/basics/001%20What%20is%20Blockchain.pdf
2. https://www.marshmclennan.com/content/dam/mmc-web/insights/publications/2019/jan/gl-2019-blockchain-101-overview-mercer.pdf

MOOCS COURSES

1. https://onlinecourses-archive.nptel.ac.in
2. https://swayam.gov.in/
3. https://swayam.gov.in/NPTEL

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ETHICAL HACKING (Professional Elective-III)

III B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT611PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. The aim of the course is to introduce the methodologies and framework of ethical hacking for enhancing the security.
2. The course includes-Impacts of Hacking; Types of Hackers; Information Security Models; Information Security Program; Business Perspective; Planning a Controlled Attack; Framework of Steps (Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Deliverable and Integration)

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Gain the knowledge of the use and availability of tools to support an ethical hack
2. Gain the knowledge of interpreting the results of a controlled attack
3. Understand the role of politics, inherent and imposed limitations and metrics for planning of a test
4. Comprehend the dangers associated with penetration testing

UNIT-I	INTRODUCTION	Classes: 12

Introduction: Hacking Impacts, The Hacker

Framework: Planning the test, Sound Operations, Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Final Analysis, Deliverable, Integration

Information Security Models: Computer Security, Network Security, Service Security, Application Security, Security Architecture

Information Security Program: The Process of Information Security, Component Parts of Information Security Program, Risk Analysis and Ethical Hacking

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UNIT-II	THE BUSINESS PERSPECTIVE	Classes: 12
The Business Perspective: Business Objectives, Security Policy, Previous Test Results, Business Challenges Planning for a Controlled Attack: Inherent Limitations, Imposed Limitations, timing is Everything, Attack Type, Source Point, Required Knowledge, Multi-Phased Attacks, Teaming and Attack Structure, Engagement Planner, The Right Security Consultant, The Tester, Logistics, Intermediates, Law Enforcement		
UNIT-III	**PREPARING FOR A HACK:**	**Classes: 12**
Preparing for a Hack:Technical Preparation, Managing the Engagement Reconnaissance: Social Engineering, Physical Security, Internet Reconnaissance		
UNIT-IV	**ENUMERATION**	**Classes: 11**
Enumeration: Enumeration Techniques, Soft Objective, Looking Around or Attack, Elements of Enumeration, Preparing for the Next Phase Exploitation: Intutive Testing, Evasion, Threads and Groups, Operating Systems, Password Crackers, RootKits, applications, Wardialing, Network, Services and Areas of Concern		
UNIT-V		**Classes: 12**
Deliverable: The Deliverable, The Document, Overal Structure, Aligning Findings, Presentation Integration: Integrating the Results, Integration Summary, Mitigation, Defense Planning, Incident Management, Security Policy, Conclusion		

TEXT BOOKS

1. James S. Tiller, "The Ethical Hack: A Framework for Business Value Penetration Testing", Auerbach Publications, CRC Press

REFERENCE BOOKS

1. EC-Council, "Ethical Hacking and Countermeasures Attack Phases", Cengage Learning
2. Michael Simpson, Kent Backman, James Corley, "Hands-On Ethical Hacking and Network Defense", Cengage Learning

WEB REFERENCES

1. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=http%3A%2F%2Feprints.binadarma.ac.id%2F1000%2F1%2FKEAMANAN%2520SISTEM%2520INFORMASI%2520MATERI%25201.pdf&clen=6790430&chunk=true

E -TEXT BOOKS

1. https://pdfroom.com/category/hacking
2. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=http%3A%2F%2Findex-

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of.es%2FHack%2FHacking%2520For%2520Beginners%2520-%2520a%2520beginners%2520guide%2520for%2520learning%2520ethical%2520hacking.pdf&clen=12008206&chunk=true
MOOCS COURSES
1.https://onlinecourses-archive.nptel.ac.in 2.https://swayam.gov.in/ 3.https://swayam.gov.in/NPTEL

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NETWORK PROGRAMMING (Professional Elective-III)

III B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS612PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To understand inter process and inter-system communication
2. To understand socket programming in its entirety
3. To understand usage of TCP/UDP / Raw sockets
4. To understand how to build network applications

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. To write socket API based programs
2. To design and implement client-server applications using TCP and UDP sockets
3. To analyze network programs

UNIT-I	INTRODUCTION TO NETWORK PROGRAMMING	Classes: 14

OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application.

Sockets : Address structures, value – result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function

UNIT-II	TCP CLIENT SERVER	Classes: 12

Introduction, TCP Echo server functions, Normal startup, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host. Elementary UDP sockets: Introduction UDP Echo server function, lost datagram, summary

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of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP. I/O Multiplexing: I/O Models, select function, Batch input, shutdown function, pol function, TCP Echo server,		
UNIT-III	**SOCKET OPTIONS:**	**Classes: 11**
Getsockopt and setsockopt functions. Socket states, Generic socket option IPV6 socket option ICMPV6 socket option IPV6 socket option and TCP socket options. Advanced I/O Functions-Introduction, Socket Timeouts, recv and send Functions,readv and write Functions, recvmsg and sendmsg Functions, Ancillary Data, How Much Data IsQueued?, Sockets and Standard I/O, T/TCP: TCP for Transactions		
UNIT-IV	**MULTICASTING**	**Classes: 11**
Elementary name and Address conversions: DNS, gethost by Name function, Resolver option, Function and IPV6 support, uname function, other networking information. Daemon Processes and inetdSuperserver – Introduction, syslogd Daemon, syslog Function, daemon_init Function, inetd Daemon, daemon_inetd Function Broadcasting- Introduction, Broadcast Addresses, Unicast versus Broadcast, dg_cli FunctionUsing Broadcasting, Race Conditions Introduction, Multicast Addresses, Multicasting versus Broadcasting on A LAN, Multicasting on a WAN, Multicast Socket Options, mcast_join and Related Functions, dg_cli Function Using Multicasting, Receiving MBone Session Announcements, Sendingand Receiving, SNTP: Simple Network Time Protocol, SNTP (Continued)		
UNIT-V	**RAW SOCKETS-INTRODUCTION**	**Classes: 12**
Raw Socket Creation, Raw Socket Output, Raw Socket Input, Ping Program, Traceroute Program, An ICMP Message Daemon, Datalink Access- Introduction, BPF: BSD Packet Filter, DLPI: Data Link Provider Interface, Linux: SOCK_PACKET, libpcap: Packet Capture Library, Examining the UDP Checksum Field. Remote Login: Terminal line disciplines, Pseudo-Terminals, Terminal modes, Control Terminals, rlogin Overview, RPC Transparency Issues.		
TEXT BOOKS		
1. UNIX Network Programming, by W. Richard Stevens, Bill Fenner, Andrew M. Rudoff, Pearson Education 2. UNIX Network Programming, 1st Edition, - W. Richard Stevens. PHI.		
REFERENCE BOOKS		

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1. UNIX Systems Programming using C++ T CHAN, PHI.
2. UNIX for Programmers and Users, 3rd Edition Graham GLASS, King abls, Pearson Education
3. Advanced UNIX Programming 2nd Edition M. J. ROCHKIND, Pearson Education

WEB REFERENCES

1.http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fbeej.us%2Fguide%2Fbgnet%2Fpdf%2Fbgnet_a4_c_1.pdf&clen=484915&chunk=true

E -TEXT BOOKS

1.http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fmathcs.clarku.edu%2F~jbreecher%2Fcs280%2FUNIX%2520Network%2520Programming(Volume1%2C3rd).pdf&clen=12377649&chunk=true

2.http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=http%3A%2F%2Fzenhadi.lecturer.pens.ac.id%2Fkuliah%2FWorkshopPemrogramanJaringan%2FKathiravelu%2520P.%2C%2520Sarker%2520F.%2520-%2520Python%2520Network%2520Programming%2520Cookbook%2C%2520Second%2520Edition%2520-%25202017.pdf&clen=16157858&chunk=true

MOOCS COURSES

1. https://onlinecourses-archive.nptel.ac.in
2. https://swayam.gov.in/
3. https://swayam.gov.in/NPTEL

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SCRIPTING LANGUAGES (Professional Elective-III)

III B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS613PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. This course introduces the script programming paradigm
2. Introduces scripting languages such as Perl, Ruby and TCL.
3. Learning TCL

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Comprehend the differences between typical scripting languages and typical system and application programming languages.
2. Gain knowledge of the strengths and weakness of Perl, TCL and Ruby; and select an appropriate language for solving a given problem.
3. Acquire programming skills in scripting language

UNIT-I	INTRODUCTION	Classes: 13

Introduction: Ruby, Rails, The structure and Excution of Ruby Programs, Package Management with RUBYGEMS, Ruby and web: Writing CGI scripts, cookies, Choice of Webservers, SOAP and webservices

RubyTk – Simple Tk Application, widgets, Binding events, Canvas, scrolling

UNIT-II	EXTENDING RUBY	Classes: 12

Ruby Objects in C, the Jukebox extension, Memory allocation, Ruby Type System, Embedding Ruby to Other Languages, Embedding a Ruby Interperter

UNIT-III	INTRODUCTION TO PERL AND SCRIPTING	Classes: 12

Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures.

arrays, list, hashes, strings, pattern and regular expressions, subroutines.

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UNIT-IV	ADVANCED PERL	Classes: 11
Finer points of looping, pack and unpack, filesystem, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Isses		
UNIT-V	**TCL and Tk**	**Classes: 12**
TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface. Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding, Perl-Tk.		

TEXT BOOKS

1. The World of Scripting Languages, David Barron,Wiley Publications.
2. Ruby Progamming language by David Flanagan and Yukihiro Matsumoto O'Reilly
3. "Programming Ruby" The PramaticProgammers guide by Dabve Thomas Second edition

REFERENCE BOOKS

1. Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP, J. Lee and B. Ware (Addison Wesley) Pearson Education.
2. Perl by Example, E. Quigley, Pearson Education.
3. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD.
4. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
5. Perl Power, J. P. Flynt, Cengage Learning.

WEB REFERENCES

1. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=http%3A%2F%2Fpages.di.unipi.it%2Fcorradini%2FDidattica%2FAP-19%2FDOCS%2FScott-ch13.pdf&clen=4675371

E -TEXT BOOKS

1. https://www.nocostlibrary.com/2021/07/the-world-of-scripting-languages-no.html
2. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=http%3A%2F%2Fwww.cs.stir.ac.uk%2Fcourses%2FCSC9Y4%2Flectures%2Fscripting1a.pdf&clen=2960972&chunk=true

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MOOCS COURSES
1.https://onlinecourses-archive.nptel.ac.in 2.https://swayam.gov.in/ 3.https://swayam.gov.in/NPTEL

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MOBILE APPLICATION DEVELOPMENT (Professional Elective-III)

III B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS614PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To demonstrate their understanding of the fundamentals of Android operating systems
2. To improves their skills of using Android software development tools
3. To demonstrate their ability to develop software with reasonable complexity on mobile platform
4. To demonstrate their ability to deploy software to mobile devices
5. To demonstrate their ability to debug programs running on mobile devices

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Student understands the working of Android OS Practically.
2. Student will be able to develop Android user interfaces
3. Student will be able to develop, deploy and maintain the Android Applications

UNIT-I	INTRODUCTION TO ANDROID OPERATING SYSTEM	Classes: 15

Android OS design and Features – Android development framework, SDK features, Installing and running applications on Android Studio, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools
Android application components – Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes Android Application Lifecycle – Activities, Activity Lifecycle activity states, monitoring state changes

UNIT-II	ANDROID USER INTERFACE	Classes: 12

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Measurements – Device and pixel density independent measuring UNIT - s Layouts – Linear ,Relative, Grid and Table Layouts

User Interface (UI) Components – Editable and non-editable TextViews, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers

Event Handling – Handling clicks or changes of various UI components

Fragments – Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities

UNIT-III	INTENTS AND BROADCASTS	Classes: 12

Intent – Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS

Broadcast Receivers – Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity

Notifications – Creating and Displaying notifications, Displaying Toasts

UNIT-IV	PERSISTENT STORAGE	Classes: 11

Files – Using application specific folders and files, creating files, reading data from files, listing contents of a directory Shared Preferences – Creating shared preferences, saving and retrieving data using Shared Preference

UNIT-V	DATABASE	Classes: 12

Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and etindelg data, Registering Content Providers, Using content Providers (insert, delete, retrieve and update)

TEXT BOOKS

1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox), 2012
2. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013

REFERENCE BOOKS

1.BeginningAndroid4ApplicationDevelopment,Wei-MengLee,Wiley India(Wrox),2013

WEB REFERENCES

1.https://www.tutorialspoint.com/mobile_development_tutorials.htm

2.https://www.javatpoint.com/android-tutorial

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E -TEXT BOOKS
1.http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=http%3A%2F%2Fprojanco.com%2FLibrary%2FAndroid%2520App%2520Development%2520in%2520Android%2520Studio%2520%2520Java%2520plus%2520Android%2520edition%2520for%2520beginners.pdf&clen=10563468&chunk=true
2.http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fwww.mediapiac.com%2Fuploads%2Fconference%2Fpresenters%2Fdocuments%2F17%2F8.pdf&chunk=true
MOOCS COURSES
1.https://onlinecourses-archive.nptel.ac.in 2.https://swayam.gov.in/ 3.https://swayam.gov.in/NPTEL

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SOFTWARE TESTING METHODOLOGIES (Professional Elective-III)

III B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS615PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To provide knowledge of the concepts in software testing such as testing process, criteria, strategies, and methodologies.
2. To develop skills in software test automation and management using latest tools.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Design and develop the best test strategies in accordance to the developmentmodel.

UNIT-I	INTRODUCTION	Classes: 15

Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT-II	TRANSACTION FLOW TESTING	Classes: 12

Transaction flows, transaction flow testing techniques. Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing. Domain Testing: domains and paths, Nice & ugly domains, domaintesting, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT-III	REGULAR EXPRESSIONS AND LOGIC BASED TESTING	Classes: 12

Paths, Path products and Regular expressions: path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.
Logic Based Testing: overview, decision tables, path expressions, kv charts, specifications.

UNIT-IV	STATE GRAPHS AND TRANSITION TESTING	Classes: 11

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State, State Graphs and Transition testing: state graphs, good & bad state graphs, state testing, Testability tips

UNIT-V	GRAPH MATRICES AND APPLICATION	Classes: 12

Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter orWin-runner).

TEXT BOOKS

1. Software Testing techniques - BarisBeizer, Dreamtech, second edition.
2. Software Testing Tools – Dr. K. V. K. K. Prasad, Dreamtech.

REFERENCE BOOKS

1.The craft of software testing - Brian Marick, Pearson Education.
2.Software Testing Techniques – SPD(Oreille)
3.Software Testing in the Real World – Edward Kit, Pearson.
4.Effective methods of Software Testing, Perry, John Wiley.
5.Art of Software Testing – Meyers, John Wiley.

WEB REFERENCES

1.https://www.smartzworld.com/notes/software-testing-methodologies-pdf-notes-stm-pdf-notes/
2.https://www.academia.edu/27915965/SOFTWARE_TESTING_METHODOLOGIES

E -TEXT BOOKS

1.https://examupdates.in/software-testing-methodologies/

MOOCS COURSES

1.https://onlinecourses-archive.nptel.ac.in
2.https://swayam.gov.in/
3.https://swayam.gov.in/NPTEL

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WEB SECURITY (Professional Elective-IV)

IV B. TECH- I SEMESTER(R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT711PE	B.Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

1. Give an Overview of information security.
2. Give an overview of Access control of relational databases.
3. Provide the different security mechanisms used in web programming

COURSE OUTCOMES

1. Understand the Web architecture and applications.
2. Understand client side and service side programming.
3. Understand how common mistakes can be bypassed and exploit the application.
4. Identify common application vulnerabilities.

UNIT-I	The Web Security	Classes: 14

The Web Security, The Web Security Problem, Risk Analysis and Best Practices Cryptography and the Web: Cryptography and Web Security, Working Cryptographic Systems and Protocols, Legal Restrictions on Cryptography, Digital Identification.

UNIT-II	The World Wide Web	Classes: 12

The Web's War on Your Privacy, Privacy-Protecting Techniques, Backups and Antitheft, Web Server Security, Physical Security for Servers, Host Security for Servers, Securing Web Applications.

UNIT-III	Database Security	Classes:10

Database Security: Recent Advances in Access Control, Access Control Models for XML, Database Issues in Trust Management and Trust Negotiation, Security in Data Warehouses and OLAP Systems.

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UNIT-IV	Security Re-Engineering	Classes: 12
Security Re-engineering for Databases: Concepts and Techniques, Database Watermarking for Copyright Protection, Trustworthy Records Retention, Damage Quarantine and Recovery in Data Processing Systems, Hippocratic Databases: Current Capabilities and.		

UNIT-V	Future Trends	Classes: 12
Future Trends Privacy in Database Publishing: A Bayesian Perspective, Privacy-enhanced Location- based Access Control, Efficiently Enforcing the Security and Privacy Policies in a Mobile Environment		

TEXT BOOKS

1. Web Security, Privacy and Commerce Simson G Arfinkel, Gene Spafford, O'Reilly.
2. Handbook on Database security applications and trends Michael Gertz, Sushil Jajodia.

REFERENCE BOOKS

1. HackNotes(tm) Web Security Pocket Reference 1st Edition, Mike Shema
2. Web Application Security Assessment (Pro-Developer) 01 Edition, Irfan A Chaudhry, Justin Clarke, Shawn Veney, Eric Rachner, Jessika Sutton, Tony Dang
3. Web Security and Commerce (Nutshell Handbooks) 1st Edition, Simson Garfinkel, Gene Spafford.

E -TEXT BOOKS

1. https://bookauthority.org ›Cyber Security Books
2. http://www.webappsec.org › web_security_books

MOOCS COURSES

1. https://www.jigsawacademy.com/blogs/cyber-security
2. https://nptel.ac.in/course.html
3. https://portswigger.net/web-security
4. https://websecurity-academy.com/

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HIGH PERFORMANCE COMPUTING (Professional Elective-IV)

IV B. TECH- I SEMESTER(R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT712PE	B.Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

1. To Improve the system performance.
2. To learn various distributed and parallel computing architecture.
3. To learn different computing technologies.

COURSE OUTCOMES

1. Understanding the concepts in grid computing.
2. Ability to set up cluster and run parallel applications.
3. Ability to understand the cluster projects and cluster OS.
4. Understanding the concepts of pervasive computing & quantum computing.

UNIT-I	Grid Computing	Classes: 14

Grid Computing: Data & Computational Grids, Grid Architectures And Its Relations To Various Distributed Technologies. Autonomic Computing, Examples Of The Grid Computing Efforts (Ibm).

UNIT-II	Cluster Setup	Classes: 12

Cluster Setup & Its Advantages, Performance Models & Simulations; Networking Protocols & I/O, Messaging Systems. Process Scheduling, Load Sharing And Balancing; Distributed Shared Memory, Parallel I/O.

UNIT-III	Cluster System	Classes:10

Example Cluster System – Beowlf; Cluster Operating Systems: Compas And Nanos Pervasive Computing Concepts & Scenarios; Hardware & Software; Human – Machine Interface.

UNIT-IV	Device Connectivity	Classes: 12

Device Connectivity; Java for Pervasive Devices; Application Examples.

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UNIT-V	Quantum Logic	Classes: 12

Classical Vs Quantum Logic Gates; One, Two & Three Qubit Quantum Gates; Fredkin & Toffoli Gates; Quantum Circuits; Quantum Algorithms

TEXT BOOKS

1. "Selected Topics In Advanced Computing" Edited By Dr. P. Padmanabham And Dr. M.B. Srinivas, 2005 Pearson Education

REFERENCE BOOKS

1. J. Joseph & C. Fellenstien: 'Grid Computing ', Pearson Education
2. J Burkhardt et.al: 'pervasive computing' Pearson Education
3. Marivesar:' Approaching quantum computing', Pearson Education.
4. Raj kumar Buyya:'High performance cluster computing', Pearson Education.
5. Neilsen & Chung L:' Quantum computing and Quantum Information', Cambridge University Press.
6. A networking approach to Grid Computing, Minoli, Wiley

E -TEXT BOOKS

1. High Performance Computing, Charles Severance, Kevin Dowd, Copyright Year: 2010
2. High Performance Computing Modern Systems and Practices,2018

MOOCS COURSES

1. https://www.ibm.com/in-en/it-infrastructure/
2. https://www.yotta.com/lp/high-performance-computing
3. https://www.netapp.com/data-storage/high-performance-computing/what-is-hpc/

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ARTIFICIAL INTELLIGENCE (Professional Elective-IV)

IV B. TECH- I SEMESTER(R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS713PE	B.Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

1. To learn the distinction between optimal reasoning Vs. human like reasoning
2. To understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
3. To learn different knowledge representation techniques.
4. To understand the applications of AI, namely game playing, theorem proving, and machine learning.

COURSE OUTCOMES

1. Ability to formulate an efficient problem space for a problem expressed in natural language.
2. Select a search algorithm for a problem and estimate its time and space complexities.
3. Possess the skill for representing knowledge using the appropriate technique for a given problem.
4. Possess the ability to apply AI techniques to solve problems of game playing, and machine learning.

UNIT-I	Introduction to Artificial Intelligence	Classes: 14

Problem Solving by Search-I: Introduction to AI, Intelligent Agents
Problem Solving by Search– Problem Solving Agents, Searching for Solutions, Uninformed Search Strategies: Breadth-first search, Uniform cost search, Depth-first search, Iterative deepening Depth-first search, Bidirectional search, Informed (Heuristic) Search Strategies: Greedy best-first search, A*search, Heuristic Functions, Beyond Classical Search: Hill-climbing search, Simulated annealing search, Local Search in Continuous Spaces, Searching with Non-Deterministic Actions, Searching with Partial Observations, Online Search Agents and Unknown Environment).

UNIT-II	Propositional Logic	Classes: 12

Problem Solving by Search-II and Propositional Logic Adversarial Search: Games,

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Optimal Decisions in Games, Alpha–Beta Pruning, Imperfect Real-Time Decisions.

Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems.

Propositional Logic: Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic, Propositional Theorem Proving: Inference and proofs, Proof by resolution, Horn clauses and definite clauses, Forward and backward chaining, Effective Propositional Model Checking, Agents Based on Propositional Logic.

UNIT-III	Logic and Knowledge Representation	Classes:10

Logic and Knowledge Representation

First-Order Logic: Representation, Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic.

Inference in First-Order Logic: Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.

Knowledge Representation: Ontological Engineering, Categories and Objects, Events. Mental Events and Mental Objects, Reasoning Systems for Categories, Reasoning with Default Information

UNIT-IV	Planning	Classes: 12

Planning

Classical Planning: Definition of Classical Planning, Algorithms for Planning with State-Space Search, Planning Graphs, other Classical Planning Approaches, Analysis of Planning approaches.

Planning and Acting in the Real World: Time, Schedules, and Resources, Hierarchical Planning, Planning and Acting in Nondeterministic Domains, Multi agent Planning.

UNIT-V	Knowledge & Learning	Classes: 12

Uncertain knowledge and Learning

Uncertainty: ActingunderUncertainty,BasicProbabilityNotation,InferenceUsingFullJoint Distributions,Independence,Bayes' Rule and Its Use,

Probabilistic Reasoning: Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient Representation of Conditional Distributions, Approximate Inference in Bayesian Networks ,Relational and First-Order Probability, Other Approaches to Uncertain Reasoning; Dempster- Shafer theory.

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Learning: Forms of Learning, Supervised Learning, Learning Decision Trees. Knowledge in Learning: Logical Formulation of Learning, Knowledge in Learning, Explanation-Based Learning, Learning Using Relevance Information, Inductive Logic Programming.

TEXT BOOKS

1. ArtificialIntelligenceAModernApproach,ThirdEdition,StuartRussellandPeterNorvig,PearsonEducation.

REFERENCE BOOKS

1. ArtificialIntelligence,3rdEdn,E.RichandK.Knight(TMH).
2. ArtificialIntelligence,3rd Edn.,PatrickHennyWinston,PearsonEducation. Artificial Intelligence,ShivaniGoel,PearsonEducation.
3. Artificial Intelligence and Expert systems–Patterson, PearsonEducation

E -TEXT BOOKS

1. https://bookauthority.org/books/beginner-cloud-computing-ebooks
2. The Cloud Computing Book The Future of Computing Explained, 1st Edition, By Douglas Comer,Copyright YeaR2021

MOOCS COURSES

1. https://www.ibm.com/in-en/cloud/learn/what-is-artificial-intelligence
2. https://cloud-computing.tmcnet.com/
3. https://www.salesforce.com/in/learning-centre/tech/cloudcomputing/

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CLOUD COMPUTING (Professional Elective-IV)

IV B. TECH- I SEMESTER(R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS714PE	B.Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

1. This course provides an insight in to cloud computing
2. Topics covered include-distributed system models, different cloud service models, service-oriented architectures, cloud programming and software environments ,resource management.

COURSE OUTCOMES

1. Ability to understand various service delivery models of a cloud computing architecture.
2. Ability to understand the ways in which the cloud can be programmed and deployed.
3. Understanding cloud service providers

UNIT-I	Computing Paradigms	Classes: 14

Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Bio computing, Mobile Computing, Quantum Computing, Optical Computing, Nano computing.

UNIT-II	Cloud Computing Fundamentals	Classes: 12

Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models.

UNIT-III	Logic and Knowledge Representation	Classes:10

CloudComputingArchitectureandManagement: Cloudarchitecture,Layer,Anatomyofthe Cloud,Network Connectivity in Cloud Computing, Applications, on the Cloud, Managing the Cloud, Managing the Cloud Infrastructure Managing the Cloud application, Migrating Application to Cloud, Phases of Cloud Migration Approaches for Cloud Migration

UNIT-IV	Cloud Service Models	Classes: 12

Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS. Suitability of

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IaaS, Pros and Cons of IaaS, Summary of IaaS Providers, Platform as a Service, Characteristics of PaaS, Suitability of PaaS, Pros and Cons of PaaS, Summary of PaaS Providers, Software as a Service, Characteristics of SaaS, Suitability of SaaS, Pros and Cons of SaaS, Summary of SaaS Providers, Other Cloud Service Models.

UNIT-V	Cloud Service Providers	Classes: 12

Cloud Service Providers: EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue ,service, Microsoft, Windows Azure, Microsoft Assessment and Planning Toolkit, Share Point, IBM, Cloud Models, IBM Smart Cloud, SAP Labs, SAP HANA Cloud Platform, Virtualization Services Provided by SAP, Sales force, Sales Cloud, Service Cloud: Knowledge as a Service ,Rack space, VMware, Manjra soft, Aneka Platform.

TEXT BOOKS

1. Essentials of cloud Computing: K. Chandrasekhra n, CRCpress,2014.

REFERENCE BOOKS

1. Cloud Computing: Principles and Para digms by Rajkumar Buyya, James Broberg and Andrzej M.Goscinski,Wiley,2011.
2. Distributed and CloudComputing,KaiHwang,GeofferyC.Fox,JackJ.Dongarra,Elsevier,2012.
3. CloudSecurityandPrivacy:AnEnterprisePerspectiveonRisksandCompliance,Tim Mather, Subra Kumara swamy, Shahed Latif,O'Reilly,SPD,rp2011

E -TEXT BOOKS

1. https://bookauthority.org/books/beginner-cloud-computing-ebooks
2. The Cloud Computing Book The Future of Computing Explained, 1st Edition,By Douglas Comer,Copyright Year 2021

MOOCS COURSES

1. https://cloud-computing.tmcnet.com/
2. https://www.salesforce.com/in/learning-centre/tech/cloudcomputing/

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AD-HOC & SENSOR NETWORKS (Professional Elective-IV)

IV B. TECH- I SEMESTER(R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS715PE	B.Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

1. To understand the concepts of sensor networks
2. To understand the MAC and transport protocols for ad hoc networks
3. To understand the security of sensor networks
4. To understand the applications of ad hoc and sensor networks.

COURSE OUTCOMES

1. Ability to understand the state-of-the-art research in the emerging subject of Ad Hoc and Wireless Sensor Networks
2. Ability to solve the issues in real-time application development based on ASN.
3. Ability to conduct further research in the domain of ASN

UNIT-I	INTRODUCTION TO AD HOC NETWORKS	Classes: 14

Introduction to Ad Hoc Networks-Characteristics of MANETs, Applications of MANETs and Challenges of MANETs.

Routing in MANETs - Criteria for classification, Taxonomy of MANET routing algorithms, Topology-based routing algorithms-**Proactive**: DSDV; **Reactive**: DSR, AODV; Hybrid: ZRP; Position-based routing algorithms-**Location Services**-DREAM, Quorum-based ;**Forwarding Strategies:** Greedy Packet, Restricted Directional Flooding-DREAM,LAR.

UNIT-II	DATA TRANSMISSION	Classes: 12

Data Transmission-Broad cast Storm Problem, **Re broad casting Schemes**-Simple-flooding ,Probability-based Methods, Area-based Methods, Neighbor Knowledge-based: SBA, Multipoint Relaying, AHBP. **Multicasting: Tree-based:** AMRIS, MAODV; **Mesh-based:** ODMRP, CAMP; **Hybrid:** AMR oute**,** MCEDAR

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UNIT-III	GEOCASTING	Classes:10
Geo casting: Data-transmission Oriented-LBM; Route Creation Oriented-Geo TORA, MGR.TCP over Ad Hoc TCP proto colover view, TCP and MANETs, Solutions for TC Pover Ad hoc		
UNIT-IV	**BASICS OF WIRELESS NETWORKS**	**Classes: 12**
Basics of Wireless, Sensors and Lower Layer Issues: Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer, Routing Layer.		
UNIT-V	**WSN**	**Classes: 12**
Upper Layer Issues of WSN: Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile Robots.		

TEXT BOOKS

1. Ad Hoc and Sensor Networks–Theory and Applications, Carlos Corderio Dharma P.Aggarwal, World Scientific Publications, March 2006,ISBN–981–256–681–3.
2. WirelessSensorNetworks:AnInformationProcessingApproach,FengZhao,LeonidasGuibas,ElsevierScience,ISBN –978-1-55860-914-3 (Morgan Kauffman)

REFERENCE BOOKS

1. Ad Hoc And Sensor Networks: Theory And Applications (2nd Edition) Paperback – Import,1 March 2011 by Carlos De Morais Cordeiro, Dharma Prakash Agrawal
2. Wireless Ad Hoc and Sensor Networks by Rohtash Ghuriya, GAZELLE BOOKSERVICESRohtash Ghuriya

E -TEXT BOOKS

1. http://www.tfb.edu.mk › WSN › Kniga-w03 PDF
2. https://www.worldscientific.com/worldscibooks/10.1142/8066
3. Ad Hoc And Sensor Networks: Theory And Applications (2nd Edition) Paperback – Import, 1 March 2011 by Carlos De Morais Cordeiro, Dharma Prakash Agrawal

MOOCS COURSES

1. https://www.classcentral.com/course/swayam-wireless-ad-hoc-and-sensor-networks-7888

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INTRUSION DETECTION STSTEMS (Professional Elective-V)

IV B. TECH- I SEMESTER(R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT721PE	B.Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

1. Compare alternative tools and approaches for Intrusion Detection through quantitative analysis to determine the best tool or approach to reduce risk from intrusion.
2. Identify and describe the parts of all intrusion detection systems and characterize new and emerging IDS technologies according to the basic capabilities all intrusion detection systems share

COURSE OUTCOMES

1. Possess a fundamental knowledge of Cyber Security.
2. Understand what vulnerability is and how to address most common vulnerabilities.
3. Know basic and fundamental risk management principles asitre lates to Cyber Security and Mobile Computing.
4. Have the knowledge needed to practices afer computing and safeguard your information using Digital Forensics.
5. Understand basic technical controls in use today, such as firewalls and Intrusion Detection systems.
6. Understand legal perspectives of Cyber Crimes and Cyber Security

UNIT-I	The Introduction	Classes: 14

The state of threats against computers, and networked systems-Overview of computer security solutions and why they fail-Vulnerability assessment, firewalls, VPN's –Overview of Intrusion Detection and Intrusion Prevention, Network and Host-based IDS.

UNIT-II	The Classes of Attacks	Classes: 12

Classes of attacks - Network layer: scans, denial of service, penetration Application layer: software exploits, code injection-Human layer: identity theft, root access-Classes of attackers-Kids/hackers/sopHesitatedgroups-Automated:Drones,Worms,Viruses

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UNIT-III	IDS	Classes:10
A General IDS model and taxonomy, Signature-based Solutions, Snort, Snort rules, Evaluation of IDS, Cost sensitive IDS.		
UNIT-IV	**Anomaly Detection**	**Classes: 12**
Anomaly Detection Systems and Algorithms-Network Behaviour Based Anomaly Detectors (rate based)-Host-based Anomaly Detectors-Software Vulnerabilities-State transition, Immunology, Payload Anomaly Detection.		
UNIT-V	**Future Trends**	**Classes: 12**
Attack trees and Correlation of alerts-Autopsy of Worms and Botnets-Malware Detection-Obfuscation, polymorphism-Document vectors. Email/IM security issues-Viruses/Spam-From signatures to thumb prints to zero day detection-Insider Threat issues-Taxonomy-Masquerade and Impersonation Traitors, Decoys and Deception-Future: Collaborative Security		

TEXT BOOKS

1. PeterS zor, The Art of Computer Virus Research and Defense, Symantec Press ISBN0-321-30545-3.
2. Markus Jakobs son and Zulfikar Ramzan, Crimeware, Understanding New Attacks and Defenses.

REFERENCE BOOKS

1. Saiful Hasan ,Intrusion Detection System, Kindle Edition.
2. AnkitFadia,IntrusionAlert:AnEthicalHackingGuidetoIntrusionDetection

E -TEXT BOOKS

1. https://www.intechopen.com/books/intrusion-detection-systems

MOOCS COURSES

1. https://www.sans.org/course/intrusion-detection-in-depth
2. https://www.cybrary.it/skill-certification-course/ids-ips-certification-training-course

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REAL TIME SYSTEMS (Professional Elective-V)

IV B. TECH- I SEMESTER(R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS722PE	B.Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

1. To provide broad understanding of the requirements of Real Time Operating Systems.
2. To make the student understand, applications of these Real Time features using case studies

COURSE OUTCOMES

1. Be able to explain real-time concepts such as pre-emptive multitasking, task priorities, priority inversions, mutual exclusion, context switching, and synchronization, interrupt latency and response time, and semaphores.
2. Able describe how a real-time operating system kernel is implemented.
3. Able explain how tasks are managed.
4. Explain how the real-time operating system implements time management.
5. Discuss how tasks can communicate using semaphores, mail boxes, and queues.
6. Be able to implement a real-time system on an embedded processor.
7. Be able to work with real time operating systems like RT Linux, Vx Works, MicroC /OSII, Tiny Os

UNIT-I	The Introduction	Classes: 14

Introduction: Introduction to UNIX/LINUX, Overview of Commands, File I/O,(open, create, close,lseek,read,write),ProcessControl(fork,vfork,exit,wait,waitpid,exec).

UNIT-II	Real Time Operating Systems	Classes: 12

Real Time Operating Systems: Brief History of OS, Defining RTOS, The Scheduler, Objects, Services, Characteristics of RTOS, Defining a Task, asks States and Scheduling, Task Operations, Structure, Synchronization, Communication and Concurrency. Defining Semaphores, Operations and Use, Defining Message Queue, States, Content, Storage, Operations and Use.

UNIT-III	Objects, Services and I/O	Classes:10

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Objects, Services and I/O: Pipes, Event Registers, Signals, Other Building Blocks, Component Configuration, Basic I/O Concepts, I/O Subsystem.

UNIT-IV	Exceptions, Interrupts and Timers	Classes: 10

Exceptions, Interrupts and Timers: Exceptions, Interrupts, Applications, Processing of Exceptions and Spurious Interrupts, Real Time Clocks, Programmable Timers, Timer Interrupt Service Routines (ISR),Soft Timers, Operations.

UNIT-V	Case Studies of RTOS	Classes: 8

Case Studies of RTOS: RTLinux,MicroC/OS-II,VxWorks,EmbeddedLinux,andTinyOS

TEXT BOOKS

1. Real Time Concepts for Embedded Systems– QingLi,Elsevier,2011.

REFERENCE BOOKS

1. Embedded Systems-Architecture ,Programming and Design by Rajkamal, 2007,TMH.
2. Advanced UNIX Programming, Richard Stevens
3. Embedded Linux: Hardware, Software and Interfacing–Dr.Craig Hollabaugh

E -TEXT BOOKS

1. https://users.ece.cmu.edu/~koopman/des_s99/real_time/
2. https://www.real-time-systems.com/

MOOCS COURSES

1. https://www.coursera.org/learn/real-time-systems
2. https://nptel.ac.in/courses/106/105/106105036/
3. https://www.mooc-list.com/tags/real-time-systems

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SOFT COMPUTING (Professional Elective-V)

IV B. TECH- I SEMESTER(R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS723PE	B.Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

1. Familiarize with soft computing concepts
2. Introduce and use the idea of fuzzy logic and use of heuristics based on human experience
3. Familiarize the Neuro-Fuzzy modeling using Classification and Clustering techniques
4. Learn the concepts of Genetic algorithm and its applications
5. Acquire the knowledge of Rough Sets

COURSE OUTCOMES

1. Identify the difference between Conventional Artificial Intelligence to Computational Intelligence.
2. Understand fuzzy logic and reasoning to handle and solve engineering problems
3. Apply the Classification and clustering techniques on various applications.
4. Understand the advanced neural networks and its applications
5. Perform various operations of genetic algorithms, Rough Sets.
6. Comprehend various techniques to build model for various applications

UNIT-I	Introduction to Soft Computing	Classes: 14

Introduction to Soft Computing: Evolutionary Computing,"Soft"computing versus"Hard "computing, Soft Computing Methods, Recent Trends in Soft Computing, Characteristics of Soft computing, Applications of Soft Computing Techniques.

UNIT-II	Fuzzy Systems	Classes: 12

Fuzzy Systems: Fuzzy Sets, Fuzzy Relations, Fuzzy Logic, Fuzzy Rule-Based Systems

UNIT-III	Fuzzy Decision Making	Classes:10

Fuzzy Decision Making, Particle Swarm Optimization.

UNIT-IV	Genetic Algorithms	Classes: 12

Genetic Algorithms: Basic Concepts, Basic Operators for Genetic Algorithms, Crossover and Mutation Properties, Genetic Algorithm Cycle, Fitness Function, Applications of Genetic Algorithm.

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UNIT-V	Rough Sets	Classes: 12

Rough Sets, Rough Sets, Rule Induction, and Discernibility Matrix, Integration of Soft Computing Techniques.

TEXT BOOKS

1. SoftComputing–AdvancesandApplications-Jan2015byB.K.TripathyandJ.Anuradha–CengageLearning

REFERENCE BOOKS

1. S.N.Sivanandam&S.N.Deepa,"PrinciplesofSoftComputing",2ndedition,WileyIndia,2008.
2. DavidE.Goldberg,"GeneticAlgorithms-InSearch,optimizationandMachinelearning",PearsonEducation.
3. J.S.R.Jang,C.T.SunandE.Mizutani,"Neuro-FuzzyandSoftComputing",PearsonEducation,2004.
4. G.J.Klir&B.Yuan,"FuzzySets&Fuzzy Logic",PHI,1995.
5. MelanieMitchell,"AnIntroductiontoGenetic Algorithm",PHI,1998.
6. TimothyJ.Ross,"FuzzyLogicwithEngineeringApplications",McGraw-HillInternationaleditions,1995

E -TEXT BOOKS

1. https://books.google.com/books/about/Soft_Computing.html?id=IkajJC9iGxMC
2. https://www.myreaders.info/html/body_soft_computing.html

MOOCS COURSES

1. http://www.softcomputing.org/
2. http://www.softcomputing.net/

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DISTRIBUTED DATABASES (Professional Elective-V)

IV B. TECH- I SEMESTER(R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT724PE	B.Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

1. The purpose of the course is to enrich the previous knowledge of database systems and exposing the need for distributed database technology to confront with the deficiencies of the centralized database systems.
2. Introducebasicprinciplesandimplementationtechniquesofdistributeddatabasesystems.
3. Equip students with principles and knowledge of parallel and object-oriented databases.
4. Topics include distributed DBMS architecture and design; query processing and optimization; distributed transaction management and reliability; parallel and object database management systems

COURSE OUTCOMES

1. Understand theoretical and practical aspects of distributed database systems.
2. Study and identify various issues related to the development of distributed database system.
3. Understand the design aspects of object-oriented data base system and related development

UNIT-I	Introduction to Distributed Databases	Classes: 14

Introduction; Distributed Data Processing, Distributed Database System, Promises of DDBSs , Problem areas.

Distributed DBMS Architecture: Architectural Models for Distributed DBMS, DDMBS Architecture. **Distributed Database Design**:Alternative Design Strategies, Distribution Design issues, Fragmentation, Allocation.

UNIT-II	Query Processing	Classes: 12

Query processing and decomposition:Query processing objectives ,characterization of query processors, layers of query processing, query decomposition ,localization of distributed data.

Distributed query Optimization: Query optimization, centralized query optimization, distributed query optimization algorithms

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UNIT-III	**Transaction Management**	**Classes:10**

Transaction Management: Definition, properties of transaction, types of transactions, distributed concurrency control: serializability, concurrency control mechanisms & algorithms, time - stamped &optimistic concurrency control Algorithms, deadlock Management

UNIT-IV	**Distributed DBMS Reliability**	**Classes: 12**

Distributed DBMS Reliability: Reliability concepts and measures, fault-tolerance in distributed systems, failures in Distributed DBMS, local & distributed reliability protocols, site failures and network partitioning.

Parallel Database Systems: Parallel database system architectures, parallel data placement, parallel query processing, load balancing, data base clusters.

UNIT-V	**Distributed Object DBMS**	**Classes: 12**

Distributed object Database Management Systems: Fundamental object concepts and models, object distributed design, architectural issues, object management, distributed object storage, object query Processing.

Object Oriented Data Model: Inheritance, object identity, persistent programming languages, persistence of objects, comparison OODBMS and ORDBMS

TEXT BOOKS

1. M.TamerOZSUandPatuckValduriez:PrinciplesofDistributedDatabaseSystems,PearsonEdn.Asia,2001.
2. StefanoCeriandGiuseppePelagatti:DistributedDatabases,McGrawHill

REFERENCE BOOKS

1. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: “Database Systems: The CompleteBook”,Second Edition,Pearson InternationalEdition

E-TEXT BOOKS

1. Distributed Database Systems 1st Edition, Kindle Edition by Chhanda Ray
2. https://link.springer.com/book/10.1007/978-1-4419-8834-8

WEB REFERENCE

1. https://www.geeksforgeeks.org/distributed-database-system/
2. https://docs.oracle.com/cd/A57673_01/DOC/server/doc/SCN73/ch21.htm

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3. https://gousios.org/courses/bigdata/dist-databases.html

MOOCS COURSES

1. https://www.coursera.org/lecture/introduction-to-nosql-databases/distributed-databases-Y5y2o
2. https://www.academyeurope.org/course/distributed-database-management-system-course/
3. https://www.udemy.com/course/from-0-to-1-the-cassandra-distributed-database/

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SOFTWARE PROCESS & PROJECT MANAGEMENT (Professional Elective-V)

IV B. TECH- I SEMESTER(R20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS725PE	B.Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

1. To acquire knowledge on software process management
2. To acquire managerial skills for software project development
3. To understand software economics

COURSE OUTCOMES

1. Gain knowledge of software economics, phases in the life cycle of software development, project organization, project control and process instrumentation
2. Analyze the major and minor milestones, artifacts and metrics from management and technical perspective
3. Designanddevelopsoftwareproductusingconventionalandmodernprinciplesofsoftwareproj Ectmanagement

UNIT-I	Software Process Maturity	Classes: 14

Software Process Maturity Software maturity Framework, Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process.Process Reference Models Capability Maturity Model(CMM),CMMI,PCMM,PSP,TSP).

UNIT-II	Software Project Management Renaissance	Classes: 12

Software Project Management Renaissance Conventional Software Management, Evolution of Software Economics, Improving Software Economics, The old way and the new way. Life-Cycle Phases and Process artifacts Engineering and Production stages, inception phase, elaboration phase, construction phase, transition phase, artifact sets, management artifacts ,engineering artifacts and pragmatic artifacts, model-based software architectures

UNIT-III	Workflows and Checkpoints	Classes:10

Work flows and Checkpoints of process Software process workflows, Iteration workflows, Major milestones, minor milestones, periodic status assessments. Process Planning Work break down structures, Planning guidelines, cost and schedule estimating process, iteration

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planning process, Pragmatic planning		
UNIT-IV	**Project Organization**	**Classes: 12**
Project Organizations Line-of- business organizations, project organizations, evolution of organizations, process automation. Project Control and process instrumentation The seven-core metrics, management indicators, quality indicators ,life-cycle expectations, Pragmatic software metrics, metrics automation.		
UNIT-V	**CCPDS-R Case Study**	**Classes: 12**
CCPDS- RC as e Study and Future Software Project Management Practices Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions		

TEXT BOOKS

1. Managing the Software Process, WattsS.Humphrey, PearsonEducation
2. Software Project Management, Walker Royce, Pearson Education

REFERENCE BOOKS

1. An Introduction to the Team Software Process,WattsS. Humphrey,Pearson Education, 2000
2. Process Improvement essentials, James R.Persse,O'Reilly, 2006
3. Software Project Management, Bob Hughes& MikeCotterell,fourthedition,TMH,2006
4. Applied Software Project Management, Andrew Stellman& JenniferGreene,O'Reilly,2006.
5. HeadFirstPMP,JenniferGreene&AndrewStellman,O'Reilly,2007
6. SoftwareEngineeringProjectManagement,RichardH.Thayer&EdwardYourdon,2nd edition,WileyIndia,2004.

E -TEXT BOOKS

1. https://mrcet.com/downloads/digital_notes/CSE/IV%20Year/SOFTWARE%20PROCESS%20&%20PROJECT%20MANAGEMENT(R17A0539).pdf
2. https://www.routledge.com/Introduction-to-Software-Project-Management/Villafiorita/p/book/9781466559530

MOOCS COURSES

1. https://www.coursera.org/courses?query=software%20project%20management
2. https://www.learningtree.com/courses/340/software-development-project-management/

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NATURAL LANGUAGE PROCESSING (Professional Elective-VI)

IV B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT811PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Introduce to some of the problems and solutions of NLP and their relation to linguistics and statistics.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Show sensitivity to linguistic phenomena and an ability to model them with formal Grammars.
2. Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems
3. Able to manipulate probabilities, construct statistical models over strings and trees, and Estimate parameters using supervised and unsupervised training methods.
4. Able to design, implement, and analyze NLP algorithms
5. Able to design different language modelling Techniques.

UNIT-I	FINDING THE STRUCTURE OF WORDS	Classes: 13

Finding the Structure of Words: Words and Their Components, Issues and Challenges, Morphological Models Finding the Structure of Documents: Introduction, Methods, Complexity of the Approaches, Performances of the Approaches

UNIT-II	SYNTAX ANALYSIS	Classes: 12

Syntax Analysis: Parsing Natural Language, Tree banks: A Data-Driven Approach to Syntax, Representation of Syntactic Structure, Parsing Algorithms, Models for Ambiguity Resolution in Parsing, Multilingual Issues

UNIT-III	SEMANTIC PARSING	Classes: 10

Semantic Parsing: Introduction, Semantic Interpretation, System Paradigms, Word Sense Systems, Software.

UNIT-IV	INTRODUCTION OF PREDICATE	Classes: 10

Predicate-Argument Structure, Meaning Representation Systems, Software.

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UNIT-V	DISCOURSE PROCESSING	Classes: 12
Discourse Processing: Cohension, Reference Resolution, Discourse Cohension and Structure Language Modeling: Introduction, N-Gram Models, Language Model Evaluation, Parameter Estimation, Language Model Adaptation, Types of Language Models, Language-Specific Modeling Problems, Multilingual and Crosslingual Language Modeling		
TEXT BOOKS		
1. Multilingual natural Language Processing Applications: From Theory to Practice – Daniel M. Bikel and Imed Zitouni, Pearson Publication 2. Natural Language Processing and Information Retrieval: Tanvier Siddiqui, U.S. Tiwary		
REFERENCE BOOKS		
1.Speech and Natural Language Processing - Daniel Jurafsky & James H Martin, Pearson Publications		
WEB REFERENCES		
1.https://www.tableau.com/learn/articles/natural-language-processing-books		
E -TEXT BOOKS		
1.https://machinelearningmastery.com/books-on-natural-language-processing/		
MOOCS COURSES		
1.https://analyticsindiamag.com/top-rated-moocs-for-learning-natural-language-Processing		

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IT ENABLED SERVICES (Professional Elective-VI)

IV B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT812PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Global outsourcing market on a growth path, IT enabled services, project work, software technologies, other emerging verticals in outsourcing, disaster recovery strategies, HR and quality issues in IT enables services,
2. To learn fundamental principles or theories,
3. To learn consumer decision making process and how consumer decision making process will be affected by social and cultural aspects.

COURSE OUTCOMES

1. Upon successful completion of the course, the student is able to
2. Understand the basic concepts of IT enabled services in India
3. Understand the networking communication systems
4. Understand the other Emerging verticals in outsourcing
5. Understand Disaster Recovery Strategies and HR and Quality Issues in IT Enabled Services.

UNIT-I	INTRODUCTION	Classes: 13
Global Outsourcing Market on a Growth Path; The Indian IT Enabled Services Market; The Indian Contract Services Market. Project Work		

UNIT-II	NETWORKING TECHNOLOGIES	Classes: 12
Networking, Data Communication & Computer Networks Infrastructure; Software Technologies &Frameworks		

UNIT-III	IT SERVICES	Classes: 10
The Medical Transcription Market; Back Office Operations, GIS, Animation, Engineering and Design Services, Other Emerging verticals in outsourcing, On-line Training..		

UNIT-IV	BUSINESS MODELS	Classes: 10
Disaster Recovery Strategies; Business Models Driving IT Enabled Service; India's Challenge in the IT Enabled Services Space.		

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UNIT-V	ISSUES	Classes: 12
HR and Quality Issues in IT Enabled Services; Challenges Facing the Indian IT Enabled Outsourcing Market		

TEXT BOOKS

1. The Offshore Advantage, 2e Hillary Kobhayashi Mark, Springer (India) Pvt. Ltd

REFERENCE BOOKS

1. The Services Shift: Seizingthe Ultimate Offshore Opportunity, Robert E Kennedy, Ajay Sharma, Pearson Education.
2. Computer Networks by Andrew S. Tanenbaum, Prentice Hall PTR.
3. Disaster Recovery Planning : Preparing for the Unthinkable by Jon William Toigo

WEB REFERENCES

1.https://cio-wiki.org/wiki/Information_Technology_Enabled_Services_(ITeS)

E -TEXT BOOKS

1. https://link.springer.com/book/10.1007/978-3-7091-1425-4
2. https://link.springer.com/chapter/10.1007/978-3-7091-1425-4_10

MOOCS COURSES

1. https://www.mooc.org/
2. https://educationaltechnology.net/massive-open-online-courses-moocs-definitions/

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NEURAL NETWORKS & DEEP LEARNING (Professional Elective-VI)

IV B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS813PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To Learn

1. To introduce the foundations of Artificial Neural Networks
2. To acquire the knowledge on Deep Learning Concepts
3. To learn various types of Artificial Neural Networks
4. To gain knowledge to apply optimization strategies learn

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Ability to understand the concepts of Neural Networks
2. Ability to select the Learning Networks in modelling real world systems
3. Ability to use an efficient algorithm for Deep Models
4. Ability to apply optimization strategies for large scale applications•

UNIT-I	Artificial Neural Networks Introduction	Classes: 10

Artificial Neural Networks Introduction, Basic models of ANN, important terminologies, Supervised Learning Networks, Preceptor Networks, Adaptive Linear Neuron, Back-propagation Network. Associative Memory Networks. Training Algorithms for pattern association, BAM and Hopfield Networks.

UNIT-II	Unsupervised Learning Network	Classes: 10

Unsupervised Learning Network- Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks, Adaptive Resonance Theory Networks. Special Networks-Introduction to various networks.

UNIT-III	Introduction to Deep Learning	Classes: 10

Introduction to Deep Learning, Historical Trends in Deep learning, Deep Feed - forward networks, Gradient-Based learning, Hidden Units, Architecture Design, Back-Propagation and Other Differentiation Algorithms

UNIT-IV	Regularization for Deep Learning	Classes: 12

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Regularization for Deep Learning: Parameter norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised learning, Multi-task learning, Early Stopping, Parameter Typing and Parameter Sharing, Sparse Representations, Bagging and other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, tangent Prop and Manifold, Tangent Classifier

UNIT-V	Optimization for Train Deep Models	Classes: 10

Optimization for Train Deep Models: Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate Second Order Methods, Optimization Strategies and Meta-Algorithms Applications: Large-Scale Deep Learning, Computer Vision, Speech Recognition, Natural Language Processing.

TEXT BOOKS

1. Deep Learning: An MIT Press Book By Ian Goodfellow and Yoshua Bengio and Aaron Courville
2. Neural Networks and Learning Machines, Simon Haykin, 3rd Edition, Pearson Prentice Hall.

REFERENCE BOOKS

1. Grokking Artificial Intelligence Algorithms by Rishal Hurbans published by Manning Publications
2. Deep Learning From Scratch: Building with Python from First Principles by Seth Weidman published by O`Reilley

WEB REFERENCES

1.https://project.inria.fr/deeplearning/files/2016/05/deepLearning.pdf
2.https://link.springer.com/book/10.1007/978-3-319-94463-0

E -TEXT BOOKS

1. https://books.google.co.in/books/about/Neural_Networks_and_Deep_Learning.html?id=achqDwAAQBAJ&redir_esc=y

MOOCS COURSES

1.https://margaretmz.medium.com/deep-learning-moocs-1be70cf9737f

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HUMAN COMPUTER INTERACTION (Professional Elective-VI)

IV B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS814PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To gain an overview of Human-Computer Interaction (HCI), with an understanding of user interface design in general, and alternatives to traditional "keyboard and mouse" computing; become familiar with the vocabulary associated with sensory and cognitive systems as relevant to task performance by humans; be able to apply models from cognitive psychology to predicting user performance in various human-computer interaction tasks and recognize the limits of human performance as they apply to computer operation; appreciate the importance of a design and evaluation methodology that begins with and maintains a focus on the user; be familiar with a variety of both conventional and non-traditional user interface paradigms, the latter including virtual and augmented reality, mobile and wearable computing, and ubiquitous computing; and understand the social implications of technology and their ethical responsibilities as engineers in the design of technological systems. Finally, working in small groups on a product design from start to finish will provide you with invaluable team-work experience.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Ability to apply HCI and principles to interaction design.
2. Ability to design certain tools for blind or PH people.

UNIT-I	Introduction	Classes: 12

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design. The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT-II	Design Process	Classes: 10

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions. Screen Designing: Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing

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composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT-III	Windows	Classes: 10

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT-IV	HCI in the Software Process	Classes: 12

HCI in the software process, The software life cycle Usability engineering Iterative design and prototyping Design Focus: Prototyping in practice Design rationale Design rules Principles to support usability Standards Golden rules and heuristics HCI patterns Evaluation techniques, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing an evaluation method. Universal design, Universal design principles Multi-modal interaction

UNIT-V	Cognitive Models Goal and Task Hierarchies Design Focus	Classes: 12

Cognitive models Goal and task hierarchies Design Focus: GOMS saves money Linguistic models The challenge of display-based systems Physical and device models Cognitive architectures Ubiquitous computing and augmented realities Ubiquitous computing applications research Design Focus: Ambient Wood – augmenting the physical Virtual and augmented reality Design Focus: Shared experience Design Focus: Applications of augmented reality Information and data visualization Design Focus: Getting the size right.

TEXT BOOKS

1. The essential guide to user interface design, Wilbert O Galitz, Wiley Dream Tech. Units 1, 2, 3
2. Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education Units 4,5

REFERENCE BOOKS

1. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia.
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.
3. User Interface Design, Soren Lauesen , Pearson Education.
4. Human –Computer Interaction, D. R. Olsen, Cengage Learning.
5. Human –Computer Interaction, Smith - Atakan, Cengage Learning

WEB REFERENCES

1. https://onlinelibrary.wiley.com/doi/full/10.1002/9781118540190.wbeic182

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E -TEXT BOOKS
1. https://www.ncertbooks.guru/human-computer-interaction-pdf/ 2. https://www.amazon.in/Human-Computer-Interaction-3e-Dix/dp/8131717038
MOOCS COURSES
1. https://www.mooc-list.com/tags/human-computer-interaction

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CYBER FORENSICS (Professional Elective-VI)

IV B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS815PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. A brief explanation of the objective is to provide digital evidences which are obtained from digital media.
2. In order to understand the objectives of computer forensics, first of all, people have to recognize the different roles computer plays in a certain crime.
3. According to a snippet from the United States Security Service, the functions computer has in different kinds of crimes.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Students will understand the usage of computers in forensic and grow to use various Forensic tools for wide variety of investigations.
2. It gives an opportunity to students to continue their zeal in research in computer Forensics.
3. Techniques and tools will be used for data recovery.
4. Improve knowledge in various Disk and File systems.
5. Students can gain knowledge in Data validation, verification, Authentication and Authorization etc.

UNIT-I	INTRODUCTION OF CYBERCRIME	Classes: 10

Introduction of Cybercrime: Types, The Internet spawns crime, Worms versus viruses, Computers' roles in crimes, Introduction to digital forensics, Introduction to Incident – Incident Response Methodology –Steps - Activities in Initial Response, Phase after detection of an incident.

UNIT-II	INTRODUCTION T0 FORENSIC DUPLICATION	Classes: 10

Initial Response and forensic duplication, Initial Response & Volatile Data Collection from Windows system -Initial Response & Volatile Data Collection from Unix system – Forensic Duplication: Forensic duplication: Forensic Duplicates as Admissible Evidence, Forensic Duplication Tool Requirements, Creating a Forensic. Duplicate/Qualified

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Forensic Duplicate of a Hard Drive

UNIT-III	COMPUTER FORENSIC ANALYSIS AND VALIDATION	Classes: 12

Computer forensic analysis and validation: Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, and performing remote acquisitions Network Forensics: Network forensic overview, performing live acquisitions, developing standard procedures for network forensics, using network tools, examining the honey net project.

UNIT-IV	CURRENT COMPUTER FORENSIC TOOLS	Classes: 10

Current Computer Forensic Tools: evaluating computer forensic tool needs, computer forensic software tools, computer forensic hardware tools, validating and testing forensic software. E-mail investigations: Exploring the role of email in investigations, exploring the role of client and server in email, investigating email crimes and violations, understanding email servers, using specialized email forensic tools. Cell phone and mobile device forensics Understanding mobile device forensic, understanding acquisition procedures for cell phones and mobile devices.

UNIT-V	WORKING WITH WINDOWS AND DOS SYSTEMS	Classes: 10

Working with windows and dos systems: understanding file systems, exploring Microsoft file structures examining NTFS disks, understanding whole disk encryption, registry, Microsoft startup tasks, MS Dos startup tasks, virtual machines

TEXT BOOKS

1. Computer Forensics, Computer Crime Investigation by John R,Vacca, Firewall Media, New Delhi.
2. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning

REFERENCE BOOKS

1. Real Digital Forensics by Keith j. Jones, Richard Bejitlich, Curtis W.Rose ,Addison-Wesley PearsonEducation
2. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brain Jenkinson, SpringerInternationaledition
3. Computer Evidence Collection & Presentation by Chrostopher L.T. Brown, FirewallMedia
4. Homeland Security, Techniques & Technologies by Jesus Mena, FirewallMedia. SoftwareForensicsCollectingEvidencefromtheSceneofaDigitalCrimebyRobertM.Slade, TMH 2005
5. Windows Forensics by Chad Steel, Wiley IndiaEdition

WEB REFERENCES

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1. https://en.wikipedia.org/wiki/Computer_forensics
E -TEXT BOOKS
1.https://mrcet.com/pdf/Lab%20Manuals/IT/R15A0533%20CF.pdf
MOOCS COURSES
1.https://www.my-mooc.com/en/mooc/computer-forensics-ritx-cyber502x/.

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S.No.	Open Elective-I		
	Course Code	**Course**	**Department**
1	CS600OE	Enterprenuership	Information Technology
	CS601OE	Fundamentals of Management for Engineers	
	CS602OE	Cyber Law & Ethics	

S.No.	Open Elective-II		
	Course Code	**Course**	**Department**
1	CS700OE	Data Structures	Information Technology
	CS701OE	Artificial Intelligence	
	CS702OE	Python Programming	
	CS703OE	Java Programming	

S.No.	Open Elective-III		
	Course Code	**Course**	**Department**
1	CS800OE	Machine Learning	Information Technology
	CS801OE	Mobile Application Development	
	CS802OE	Scripting Languages	
	CS803OE	Database Management Systems	

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ENTREPRENEURSHIP (Open Elective-I)

III B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS600OE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. The aim of this course is to have a comprehensive perspective of inclusive learning, ability to learn and implement the Fundamentals of Entrepreneurship.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. It enables students to learn the basics of Entrepreneurship and entrepreneurial development which will help them to provide vision for their own Start-up.

UNIT-I	ENTREPRENEURIAL PERSPECTIVES	Classes: 14

Introduction to Entrepreneurship – Evolution - Concept of Entrepreneurship - Types of Entrepreneurs - Entrepreneurial Competencies, Capacity Building for Entrepreneurs. Entrepreneurial Training Methods - Entrepreneurial Motivations - Models for Entrepreneurial Development - The process of Entrepreneurial Development.

UNIT-II	NEW VENTURE CREATION	Classes: 12

Introduction, Mobility of Entrepreneurs, Models for Opportunity Evaluation; Business plans – Purpose, Contents, Presenting Business Plan, Procedure for setting up Enterprises, Central level - Startup and State level - T Hub, Other Institutions initiatives.

UNIT-III	MANAGEMENT OF MSMES AND SICK ENTERPRISES	Classes: 12

Challenges of MSMEs, Preventing Sickness in Enterprises – Specific Management Problems; Industrial Sickness; Industrial Sickness in India – Symptoms, process and Rehabilitation of Sick Units.

UNIT-IV	MANAGING MARKETING AND GROWTH OF ENTERPRISES	Classes: 11

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Essential Marketing Mix of Services, Key Success Factors in Service Marketing, Cost and Pricing, Branding, New Techniques in Marketing, International Trade.

UNIT-V	STRATEGIC PERSPECTIVES IN ENTREPRENEURSHIP	Classes: 12

Strategic Growth in Entrepreneurship, The Valuation Challenge in Entrepreneurship, The Final Harvest of New Ventures, Technology, Business Incubation, India way – Entrepreneurship; Women Entrepreneurs – Strategies to develop Women Entrepreneurs, Institutions supporting Women Entrepreneurship in India.

TEXT BOOKS

1. Entrepreneurship Development and Small Business Enterprises, Poornima M. Charantimath, 2e, Pearson, 2014.
2. Entrepreneurship, a South – Asian Perspective, D.F. Kuratko and T. V. Rao, 3e, Cengage, 2012.
3. Entrepreneurship, Arya Kumar, 4 e, Pearson 2015.
4. The Dynamics of Entrepreneurial Development and Management, Vasant Desai, Himalaya Publishing House, 2015.

REFERENCE BOOKS

1. Vasant Desai, Dynamics of Entrepreneurial Development and Management, Himalaya Publishing House, 2009.
2. Harvard Business Review on Entrepreneurship, HBR Paper Back.
3. Robert J. Calvin: Entrepreneurial Management, TMH, 2009.
4. Gurmeet Naroola: The entrepreneurial Connection, TMH, 2009.
5. Bolton and Thompson: EntrepreneursTalent, Temperament and Techniques, Butterworth Heinemann, 2009.
6. Agarwal: Indian Economy, Wishwa Prakashan 2009.

WEB REFERENCES

1.http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Febooks.lpude.in%2Fcommerce%2Fbcom%2Fterm_5%2FDCOM305_DMGT310_ENTREPRENEURSHIP_AND_SMALL_BUSINESS_MANAGEMENT.pdf&clen=5308295&chunk=true

E -TEXT BOOKS

1.http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=http%3A%2F%2Fwww.untagsmd.ac.id%2Ffiles%2FPerpustakaan_Digital_1%2FENTREPRENEURSHIP%2520Innovation%2520and%2520entrepreneurship.PDF&clen=7528422&chunk=true

2.http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fptgmedia.pearsoncmg.com%2Fimages%2F9780133966817%2Fsamplepages%2F9780133966817.pdf&clen=3420774&chunk=true

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MOOCS COURSES
1.https://onlinecourses-archive.nptel.ac.in 2.https://swayam.gov.in/ 3.https://swayam.gov.in/NPTEL

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FUNDAMENTALS OF MANAGEMENT FOR ENGINEERS (Open Elective-I)

III B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS601OE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1.To understand the Management Concepts, applications of Concepts in Practical aspects of business and development of Managerial Skills for Engineers.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1.The students understand the significance of Management in their Profession. The various Management Functions like Planning, Organizing, Staffing, Leading, Motivation and Control aspects are learnt in this course. The students can explore the Management Practices in their domain area.

UNIT-I	Introduction to Management	Classes: 15

Evolution of Management, Nature & Scope-Functions of ManagementRole of Manager-levels of Management-Managerial Skills - Challenges-Planning-Planning ProcessTypes ofPlans-MBO

UNIT-II	Organization Structure & HRM	Classes: 12

Organization Design-Organizational Structure-Departmentation– Delegation-Centralization -Decentralization-Recentralization-Organizational Culture- Organizational climate- Organizational change Human Resource Management-HR Planning - Recruitment & Selection - Training & DevelopmentPerformance appraisal - Job Satisfaction-Stress Management Practices

UNIT-III	Operation Management	Classes: 12

Introduction to Operations Management-Principles and Types of Plant Layout-Methods of production (Job Batch and Mass production) - Method study and Work Measurement-Quality Management - TQM-Six sigma - Deming's Contribution to Quality – Inventory Management – EOQ - ABC Analysis - JIT System-Business Process Re-Engineering

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(BPR)

UNIT-IV	Marketing Management	Classes: 11

Introduction to Marketing-Functions of Marketing-Marketing vs. SellingMarketing Mix – Marketing Strategies - Product Life Cycle - Market Segmentation -Types of Marketing – Direct Marketing-Network Marketing - Digital Marketing-Channels of Distribution – Supply Chain Management (SCM)

UNIT-V	Project Management	Classes: 12

Introduction to Project Management-steps in Project Management - Project Planning – Project Life Cycle-Network Analysis-Program Evaluation & Review Technique (PERT)-Critical Path Method (CPM) - Project Cost Analysis - Project Crashing – Project Information Systems.

TEXT BOOKS

1. Management Essentials, Andrew DuBrin, 9e, Cengage Learning, 2012.
2. Fundamentals of Management, Stephen P.Robbins, Pearson Education, 2009.
3. Essentials of Management, Koontz Kleihrich, Tata Mc - Graw Hill.
4. Management Fundamentals, Robert N Lussier, 5e, Cengage Learning, 2013.
5. Industrial Engineering and Management: Including Production Management, T.R.Banga, S.C Sharma , Khanna Publishers.

REFERENCE BOOKS

1.Business Organization and Management – Basu; Tata McGraw Hill
2.Management and OB– Mullins; Pearson Education
3. Essentials of Management – Koontz, Tata McGraw-Hill
4. Management Theory and Practice – Gupta, C.B; Sultan Chand and Sons, New Delhi

WEB REFERENCES

1.https://lecturenotes.in/subject/836/fundamentals-of-management

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1. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=http%3A%2F%2Fgeoff.cox.free.fr%2FDocs%2FText1.pdf&clen=581125&chunk=true
2. https://gateknowledge.in/fundamentals-of-management/

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2.https://swayam.gov.in/
3.https://swayam.gov.in/NPTEL

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CYBER LAW AND ETHICS (Open Elective-I)

III B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS602OE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To make the students understand the types of roles they are expected to play in the society as practitioners of the civil engineering profession
2. To develop some ideas of the legal and practical aspects of their profession.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. The students will understand the importance of professional practice, Law and Ethics in their personal lives and professional careers.
2. The students will learn the rights and responsibilities as an employee, team member and a global citizen.

UNIT-I	INTRODUCTION TO COMPUTER SECURITY	Classes: 15

Definition, Threats to security, Government requirements, Information Protection and Access Controls, Computer security efforts, Standards, Computer Security mandates and legislation, Privacy considerations, International security activity.

UNIT-II	SECURE SYSTEM PLANNING AND ADMINISTRATION	Classes: 14

Secure System Planning and administration, Introduction to the orange book, Security policy requirements, accountability, assurance and documentation requirements, Network Security, The Red book and Government network evaluations.

UNIT-III	INFORMATION SECURITY POLICIES AND PROCEDURES	Classes: 13

Information security policies and procedures: Corporate policies- Tier 1, Tier 2 and Tier3 policies - process management-planning and preparation-developing policies-asset classification policydeveloping standards.

UNIT-IV	INFORMATION SECURITY	Classes: 12

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Information security: fundamentals-Employee responsibilities- information classification Informationhandling- Tools of information security- Information processing-secure program administration.		
UNIT-V	**ORGANIZATIONAL AND HUMAN SECURITY**	**Classes: 11**
Organizational and Human Security: Adoption of Information Security Management Standards, Human Factors in Security- Role of information security professionals		

TEXT BOOKS

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, Mc Graw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

REFERENCE BOOKS

1. Debby Russell and Sr. G. T Gangemi, "Computer Security Basics (Paperback)", 2nd Edition, O' Reilly Media, 2006.
2. Thomas R. Peltier, "Information Security policies and procedures: A Practitioner's Reference", 2nd Edition Prentice Hall, 2004.
3. Kenneth J. Knapp, "Cyber Security and Global Information Assurance: Threat Analysis and Response Solutions", IGI Global, 2009.
4. Thomas R Peltier, Justin Peltier and John blackley," Information Security Fundamentals", 2nd Edition, Prentice Hall, 1996
5. Jonathan Rosenoer, "Cyber law: the Law of the Internet", Springer-verlag, 1997
6. James Graham, "Cyber Security Essentials" Averbach Publication T & F Group.

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1.http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fwww.scu.edu%2Fmedia%2Fethics-center%2Ftechnology-ethics%2FIntroToCybersecurityEthics.pdf&clen=592201&chunk=true

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2. https://swayam.gov.in/
3. https://swayam.gov.in/NPTEL

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Data Structures (Open Elective-II)

IV B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS700OE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Exploring basic data structures such as stacks and queues.
2. Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs.
3. Introduces sorting and pattern matching algorithms

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Ability to select the data structures that efficiently model the information in a problem.
2. Ability to assess efficiency trade-offs among different data structure implementations or combinations.
3. Implement and know the application of algorithms for sorting and pattern matching.
4. Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees

UNIT-I	Data Structure	Classes: 15

Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations..

UNIT-II	Dictionaries	Classes: 12

Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching.

Hash table representation: hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing Propositional Logic:

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UNIT-III	Search Trees	Classes: 12
Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees.		
UNIT-IV	**Graphs**	**Classes: 11**
Graphs: Graph Implementation Methods. Graph Traversal Methods. Sortings: Heap Sort, External Sorting- Model for external sorting, Merge Sort		
UNIT-V	**Pattern matching and Tries**	**Classes: 12**
Pattern matching and Tries: Pattern matching algorithms-Brute force, the Boyer –Moore algorithm,the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.		

TEXT BOOKS

1. Fundamentals of data structures in C, 2 nd edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data structures using c – A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/pearson education

REFERENCE BOOKS

1. Programming Languages, 2nd Edition, A.B. Tucker, R. E. Noonan, TMH.
2. Programming Languages, K. C. Louden, 2nd Edition, Thomson, 2003

WEB REFERENCES

1. Data structures: A Pseudo code Approach with C, 2nd edition, R.F.Gilberg And B.A.Forouzan, Cengage Learning.
2. Introduction to data structures in c, 1/e Ashok Kamthane.

E -TEXT BOOKS

1. https://eplibrary.libguides.com/CPOL/SR/AI-law/e-books

MOOCS COURSES

1. https://onlinecourses-archive.nptel.ac.in
2. https://www.mooc-list.com/tags data structure

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ARTFICIAL INTELLIGENCE (Open Elective-II)

IV B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS701OE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To learn the distinction between optimal reasoning Vs. human like reasoning
2. To understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
3. To learn different knowledge representation techniques.
4. To understand the applications of AI, namely game playing, theorem proving, and machine learning.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Ability to formulate an efficient problem space for a problem expressed in natural language.
2. Select a search algorithm for a problem and estimate its time and space complexities.
3. Possess the skill for representing knowledge using the appropriate technique for a given problem.
4. Possess the ability to apply AI techniques to solve problems of game playing, and machine learning.

UNIT-I	PROBLEM SOLVING BY SEARCH	Classes: 15

Problem Solving by Search-I: Introduction to AI, Intelligent Agents

Problem Solving by Search –II: Problem-Solving Agents, Searching for Solutions, Uninformed Search Strategies: Breadth-first search, Uniform cost search, Depth-first search, Iterative deepening Depth-first search, Bidirectional search, Informed (Heuristic) Search Strategies: Greedy best-first search, A* search, Heuristic Functions, Beyond Classical Search: Hill-climbing search, Simulated annealing search, Local Search in Continuous Spaces, Searching with Non-Deterministic Actions, Searching with Partial Observations, Online Search Agents and Unknown Environment.

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UNIT-II	PROBLEM SOLVING BY SEARCH-II AND PROPOSITIONAL LOGIC	Classes: 12

Adversarial Search: Games, Optimal Decisions in Games, Alpha–Beta Pruning, Imperfect Real-Time Decisions.

Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems.

Propositional Logic: Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic, Propositional Theorem Proving: Inference and proofs, Proof by resolution, Horn clauses and definite clauses, Forward and backward chaining, Effective Propositional Model Checking, Agents Based on Propositional Logic.

UNIT-III	LOGIC AND KNOWLEDGE REPRESENTATION	Classes: 12

First-Order Logic: Representation, Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic.

Inference in First-Order Logic: Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution. **Knowledge Representation:** Ontological Engineering, Categories and Objects, Events. Mental Events and Mental Objects, Reasoning Systems for Categories, Reasoning with Default Information.

UNIT-IV	PLANNING	Classes: 11

Classical Planning: Definition of Classical Planning, Algorithms for Planning with State-Space Search, Planning Graphs, other Classical Planning Approaches, Analysis of Planning approaches.

Planning and Acting in the Real World: Time, Schedules, and Resources, Hierarchical Planning, Planning and Acting in Nondeterministic Domains, Multi agent Planning.

UNIT-V	UNCERTAIN KNOWLEDGE AND LEARNING	Classes: 12

Uncertainty: Acting under Uncertainty, Basic Probability Notation, Inference Using Full Joint Distributions, Independence, Bayes' Rule and Its Use,

Probabilistic Reasoning: Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient Representation of Conditional Distributions, Approximate Inference in Bayesian Networks, Relational and First-Order Probability, Other Approaches to Uncertain Reasoning; Dempster-Shafer theory.

Learning: Forms of Learning, Supervised Learning, Learning Decision Trees. Knowledge

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in Learning: Logical Formulation of Learning, Knowledge in Learning, Explanation-Based Learning, Learning Using Relevance Information, Inductive Logic Programming

TEXT BOOKS

3. Artificial Intelligence A Modern Approach, Third Edition, Stuart Russell and Peter Norvig, Pearson Education

REFERENCE BOOKS

1. Programming Languages, 2nd Edition, A.B. Tucker, R. E. Noonan, TMH.
2. Programming Languages, K. C. Louden, 2nd Edition, Thomson, 2003

WEB REFERENCES

3. https://www.britannica.com/technology/artificial-intelligence
4. https://www.sas.com/nl_nl/insights/analytics/what-is-artificial-intelligence.html
5. https://www.st.com/content/st_com/en/about/innovation---technology/artificial-intelligence.html

E -TEXT BOOKS

2. https://eplibrary.libguides.com/CPOL/SR/AI-law/e-books

MOOCS COURSES

3. https://onlinecourses-archive.nptel.ac.in
4. https://www.mooc-list.com/tags/chemistry

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PYTHON PROGRAMMING (Open Elective-II)

IV B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS702OE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Learn Syntax and Semantics and create Functions in Python.
2. N Handle Strings and Files in Python.
3. Understand Lists, Dictionaries and Regular expressions in Python.
4. Implement Object Oriented Programming concepts in Python.
5. Build Web Services and introduction to Network and Database Programming in Python

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Demonstrate proficiency in handling Strings and File Systems.
2. Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
3. Interpret the concepts of Object-Oriented Programming as used in Python.
4. Implement exemplary applications related to Network Programming, Web Services and Databases in Python.

UNIT-I	PYTHON BASICS	Classes: 15

Python Basics, Objects- Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types Numbers - Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions, Related Modules Sequences - Strings, Lists, and Tuples, Mapping and Set Types.

UNIT-II	FILES AND EXCEPTIONS	Classes: 12

FILES: File Objects, File Built-in Function [open()], File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules, Related Modules

Exceptions: Exceptions in Python, Detecting and Handling Exceptions, Context

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Management,*Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, Creating Exceptions, Why Exceptions (Now)?, Why Exceptions at All?, Exceptions and the sys Module, Related Modules Modules: Modules and Files, Namespaces, Importing Modules, Importing Module Attributes, Module Built-in Functions, Packages, Other Features of Modules		
UNIT-III	**REGULAR EXPRESSIONS**	**Classes: 12**
Regular Expressions: Introduction, Special Symbols and Characters, Res and Python Multithreaded Programming: Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock, Thread Module, Threading Module, Related Modules		
UNIT-IV	**GUI PROGRAMMING: INTRODUCTION**	**Classes: 11**
GUI Programming: Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs WEB Programming: Introduction, Wed Surfing with Python, Creating Simple Web Clients, Advanced Web Clients, CGI-Helping Servers Process Client Data, Building CGI Application Advanced CGI, Web (HTTP) Servers		
UNIT-V	**DATABASE PROGRAMMING:**	**Classes: 12**
Introduction, Python Database Application Programmer's Interface (DB-API), Object Relational Managers (ORMs), Related Modules		

TEXT BOOKS

1. Digital Image Processing: R.C. Gonzalez & R. E. Woods, Addison Wesley/ Pearson Education, 2nd Ed, 2004.

REFERENCE BOOKS

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson

WEB REFERENCES

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

E -TEXT BOOKS

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2. https://www.e-booksdirectory.com/details.php?ebook=10830

MOOCS COURSES

1. https://onlinecourses-archive.nptel.ac.in

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JAVA PROGRAMMING (Open Elective-II)

IV B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS703OE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To introduce the object-oriented programming concepts.
2. To understand object-oriented programming concepts, and apply them in solving problems.
3. To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes
4. To introduce the implementation of packages and interfaces
5. To introduce the concepts of exception handling and multithreading.
6. To introduce the design of Graphical User Interface using applets and swing controls

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Able to solve real world problems using OOP techniques.
2. Able to understand the use of abstract classes.
3. Able to solve problems using java collection framework and I/o classes.
4. Able to develop multithreaded applications with synchronization.
5. Able to develop applets for web applications.
6. Able to design GUI based applications

UNIT-I	OBJECT-ORIENTED THINKING ANDINHERITANCE	Classes: 15

Object-Oriented Thinking- A way of viewing world – Agents and Communities, messages and methods, Responsibilities, Classes and Instances, Class Hierarchies- Inheritance, Method binding, Overriding and Exceptions, Summary of Object-Oriented concepts. Java buzzwords, An Overview of Java, Data types, Variables and Arrays, operators, expressions, control statements, Introducing classes, Methods and Classes, String handling.

Inheritance– Inheritance concept, Inheritance basics, Member access, Constructors,

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Creating Multilevel hierarchy, super uses, using final with inheritance, Polymorphism-ad hoc polymorphism, pure polymorphism, method overriding, abstract classes, Object class, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance.

UNIT-II	PACKAGES AND STREAM BASED I/O	Classes: 12

Packages- Defining a Package, CLASSPATH, Access protection, importing packages. Interfaces- defining an interface, implementing interfaces, Nested interfaces, applying interfaces, variables in interfaces and extending interfaces.

Stream based I/O (java.io) – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and writing Files, Random access file operations, The Console class, Serialization, Enumerations, auto boxing, generics

UNIT-III	EXCEPTION HANDLING AND MULTITHREADING	Classes: 12

Exception handling - Fundamentals of exception handling, Exception types,Termination or resumptive models, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built- in exceptions, creating own exception sub classes.

Multithreading- Differences between thread-based multitasking and process-based multitasking, Java thread model, creating threads, thread priorities, synchronizing threads, inter thread communication.

UNIT-IV	COLLECTIONS FRAMEWORK	Classes: 11

The Collections Framework (java.util)- Collections overview, Collection Interfaces, The Collection classes- Array List, Linked List, Hash Set, Tree Set, Priority Queue, Array Deque. Accessing a Collection via an Iterator, Using an Iterator, The For-Each alternative, Map Interfaces and Classes, Comparators, Collection algorithms, Arrays, The Legacy Classes and Interfaces- Dictionary, Hash table, Properties, Stack, Vector More Utility classes, String Tokenizer, Bit Set, Date, Calendar, Random, Formatter, Scanner

UNIT-V	MODELS FOR THE PROTECTION OF NEW GENERATION DATABASE SYSTEMS -2	Classes: 12

GUI Programming with Swing – Introduction, limitations of AWT, MVC architecture, components, containers. Understanding Layout Managers, Flow Layout, Border Layout, Grid Layout, Card Layout, Grid Bag Layout.

Event Handling- The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes, Inner classes,

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Anonymous Inner classes.

A Simple Swing Application, Applets – Applets and HTML, Security Issues, Applets and Applications, passing parameters to applets. Creating a Swing Applet, Painting in Swing, A Paint example, Exploring Swing Controls- JLabel and Image Icon, JText Field, **The Swing Buttons**- JButton, JToggle Button, JCheck Box, JRadio Button, JTabbed Pane, JScroll Pane, JList, JCombo Box, Swing Menus, Dialogs.

TEXT BOOKS

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education

REFERENCE BOOKS

1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. Object Oriented Programming through Java, P. Radha Krishna, University Press.
4. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Press.
5. Java Programming and Object-oriented Application Development, R. A. Johnson, Cengage Learning.

WEB REFERENCES

1. https://easyengineering.net/basicl-engineering-by-wadhwa/

E -TEXT BOOKS

1. https://easyengineering.net/objective-technology-by-mehta/

MOOCS COURSES

1. https://onlinecourses-archive.nptel.ac.in
2. https://swayam.gov.in/
3. https://swayam.gov.in/NPTEL

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MACHINE LEARNING (Open Elective-III)

IV B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT702PC	B. Tech	2	0	0	2	30	70	100

COURSE OBJECTIVES

To learn

4. This course explains machine learning techniques such as decision tree learning, Bayesian learning etc.
5. To understand computational learning theory.
6. To study the pattern comparison techniques.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

4. Understand the concepts of computational intelligence like machine learning
5. Ability to get the skill to apply machine learning techniques to address the real time problems in different areas
6. Understand the Neural Networks and its usage in machine learning application.

UNIT-I	INTRODUCTION TO MACHINE LEARNING	Classes: 12

Introduction - Well-posed learning problems, designing a learning system, Perspectives and issues in machine learning

Concept learning and the general to specific ordering – introduction, a concept learning task, concept learning as search, find-S: finding a maximally specific hypothesis, version spaces and the candidate elimination algorithm, remarks on version spaces and candidate elimination, inductive bias**.**

Decision Tree Learning – Introduction, decision tree representation, appropriate problems for decision tree learning, the basic decision tree learning algorithm, hypothesis space search in decision tree learning, inductive bias in decision tree learning, issues in decision tree learning.

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UNIT-II	Artificial Neural Networks	Classes: 11

Artificial Neural Networks-1– Introduction, neural network representation, appropriate problems for neural network learning, perceptions, multilayer networks and the back-propagation algorithm.

Artificial Neural Networks-2- Remarks on the Back-Propagation algorithm, Anillustrative example: face recognition, advanced topics in artificial neural networks.

Evaluation Hypotheses – Motivation, estimation hypothesis accuracy, basics of sampling theory, a general approach for deriving confidence intervals, difference in error of two hypotheses, comparing learning algorithms.

UNIT-III	Bayesian learning	Classes: 12

Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum Likelihood and least squared error hypotheses, maximum likelihood hypotheses for predicting probabilities, minimum description length principle, Bayes optimal classifier, Gibs algorithm, Naïve Bayes classifier, an example: learning to classify text, Bayesian belief networks, the EM algorithm.

Computational learning theory – Introduction, probably learning an approximately correct hypothesis, sample complexity for finite hypothesis space, sample complexity for infinite hypothesis spaces, the mistake bound model of learning.

Instance-Based Learning- Introduction, *k*-nearest neighbour algorithm, locally weighted regression, radial basis functions, case-based reasoning, remarks on lazy and eager learning.

UNIT-IV	Genetic Algorithms	Classes: 12

Genetic Algorithms – Motivation, Genetic algorithms, an illustrative example, hypothesis space search, genetic programming, models of evolution and learning, parallelizing genetic algorithms.

Learning Sets of Rules – Introduction, sequential covering algorithms, learning rule sets: summary, learning First-Order rules, learning sets of First-Order rules: FOIL, Induction as inverted deduction, inverting resolution.

Reinforcement Learning – Introduction, the learning task, *Q*–learning, non- deterministic, rewards and actions, temporal difference learning, generalizing from examples, relationship to dynamic programming.

UNIT-V	Analytical Learning	Classes: 11

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Analytical Learning-1- Introduction, learning with perfect domain theories: PROLOG-EBG, remarks on explanation-based learning, explanation-based learning of search control knowledge.

Analytical Learning-2-Using prior knowledge to alter the search objective, using prior knowledge to augment search operators.

Combining Inductive and Analytical Learning – Motivation, inductive-analytical approaches to learning, using prior knowledge to initialize the hypothesis.

TEXT BOOKS

1. Machine Learning – Tom M. Mitchell, - MGH.

REFERENCE BOOKS

1. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis

WEB REFERENCES

https://www.tutorialspoint.com/machine_engineering/index.htm

E -TEXT BOOKS

1. https://www.geeksforgeeks.org/Machine Learning

MOOCS COURSES

3. https://nptel.ac.in/courses/106105087/pdf/m01L01.pdf
4. https://onlinecourses.nptel.ac.in/noc21_cs13/preview.

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MOBILE APPLICATION DEVELOPMENT (Open Elective-III)

IV B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS801OE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To demonstrate their understanding of the fundamentals of Android operating systems
2. To improves their skills of using Android software development tools
3. To demonstrate their ability to develop software with reasonable complexity on mobile platform
4. To demonstrate their ability to deploy software to mobile devices
5. To demonstrate their ability to debug programs running on mobile devices

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Student understands the working of Android OS Practically. Student will be able to develop Android user interfaces
2. Student will be able to develop, deploy and maintain the Android Applications.

UNIT-I	INTRODUCTION TO ANDROID OPERATING SYSTEM	Classes: 15

Introduction to Android Operating System: Android OS design and Features – Android development framework, SDK features, Installing and running applications on Android Studio, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools Android application components – Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes Android Application Lifecycle – Activities, Activity lifecycle, activity states, monitoring state changes

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UNIT-II	ANDROID USER INTERFACE	Classes: 11
Android User Interface: Measurements – Device and pixel density independent measuring UNIT - s Layouts – Linear, Relative, Grid and Table Layouts User Interface (UI) Components – Editable and non editable TextViews, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers Event Handling – Handling clicks or changes of various UI components Fragments – Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities.		
UNIT-III	**INTENTS AND BROADCASTS**	**Classes: 10**
Intents and Broadcasts: Intent – Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS Broadcast Receivers – Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity Notifications – Creating and Displaying notifications, Displaying Toasts.		
UNIT-IV	**PERSISTENT STORAGE**	**Classes: 11**
Persistent Storage: Files – Using application specific folders and files, creating files, reading data from files, listing contents of a directory Shared Preferences – Creating shared preferences, saving and retrieving data using Shared Preference		
UNIT-V	**DATABASE**	**Classes: 11**
Database – Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and etindelg data, Registering Content Providers, Using content Providers (insert, delete, retrieve and update)		

TEXT BOOKS

1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox) , 2012
2. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013

REFERENCE BOOKS

1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013

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1.	https://www.ibm.com/cloud/learn/mobile-application-development-explained
2.	https://www.openxcell.com/mobile-app-development/
3.	https://www.invonto.com/insights/mobile-app-development-process/

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2.	http://www.freebookcentre.net/mobile-technology/Free-GSM-Books-Download.html
3.	https://booksoncode.com/articles/mobile-developers
4.	https://www.cs.cmu.edu/~bam/uicourse/830spring09/BFeiginMobileApplicationDevelopment.pdf

MOOCS COURSES	
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2.	https://www.coursera.org/courses?query=mobile%20app%20development
3.	https://www.edx.org/learn/app-development
4.	https://www.shawacademy.com/courses/technology/online-mobile-app-development-course/

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SCRIPTING LANGUAGES (Open Elective-III)

IV B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS802OE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. This course introduces the script programming paradigm
2. Introduces scripting languages such as Perl, Ruby and TCL.
3. Learning TCL

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Comprehend the differences between typical scripting languages and typical system and application programming languages.
2. Gain knowledge of the strengths and weakness of Perl, TCL and Ruby; and select an appropriate language for solving a given problem.
3. Acquire programming skills in scripting language

UNIT-I	INTRODUCTION TO RUBY	Classes: 12

Introduction: Ruby, Rails, The structure and Execution of Ruby Programs, Package Management with RUBYGEMS, Ruby and web: Writing CGI scripts, cookies, Choice of Web servers, SOAP and web services. Ruby Tk – Simple Tk Application, widgets, Binding events, Canvas, scrolling

UNIT-II	EXTENDING RUBY	Classes: 11

Extending Ruby: Ruby Objects in C, the Jukebox extension, Memory allocation, Ruby Type System, Embedding Ruby to Other Languages, Embedding a Ruby Interpreter

UNIT-III	INTRODUCTION TO PERL SCRIPTING	Classes: 12

Introduction to PERL and Scripting Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web

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Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT-IV	ADVANCED PERL	Classes: 12

Finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT-V	TCL	Classes: 11

TCL: TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and up level commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface. Tk: Tk- Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding, Perl-Tk.

TEXT BOOKS

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Ruby Programming language by David Flanagan and Yukihiro Matsumoto O'Reilly
3. "Programming Ruby" The Pramatic Programmers guide by Dabve Thomas Second edition

REFERENCE BOOKS

1. Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP, J.Lee and B. Ware (Addison Wesley) Pearson Education.
2. Perl by Example, E. Quigley, Pearson Education.
3. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD.
4. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
5. Perl Power, J.P. Flynt, Cengage Learning.

WEB REFERENCES

1. https://docs.oracle.com/javase/10/scripting/scripting-languages-and-java.htm#JSJSG107
2. https://www.geeksforgeeks.org/introduction-to-scripting-languages/
3. https://careerkarma.com/blog/what-is-a-scripting-language/
4. https://www.javatpoint.com/scripting-vs-programming

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MOOCS COURSES
2. https://www.udemy.com/courses/development/programming-languages/ 3. https://freevideolectures.com/blog/free-courses-learn-scripting-language/ 4. https://www.coursera.org/courses?query=programming%20languages

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DATABASE MANAGEMENT SYSTEMS (Open Elective-III)

IV B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS803OE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Understand the basic concepts and the applications of database systems.
2. To master the basics of SQL and construct queries using SQL.
3. Topics include data models, database design, relational model, relational algebra, transaction
4. Control, concurrency control, storage structures and access techniques.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Gain knowledge of fundamentals of DBMS, database design and normal forms Master the basics of SQL for retrieval and management of data.
2. Be acquainted with the basics of transaction processing and concurrency control.
3. Familiarity with database storage structures and access techniques.

UNIT-I	DATABASE SYSTEM APPLICATIONS	Classes: 14

Database System Applications: A Historical Perspective, File Systems versus a DBMS, the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design With the ER Model

UNIT-II	INTRODUCTION TO THE RELATIONAL MODEL	Classes: 12

Introduction to the Relational Model: Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical data base design, introduction to views, destroying/altering tables and views. Relational Algebra, Tuple relational Calculus, Domain relational calculus.

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UNIT-III	SQL	Classes: 10
SQL: Queries, Constraints, Triggers: form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active data bases. Schema refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, multi-valued dependencies, FOURTH normal form, FIFTH normal form.		
UNIT-IV	**TRANSACTION**	**Classes: 12**
Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity, Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions.		
UNIT-V	**DATA ON EXTERNAL STORAGE**	**Classes: 12**
Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning, Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure		

TEXT BOOKS

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill 3rd Edition
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, V edition..

REFERENCE BOOKS

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C.J.Date Pearson Education
4. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition

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1. https://www.geeksforgeeks.org/introduction-of-dbms-database-management-system-set-1/
2. https://www.ibm.com/docs/en/zos-basic-skills?topic=zos-what-is-database-management-system
3. https://www.appdynamics.com/topics/database-management-systems
4. https://searchsqlserver.techtarget.com/definition/database-management-system

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1. https://www.tutorialspoint.com/dbms/index.htm
2. https://www.techopedia.com/definition/24361/database-management-systems-dbms
3. https://www.omnisci.com/technical-glossary/dbms
4. https://www.researchgate.net/publication/258328266_Database_Management_Systems_A_NoSQL_Analysis
5. https://arxiv.org/ftp/arxiv/papers/1404/1404.2160.pdf

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2. https://onlinecourses.nptel.ac.in/noc19_cs46/preview
3. https://www.edx.org/learn/databases
4. https://onlinecourses.swayam2.ac.in/cec19_cs05/preview

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