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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

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							

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	0	0	2	-	100	-	100

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

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	CSG301ES	Analog and Digital Electronics	3	0	0	3	30	70	100
2	CSG302PC	Data Structures	3	1	0	4	30	70	100
3	MA303BS	Mathematical and Statistical Foundations	3	1	0	4	30	70	100
4	CSG304PC	Computer Vision	3	0	0	3	30	70	100
5	CSG305PC	Python Programming	2	0	0	2	30	70	100
6	CSG306PC	Data Structures Lab	0	0	3	1.5	30	70	100
7	CSG307EC	IT Workshop Lab	0	0	3	1.5	30	70	100
8	CSG308ES	Analog and Digital Electronics Lab	0	0	2	1	30	70	100
9	CSG309PC	Python Programming Lab	0	0	2	1	30	70	100
Total			**14**	2	10	**21**	**270**	**630**	**900**
Mandatory Course (Non-Credit)									
10	*GS310MC	Gender Sensitization Lab	0	0	2	-	100	-	100

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	CSG401PC	Discrete Mathematics	3	0	0	3	30	70	100
2	CSG402PC	Computer Graphics	3	0	0	3	30	70	100
3	CSG403PC	Operating Systems	3	0	0	3	30	70	100
4	CSG404PC	Database Management Systems	3	1	0	4	30	70	100
5	CSG405PC	Java Programming	3	1	0	4	30	70	100
6	CSG406PC	Computer Graphics Lab	0	0	3	1.5	30	70	100
7	CSG407PC	Database Management Systems Lab	0	0	3	1.5	30	70	100
8	CSG408PC	Java Programming Lab	0	0	2	1	30	70	100
Total			**15**	**2**	**8**	**21**	**240**	**560**	**800**
Mandatory Course (Non-Credit)									
9	*CI409MC	Constitution of India	3	0	0	-	100	-	100

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

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	CSG501PC	Design and Analysis of Experiments	3	0	0	3	30	70	100
2	CSG502PC	Computer Networks	3	0	0	3	30	70	100
3	CSG503PC	Design and Analysis of Algorithms	3	0	0	3	30	70	100
4	CSG504PC	Software Engineering	3	0	0	3	30	70	100
5		Professional Elective-I	3	0	0	3	30	70	100
6		Professional Elective -II	3	0	0	3	30	70	100
7	CSG505PC	Design and Analysis of Experiments Lab	0	0	3	1.5	30	70	100
8	CSG507PC	Computer Networks Lab	0	0	2	1.5	30	70	100
9	EN506HS	Advanced Communication Skills Lab	0	0	3	1	30	70	100
		Total	**18**	**0**	**8**	**22**	**270**	**630**	**900**
Mandatory Course (Non-Credit)									
10	*IP507MC	Intellectual Property Rights	3	0	0	-	100	-	100

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	CSG601PC	Automata Theory and Compiler Design	3	1	0	4	30	70	100
2	CSG602PC	Introduction to Engineering Design	3	1	0	4	30	70	100
3	CSG603PC	Machine Learning	3	1	0	4	30	70	100
4		Professional Elective – III	3	0	0	3	30	70	100
5		Open Elective-I	3	0	0	3	30	70	100
6	CSG604PC	Compiler Design Lab	0	0	3	1.5	30	70	100
7		Professional Elective-III Lab	0	0	3	1	30	70	100
8	CSG606PC	Machine Learning Lab	0	0	2	1.5	30	70	100
		Total	**15**	**3**	**8**	**22**	**240**	**560**	**800**
Mandatory Course (Non-Credit)									
9	*ES608BS	Environmental Science	3	0	0	-	100	-	100

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

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN 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	CSG701PC	Deep Learning	3	0	0	3	30	70	100
2	CSG702PC	Information Security	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	CSG703PC	Deep Learning Lab	0	0	2	1	30	70	100
7	CSG704PC	Industrial Oriented Mini Project /Summer Internship	0	0	0	2	--	100	100
8	CSG707PC	Seminar	0	0	6	1	100	--	100
9	CSG708PC	Project Stage - I	0	0	2	3	30	70	100
		Total	**14**	**0**	**10**	**21**	**310**	**590**	**900**

IVYEAR 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 Behavior	3	0	0	3	30	70	100
2		Professional Elective - VI	3	0	0	3	30	70	100
3		Open Elective - III	3	0	0	3	30	70	100
4	CSG802PC	Project Stage - II	0	0	14	7	30	70	100
		Total	**9**	**0**	**14**	**16**	**120**	**280**	**400**

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

List of Professional Electives

Professional Elective-I		Professional Elective - II	
CSG511PE	Quantum Computing	CSG521PE	Reliability Engineering
CSG512PE	Design of Interactive Systems	CSG522PE	Embedded Systems
CSG513PE	Data Analytics	CSG523PE	Information Retrieval Systems
CSG514PE	Image Processing	CSG524PE	Distributed Databases
CSG515PE	Systems Management	CSG525PE	Natural Language Processing
Professional Elective - III		**Professional Elective -IV**	
CSG611PE	Full Stack Development	CSG711PE	Graph Theory
CSG616PE	Internet of Things	CSG712PE	Augmented Reality & Virtual Reality
CSG613PE	Modeling and Simulation	CSG713PE	Soft Computing
CSG614PE	Mobile Application Development	CSG714PE	Cloud Computing
CSG615PE	Software Testing Methodologies	CSG715PE	Optimization Techniques
Professional Elective - V		**Professional Elective – VI**	
CSG721PE	Computer Game Design and Programming	CSG811PE	Computer Vision and Robotics
CSG722PE	Agile Methodology	CSG812PE	Computer Aided Geometric design
CSG723PE	Robotic Process Automation	CSG813PE	Nature Inspired Computing
CSG724PE	Evolutionary Computing	CSG814PE	Human Computer Interaction
CSG725PE	Visual Design and Communications	CSG815PE	VFX Animation

Professional Elective – III Lab	
CSG607PE	Full Stack Development Lab
EC614PE	Internet of Things Lab
CSG608PE	Modeling and Simulation Lab
CSG609PE	Mobile Application Development Lab
CSG612PE	Software Testing Methodologies Lab

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

List of Open Electives

Open Electives offered by the Department of CSD for Others

List of Open Elective I

CSG631OE	Data Structures
CSG632OE	Database Management Systems

List of Open Elective II

CSG731OE	Operating Systems
CSG732OE	Software Engineering

List of Open Elective III

CSG841OE	Algorithms Design and Analysis
CSG842OE	Introduction to Computer Networks

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

LINEAR ALGEBRA AND CALCULUS

I B. TECH- I SEMESTER								
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 their properties.
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 to canonical form.
4. Determine the maxima and minima of functions of several variables by using partial differential coefficients.
5. Evaluation of improper integrals using Beta and Gamma functions.

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 of equations.
2. Find the Eigen values and Eigen vectors, reduce the quadratic form to canonical form using orthogonal transformations.
3. Apply the Mean value theorems for the single variable functions.
4. Apply maxima and minima for functions of several variables and Lagrange‘s method of multipliers.
5. Evaluate the improper integrals using Beta and Gamma functions.

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 Seidel Iteration Method.

UNIT-II	**EIGEN VALUES AND EIGEN VECTORS**	**Classes:12**

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 Orthogonal Transformation.

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 nonlinear 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, 43rd Edition.
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-
2. booksdirectory.com/listing.php?category=4https://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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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ENGINEERING CHEMISTRY

I B. TECH- I SEMESTER

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 analyze the impact of water hardness and its various methods for removal of hardness of water, numerical problems to calculate the hardness of water in a given sample
3. To discover the importance of electrical energy which originates from chemical reactions essential for industrial needs
4. To understand the basic concepts of spectroscopy and drug molecules to extrapolate their chemical knowledge in day to day life
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 engineering and technology

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 and magnetism
2. Familiarize with fundamentals of treatment technologies and considerations for its design and implementation in water treatment plants
3. To extrapolate the knowledge of cell, electrode, electrolysis, electromotive force. To analyze and develop a technical solution to corrosion problems related to engineering materials
4. Acquire the significant knowledge about basic concepts of spectroscopy and synthesis of drug molecules would be known to the students
5. Comprehended and explore engineering applications of polymers and lubricants

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

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 polymerizations: 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 of lubricants.

TEXT BOOKS

1.P.C. Jainand M. Jain,―Engineering Chemistry‖,Dhanpat Rai Publishing Company Ltd. ,New Delhi,18th edition(2018)

2. Prasanta Rath ,B.RamaDevi,Ch.VenkataramanaReddy,S.Chakrovarthy,―A Textbook of Engineering Chemistry‖, Cengage publications(2019)

3. Shashi Chawla, ―Engineering Chemistry‖,Dhanpat Rai & Co. Publishers., NewDelhi,15thedition (2015)C.N. Banwell, ―Fundamentals of Molecular Spectroscopy‖

REFERENCE BOOKS

1. B.H.Mahan,―UniversityChemistry‖,NarosaPublishinghouse,NewDelhi,3rdedition(2013)
2. B.R.Puri,L.R.SharmaandM.S.Pathania,―PrinciplesofPhysicalChemistry‖,S.NaginChand & Company Ltd., 46th edition(2013)
3. J.D.Lee,―ConciseInorganicChemistry‖,WilleyPublications,5thedition(2008)
4. P.W.Atkins,J.D.Paula,―PhysicalChemistry‖,Oxford,8thedition(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: Fourth Edition
2. Vijayasarathy, P. R., Engineering Chemistry, Print Book ISBN : 9789387472778, eBook ISBN : 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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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

BASIC ELECTRICAL ENGINEERING

I B. TECH- I SEMESTER

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 its components
2. To understand magnetic circuits, DC circuits and AC single phase &three phase circuits
3. To study and understand the different types of DC/AC machines and Transformers.
4. To import the knowledge of various electrical installations.
5. To introduce the concept of power, power factor and its improvement.

COURSEOUTCOMES

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

1. To analyze and solve electrical circuits using network laws.
2. To analyze and solve electrical circuits using theorems.
3. To understand and analyze basic Electric and Magnetic circuits.
4. To study the working principles of Electrical Machines.
5. To introduce components of Low Voltage Electrical Installations.

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

Representation of sinusoidal wave forms, peak and rms values , phase representation, real power, 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

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, Mc Graw Hill.
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 Electrical and Electronics 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-
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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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ENGINEERING WORKSHOP

I B. TECH- I SEMESTER

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 their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipment's and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at workplace.
5. It explains the construction, function, use and application of different working tools, equipment and machines.

COURSE OUTCOMES

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

1. Study and practice on machine tools and their operations
2. Practice on manufacturing of components using workshop trades including Fitting, Carpentry, Foundry, Tin-smithy, House Wiring and Welding.
3. IdentifyandapplysuitabletoolsfordifferenttradesofEngineeringprocessesincluding drilling, material removing, measuring, chiseling.
4. Apply basic electrical engineering knowledge for house wiring practice.

LIST OF EXPERIMENTS

TRADES FOR EXERCISES (Any two exercises from each trade)

1. Tin-Smithy – (Square Tin, Cone and Cylinder)
2. Carpentry – (T-Lap Joint, Planning Sawing & Dovetail Joint)
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 Split Pattern)
6. Fitting – (V-Fit, Square Filing & Semi-circular fit)
7. House-wiring – (Two-way Switch and one-way switch in series)

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

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
2. Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition
3. Workshop Technology by Chapman
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 by Hazra-Chowdhary
4. Production Engineering by R. 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/Introductio n 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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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

PROFESSIONAL ENGLISH

I B. TECH- I SEMESTER

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 reading techniques.
3. To develop the professional writing with the practice of formal letters, e-mails, reports, resumes, etc.
4. To use various sentence structures effectively in formal and informal contexts.
5. To improve scientific and technical communication skills though technical vocabulary and appropriate prose texts.

COURSE OUTCOMES:

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

1. Use vocabulary effectively and syntactically.
2. Translate the reading techniques and apply them in literary texts.
3. Demonstrate enhanced competence in standard Written English.
4. Develop the competence in writing professional documents.
5. Exhibit appropriate communicative approaches to suit various contexts.

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). English for Engineers. Cambridge University Press.
2. Education for Life and Work – English Workbook prepared by English Faculty of St. Martin‘s Engineering College.

REFERENCE BOOKS:

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

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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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ENGINEERING CHEMISTRY LABORATORY

I B. TECH- I SEMESTER

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. Estimation of hardness and chloride content in water to check its suitability for drinking purpose
2. To find the concentration of ions present in an un known solution
3. To know the handling procedure of colorimetric and conductometric instruments
4. The fundamentals of drug synthesis
5. The measurement of physical properties like surface tension, viscosity and acid value

COURSE OUTCOMES

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

1. Understand the total dissolved salts present in a sample of water
2. Determine the concentration of ions existing in a solution
3. Find the strength of an acid by conductometric methods
4. Acquire basic knowledge on the chemical reaction used to synthesize drug molecules like aspirin and Paracetamol
5. Select lubricants for various purposes such as to reduce the friction between two movable surfaces and to determine the surface tension of a given liquid

LIST OF EXPERIMENTS

Volumetric Analysis

1. Determination of total hardness of water by complexometric method using EDTA.
2. Determination of chloride content of water by Argentometry.
3. Determination of acid value of coconut oil.

Potentiometry

4. Determination of Fe^{2+} ionspresentin 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 colorimetric method.

Synthesis of Drugs

8. Synthesis of aspirin and Paracetamol.

Physical constants

9. Determination of viscosity of the given sample by using Ostwald's Viscometer.
10. Determination of surface tension of a given liquid using stalagmometer.

TEXT BOOKS

1. Senior practical physical chemistry, B. D. Khosla, A. Gulati and V. Garg (R. Chand and Co., Delhi)
2. Prasanta Rath, B. RamaDevi, Ch. VenkataramanaReddy, S .Chakrovarthy,―A Textbook of Engineering Chemistry‖, Cengage publications(2019)
3. An introduction to practical; chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, New Delhi)
4. Vogel's text book of practical organic chemistry, 5th edition.
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.MendhamandR.C.Denney,―Vogel'sTextBookofQuantitative Chemical Analysis‖
2. O. P. Vermani & Narula, ―Theory and Practice in Applied Chemistry ‖,New Age International Publishers
3. Gary D. Christian, ―Analytical chemistry‖, 6th Edition, Wiley India

WEB REFERENCES

1. Phillip E. Savage, Industrial &Engineering Chemistry: At the Forefront of Chemical 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 Private Limited

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

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

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. To use accurate and appropriate pronunciation through the practice of phonetic 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 group activities.
5. TounderstandnuancesofEnglishlanguagebypracticingvariousexercisesat Multi-media lab.

COURSEOUTCOMES:

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

1. Differentiate the speech sounds in English and demonstrate accurate pronunciation.
2. Communicate with others in clear and confident manner.
3. Improve their effective and empathetic listening ability.
4. Show the zeal to participate in Public Speaking Sessions.
5. Neutralize the mother tongue influence in day to communication.

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

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 Engineering College.
2. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

REFERENCE BOOKS:

1. T Balasubramanian. A Textbook of English Phonetics for Indian Students, Macmillan,2008
2. J Sethi et 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=References
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. Englewood Cliffs; NJ: PrenticeHall.1969

E –TEXTBOOKS:

1. Mc corry Laurie Kelly Mc Corry Jeff Mason, Communication Skills for the Healthcare Professional, 1st edition, ISBN:1582558140, ISBN-13:9781582558141
2. RobertEOwens,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

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

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 analyze a given network by applying various electrical laws
2. To analyze a given network by applying various network theorems
3. To know the response of electrical circuits for different excitations
4. To calculate, measure and know the relation between basic electrical parameters.
5. To analyze the performance characteristics of DC and AC electrical machines

COURSEOUTCOMES:

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

1. Get an exposure to basic electrical laws.
2. Understand the response of different types of electrical circuits
3. Understand the response of different types of electrical Theorems
4. Understand different types of Excitations.
5. Understand the basic characteristics of transformers and electrical machines.

LIST OFEXPERIMENTS

PART-A

1. Verification of Ohms Law
2. Verification of KVL and KCL
3. Transient Response of Series RL and RC circuits using DC excitation
4. Transient Response of RLC Series circuit using DC excitation
5. Resonance in series RLC circuit.
6. Verification of Super position theorem.
7. Verification of Thevenin ‘s Theorem.
8. Verification of Norton‘s Theorem.

PART-B

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

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

TEXTBOOKS

1. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, 3rdedition2010, Tata
2. McGraw Hill.
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, Prentice Hall India, 1989.
2. P.V. Prasad, S. sivanagaraju, R. Prasad,―Basic Electrical and Electronics 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-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/

MOOCS Course

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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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ADVANCED CALCULUS

I B. TECH- II SEMESTER								
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 higher order
2. Evaluation of multiple integrals and their applications
3. The physical quantities involved in engineering field related to vector valued functions
4. The basic properties of vector valued functions and their applications
5. Vector point functions and scalar point functions

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 or not.
2. Solve higher order differential equation and apply the concept of differential equation to real problems.
3. Evaluate the multiple integrals and apply the concept to find areas and volumes.
4. Is able to find gradient, directional derivative, divergence and curl.
5. Evaluate the line, surface and volume integrals and converting them from one to 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**

Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax}, sinax, cosax, polynomial in x^m, $e^{ax}V(x)$ and xV(x),method of variation of parameters, Applications: LCR Circuit.

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, CBS Publishes
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

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

APPLIED PHYSICS

I B. TECH- II SEMESTER

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 quantum mechanics.
2. The concepts related to semiconductors.
3. The concepts related to PN Junction diode and its applications.
4. The basic concepts of laser and optical fiber and its applications.
5. The fundamentals of dielectrics and magnetic materials.

COURSE OUTCOMES

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

1. Demonstrate the fundamental concepts on Quantum behavior of matter in its microstate.
2. Understand the knowledge of fundamentals of Semi conductor physics.
3. Design and explain the characteristics of Op to electronic devices.
4. Analyze the properties of Laser and Optical Fibers and its application in engineering fields.
5. Design, characterize and prepare new materials for various engineering applications by using dielectric and magnetic materials.

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 dimensional box.

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.

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. Fibre Optics: 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 and Sensors.

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 – Cengage Learning.
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: John Wiley & Sons)

REFERENCE BOOKS

1. Richard Robinett , Quantum Mechanics.
2. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hillinc.(1995).
3. Online Course: ―OptoelectronicsMaterialsandDevices‖byMonicaKatiyarandDeepakGupta NPTEL.

WEB REFERENCES

1. Introductory Quantum Mechanics :https://nptel.ac.in/courses/115104096/
2. Fundamental concepts of semi conductors:https://nptel.ac.in/courses/115102025/
3. SemiconductorOptoelectronics:https://nptel.ac.in/courses/115102103/
4. Fibre Optic s: 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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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

PROGRAMMING FOR PROBLEM SOLVING

I B. TECH- II SEMESTER

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 of computers.
2. To understand the various steps in program development.
3. To learn the syntax and semantics of C programming language.
4. To learn the usage of structured programming approach in solving problems.

COURSE OUTCOMES

Upon successful completion of the course, the student is able

1. To write algorithms and to draw flowcharts for solving problems.
2. To convert the algorithms/flowcharts to C Programs.
3. To code and test, a given logic in C programming language.
4. To decompose a problem into functions and to develop modular reusable code.
5. To use arrays, pointers, strings and structures to write C programs
6. Searching and sorting problems

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 structured programming. 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, type conversion

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, go to, 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, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings.

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 data type.
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, Reema Theraja, Oxford
2. Information technology, Dennis P. Curtin, Kim Foley, Kunal Sen, Cathleen Morin, 1998, TMH
3. Theory and problem of programming with C, Byron C Gottfried, 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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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ENGINEERING GRAPHICS

I B. TECH- II SEMESTER								
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

1. 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.
2. To develop in students, graphic skills for communication of concepts, ideas and design of engineering products.
3. To expose them to existing national standards related to technical drawings.
4. To impart knowledge about standard principles of orthographic projection of objects.
5. It will help students to use the techniques, skills, and modern engineering tools and communicate effectively.

COURSE OUTCOMES

Upon successful completion of the course,

1. the student is able to Familiarize with the fundamentals and standards of Engineering graphics
2. Project orthographic projections of lines and plane surfaces.
3. Convert orthographic views to isometric views and vice-versa and know the basics of AutoCAD. Preparing working drawings to communicate the ideas and information.
4. 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.

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 RanaB.C.,—EngineeringDrawing‖,Pearson,2ndEdition,2009.

REFERENCE BOOKS

1 Venugopal K. and Prabhu Raja V., —Engineering Graphics‖, New Age International (P) Limited,2011.
2 K.V.Natarajan,—AtextbookofEngineeringGraphics‖,DhanalakshmiPublishers, Chennai,2015.
3 GopalakrishnaK.R.,—EngineeringDrawing‖(Vol.I&IIcombined),SubhasStores, Bangalore,2007.
4 TrymbakaMurthy,—ComputerAidedEngineeringDrawing",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

1 http://rgpv-ed.blogspot.com/2009/09/development-of-surfaces.html
2 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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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

APPLIED PHYSICS LAB

I B. TECH- II SEMESTER

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 semiconductor devices.
2. To verify the Biot –Savartlaw.
3. To experience resonance phenomena.
4. To compare the experimental results with the class room learning.
5. The basic experimental skills which are very essential for an engineering student.

COURSE OUTCOMES

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

1. Learn the working principles of PN Junction diode.
2. Examine the electrical and magnetic properties of materials.
3. Determine the characteristics of Opto-Electronic devices.
4. Understand the basic principles of Optical Fibers.
5. Analyze the basic electronic circuits.

LIST OF EXPERIMENTS

1. **Energy gap of P-N junction diode**: To determine the energy gap of a semiconductor diode.
2. **Solar Cell**: To study the V-I Characteristics of solar cell.
3. **Light emitting diode**: Plot V-I and P-I characteristics of light emitting diode.
4. **Stewart – Gee's experiment**: Determination of magnetic field along axis of the current carrying coil.
5. **Hall Effect**: To determine Hall co-efficient of given semiconductor.
6. **Photoelectric effect**: To determine work function of a given material.
7. **LASER**: To study the characteristics of LASER sources.
8. **Optical Fibre** : To determine the Numerical aperture and bending losses of optical fibres.
9. **LCR Circuit**: To determine the Quality factor of LCR circuit.
10. **RC Circuit**: To determine the Time constant of RC circuit.

NOTE: Any 8 experiments are to be performed

TEXT BOOKS

1. Engineering Physics, B.K. Pandey, S. Chaturvedi –Cengage Learning.
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. Cambridge University Press,1984.
2. Eugene Hecht,—Optics‖ , 5thEdition,AdelphiUnioversity,2016

WEB REFERENCES
1. Fundamental concepts of semiconductors 2. Semiconductor 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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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

PROGRAMMING FOR PROBLEM SOLVING LAB

I B. TECH- II SEMESTER

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 of computers.
2. To understand the various steps in program development.
3. To learn the syntax and semantics of C programming language.
4. To learn the usage of structured programming approach in solving problems

COURSE OUTCOMES

Upon successful completion of the course, the student is able

1. To write algorithms and to draw flowcharts for solving problems.
2. To convert the algorithms/flowcharts to C programs.
3. To code and test a given logic in C programming language.
4. To decompose a problem into functions and to develop modular reusable code.
5. To use arrays, pointers, strings and structures to write C programs.
6. Searching and sorting problems

LIST OF EXPERIMENTS

1. Write a simple program that prints the results of all the operators available in C
2. Write a simple program to convert the temperature from Fahrenheit to Celsius
3. Write a program for find the max and min from the three numbers using if else statement
4. Write a C program to find the roots of a Quadratic equation.
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 prime number
7. WriteaCprogramtofindthesumofindividualdigitsofapositiveintegerandtestgiven number is palindrome.
8. Write a C program to generate the Fibonacci sequence of numbers.
9. WriteaCprogramtogeneratealltheprimenumbersbetween1and n,where n is a value supplied by the user.
10. Write a C program to find the minimum, maximum and average in an array of integers
11. Write a C program that uses functions to perform the following:1) Addition of Two Matrices 2) Multiplication of Two Matrices
12. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba,etc.)

13. To insert a sub- string into a given main string from a given position .e.ii. To delete n Characters from a given position in a given string
14. Write a C program that displays the position of a character ch in the string Sor– 1ifSdoesn_tcontainch
15. Write a C program to count the lines, words and characters in a given text.
16. Define a structure student to store the details like Roll Number, Name, and Marks in three subjects of a student and display the same.
17. Write a C program to perform specified operation on complex numbers.
18. Write a C program to store the information about three students.
19. Write a C Program to illustrate the use of nested structures.
20. Write a C Program to perform arithmetic operations using pointers.
21. Write a C Program to display the array elements in reverse order using pointer.
22. Write a C Program to to find factorial of a number using functions.
23. Write a C Program to find factorial of a number using recursive functions.
24. Write a C Program to implement call by value and call by reference.
25. Write a C Program to copy the data from one file to another
26. Write a C Program to append data to the file
27. Write a C Program to merge the two files
28. Write a C Program to display the file content on reverse order.
29. Write a C Program to count number of vowels, consonants, digits, words ina given file

TEXT BOOKS

1. The C Programming Language by Dennis M Ritchie, BrianW.Kernigham,1988, PHI Publications, 2010, New Delhi.
2. Computer System & Programming in C by S Kumar & S Jain ,Nano EdgePublic 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, Kim Foley, Kunal Sen, Cathleen Morin,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/

REFERENCE BOOKS

1. https://nptel.ac.in/courses/106105085/4
2. https://www.coursera.org/courses?query=c%20programming

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ENVIRONMENTAL SCIENCE

I B. TECH- II SEMESTER

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. Analyze the inter relationship between living organism and environment
2. Describe various types of natural resources available on the earth surface
3. Identify the values, threats of biodiversity, endangered and endemic species of India along with the conservation of biodiversity
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 of ecosystem
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. Illustrate causes, effects, and control measures of various types of environmental pollutions
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, Bio magnification.

UNIT-II	NATURAL RESOURCES	Classes: 8

Classification of Resources: Living and Non-Living resources.
Water resources: use and overutilization of surface and ground water, floods and droughts, Dams: benefits and problems.
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 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 DEVELOPEMENT**	**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.WildlifeProtection Act.		

TEXT BOOKS

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharuchafor University Grants Commission
2. Environmental Studies by R. Rajagopalan, Oxford University Press.
3. Textbook of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications
4. Dr. P. D Sharma, ―Ecology and Environment‖, Rastogi Publications, NewDelhi,12th Edition, 2015

REFERENCE BOOKS

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1. Environmental Studies by Anubha Kaushik, 4 Edition, New age international publishers
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Pvt. Ltd, New Delhi
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHL Learning Pvt. Ltd, New Delhi
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

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, 2009ISBN, 8131806413,9788131806418.

MOOCS COURSE

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

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ANALOG AND DIGITAL ELECTRONICS

II B. TECH- I SEMESTER								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	T	P	C	CIE	SEE	Total
CSG301ES	**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. Know the characteristics of various components.
2. Understand the utilization of components.
3. Design and analyze small signal amplifier circuits.
4. Learn Postulates of Boolean algebra and to minimize combinational functions
5. Design and analyze combinational and sequential circuits
6. Know about the logic families and realization of logic gates

UNIT-I	**DIODES AND APPLICATIONS**	**Classes: 14**

Junction diode characteristics: 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	**BIPOLAR JUNCTION TRANSISTORS**	**Classes:13**

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

UNIT-III	**FETS AND DIGITAL CIRCUITS**	**Classes: 10**

Ts: 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, TTL output stages, RTL and DCTL, CMOS, Comparison of logic families.

UNIT-IV	**COMBINATIONAL LOGIC CIRCUITS**	**Classes: 11**

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: 10**
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, Jaccob Millman,
2. Christos Halkias and Chethan D. Parikh, Tata McGraw-Hill Education, India, 2010.
3, Digital Design, 5/e, Morris Mano and Michael D. Cilette, Pearson,

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. Analog Electronics Authors- L.K. MAHESWARI, M.M.S. ANAND. 2009
2. Electronic Communication System Author- Kennedy
3. Integrated Electronics Analog And Digital & System Author – Jacob Millman. Christos C. Halkias
4. https://www.analog.com › education › education-library › tutorials

E -TEXT BOOKS

1. The Scientist & Engineer's Guide to Digital Signal Processing, 1999
2. Application-Specific Integrated Circuits Michael J. Smith

MOOCS COURSE

1. https://www.mooc-list.com › tags › analogue-electronics
2. https://www.mooc-list.com › course › electronic-systems-and-digital-electronics

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

DATA STRUCTURES

II B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG302PC	B. Tech	3	1	0	4	30	70	100

COURSE OBJECTIVES

To learn

1. Exploring basic data structures such as stacks and queues.
2. A variety of data structures such as hash tables, search trees, tries, heaps, graphs
3. Sorting and pattern matching algorithms

COURSE OUTCOMES

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

1. Select the data structures that efficiently model the information in a Problem.
2. Assess efficiency trade-offs among different data structure Implementations or combinations.
3. Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.
4. Implement and know the application of algorithms for sorting and pattern matching
5. Implement and know the application of algorithms in Graph Traversal methods.

UNIT-I	INTRODUCTION TO DATA STRUCTURES	Classes: 12

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 AND HASH TABLE	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.

UNIT-III	SEARCH TREES	Classes: 10

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 AND SORTING	Classes: 12
Graphs: Graph Implementation Methods. Graph Traversal Methods. **Sorting**: Bubble Sort, Selection Sort, Insertion Sort, Quick 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. 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. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B.A. Forouzan, Cengage Learning.
2. Classic Data Structures, D. Samantha, 2nd edition, PHI.

WEB REFERENCES

1. Alfred Aho , John Hopcroft, and Jeffrey Ullman, Data Structures and Algorithms, Addison-Wesley, 1983, ISBN0-201-00023-7.
2. https://www.studytonight.com/data-structures/introduction-to-data-structures
3. https://nptel.ac.in/courses/106/102/106102064/

E -TEXT BOOKS

1. Peter Brass, Advanced Data Structures, Cambridge University Press, 2008, ISBN 978-0521880374
2. G. H. Gonnet and R. Baeza-Yates, Handbook of Algorithms and Data Structures - in Pascal and C, second edition, Addison-Wesley, 1991, ISBN0-201-41607-7.

MOOCS COURSES

1. https://www.udemy.com/data-structures-and-algorithms
2. https://onlinecourses.swayam2.ac.in/cec21_cs02/preview

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

MATHEMATICAL AND STATISTICAL FOUNDATIONS

II B. TECH-I SEMESTER								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
MA303BS	**B. Tech**	**3**	**1**	**0**	**4**	**30**	**70**	**100**

COURSE OBJECTIVES

To learn

1. The Number Theory basic concepts useful for cryptography etc
2. The theory of Probability and probability distributions of single and multiple random variables
3. The sampling theory and Estimating Parameters
4. Testing of hypothesis and making inferences
5. Stochastic process and Markov chains.

COURSE OUTCOMES

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

1. Apply the number theory concepts to cryptography domain.
2. Apply the concepts of probability and distributions to some case studies.
3. Correlate the material of one unit to the material in other units.
4. Estimating a Proportion of single mean and difference of means
5. Resolve the potential misconceptions and hazards in each topic of study.

UNIT-I	GREATEST COMMON DIVISORS AND PRIME FACTORIZATION	Classes: 8

Greatest common divisors, The Euclidean algorithm, The fundamental theorem of arithmetic, Factorization of integers and the Fermat numbers, Congruences: Introduction to congruences, Linear congruences, The Chinese remainder theorem, Systems of linear congruences.

UNIT-II	SIMPLE LINEAR REGRESSION AND CORRELATION AND RANDOM VARIABLES AND PROBABILITY DISTRIBUTIONS	Classes: 8

Simple Linear Regression and Correlation: Introduction to Linear Regression, The Simple Linear Regression Model, Least Squares and the Fitted Model, Properties of the Least Squares Estimators, Inferences Concerning the Regression Coefficients, Prediction, Simple Linear Regression Case Study.

Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions, Statistical Independence.

Discrete Probability Distributions: Binomial Distribution, Poisson distribution.

UNIT-III	**CONTINUOUS PROBABILITY DISTRIBUTIONS AND FUNDAMENTAL SAMPLING DISTRIBUTIONS**	**Classes:8**

Continuous Probability Distributions: Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial **Fundamental Sampling Distributions**: Random Sampling, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, Sampling Distribution of S2, t–Distribution, F- Distribution.

UNIT-IV	**ESTIMATION & TESTS OF HYPOTHESES**	**Classes: 8**

Estimation & Tests of Hypotheses: Introduction, Statistical Inference, Classical Methods of Estimation. Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Tolerance Limits, Estimating the Variance, Estimating a Proportion for single mean , Difference between Two Means, between Two Proportions for Two Samples and Maximum Likelihood Estimation.

UNIT-V	**STOCHASTIC PROCESSES AND MARKOV CHAINS**	**Classes: 8**

Stochastic Processes and Markov Chains: Introduction to Stochastic processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, nstep transition probabilities, Markov chain, Steady state condition, Markov analysis.

TEXT BOOKS

1. Kenneth H. Rosen, Elementary number theory & its applications, sixth edition, Addison- Wesley, ISBN 978 0-321-50031-1.
2. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics for Engineers & Scientists, 9th Ed. Pearson Publishers.
3. S. D. Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi

REFERENCE BOOKS

1. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.
2. T.T. Soong, Fundamentals of Probability And Statistics For Engineers, John Wiley & Sons Ltd, 2004.
3. Sheldon M Ross, Probability and statistics for Engineers and scientists, Academic Press.

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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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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

COMPUTER VISION

II B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG304PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To review image processing techniques for computer vision.
2. To understand shape and region analysis.
3. To understand Hough, Transform and its applications to detect lines, circles, ellipses.
4. To understand three-dimensional image analysis techniques.
5. To understand motion analysis.
6. To study some applications of computer vision algorithms

COURSE OUTCOMES

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

1. Implement fundamental image processing techniques required for computer vision.
2. Perform shape analysis.
3. Implement boundary tracking techniques.
4. Apply chain codes and other region descriptors.
5. Apply Hough Transform for line, circle, and ellipse detections.
6. Apply 3D vision techniques.
7. Implement motion related techniques.
8. Develop applications using computer vision techniques

UNIT-I	IMAGE PROCESSING FOUNDATIONS	Classes: 10

Review of image processing techniques – classical filtering operations – thresholding techniques – edge detection techniques – corner and interest point detection – mathematical morphology – texture

UNIT-II	SHAPES AND REGIONS	Classes: 13

Binary shape analysis – connectedness – object labelling and counting – size filtering – distance functions – skeletons and thinning – deformable shape analysis – boundary tracking procedures – active contours – shape models and shape recognition – centroidal profiles – handling occlusion –boundary length measures – boundary descriptors – chain codes – Fourier descriptors – region descriptors moments.

UNIT-III	HOUGH TRANSFORM	Classes: 12

Line detection – Hough Transform (HT) for line detection – foot-of normal method – line localization – line fitting – RANSAC for straight line detection – HT based circular object detection– accurate centre location – speed problem – ellipse detection – Case study: Human Iris location– hole detection – generalized Hough Transform (GHT) – spatial matched filtering – GHT for ellipse detection – object location – GHT for feature collation.

UNIT-IV	3D VISION AND MOTION	Classes: 11

Methods for 3D vision – projection schemes – shape from shading – photometric stereo – shape from texture – shape from focus – active range finding – surface representations – point-based representation – volumetric representations – 3D object recognition – 3D reconstruction – introduction to motion – triangulation – bundle adjustment – translational alignment – parametric motion – spline-based motion – optical flow – layered motion.

UNIT-V	APPLICATIONS	Classes: 11

Application: Photo album – Face detection – Face recognition – Eigen faces – Active appearance and 3D shape models of faces Application: Surveillance – foreground background separation – particle filters – Chamfer matching, tracking, and occlusion –
combining views from multiple cameras – human gait analysis Application: In-vehicle vision system: locating roadway – road markings – identifying road signs – locating pedestrians

TEXT BOOKS

1. Simon J. D. Prince, ―Computer Vision: Models, Learning, and Inference ‖, Cambridge University Press, 2012.
2. Mark Nixon and Alberto S. Aquado, ―Feature Extraction & Image Processing for Computer Vision ‖, Third Edition, Academic Press, 2012.
3. E. R. Davies, ―Computer & Machine Vision, Fourth Edition, Academic Press, 2012.

REFERENCE BOOKS

1. D. L. Baggio et al., ―Mastering OpenCV with Practical Computer Vision Project s‖, Packet Publishing, 2012.
2. Jan Erik Solem, ―Programming Computer Vision with Python: Tools and algorithms For analysing images, O'Reilly Media, 2012.
3. R. S zeliski, ―Computer Vision: Algorithms and Applications ‖, Springer 2011.

WEB REFERENCES

1. https://www.e-booksdirectory.com/details.php?ebook=1743
2. https://freecomputerbooks.com/Computer-Vision-Algorithms-and-Applications.html
3. https://www.kaggle.com/getting-started/185878
4. https://www.elsevier.com/books/advanced-methods-and-deep-learning-in-computer-vision/davies/978-0-12-822109-9

E -TEXT BOOKS

1. https://www.tutorialspoint.com/computer_vision_and_image_processing_web_app_developed_using_python_flask_machine_learning_and_deployed_in_cloud/index.asp
2. https://www.tutorialspoint.com/computer_vision_and_deep_learning_in_python_novice_to_expert/index.asp

MOOCS COURSES

1. https://www.udemy.com/courses/search/?src=ukw&q=computer+vision
2. https://www.edx.org/search?q=computer%20vision

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

PYTHON PROGRAMMING

II B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG305PC	B. Tech	2	0	0	2	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 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. 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 Network Programming, Web Services and Databases in Python.

UNIT-I	INTRODUCTION TO PYTHON	Classes: 13

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, EXCEPTIONS AND MODULES	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 Management, Raising Exceptions, Assertions, Standard Exceptions, Creating Exceptions, Why Exceptions? 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	FUNCTIONS AND OBJECT-ORIENTED PROGRAMMING	Classes: 12

Functions: What are functions? Calling Functions, Creating Functions, Passing Functions, Formal Arguments, Variable-Length Arguments, Functional Programming, Recursion.
Object Oriented Programming: Introduction, Classes, Instances, Binding and Method Invocation, Inheritance, Built-in Functions, Customizing Classes, Privacy, Delegation and Wrapping.

UNIT-IV	REGULAR EXPRESSIONS AND MULTITHREADING	Classes: 12

Regular Expressions: Introduction, Special Symbols and Characters, re Module.
Multithreaded Programming: Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock, Thread Module, Threading Module, Related Modules

UNIT-V	GUI AND WEB PROGRAMMING	Classes: 12

GUI Programming: Introduction, T kinter 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

TEXT BOOKS

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.

REFERENCE BOOKS

1. Think Python, Allen Downey, Green Tea Press
2. Introduction to Python, Kenneth A. Lambert, Cengage
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
4. Learning Python, Mark Lutz, O'Reilly.

WEB REFERENCES

1. https://www.tutorialspoint.com/python3/
2. https://www.geeksforgeeks.org/cgi-programming-python/
3. https://realpython.com/python-beginner-tips/
4. https://www.python.org/

E -TEXT BOOKS

1. https://www.tutorialspoint.com/python3/
2. https://books.goalkicker.com/PythonBook/

MOOCS COURSES

1. https://www.coursera.org/learn/python-programming
2. https://www.edx.org/professional-certificate/python-data-science
3. https://swayam.gov.in/nd1_noc19_cs41/preview
4. https://swayam.gov.in/nd1_noc19_mg47/preview
5. https://swayam.gov.in/nd1_noc19_cs40/preview

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

DATA STRUCTURES LAB

II B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG306PC	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

To learn

1. It introduces searching and sorting algorithms
2. It provides an understanding of data structures such as stacks and queues.

COURSE OUTCOMES

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

1. Able to identify the appropriate data structures and algorithms for solving real World problems.
2. Able to implement various kinds of searching and sorting techniques.
3. Able to implement data structures such as stacks, queues, Search trees, and hash tables to solve various computing problems.

LIST OF EXPERIMENTS

1. Write a program that uses functions to perform the following operations on singly linked list.
    a) Creation.
    b) Insertion
    c) Deletion.
    d) Traversal
2. Write a program that uses functions to perform the following operations on doubly linked list.
    a) Creation.
    b) Insertion
    c) Deletion.
    d) Traversal
3. Write a program that uses functions to perform the following operations on circular linked list.
    a) Creation.
    b) Insertion
    c) Deletion.
    d) Traversal
4. Write a program that implement Stack operations using Arrays and Pointers.
5. Write a program that implement Queue operations using Arrays and Pointers.
6. 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 iv) Quick sort v) Merge sort
7. Write a program that use 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
8. Write a program to implement the tree traversal methods.
9. Write a program to implement the graph traversal methods.

TEXT BOOKS

1. Fundamentals of Data Structures in C, 2nd 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. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning.

WEB REFERENCES

1. “Python Data Structures and Algorithms” by Benjamin Baka.

E -TEXT BOOKS

1. Data Structures in C Nair, Achuth sankar S. Mahalakshmi, T.

MOOCS COURSES

1. https://nptel.ac.in/courses/106/106/106106127/
2. https://nptel.ac.in/courses/106/106/106106145/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

IT WORKSHOP LAB

II B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG307PC	B. Tech	0	0	3	1.5	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 software: Installation of operating Systems: Windows, Linux along with necessary Device Drivers, Installation of application software 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.
   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 Khurmi J k Gupta

REFERENCE BOOKS

1. Computer Hardware, Installation, Interfacing, Troubleshooting And Maintenance, K.L. James, Eastern Economy Edition.
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-Diane Koers

MOOCS COURSES

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

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ANALOG AND DIGITAL ELECTONICS LAB

II B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG308ES	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. Upon successful completion of the course, the student is able to
2. Know the characteristics of various components.
3. Understand the utilization of components.
4. Design and analyze small signal amplifier circuits.
5. Postulates of Boolean algebra and to minimize combinational functions
6. Design and analyze combinational and sequential circuits
7. 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. Common Source amplifier Characteristics
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.

TEXT BOOKS

1. Integrated Electronics: Analog and Digital Circuits and Systems, 2/e, Jacob Millman, 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. a plan and Christopher G. White | 15 May 2003
2. Foundations of Analog and Digital Electronic Circuits by Agarwal | 24 September 2005

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 G Jackson

MOOCS COURSES

1. https://www.mooc-list.com/tags/digital-electronics
2. https://www.coursera.org/courses?query=electronics

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

PYTHON PROGRAMMING LAB

II B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG309PC	B. Tech	0	0	2	1	30	70	100

COURSE OBJECTIVES

To learn

1. core programming basics and program design with functions using Python programming language.
2. A range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
3. The high-performance programs designed to strengthen the practical expertise.

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 program to demonstrate different number data types in Python.
2. Write a program to perform different Arithmetic Operations on numbers in Python.
3. Write a program to create, concatenate and print a string and accessing sub-string from a given string.
4. Write a python script to print the current date in the following format “Sun May 29 02:26:23IST 2017”
5. Write a program to create, append, and remove lists in python.
6. Write a program to demonstrate working with tuples in python.
7. Write a program to demonstrate working with dictionaries in python.
8. Write a python program to find largest of three numbers.
9. Write a Python program to convert temperatures to and from Celsius, Fahrenheit.
   [Formula : c/5 = f-32/9]
10. Write a Python program to construct the following pattern, using a nested for loop

```
*
* *
* * *
* * * *
* * * * *
* * * *
* * *
* *
*
```

11. Write a Python script that prints prime numbers less than 20.
12. Write a python program to find factorial of a number using Recursion.
13. Write a program that accepts the lengths of three sides of a triangle as inputs. The program output should indicate whether or not the triangle is a right triangle (Recall from the Pythagorean Theorem that in a right triangle, the square of one side equals the sum of the squares of the other two sides).
14. Write a python program to define a module to find Fibonacci Numbers and import the module to another program.
15. Write a python program to define a module and import a specific function in that module to another program.
16. Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.
17. Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.
18. Write a Python class to convert an integer to a roman numeral.
19. Write a Python class to implement pow(x, n)
20. Write a Python class to reverse a string word by word.

TEXT BOOKS

1. A Practical Introduction to Python Programming, Brian Heinold.
2. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.
3. Kenneth A. Lambert, The Fundamentals of Python: First Programs,2011, Cengage Learning. Think Python First Edition, by Allen B. Downey, O'Reilly publishing.

REFERENCE BOOKS

1. Learn Python in 1 Day: Complete Python Guide with Examples Kindle Edition
2. Python Crash Course Paperback – 8 Dec 2015 by Eric Matthes
3. Python Cookbook: Recipes for Mastering Python 33rd Edition, Kindle Edition

WEB REFERENCES

1. Python Programming (Edit): An Introduction to Computer Science Paperback– 7 May2010
2. Programming Python 4e Paperback – 14 Jan 2011 by Mark Lutz
3. Introduction to Machine Learning with Python Paperback – 7 Oct 2016 by Andreas C. Mueller (Author), Sarah Guido

E -TEXT BOOKS

1. http://www.oreilly.com/programming/free/a-whirlwind-tour-of-python.csp
2. http://www.oreilly.com/programming/free/20-python-libraries-you-arent-using-but- should.csp
3. http://www.oreilly.com/programming/free/hadoop-with-python.csp
4. http://www.oreilly.com/programming/free/how-to-make-mistakes-in-python.csp

MOOCS COURSES

1. https://www.mooc-list.com › tags ›python-programming
2. https://www.mooc-list.com › tags ›python
3. https://www.edx.org › learn ›python
4. https://www.udacity.com › course ›introduction-to-python--ud1110

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

GENDER SENSITIZATION LAB

II B. TECH- I SEMESTER

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
*GS310MC	B. Tech	-	-	2	-	100	-	100

COURSEOBJECTIVES:

1. To develop students' sensibility with regard to issues of gender in contemporary India.
2. To provide a critical perspective on the socialization of men and 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.

COURSEOUTCOMES:

Upon successful completion of the course

1. Students will have developed a better understanding of vital issues related to gender in contemporary India.
2. Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from various knowledge sources.
3. Students will acquire insight into the gendered division of labor and its relation to politics and economics.
4. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
5. Men and women students and professionals will be better equipped with impartiality to work and live together as equals and develop a sense of appreciations of women

UNIT-I	UNDERSTANDING GENDER	Classes:8

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.

UNIT-II	GENDER ROLE AND RELATIONS	Classes:8

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:8

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)

TEXTBOOKS:

1. A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, GoguShyamala, Deepa Sreenivas and Susie Tharu, The Textbook, "Towards a World of Equals: A Bilingual Textbook on Gender" written by published by Telugu Akademi, Telangana Government (2015).
2. Raj Pal Singh, Anupama Sihag, "Gender Sensitization: A World of Equals", Raj Publications (Dist.), ISBN: 9789386695123, 938669512X (2019)

REFERENCE BOOKS:

1. S. Benhabib. Situating the Self: Gender, Community, Gender and Post modernism in Contemporary Ethics, London; Routledge, 1992.

WEBREFERENCES:

1. https://www.researchgate.net/publication/329541569_EMPOWERING_WOMEN_THROUGH_GENDER_SENSITIZATION
2. https://eige.europa.eu/gender-mainstreaming/toolkits/gender-sensitive-parliaments/references-and-resources

E –TEXTBOOKS:

1. https://harpercollins.co.in/BookDetail.asp?BookCode=3732
2. https://unesdoc.unesco.org/ark:/48223/pf0000158897_eng

MOOCSCOURSE:

1. https://www.mooc-list.com/course/sustainable-development-goal-5-gender-equality-canopylab
2. https://www.coursera.org/learn/gender-sexuality

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

DISCRETE MATHEMATICS

II B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG401PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. 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. Understand and construct precise mathematical proofs
2. Use logic and set theory to formulate precise statements
3. Analyze and solve counting problems on finite and discrete structures
4. Describe and manipulate sequences
5. Apply graph theory in solving computing problems

UNIT-I	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	SETS AND RELATIONS	Classes: 11

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	INDUCTION AND RECURSION	Classes: 12

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

UNIT-IV

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, Divide-and-Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion-Exclusion, Applications of Inclusion-Exclusion

UNIT-V

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. Tremblay and R.Manohar, TMH,
2. Discrete Mathematics for Computer Scientists & Mathematicians: Joe L. Mott, Abraham Kandel, Teodore P. Baker, 2nd ed, Pearson Education.
3. Discrete Mathematics- Richard Johnsonbaugh, 7Th Edn., Pearson Education.
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. https://math.dartmouth.edu/archive/m19f03/public_html/
2. https://nptel.ac.in/courses/106/106/106106094/

E -TEXT BOOKS

1. Discrete Mathematics, An Open Introduction, Oscar Levin.

MOOCS COURSES

1. https://www.edx.org/learn/discrete-mathematics
2. https://www.udemy.com/course/discrete-math/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

COMPUTER GRAPHICS

II B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG402PC	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
4. Select a search algorithm for a problem and estimate its time and space complexities.
5. Possess the skill for representing knowledge using the appropriate technique for a given problem.
6. Possess the ability to apply CG techniques to solve problems of game playing, and machine learning.

UNIT-I	BASICS OF COMPUTER GRAPHICS	Classes: 11

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), midpoint circle and ellipse algorithms Polygon Filling: Scan-line algorithm, boundary-fill and flood-fill algorithms

UNIT-II	2-D GEOMETRICAL TRANSFORMS	Classes: 11

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, Sutherland –Hodgeman polygon clipping algorithm.

UNIT-III	3-D OBJECT REPRESENTATION	Classes: 12

3-D object representation: 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 TRANSFORMATION	Classes: 12

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	SURFACE DEDUCTION AND COLOR MODELS	Classes: 12

Visible surface detection methods: Classification, back-face detection, depth-buffer, BSP-tree methods and area sub-division methods
Color Model Properties of Light XYZ RGB, YIQ, and CMY Color Models

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. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
2. Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
3. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.

WEB REFERENCES

1. https://eecs.wsu.edu/~cook/ai/lectures/p.html
2. http://www.cs.toronto.edu/~fbacchus/csc384/Lectures/lectures.html
3. http://web.cs.iastate.edu/~cs572/studyguide.html
4. https://faculty.ist.psu.edu/vhonavar/Courses/ai/studyguide.html

E -TEXT BOOKS

1. Computer Graphics C version, Donald Hearn and M. Pauline Baker, Pearson Education

MOOCS COURSES

1. https://www.udacity.com/course/intro-to computer-graphics--cs271
2. https://www.classcentral.com/course/edx-computer-graphics-cg-7230
3. https://www.my-mooc.com/en/mooc/intro-to-computergraphics/

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DEPARTMENT OF COMPUTER SCIENC AND DESIGN

OPERATING SYSTEMS

II B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG403PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection)
2. The issues to be considered in the design and development of operating system
3. Basic Unix commands, system call interface for process management, inter process communication and I/O in Unix

COURSE OUTCOMES

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

1. Control access to a computer and the files that may be shared
2. Demonstrate the knowledge of the components of computer and their respective roles in computing.
3. Recognize and resolve user problems with standard operating environments.
4. Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

UNIT-I	OPERATING SYSTEM INTRODUCTION	Classes: 12

Introduction: Operating system objectives, User view, System view, Operating system Definition, Computer System Organization, Computer System Architecture, OS Structure, OS Operations, Process Management, Memory Management, Storage Management, Protection and Security, Computing Environments. Operating Systems services, User and OS Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, OS Structure.

UNIT-II	PROCESS AND CPU SCHEDULING	Classes: 14

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, wait pid, exec

UNIT-III	DEADLOCKS AND PROCESS SYNCHRONIZATION	Classes: 11

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 **Inter process 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: 13

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, seek system calls.

TEXT BOOKS

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Advanced programming in the UNIX environment, W.R. Stevens, Pearson education.

REFERENCE BOOKS

1. Modern Operating Systems, Andrew S Tanenbaum, 3rdEdition, PHI.
2. Operating Systems: A concept-based Approach, 2nd Edition, D.M . Dhamdhere, TMH.
3. Operating System A Design Approach- Crowley, TMH.
4. UNIX programming environment, Kernighan and Pike, PHI/ Pearson Education
5. UNIX Internals -The New Frontiers, U. Vahalia, Pearson Education.

WEB REFERENCES

1. http://www.dreamcss.com/2009/07/-operating-system-applications.html
2. http://www.cornelios.org/
3. http://www.yousaytoo.com/best--operating-systems/247122
4. http://www.masternewmedia.org/operating_systems/web-operating-systems-vi...
5. http://desizntech.info/2009/08/top-5-web-operating-systems/

E -TEXT BOOKS

1. An Introduction To Operating Systems: Concepts And Practice(Gnu/Linux and Windows) Bhatt, Pramod Chandra P.
2. Operating Systems: Principles And Design Choudhury, Pabitra Pal
3. Operating Systems Mohan, I. Chandra
4. Understanding Unix Srirengan, K.

MOOCS COURSES

1. https://www.udacity.com › course› introduction-to-operating-systems--ud.
2. https://www.classcentral.com › tag› operating-systems
3. https://www.my-mooc.com›mooc›introduction-to-operating-systems-ucs140.stanford.edu

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

DATABASE MANAGEMENT SYSTEMS

II B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG404PC	B. Tech	3	1	0	4	30	70	100

COURSE OBJECTIVES

To learn

1. The basic concepts and the applications of database systems.
2. The basics of SQL and construct queries using SQL.
3. Data models, 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. Familiar with database storage structures and access techniques

UNIT-I	DATABASE SYSTEM APPLICATIONS AND INTRODUCTION	Classes: 13

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	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.

UNIT-III	SQL AND NORMAL FORMS	Classes: 12

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 PROCESSING	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	STORAGE STRUCTURE	Classes: 13

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, Raghu rama 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 Navathe, 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.

WEB REFERENCES

1. https://www.edx.org/learn/databases
2. https://www.youtube.com/playlist?list=PLyvBGMFYV3auVdxQ1-88ivNFpmUEy-U3M
3. https://www.youtube.com/watch?v=bGyHqvQW6JY&list=PLRFPL_aa_SLVjQn93cUGZaKZVGr_80vYv&index=1

E -TEXT BOOKS

1. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

MOOCS COURSES

1. https://onlinecourses.nptel.ac.in/noc21_cs04/preview
2. https://www.coursera.org/learn/database-management
3. https://www.udemy.com/course/database-management-system-from-scratch-part-1/

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DEPARTMENT OF COMPUTER SCIENCE AND DESGN

JAVA PROGRAMMING

II B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG405PC	B. Tech	3	1	0	4	30	70	100

COURSE OBJECTIVES

To learn

1. The object-oriented programming concepts.
2. Object-oriented programming concepts, and apply them in solving problems.
3. The principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes
4. The implementation of packages and interfaces
5. 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. Solve real world problems using OOP techniques.
2. Understand the use of abstract classes.
3. Solve problems using java collection framework and I/o classes.
4. Develop multithreaded applications with synchronization.
5. Develop applets for web applications and GUI based applications.

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

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, autoboxing, 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 AND INTERFACES	Classes: 12

The Collections Framework (java.util)- Collections overview, Collection Interfaces, The Collectionclasses- ArrayList,LinkedList,HashSet,TreeSet,PriorityQueue,ArrayDeque.Accessing a Collection via an Iterator, Using an Iterator, The For-Each alternative, Map InterfacesandClasses,Comparators,Collectionalgorithms,Arrays,TheLegacyClassesand Interfaces- Dictionary, Hash table, 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- J Label and Image Icon, J Text Field, The Swing Buttons-J Button, J Toggle Button, J Check Box, J Radio Button, J Tabbed Pane, J Scroll Pane, J List, J Combo Box, Swing Menus, Dialogs.

TEXT BOOKS

1. Java The complete reference, 11th edition, Herbert Schildt , McGraw Hill Education (India) Pvt.Ltd,2018.
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. 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. HTTP Programming Recipes for Java Bots by Jeff Heaton - Heaton Research, Inc.
2. Java Distributed Computing by Jim Farley -O'Reilly Media
3. Java Precisely by Peter Sestoft - IT University of Copenhagen
4. Java for Absolute Beginners: Learn to Program the Fundamentals the Java9+ Way
5. Fundamentals of the Java Programming Language, JavaSE6
6. JAVA: Easy Java Programming for Beginners, Your Step-By-Step Guide to

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.udacity.com › course ›java-programming-basics--ud282
5. https://www.futurelearn.com › courses› begin-programming.

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

COMPUTER GRAPHICS LAB

II B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG406PC	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

To learn

1. Basic principles of CG toward problem solving, inference, perception, knowledge representation, and learning.
2. Advanced topics of CG such as planning, Design and thinking.

COURSE OUTCOMES

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

1. Identify problems that are amenable to solution by CG method.
2. Understand and analyze working of an CG technique.
3. Formalize a given problem in the language/framework of different CG methods.
4. Apply CG techniques to real-world problems to develop intelligent systems.

LIST OF EXPERIMENTS

1. Study the various graphics commands
2. Develop the DDA Line drawing algorithm
3. Develop the Bresenham's Line drawing algorithm
4. Develop the Bresenham's Circle drawing algorithm
5. Develop the C program for to display different types of lines
6. Perform the following 2D Transformation operation Translation, Rotation and Scaling
7. Implementation of 2D transformation Mirror reflection and Shearing.
8. Perform the Line Clipping Algorithm
9. Perform the Polygon clipping algorithm
10. Implementation of 3D transformation: Translation, Scaling and Rotation.
11. Develop a menu driven program to animate a flag using Bezier Curve algorithm.

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. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
2. Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
3. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer

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1. https://eecs.wsu.edu/~cook/ai/lectures/p.html
2. http://www.cs.toronto.edu/~fbacchus/csc384/Lectures/lectures.html
3. http://web.cs.iastate.edu/~cs572/studyguide.html
4. https://faculty.ist.psu.edu/vhonavar/Courses/ai/studyguide.html

E -TEXT BOOKS

1. Computer Graphics C version, Donald Hearn and M. Pauline Baker, Pearson Education

MOOCS COURSES

1. https://www.udacity.com/course/intro-to computer-graphics--cs271
2. https://www.classcentral.com/course/edx-computer-graphics-cg-7230
3. https://www.my-mooc.com/en/mooc/intro-to-computergraphics/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

DATABASE MANGEMENT SYSTEMS LAB

II B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG407PC	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

To learn

1. ER data model, database design and normalization
2. 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 EXPERIMENTS

1. Concept design with E-R Model (Library Management System and Employee Management System)
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. Practicing DCL commands
7. Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
8. Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
9. Queries using Joins (NATURAL, INNER, OUTER, LEFT, RIGHT)
10. Triggers (Creation of insert trigger, delete trigger, update trigger)
11. Procedures
12. Usage of Cursors

TEXT BOOKS

1. Database Management Systems, Raghu rama Krishnan, Johannes Gehrke, Tata Mc Graw Hill, 3rd Edition
2. Database System Concepts, Silber Schatz, Korth, McGraw 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.

WEB REFERENCES

1. https://www.edx.org/learn/databases
2. https://www.youtube.com/playlist?list=PLyvBGMFYV3auVdxQ1-88ivNFpmUEy-U3M
3. https://www.youtube.com/watch?v=bGyHqvQW6JY&list=PLRFPL_aa_SLVjQn93cUGZaKZVGr_80vYv&index=1

E -TEXT BOOKS

1. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

MOOCS COURSES

1. https://onlinecourses.nptel.ac.in/noc21_cs04/preview
2. https://www.coursera.org/learn/database-management
3. https://www.udemy.com/course/database-management-system-from-scratch-part-1/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

JAVA PROGRAMMING LAB

II B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG408PC	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. Able to write programs for solving real world problems using java collection framework.
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 cube of the number.
6. 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.
7. Write a Java program for the following:
   - Create a doubly linked list of elements.
   - Delete a given element from the above list
   - Display the contents of the list after deletion.
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.

TEXT BOOKS

1. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition Pearson education.
2. Thinking in Java, Bruce Eckel, Pearson Education.
3. Java Programming, D. S. Malik and P. S. Nair, Cengage Learning.

REFERENCE BOOKS

1. "The Java Programming Language" by Arnold
2. "Java: The Complete Reference" by Herbert Schildt
3. "Core Java: An Integrated Approach, New: Includes All Versions up to Java 8"by R Nageswara Rao and DT Editorial Services
4. "Java Programming Interviews Exposed (WROX)"by Noel Markham
5. "Advanced Java Programming" by Uttam Roy
6. "Cracking the C, C++and Java Interview" by S G Ganesh and K U Subhash

WEB REFERENCES

1. Head First Java: A Brain-Friendly Guide 2nd Edition, Kindle Edition by Kathy Sierra.
2. Effective Java: A Programming Language Guide (Java Series)2nd Edition, Kindle Edition by Joshua Bloch.
3. AI Algorithms, Data Structures, and Idioms in Prolog, Lisp, and Java Paperback – 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. Daniel Liang.
2. Java How to Program, Early Objects (11th Edition) (Deitel: How to

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://onlinecourses.nptel.ac.in/noc21_cs03/preview

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

CONSTITUTION OF INDIA

II B. TECH II SEMESTER R 20								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
CI409MC	**B. Tech**	3	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; it is 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 analyze 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 analyze 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	**INTRODUCTION 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**

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

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 COURSES

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

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN DESIGN AND ANALYSIS OF EXPERIMENTS

III B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG501PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn
1. Knowledge on need of experimentation.
2. Fractional Factorial Experiments in design and analysis of experiments

COURSE OUTCOMES

Upon successful completion of the course, the student is able to
1. Understand the strategy of experimentation.
2. Analyze characterization of experiments, Factorial experiments, Factorial experiments with factors at Two levels.
3. Illustrate the significance of Asymmetrical factorial designs and confounded asymmetrical factorials.
4. Understand Incomplete block designs and balanced Incomplete block designs.

UNIT-I	Need for Experimentation	Classes: 12

Strategy of Experimentation, Some Typical Applications of Experimental Design, Basic Principles, Guidelines for Designing Experiments, A Brief History of Statistical Design, Review of Statistics and Testing of Hypothesis.

UNIT-II	Experimentation with Single factor	Classes: 12

The Randomized Complete Block Design, Statistical Analysis of the RCBD, Model Adequacy Checking, Some Other Aspects of the Randomized Complete Block Design, Estimating Model Parameters and the General Regression Significance Test, The Latin Square Design, The Graeco-Latin Square Design, Least Squares Estimation of the Parameters

UNIT-III	2k Factorial Experiments	Classes: 10

Characterization of experiments, Factorial experiments, Factorial experiments with factors at Two levels, Finite fields and Design of experiments, Grouping for interaction contrasts, Confounding, confounding in more than two blocks, Experiments with factors at Three levels, A general method of construction of confounded factorials, Analysis of factorial experiments, fractional factorials..

UNIT-IV	Fractional Factorial Experiments	Classes: 12

Asymmetrical factorial designs, confounded asymmetrical factorials, Construction of balanced confounded Asymmetrical factorials, Analysis of balanced confounded experiments, Construction and Analysis of partially confounded experiments		
UNIT-V	**Advance Studies**	**Classes: 12**
Incomplete Block designs, Balanced Incomplete Block designs, Construction of BIBD, Analysis, Response Surface Methodology.		

TEXT BOOKS

1. Montgomery (2012) "Design-and-analysis-of-experiments"- JW http://www.ru.ac.bd/stat/wp-content/uploads/sites/25/2019/03/502_06_Montgomery-Designand- analysis-of-experiments-2012.pdf
2. Manindra Nath Das, Narayan C. Giri (2003) "Design and Analysis of Experiments" New Age International (P) Limited, Publishers, New Delhi.
3. Gary W. Oehlert University of Minnesota, "A First Course in Design and Analysis of Experiments - http://users.stat.umn.edu/~gary/book/fcdae.pdf

REFERENCE BOOKS

1 . Design and Analysis of Experiments Hardcover – Import, 11 August 200by Douglas C. Montgomery

WEB REFERENCES

1. https://onlinecourses.nptel.ac.in/noc21_mg48/preview
2. https://www.stat.cmu.edu/~hseltman/AboutMe.html
3. https://www.coursera.org/specializations/design-experiments
4. https://www.udemy.com/course/design-of-experiments-i/
5. https://professional.mit.edu/course-catalog/design-and-analysis-experiments
6. https://www.six-sigma-material.com/Design-of-Experiments.html
7. https://sixsigmastudyguide.com/design-of-experiments-study-guide//

E -TEXT BOOKS

1. Design and Analysis of Experiments Kindle Edition byR Panneerselvam (Author) Format: Kindle Edition

MOOCS COURSES

1. https://in.coursera.org/specializations/design-experiments

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
COMPUTER NETWORKS

III B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG502PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. The objective of the course is to equip the students with a general overview of the concepts and fundamentals of computer networks.
2. Familiarize the students with the standard models for the layered approach to communication between machines in a network and the protocols of the various layers

COURSE OUTCOMES

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

1. Gain the knowledge of the basic computer network technology.
2. Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
3. Obtain the skills of subnetting and routing mechanisms.
4. Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation.

UNIT-I	Network hardware	Classes: 12

Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet. Physical Layer: Guided Transmission media: twisted pairs, coaxial cable, fiber optics, Wireless transmission.

UNIT-II	Data link layer:	Classes: 12

Data link layer: Design issues, framing, Error detection and correction. Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an error-free channel, A simplex stop and wait protocol for noisy channel. Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat, Example data link protocols. Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols. Wireless LANs, Data link layer switching

UNIT-III	Network Layer	Classes: 10

Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service, Internetworking, The Network layer in the internet...		
UNIT-IV	**Transport Layer**	**Classes: 12**
Transport Layer: Transport Services, Elements of Transport protocols, Connection management, TCP and UDP protocols.		
UNIT-V	**Application Layer**	**Classes: 12**
Application Layer –Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streaming audio and video.		

TEXT BOOKS

1. Computer Networks -- Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI

REFERENCE BOOKS

1. An Engineering Approach to Computer Networks-S. Keshav, 2nd Edition, Pearson Education.
2. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH

WEB REFERENCES

1. https://www.guru99.com/best-computer-networks-books.html
2. https://www.sanfoundry.com/best-reference-books-computer-networks/
3. https://www.geeksforgeeks.org/best-computer-networks-books/

E -TEXT BOOKS

1. https://open.umn.edu/opentextbooks/textbooks/353
2. https://freecomputerbooks.com/networkComputerBooks.html

MOOCS COURSES

1 https://in.coursera.org/courses?query=computer%20network

2 https://www.mooc-list.com/tags/computer-networking

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

DESIGN AND ANALYSIS OF ALGORITHMS

III B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG503PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Introduces the notations for analysis of the performance of algorithms
2. Introduces the data structure of disjoint sets.
3. Describes major algorithmic techniques (divide-and-conquer, backtracking, dynamic Programming, greedy, branch and bound methods) and mention problems for which each technique is appropriate
4. Describes how to evaluate and compare different algorithms using worst-, average-, and best case analysis
5. Explains the difference between tractable and intractable problems, and introduces the Problems that are P, NP and NP complete

COURSE OUTCOMES

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

1. Ability to analyze the performance of algorithms
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 of programs.

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UNIT-I	Introduction	Classes: 12

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

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication...

UNIT-II	Disjoint Sets:	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

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: 12**
General method, applications-Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem		
UNIT-V	**Branch and Bound:**	**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.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm
2. https://www.guru99.com/design-analysis-algorithms-tutorial.html/

E -TEXT BOOKS

https://doc.lagout.org/science/0_Computer%20Science/2_Algorithms/Introduction%20to%20the%20Design%20and%20Analysis%20of%20Algorithms%20%283rd%20ed.%29%20%5BLevitin%202011-10-09%5D.pdf

MOOCS COURSES

https://onlinecourses.nptel.ac.in/noc19_cs47/preview

https://www.udemy.com/course/design-and-analysis-of-algorithm-/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
SOFTWARE ENGINEERING

III B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG504PC	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 requirements, 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 requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
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

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

UNIT-II	Software Requirements	Classes: 12

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, behavioral models, data models, object models, structured method

UNIT-III	Design Engineering	Classes: 10
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, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams		
UNIT-IV	**Testing Strategies:**	**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		
UNIT-V	**Metrics for Process and Products**	**Classes: 12**
Metrics for Process and Products: Software measurement, metrics for software quality. 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, software reliability, the ISO 9000 quality standards		

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. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
2. Software Engineering principles and practice- Waman S Jawadekar, The Mc Graw-Hill Companies.
3. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.

WEB REFERENCES

https://www.tutorialspoint.com/software_engineering/index.html
https://www.guru99.com/what-is-software-engineering.html

E -TEXT BOOKS

https://engineering.futureuniversity.com/BOOKS%20FOR%20IT/Software-Engineering-9th-Edition-by-Ian-Sommerville.pdf

MOOCS COURSES

https://www.edx.org/course/software-engineering-essentials

https://in.coursera.org/courses?query=software%20engineering

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
PROFESSIONAL ELECTIVES -I
QUANTUM COMPUTING

III B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG511PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn
1. To introduce the fundamentals of quantum computing
2. The problem-solving approach using finite dimensional mathematics

COURSE OUTCOMES

Upon successful completion of the course, the student is able to
1. Understand basics of quantum computing
2. Understand physical implementation of Qubit.
3. Understand Quantum algorithms and their implementation
4. Understand the Impact of Quantum Computing on Cryptography

UNIT-I	Introduction to Essential Linear Algebra	Classes: 12

Introduction to Essential Linear Algebra: Some Basic Algebra, Matrix Math, Vectors and Vector Spaces, Set Theory. Complex Numbers: Definition of Complex Numbers, Algebra of Complex Numbers, Complex Numbers Graphically, Vector Representations of Complex Numbers, Pauli Matrice, Transcendental Numbers

UNIT-II	Basic Physics for Quantum Computing	Classes: 12

Basic Physics for Quantum Computing: The Journey to Quantum, Quantum Physics Essentials, Basic Atomic Structure, Hilbert Spaces, Uncertainty, Quantum States, Entanglement.
Basic Quantum Theory: Further with Quantum Mechanics, Quantum Decoherence, Quantum Electrodynamics, Quantum Chromodynamics, Feynman Diagram Quantum Entanglement and QKD, Quantum Entanglement, Interpretation, QKE.

UNIT-III	Quantum Architecture	Classes: 10

Quantum Architecture: Further with Qubits, Quantum Gates, More with Gates, Quantum Circuits, The D-Wave Quantum Architecture. Quantum Hardware: Qubits, How Many Qubits Are Needed? Addressing Decoherence, Topological Quantum Computing, Quantum Essentials

UNIT-IV	Quantum Algorithms	Classes: 12

Quantum Algorithms: What Is an Algorithm? Deutsch's Algorithm, Deutsch-Jozsa Algorithm, Bernstein-Vazirani Algorithm, Simon's Algorithm, Shor's Algorithm, Grover's Algorithm		
UNIT-V	**Current Asymmetric Algorithms**	**Classes: 12**
Current Asymmetric Algorithms: RSA, Diffie-Hellman, Elliptic Curve. The Impact of Quantum Computing on Cryptography: Asymmetric Cryptography, Specific Algorithms, Specific Applications		

TEXT BOOKS

. 1. Nielsen M. A., Quantum Computation and Quantum Information, Cambridge University Press
2. Dr. Chuck Easttom, Quantum Computing Fundamentals, Pearson

REFERENCE BOOKS

1. Quantum Computing for Computer Scientists by Noson S. Yanofsky and Mirco A. Mannucci
2. Benenti G., Casati G. and Strini G., Principles of Quantum Computation and Information, Vol. Basic Concepts. Vol. Basic Tools and Special Topics, World Scientific.
3. Pittenger A. O., An Introduction to Quantum Computing Algorithms

WEB REFERENCES

https://www.javatpoint.com/what-is-quantum-computing
https://www.tutorialspoint.com/the-complete-quantum-computing-course-for-beginners/index.asp

E -TEXT BOOKS

https://www.e-booksdirectory.com/details.php?ebook=12311

MOOCS COURSES

https://www.edx.org/learn/quantum-computing

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
PROFESSIONAL ELECTIVES -I
DESIGN OF INTERACTIVE SYSTEMS

III B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG512PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn
1) To focus on creating interfaces, systems
2) To analyze the devices revolving around user behaviour
3) To explore the interaction design process
4) To explain how interaction designers work and the tools used for principles of interaction design.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to
1. Describe creating interfaces and systems
2. Explain the devices revolving around user behavior
3. List the interaction of design process.
4. Recognize the designers work and the tools they use for interaction design

UNIT-I	Introduction:	Classes: 12

Introduction: Goals of System Engineering – Goals of User Interface Design – Motivations of Human factors in Design – High Level Theories –Object-Action Interface Design - Three Principles – Guidelines for Data Display and Data Entry

UNIT-II	Managing Design Process	Classes: 12

Managing Design Process: Organizational Design to Support Usability – The Three Pillars of Design Development Methodologies- Ethnographic Observation – Participating Design Scenario Development-Social Impact Statement for Early Design – Legal Issues- Reviews – Usability Testing and laboratories-Surveys- Acceptance tests – Evaluation during Active use- Specification Methods-Interface – Building Tools- Evaluation and Critiquing tools

UNIT-III	Manipulation and Virtual Environments	Classes: 10

Introduction-Examples of Direct Manipulation Systems – Explanation of Direct Manipulation-Visual Thinking and Icons – Direct manipulation Programming – Home Automation- Remote Direct Manipulation- Virtual Environments- Task-Related Organization – Item Presentation Sequence-Response Time and Display Rate – Fast Movement Through Menus- Menu Layouts- Form Filling –

Dialog Box – Functionality to Support User's Tasks – Command Organization Strategies – Benefits of Structure- Naming and Abbreviations – Command Menus- Natural Language in Computing.		
UNIT-IV	**Interaction Devices:**	**Classes: 12**
Introduction – Keyboards and Functions – Pointing Devices- Speech recognition, Digitization and Generation – Image and Video Displays – Printers – Theoretical Foundations – Expectations and Attitudes – User Productivity – Variability – Error messages – Non anthropomorphic Design –Display Design – color-Reading from Paper versus from Displays- Preparation of Printed Manuals- Preparation of Online Facilities		
UNIT-V	**Windows Strategies and Information Search**	**Classes: 12**
Introduction- Individual Window Design Multiple Window Design- Coordination by Tightly – Coupled Window- Image Browsing Personal Role Management and Elastic Windows – Goals of Cooperation – Asynchronous Interaction – Synchronous Distributed – Face to Face- Applying Computer Supported Cooperative Work to Education – Database query and phrase search in Textual documents – Multimedia Documents Searches – Information Visualization – Advance Filtering Hypertext and Hypermedia – World Wide Web- Genres and Goals and Designers – Users and their tasks – Object Action Interface Model for Web site Design		

TEXT BOOKS

1. Ben Shneiderman, "Designing the User Interface", 5th Edition, Addison-Wesley, 2010.

REFERENCE BOOKS

1. Barfied, Lon, "The User Interface: Concepts and Design", Addison – Wesley.
2. Wilbert O. Galiz, "The Essential guide to User Interface Design", Wiley Dreamtech.
3. Jacob Nielsen, "Usability Engineering", Academic Press.
4. Alan Dix et al, "Human - Computer Interaction ", Prentice Hall, 2012.

WEB REFERENCES

https://www.interaction-design.org/literature/topics/interaction-design

E -TEXT BOOKS

1. https://www.perlego.com/book/811841/designing-interactive-systems-pdf-etextbook-a-comprehensive-guide-to-hci-ux-and-interaction-design-pdf
2. https://books.google.co.in/books/about/Designing_Interactive_Systems.html?id=P923PwAACAAJ&redir_esc=y

MOOCS COURSES

1. https://in.coursera.org/specializations/interaction-design
2. https://www.my-mooc.com/en/mooc/hcidesign/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
PROFESSIONAL ELECTIVES -I
DATA ANALYTICS

III B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG513PE	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: 12

Data Management: Design Data Architecture and manage the data for analysis, understand various sources of Data like Sensors/Signals/GPS etc. Data Management, Data Quality (noise, outliers, missing values, duplicate data) and Data Processing & Processing

UNIT-II	Data Analytics	Classes: 12

Data Analytics: 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	Classes: 10

.Regression – Concepts, Blue property assumptions, Least Square Estimation, Variable Rationalization, and Model Building etc. Logistic Regression: Model Theory, Model fit Statistics, Model Construction, Analytics applications to various Business Domains etc.

UNIT-IV	Object Segmentation	Classes: 12
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, Addision Wisley, 2006.
2. Data Mining Analysis and Concepts, M. Zaki and W. Meira
3. Mining of Massive Datasets, Jure Leskovec Stanford Univ. Anand Rajaraman Milliway Labs Jeffrey D Ullman Stanford Univ.

WEB REFERENCES

https://www.itl.nist.gov/div898/handbook/index.htm
https://core.ac.uk/download/pdf/83943361.pdf

E -TEXT BOOKS

https://bookauthority.org/books/best-analytics-ebooks

MOOCS COURSES

https://www.mooc-list.com/tags/data-analytics

https://in.coursera.org/courses?query=data%20analytics

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
PROFESSIONAL ELECTIVES -I
IMAGE PROCESSING

III B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG514PE	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; pre-processing; 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: 12

Digital Image Fundamentals: 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: 10

.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: 12**
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

https://www.simplilearn.com/image-processing-article
https://www.v7labs.com/blog/image-processing-guide

E -TEXT BOOKS

https://bookauthority.org/books/new-image-processing-ebooks

MOOCS COURSES

https://in.coursera.org/courses?query=image%20processing

https://www.udemy.com/topic/image-processing/

https://www.edx.org/learn/image-processing

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
PROFESSIONAL ELECTIVES -I
SYSTEMS MANAGEMENT

III B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG515PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1) Knowledge on concepts of systems management

COURSE OUTCOMES

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

1. Understand the need of executive support and organizing for systems management.
2. Analyze customer service and its key elements
3. Illustrate desired traits of an availability Process owner and Methods for Measuring Availability
4. Understand preferred Characteristics of a Performance and Tuning

UNIT-I	Acquiring Executive Support:	Classes: 12

Acquiring Executive Support: Introduction, Systems Management: A Proposed Definition, Why Executive Support Is Especially Critical Today, Building a Business Case for Systems Management, Educating Executives on the Value of Systems Management.
Organizing for Systems Management: Introduction, Factors to Consider in Designing IT Organizations, Factors to Consider in Designing IT Infrastructures

UNIT-II	Customer Service	Classes: 12

Customer Service: Introduction, How IT Evolved into a Service Organization, The Four Key Elements of Good Customer Service, Integrating the Four Key Elements of Good Customer Service, The Four Cardinal Sins that Undermine Good Customer Service. Comparison to ITIL Processes: Introduction, Developments Leading Up To ITIL, IT Service Management, The Origins of ITIL, Quality Approach and Standards, Criteria to Differentiate Infrastructure Processes, Comparison of Infrastructure Processes, Ten Common Myths Concerning the Implementation of ITIL..

UNIT-III	Availability:	Classes: 10

. Availability: Introduction, Definition of Availability, Differentiating Availability from Uptime, Differentiating Slow, Response from Downtime, Differentiating Availability from High Availability,

Desired Traits of an Availability Process Owner, Methods for Measuring Availability, The Seven Rs of High Availability, Assessing an Infrastructure's Availability Process, Measuring and Streamlining the Availability Process.		
UNIT-IV	**Performance and Tuning:**	**Classes: 12**
Performance and Tuning: Introduction, Differences between the Performance and Tuning Process and Other Infrastructure Processes, Definition of Performance and Tuning, Preferred Characteristics of a Performance and Tuning Process Owner, Performance and Tuning Applied to the Five Major Resource Environments, Server Environment, Disk Storage Environment, Database Environment, Network Environment, Desktop Computer Environment, Assessing an Infrastructure's Performance and Tuning Process, Measuring and Streamlining the Performance and Tuning Process.		
UNIT-V	**Change Management**	**Classes: 12**
Change Management: Introduction, Definition of Change Management, Drawbacks of Most Change Management Processes, Key Steps Required in Developing a Change Management Process, Emergency Changes Metric, Assessing an Infrastructure's Change Management Process, Measuring and Streamlining the Change Management Process.		

TEXT BOOKS

1. Rich Schiesser, IT Systems Management, 2nd edition, Pearson Education.

REFERENCE BOOKS

1. Murdick, Robert G, Information Systems for Modern Management, 3rd edition, Prentice Hall India Learning Private Limited.
2. Suman Mann Seema Shokeen, Pooja Singh, Information Systems Management, Wiley Publications.

WEB REFERENCES

https://www.tandfonline.com/journals/uism20

E -TEXT BOOKS

https://www.phindia.com/Books/ShoweBooks/ODE/Management-Information-Systems

MOOCS COURSES

https://in.coursera.org/courses?query=management%20systems

https://www.edx.org/course/introduction-to-management-information-systems-mis

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
PROFESSIONAL ELECTIVES -II
RELIABILITY ENGINEERING

III B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG521PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1) Knowledge on concepts of failure mode and effect analysis, Fault tree analysis, Design of design of experiments.

COURSE OUTCOMES

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

1) Understand Basic Principles and General Fundamentals of FMEA Methodology.
2) Analyze the general Procedure of the FTA
3) Illustrate the Strategy of Experimental Design
4) Understand the product Liability and planning, product development process

UNIT-I	Failure Mode and Effect Analysis (FMEA)	Classes: 12

Failure Mode and Effect Analysis (FMEA): Basic Principles and General Fundamentals of FMEA Methodology- FMEA according to VDA 86- Example of a Design FMEA according to VDA 86- FMEAaccording to VDA 4.2- Example of a System FMEA Product according to VDA 4.2- Example of a System FMEA Process according to VDA 4.2.

UNIT-II	Fault Tree Analysis (FTA):	Classes: 12

. Fault Tree Analysis (FTA): General Procedure of the FTA- Qualitative Fault Tree Analysis- Quantitative Fault Tree Analysis Reliability Graph- Examples.

UNIT-III	Design of Experiments	Classes: 10

Design of Experiments: Analysis of Variance Technique-Strategy of Experimental Design-t test-one and two sample test-F test-one factor at a time-power of analysis of variance tests-Orthogonal design. Completely Randomized design-Randomized Block Design-Latin Square Design-Graeco Latin Squares-Two Factor analysis of variance-Factorial Experiments. Three Factor Experiments-Factorial Experiments in a Regression setting-Incomplete Blocks Design

UNIT-IV	Product Liability and Planning	Classes: 12

Product Liability and Planning: History-Product Safety Law-Product Liability Law – Defenses – proof and the Expert Witness Financial Loss- The future of product Liability- Prevention- Degree of Novelty of a Product, Product Life Cycle, Company Goals and Their Effect. Solution Finding Methods- Conventional Methods, Intuitive Methods, Discursive Methods, Methods for Combining Solutions- Examples

UNIT-V	**Product Development Process**	**Classes: 12**

Product Development Process: General Problem-Solving Process- Flow of Work During the Process of Designing- Activity Planning, Timing and Scheduling, Planning Project and Product Costs, Effective Organization Structures- Interdisciplinary Cooperation, Leadership and Team Behaviour.

TEXT BOOKS

1. G. Haribaskaran, Probability, Queuing Theory & Reliability Engineering, Laxmi publications, 2nd Edition.
2. D. H. Besterfield, Glen H. Besterfield and M. Besterfield-Sacre, Total Quality Management, Pearson Publications, Third Edition.

REFERENCE BOOKS

1. E. Walpole, H. Myers and L. Myers, Probability and Statistics for engineering and Scientists, Pearson Publications, Eighth Edition.
2 Brend Bretsche, Reliability in Automotive and Mechanical Engineering, Springer Publications.
3 . G. Pahl, W. Bietz, J. Feldhusen and K. H. Grote, Engineering Design a Systematic approach, Springer Publications, Third Edition.

WEB REFERENCES

https://onlinelibrary.wiley.com/journal/10991638
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E -TEXT BOOKS

https://onlinelibrary.wiley.com/doi/book/10.1002/9781119665946

MOOCS COURSES

https://in.coursera.org/learn/site-reliability-engineering-slos

https://www.classcentral.com/course/edx-reliability-in-engineering-design-19584

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
PROFESSIONAL ELECTIVES -II
EMBEDDED SYSTEMS

III B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG522PE	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 the role of firmware, operating systems in correlation with hardware systems.

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 firmware
3) Expected to visualize the role of real time operating systems in embedded systems
4) Expected to evaluate the correlation between task synchronization and latency issues

UNIT-I	Introduction to Embedded Systems:	Classes: 12

Introduction to Embedded Systems: Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification of Embedded Systems, Major application areas, Purpose of Embedded Systems, Characteristics and Quality attributes of Embedded Systems.

UNIT-II	The Typical Embedded System	Classes: 12

. The Typical Embedded System: Core of the Embedded System, Memory, Sensors and Actuators, Communication Interface, Embedded Firmware, Other System components.

UNIT-III	Embedded Firmware Design and Development	Classes: 10

Embedded Firmware Design and Development: Embedded Firmware Design, Embedded Firmware Development Languages, Programming in Embedded C.

UNIT-IV	RTOS Based Embedded System Design:	Classes: 12

RTOS Based Embedded System Design: Operating System basics, Types of Operating Systems, Tasks, Process, Threads, Multiprocessing and Multitasking, Task Scheduling, Threads-Processes-Scheduling putting them together, Task Communication, Task Synchronization, Device Drivers, How to choose an RTOS		
UNIT-V	**Integration and Testing of Embedded Hardware and Firmware**	**Classes: 12**
.Integration and Testing of Embedded Hardware and Firmware: Integration of Hardware and Firmware, Boards Bring up The Embedded System Development Environment: The Integrated Development Environment (IDE), Types of files generated on Cross-Compilation, Disassembler/Decompiler, Simulators, Emulators and Debugging, Target Hardware Debugging, Boundary Scan		

TEXT BOOKS

1. Shibu K V, “Introduction to Embedded Systems", Second Edition, McGraw Hill

REFERENCE BOOKS

1. Rajkamal, Embedded Systems Architecture, Programming and Design, Tata McGraw-Hill
2. Frank Vahid and Tony Givargis, “Embedded Systems Design” - A Unified Hardware/Software Introduction, John Wiley
3. Lyla, “Embedded Systems” –Pearson
4. David E. Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.

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https://www.trentonsystems.com/blog/what-are-embedded-systems

E -TEXT BOOKS

https://ptolemy.berkeley.edu/books/leeseshia/releases/LeeSeshia_DigitalV2_2.pdf

MOOCS COURSES

https://in.coursera.org/courses?query=embedded%20systems

https://www.edx.org/learn/embedded-systems

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
PROFESSIONAL ELECTIVES -II
INFORMATION RETRIEVAL SYSTEMS

III B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG523PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To learn the important concepts and algorithms in IRS
2. To understand the data/file structures that are necessary to design, and implement information retrieval (IR) systems.

COURSE OUTCOMES

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

1) Ability to apply IR principles to locate relevant information large collections of data.
2) Ability to design different document clustering algorithms
3) Implement retrieval systems for web search tasks
4) Design an Information Retrieval System for web search tasks.

UNIT-I	Introduction to Embedded Systems:	Classes: 12

Introduction to Information Retrieval Systems: Definition of Information Retrieval System, Objectives of Information Retrieval Systems, Functional Overview, Relationship to Database Management Systems, Digital Libraries and Data Warehouses. Information Retrieval System Capabilities: Search Capabilities, Browse Capabilities, Miscellaneous Capabilities.

UNIT-II	Cataloging and Indexing:	Classes: 12

. Cataloging and Indexing: History and Objectives of Indexing, Indexing Process, Automatic Indexing, Information Extraction. Data Structure: Introduction to Data Structure, Stemming Algorithms, Inverted File Structure, N-Gram Data Structures, PAT Data Structure, Signature File Structure, Hypertext and XML Data Structures, Hidden Markov Models

UNIT-III	Automatic Indexing	Classes: 10

Automatic Indexing: Classes of Automatic Indexing, Statistical Indexing, Natural Language, Concept Indexing, Hypertext Linkages. Document and Term Clustering: Introduction to Clustering, Thesaurus Generation, Item Clustering, Hierarchy of Clusters

UNIT-IV	User Search Techniques:	Classes: 12

User Search Techniques: Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of Boolean

Systems, Searching the INTERNET and Hypertext. Information Visualization: Introduction to Information Visualization, Cognition and Perception, Information Visualization Technologies		
UNIT-V	**Text Search Algorithms**	**Classes: 12**
.Text Search Algorithms: Introduction to Text Search Techniques, Software Text Search Algorithms, Hardware Text Search Systems. Multimedia Information Retrieval: Spoken Language Audio Retrieval, Non-Speech Audio Retrieval, Graph Retrieval, Imagery Retrieval, Video Retrieval		

TEXT BOOKS

1. Information Storage and Retrieval Systems – Theory and Implementation, Second Edition, Gerald J. Kowalski, Mark T. Maybury, Springer

REFERENCE BOOKS

1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
2. Information Storage & Retrieval by Robert Korfhage – John Wiley & Sons.
3. Modern Information Retrieval by Yates and Neto Pearson Education

WEB REFERENCES

https://link.springer.com/referenceworkentry/10.1007/978-1-4614-8265-9_928

E -TEXT BOOKS

https://nlp.stanford.edu/IR-book/information-retrieval-book.html

MOOCS COURSES

https://in.coursera.org/courses?query=information%20retrieval

https://www.classcentral.com/course/music-information-retrieval-48348

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
PROFESSIONAL ELECTIVES -II
DISTRIBUTED DATABASES

III B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG524PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

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. Introduce basic principles and implementation techniques of distributed database systems
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

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

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) Implement retrieval systems for web search tasks
4) Understand the design aspects of object-oriented database system and related development.

UNIT-I	Introduction:	Classes: 12

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 and decomposition:	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.

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, database clusters		
UNIT-V	**Distributed object Database Management Systems**	**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. Tamer OZSU and Patuck Valduriez: Principles of Distributed Database Systems, Pearson Edn. Asia, 2001.
2. Stefano Ceri and Giuseppe Pelagatti: Distributed Databases, McGraw Hill.

REFERENCE BOOKS

1. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: “Database Systems: The Complete Book”, Second Edition, Pearson International Edition.

WEB REFERENCES

https://www.techtarget.com/searchoracle/definition/distributed-database

E -TEXT BOOKS

https://onlinelibrary.wiley.com/doi/10.1002/9780470050118.ecse117
https://www.kobo.com/ww/en/ebook/distributed-database-management-systems

MOOCS COURSES

https://www.classcentral.com/course/distributed-database-11170

https://www.coursera.org/courses?query=distributed%20systems

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
PROFESSIONAL ELECTIVES -II
NATURAL LANGUAGE PROCESSING

III B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG525PE	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: 12

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, Treebanks: 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	Predicate-Argument	Classes: 12

Predicate-Argument Structure, Meaning Representation Systems, Software.		
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 Cross lingual 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		
https://www.tableau.com/learn/articles/natural-language-processing-books https://www.ibm.com/in-en/topics/natural-language-processing		
E -TEXT BOOKS		
https://www.e-booksdirectory.com/listing.php?category=281		
MOOCS COURSES		
https://in.coursera.org/specializations/natural-language-processing https://www.classcentral.com/subject/nlp		

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

DESIGN AND ANALYSIS OF EXPERIMENTS LAB

III B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG505PC	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

To learn

1. Knowledge on need of experimentation, Fractional Factorial Experiments in design and analysis of experiments.

COURSE OUTCOMES

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

1) Understand the strategy of experimentation.
2) Analyze characterization of experiments, Factorial experiments, Factorial experiments with factors at Two levels
3) Illustrate the significance of Asymmetrical factorial designs and confounded asymmetrical Factorials
4) Able to design, implement, and analyze NLP algorithms
5) Understand Incomplete block designs and balanced Incomplete block designs..

LIST OF EXPERIMENTS

1. CRD
2. RBD
3. LSD
4. Complete Block Design
5. 2k – Factorial experiments
6. 2k – Factorial experiments with confounding
7. 2k – Fractional Factorial Experiments
8. BIBD
9. Response Surface methods

TEXT BOOKS

1. Montgomery (2012) “Design-and-analysis-of-experiments”- JW http://www.ru.ac.bd/stat/wp-content/uploads/sites/25/2019/03/502_06_Montgomery-Designand-analysis-of-experiments-2012.pdf
2 Gary W. Oehlert University of Minnesota, “A First Course in Design and Analysis of Experiments - http://users.stat.umn.edu/~gary/book/fcdae.pdf

REFERENCE BOOKS
1 Manindra Nath Das, Narayan C. Giri (2003) "Design and Analysis of Experiments" New Age International (P) Limited, Publishers, New Delhi.. .
WEB REFERENCES
https://onlinecourses.nptel.ac.in/noc21_mg48/preview https://www.stat.cmu.edu/~hseltman/AboutMe.html https://www.coursera.org/specializations/design-experiments https://www.udemy.com/course/design-of-experiments-i/ https://professional.mit.edu/course-catalog/design-and-analysis-experiments https://www.six-sigma-material.com/Design-of-Experiments.html https://sixsigmastudyguide.com/design-of-experiments-study-guide/
E -TEXT BOOKS
https://www.pdfdrive.com/design-and-analysis-of-algorithm-books.html
MOOCS COURSES
https://in.coursera.org/courses?query=design%20of%20experiments https://online.stanford.edu/courses/soe-ycsalgorithms1-algorithms-design-and-analysis-part-1

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

COMPUTER NETWORKS LAB

III B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG506PC	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 tools.

LIST OF 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
8. Write a program for congestion control using Leaky bucket algorithm.
9. Write a program for frame sorting techniques 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
TEXT BOOKS
1. Computer Networks, Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI
REFERENCE BOOKS
1. An Engineering Approach to Computer Networks, S.Keshav, 2nd Edition, Pearson Education 2. Data Communications and Networking – Behrouz A. Forouzan. 3rd Edition, TMH.
WEB REFERENCES
https://www.studytonight.com/computer-networks/reference-models-in-computer-networks
E -TEXT BOOKS
https://open.umn.edu/opentextbooks/textbooks/771
MOOCS COURSES
https://www.mooc-list.com/tags/computer-networking

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ADVANCED COMMUNICATION SKILLS LAB

III B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
EN506HS	B. Tech	0	0	2	1	30	70	100

COURSE OBJECTIVES

To learn
1To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and 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

COURSE OUTCOMES

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

1. Writing formal letters.
2. Making oral presentations.
3. Facing interviews
4. Engaging in debates

LIST OF EXPERIMENTS

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.
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 Aruna Koneru, 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, Aysha Vishwamohan, Tata Mc Graw-Hill 2009.
WEB REFERENCES
https://orelltalk.com/language-lab-india/?gclid=EAIaIQobChMIjZa3teX3_QIV0X0rCh1N0QoXEAAYASAAEgJjm_D_BwE
E -TEXT BOOKS
https://ebooks.lpude.in/management/mba/term_1/DENG401_ADVANCED_COMMUNICATION_SKILLS.pdf
MOOCS COURSES
https://oeru.org/?gclid=EAIaIQobChMIjqmN4OX3_QIV13wrCh0pVgm2EAAYAiAAEgIw-vD_BwE

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
INTELLECTUAL PROPERTY RIGHTS

III B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IP507MC	B. Tech	3	0	0	0	100	-	100

COURSE OBJECTIVES

To learn

1. To recognize the importance of IP and to educate the pupils on basic concepts of Intellectual Property Rights.
2. To identify the significance of practice and procedure of Patents.
3. To make the students to understand the statutory provisions of different forms of IPRs in simple forms.
4. To learn the procedure of obtaining Patents, Copyrights, Trade Marks &Industrial Design
5. To enable the students to keep their IP rights alive**COURSE OUTCOMES**

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

1) Identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP.
2) Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development.
3) Identify activities and constitute IP infringements and the remedies available to the IP owner and describe the precautious steps to be taken to prevent infringement of proprietary rights in products and technology development.
4) Be familiar with the processes of Intellectual Property Management (IPM) and various
5) approaches for IPM and conducting IP and IPM auditing and explain how IP can be managed as a strategic resource and suggest IPM strategy.
6) Be able to anticipate and subject to critical analysis arguments relating to the development and reform of intellectual property right institutions and their likely impact on creativity and innovation.
7) Be able to demonstrate a capacity to identify, apply and assess ownership rights and marketing protection under intellectual property law as applicable to information, ideas, new products and product marketing;.

UNIT-I	Introduction to Intellectual property	Classes: 12

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights

UNIT-II	Trade Marks:	Classes: 12
Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting, and evaluating trade mark, trade mark registration processes		

UNIT-III	Law of copy rights	Classes: 10
.Law of copy rights: 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	Trade Secrets	Classes: 12
Trade Secrets: 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	New development of intellectual property	Classes: 12
New development of intellectual property: 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..

REFERENCE BOOKS

1. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tata McGraw Hill Publishing company ltd.

WEB REFERENCES

https://www.wipo.int/about-ip/en/

E -TEXT BOOKS

https://www.e-booksdirectory.com/listing.php?category=269

MOOCS COURSES

https://ialm.academy/courses/ADVANCE-CERTIFICATION-IN-IPRs--LAW-AND-PROCEDURE-

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
AUTOMATA THEORY AND COMPILER DESIGN

III B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG601PC	B. Tech	3	0	0	4	30	70	100

COURSE OBJECTIVES

To learn

1. To introduce the fundamental concepts of formal languages, grammars and automata theory.
2. To understand deterministic and non-deterministic machines and the differences between decidability and undecidability.
3. Introduce the major concepts of language translation and compiler design and impart the knowledge of practical skills necessary for constructing a compiler.
4. Topics include phases of compiler, parsing, syntax directed translation, type checking use of symbol tables, intermediate code generation

COURSE OUTCOMES

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

1. Able to employ finite state machines for modeling and solving computing problems.
2. Able to design context free grammars for formal languages.
3. Able to distinguish between decidability and undecidability.
4. Demonstrate the knowledge of patterns, tokens & regular expressions for lexical analysis.
5. Acquire skills in using lex tool and design LR parsers

UNIT-I	Introduction to Finite Automata	Classes: 12

Introduction to Finite Automata: Structural Representations, Automata and Complexity, the Central Concepts of Automata Theory – Alphabets, Strings, Languages, Problems.
Nondeterministic Finite Automata: Formal Definition, an application, Text Search, Finite Automata with Epsilon-Transitions.
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

UNIT-II	Regular Expressions:	Classes: 12

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 Context-Free Grammars: Definition of Context-Free

Grammars, Derivations Using a Grammar, Leftmost and Rightmost Derivations, the Language of a Grammar, Parse Trees, Ambiguity in Grammars and Languages.

UNIT-III	Push Down Automata	Classes: 10

Push Down Automata: Definition of the Pushdown Automaton, the Languages of a PDA, Equivalence of PDA's and CFG's, Acceptance by final state Turing Machines: Introduction to Turing Machine, Formal Description, Instantaneous description, The language of a Turing machine Undecidability: Undecidability, A Language that is Not Recursively Enumerable, An Undecidable Problem That is RE, Undecidable Problems about Turing Machines

UNIT-IV	Introduction:	Classes: 12

Introduction: The structure of a compiler, Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical- Analyzer Generator Lex,
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-V	Syntax-Directed Translation	Classes: 12

Syntax-Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD's, Syntax- Directed Translation Schemes, Implementing L-Attributed SDD's. Intermediate-Code Generation: Variants of Syntax Trees, Three-Address Code Run-Time Environments: Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management

TEXT BOOKS

1. Introduction to Automata Theory, Languages, and Computation, 3nd Edition, John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.
2. Compilers: Principles, Techniques and Tools, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, 2nd Edition, Pearson.
3. Theory of Computer Science – Automata languages and computation, Mishra and Chandra shekaran, 2nd Edition, PHI.

REFERENCE BOOKS

1. Introduction to Formal languages Automata Theory and Computation, Kamala Krithivasan, Rama R, Pearson.
2. Introduction to Languages and The Theory of Computation, John C Martin, TMH.
3. lex & yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
4. Compiler Construction, Kenneth C. Louden, Thomson. Course Technology

WEB REFERENCES

1. https://www.tutorialspoint.com/compiler_design/compiler_design_quick_guide.htm
2. https://rdw.rowan.edu/cgi/viewcontent.cgi?article=1001&context=oer

E -TEXT BOOKS

1. Design and Analysis of Experiments Kindle Edition byR Panneerselvam (Author) Format: Kindle Edition

MOOCS COURSES

1. https://onlinecourses.nptel.ac.in/noc20_cs13/preview

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
INTRODUCTION TO ENGINEERING DESIGN

III B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG602PC	B. Tech	3	0	0	4	30	70	100

COURSE OBJECTIVES

To learn

1. Knowledge on significance of Engineering design and its concepts..

COURSE OUTCOMES

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

1. Gain the knowledge of the basic computer network technology.
2. Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
3. Obtain the skills of subnetting and routing mechanisms.
4. Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation.

UNIT-I	Engineering Design	Classes: 12

. Engineering Design: Introduction, Engineering Design Process, Ways to Think About the Engineering Design Process, Considerations of a Good Design, Description of Design Process, Conceptual Design, Embodiment Design, Detail Design, Planning for Manufacture, Planning for Distribution, Planning for Use, Planning for Retirement of the Product, Computer-Aided Engineering, Designing to Codes and Standards, Design Review

UNIT-II	Problem Definition and Need Identification	Classes: 12

Problem Definition and Need Identification: Introduction, Identifying Customer Needs, Customer Requirements, Establishing the Engineering Characteristics, Quality Function Deployment, Product Design Specification. Gathering Information: The Information Challenge, Types of Design Information, Sources of Design Information, Library Sources of Information, Government Sources of Information, Information From the Internet, Professional Societies and Trade Associations, Codes and Standards

UNIT-III	Concept Generation	Classes: 10

Concept Generation: Introduction to Creative Thinking, Creative Methods for Design, Morphological Methods, Morphological Method for Design, Generating Concepts from Morphological Chart, TRIZ: The Theory of Inventive Problem Solving, Invention: Evolution to Increased Ideality, Innovation by Overcoming Contradictions, TRIZ Inventive Principles, The TRIZ Contradiction Matrix, Axiomatic Design.

UNIT-IV	Embodiment Design	Classes: 12
.Embodiment Design: Introduction, Comments on Nomenclature Concerning the Phases of the Design Process, Oversimplification of the Design Process Model, Product Architecture, Types of Modular Architectures, Configuration Design, Best Practices for Configuration Design, Parametric Design- Systematic Steps in Parametric Design, A Parametric Design Example: Helical Coil, Compression Spring.		
UNIT-V	**Industrial Design**	**Classes: 12**
.Industrial Design: Visual Aesthetics, Human Factors Design, Design for the Environment, Prototyping and Testing, Prototype and Model Testing Throughout the Design Process, Building Prototypes, Rapid Prototyping, RP Processes, Testing, Statistical Design of Testing, Design for X (DFX).		

TEXT BOOKS

1. George E. Dieter, Linda C. Schmidt, Engineering Design, Fourth Edition, McGraw-Hill.

REFERENCE BOOKS

1 Andrew Samuel, John Weir, Introduction to Engineering Design, Butterworth-Heinemann

WEB REFERENCES

1. https://www.oreilly.com/library/view/engineering-design-a/9781118324585/32_bib.html

E -TEXT BOOKS

1. https://link.springer.com/book/10.1007/978-3-031-02093-3
2. https://www.overdrive.com/media/6942599/introduction-to-engineering-design

MOOCS COURSES

1 https://www.my-mooc.com/en/mooc/introduction-to-engineering-and-design/

2 https://www.edx.org/course/introduction-to-engineering-and-design

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
MACHINE LEARNING

III B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG603PC	B. Tech	3	0	0	4	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	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.

UNIT-II	Artificial Neural Networks-1	Classes: 12

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, An illustrative 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: 10

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-1-**	**Classes: 12**
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

1. https://teachablemachine.withgoogle.com/
2. https://machinelearningmastery.com/

E -TEXT BOOKS

https://machinelearningmastery.com/machine-learning-with-python/

MOOCS COURSES

https://www.coursera.org/learn/machine-learning

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
FULL STACK DEVELOPMENT (Professional Elective - III)

III B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG611PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

To learn the core concepts of both the frontend and backend programming course.

1. To get familiar with the latest web development technologies.
2. To learn all about databases.
3. To learn complete web development process.
4. To provide an in-depth study of the various web development tools

COURSE OUTCOMES

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

1. Develop a fully functioning website and deploy on a web server.
2. Gain Knowledge about the front end and back-end Tools.
3. Find and use code packages based on their documentation to produce working results in a project.
4. Create web pages that function using external data.

UNIT-I	Web Development Basics	Classes: 12

Web Development Basics: Web development Basics - HTML & Web servers Shell - UNIX CLI Version control - Git & GitHub HTML, CSS

UNIT-II	Frontend Development	Classes: 12

Frontend Development: JavaScript basics OOPS Aspects of JavaScript Memory usage and Functions in JS AJAX for data exchange with server jQuery Framework jQuery events, UI components etc. JSON data format.

UNIT-III	REACT JS:	Classes: 10

REACT JS: Introduction to React Router and Single Page Applications React Forms, Flow Architecture and Introduction to Redux More Redux and Client-Server Communication.

UNIT-IV	Java Web Development	Classes: 12

Java Web Development: JAVA PROGRAMMING BASICS, Model View Controller (MVC) Pattern MVC Architecture using Spring RESTful API using Spring Framework Building an application using Maven		
UNIT-V	**Databases & Deployment**	**Classes: 12**
Databases & Deployment: Relational schemas and normalization Structured Query Language (SQL) Data persistence using Spring JDBC Agile development principles and deploying application in Cloud		
TEXT BOOKS		
1. Web Design with HTML, CSS, JavaScript and JQuery Set Book by Jon Duckett Professional JavaScript for Web Developers Book by Nicholas C. Zakas. 2. Learning PHP, MySQL, JavaScript, CSS & HTML5: A Step-by-Step Guide to Creating Dynamic Websites by Robin Nixon. 3. Full Stack JavaScript: Learn Backbone.js, Node.js and MongoDB. Copyright © 2015 azat mardan.		
REFERENCE BOOKS		
1. Full-Stack JavaScript Development by Eric Bush. 2. Mastering Full Stack React Web Development Paperback – April 28, 2017 Tomasz Dyl , Kamil Przeorski, Maciej Czarnecki		
WEB REFERENCES		
https://www.mongodb.com/languages/full-stack-development		
E -TEXT BOOKS		
https://bookauthority.org/books/new-full-stack-development-ebooks https://www.knowledgehut.com/blog/web-development/best-books-for-full-stack-web-development		
MOOCS COURSES		
https://in.coursera.org/courses?query=full%20stack%20web%20development https://www.edx.org/learn/full-stack-development		

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
INTERNET OF THINGS (Professional Elective - III)

III B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG616PE	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 M2M (machine to machine) with necessary protocols.
3. To introduce the Python Scripting Language which is used in many IoT devices.
4. To introduce the Raspberry PI platform, that is widely used in IoT applications.
5. To introduce the implementation of web-based services on IoT devices

COURSE OUTCOMES

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

1Interpret the impact and challenges posed by IoT networks leading to new architectural models.
2. Compare and contrast the deployment of smart objects and the technologies to connect them to network.
3. Appraise the role of IoT protocols for efficient network communication.
4. Elaborate the need for Data Analytics and Security in IoT.
5. Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry

UNIT-I	Introduction to Internet of Things	Classes: 12

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, 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 and Lifestyle

UNIT-II	IoT and M2M	Classes: 12

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

UNIT-III	Introduction to Python	Classes: 10

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib		
UNIT-IV	**IoT Physical Devices and Endpoints**	**Classes: 12**
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, controlling output, reading input from pins		
UNIT-V	**IoT Physical Servers and Cloud Offering**	**Classes: 12**
IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT, Python web application framework Designing a RESTful web API		

TEXT BOOKS

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547.
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

REFERENCE BOOKS

1 “Learning Internet of Things” by Peter Waher
2 Getting started with Internet of Things” by Cuno Pfister
3 The Fourth Industrial Revolution” by Klaus Schwab

WEB REFERENCES

https://thingsboard.io/
https://www.softwaretestinghelp.com/top-iot-companies/

E -TEXT BOOKS

https://www.pdfdrive.com/internet-of-things-books.html
https://bridgera.com/ebook/

MOOCS COURSES

https://www.mooc-list.com/tags/iot

https://www.edx.org/learn/iot-internet-of-things

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
MODELING AND SIMULATION (Professional Elective - III)

III B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG613PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn
Define the basics of simulation modeling and replicating the practical situations in organizations

1. Generate random numbers and random variates using different techniques.
2. Develop a simulation model using heuristic methods.
3. Analysis of Simulation models using input analyzer, and output analyzer
4. Explain Verification and Validation of simulation model

COURSE OUTCOMES

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

1Describe the role of important elements of discrete event simulation and modelling paradigm.

2 Conceptualize real world situations related to systems development decisions, originating from source requirements and goals.

3. Develop skills to apply simulation software to construct and execute goal-driven system models.

4 Interpret the model and apply the results to resolve critical issues in a real world environment

UNIT-I	Overview of Modeling and Simulation:	Classes: 12

Overview of Modeling and Simulation: Motivating Examples, Mathematical Foundations for Mathematical Modeling, Elements of Probability and Statistics, Review of Block diagrams, Flow Charts, Algorithms, Principles of Mathematical modelling

UNIT-II	Deterministic Models – I:	Classes: 12

Deterministic Models – I: Conceptual inputs: Principles of Mathematical Modeling. Compartmental Models, Single population models and Interacting population models.
Applications/case studies of Compartmental Models, Single population models and Interacting population models

UNIT-III	Deterministic Models – II	Classes: 10

.Deterministic Models – II: Conceptual Inputs: Static and Dynamical systems (simple), System studies, System simulation, Applications of Static and Dynamical systems: Cobweb Models, Distributed Lag Models.

UNIT-IV	**Pseudo Random Numbers**	**Classes: 12**

Pseudo Random Numbers: Conceptual Inputs: Random number generation and tests for randomness, Generation of Random deviates of discrete and continuous variables, Applications of Monte Carlo Integration.

UNIT-V	**Stochastic Modeling**	**Classes: 12**

Stochastic Modeling: Conceptual Inputs: Queuing systems, Inventory systems. System simulation of PERT, Queuing, Inventory. Discrete System Simulation.

TEXT BOOKS

1. J.N Kapur (1988) "Mathematical Modeling" New Age International (P) Limited Publications.
2. Geoffrey Gordon (2005) "System Simulation" Prentice-Hill of India Private Limited.
3. Donald W. Boyd (2001) "System Analysis and Modeling" Harcout India Private Ltd.

REFERENCE BOOKS

1. Sankar Sangupta (2013) "System Simulation and Modeling" Dorling Kindersley (india) Pvt. Ltd.
2. Narsing Deo (1996) "System Simulation with Digital Computer" Prentice-Hall of India.
3. Jerry Banks, John S Carson II, Barry L Nelson and David M Nicol (2010) Dorling Kindersley (india) Pvt. Ltd.
4. Clive L. Dym (2004) "Principles of Mathematical Modeling" Elsevier, New Delhi, India

WEB REFERENCES

https://www.mathworks.com/discovery/modeling-and-simulation.html
http://home.ubalt.edu/ntsbarsh/simulation/sim.htm

E -TEXT BOOKS

https://www.e-booksdirectory.com/listing.php?category=100

MOOCS COURSES

1. https://www.coursera.org/lecture/modeling-simulation-natural-processes/modeling-and-simulation-F7vas
2. https://iversity.org/en/courses/modelling-and-simulation-using-simulink

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
MOBILE APPLICATION DEVELOPMENT (Professional Elective - III)

III B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG614PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1To improves their skills of using Android software development tools.

2 To demonstrate their ability to develop software with reasonable complexity on mobile platform.

3To demonstrate their ability to deploy software to mobile devices.

4.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: 12

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

UNIT-II	Android User Interface	Classes: 12

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: 12**
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: 12**
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

WEB REFERENCES

https://clutch.co/directory/mobile-application-developers
https://theappsolutions.com/

E -TEXT BOOKS

https://www.e-booksdirectory.com/listing.php?category=442

MOOCS COURSES

https://in.coursera.org/courses?query=mobile%20app%20development

https://www.classcentral.com/subject/mobile-development

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
SOFTWARE TESTING METHODOLOGIES (Professional Elective - III)

III B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG615PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn
1To provide knowledge of the concepts in software testing such as testing process, criteria, strategies, and methodologies.
2To develop skills in software test automation and management using latest tools

COURSE OUTCOMES

1) Upon successful completion of the course, the student is able to
2) Design and develop the best test strategies in accordance to the development model

UNIT-I	Introduction	Classes: 12

Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy ofbugs. 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 Flow Testing: 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, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT-III	Paths, Path products	Classes: 10

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	Classes: 12

.State, State Graphs and Transition testing: state graphs, good & bad state graphs, state testing, Testability tips.

UNIT-V	Graph Matrices and Application:	Classes: 12

Graph Matrices and Application: 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 or Win-runner).

TEXT BOOKS

1. Software Testing techniques - Baris Beizer, 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

https://www.tutorialspoint.com/software_testing_dictionary/web_application_testing.htm
https://www.geeksforgeeks.org/software-testing-techniques/

E -TEXT BOOKS

https://books.google.co.in/books/about/Software_Testing_Techniques.html?id=Ixf97h356zcC

MOOCS COURSES

https://in.coursera.org/courses?query=software%20testing

https://www.udacity.com/course/software-testing--cs258

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
DATA STRUCTURES (Open Elective - I)

III B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG631OE	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
5) tree structures, search trees, tries, heaps, graphs, and AVL-trees.

UNIT-I	Introduction to Data Structures,	Classes: 12

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

UNIT-III	Search Trees	Classes: 10

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: 12

Graphs: Graph Implementation Methods. Graph Traversal Methods. Sorting: 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. 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

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

WEB REFERENCES

https://www.geeksforgeeks.org/data-structures/

E -TEXT BOOKS

https://www.e-booksdirectory.com/listing.php?category=240

MOOCS COURSES

https://in.coursera.org/learn/data-structures

https://www.classcentral.com/course/swayam-data-structures-13983

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
DATABASE MANAGEMENT SYSTEMS (Open Elective - I)

III B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG632OE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn
- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- 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
- Gain knowledge of fundamentals of DBMS, database design and normal forms
- Master the basics of SQL for retrieval and management of data.
- Be acquainted with the basics of transaction processing and concurrency control.
- 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, 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

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.		
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. 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

WEB REFERENCES

https://www.w3schools.in/dbms/web-based-database-management-system
https://www.g2.com/categories/database-management-systems-dbms/enterprise

E -TEXT BOOKS

https://ebooks.lpude.in/management/mba/term_3/DCAP204_MANAGING_DATABASE_DCAP402_DATABASE_MANAGEMENT_SYSTEMS.pdf

MOOCS COURSES

https://onlinecourses.nptel.ac.in/noc19_cs46/preview

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

COMPILER DESIGN LAB

III B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG604PC	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.
2) Apply client-server principles to develop scalable and enterprise web applications.
3) Ability to design, develop, and implement a compiler for any language.
4) Able to use lex and yacc tools for developing a scanner and a parser.
5) Able to design and implement LL and LR parsers..

LIST OF EXPERIMENTS

1. Write a LEX Program to scan reserved word & Identifiers of C Language
2. Implement Predictive Parsing algorithm
3. Write a C program to generate three address code.
4. Implement SLR(1) Parsing algorithm
5. Design LALR bottom up parser for the given language

<program> ::= <block>
<block> ::= { <variabledefinition> <slist> }
| { <slist> }
<variabledefinition> ::= int <vardeflist> ;
<vardeflist> ::= <vardec> | <vardec> , <vardeflist>
<vardec> ::= <identifier> | <identifier> [<constant>]
<slist> ::= <statement> | <statement> ; <slist>
<statement> ::= <assignment> | <ifstatement> | <whilestatement>

| <block> | <printstatement> | <empty>
<assignment> ::= <identifier> = <expression>
| <identifier> [<expression>] = <expression>
<ifstatement> ::= if <bexpression> then <slist> else <slist> endif
| if <bexpression> then <slist> endif
<whilestatement> ::= while <bexpression> do <slist> enddo
<printstatement> ::= print (<expression>)
<expression> ::= <expression> <addingop> <term> | <term> | <addingop> <term>
<bexpression> ::= <expression> <relop> <expression>
<relop> ::= < | <= | == | >= | > | !=
<addingop> ::= + | -
<term> ::= <term> <multop> <factor> | <factor>
<multop> ::= * | /
<factor> ::= <constant> | <identifier> | <identifier> [<expression>]
| (<expression>)
<constant> ::= <digit> | <digit> <constant>
<identifier> ::= <identifier> <letterordigit> | <letter>
<letterordigit> ::= <letter> | <digit>
<letter> ::= 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
<digit> ::= 0|1|2|3|4|5|6|7|8|9
<empty> 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 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

https://holub.com/goodies/compiler/compilerDesignInC.pdf

REFERENCE BOOKS
https://www.sanfoundry.com/best-reference-books-compilers/
WEB REFERENCES
https://www.freebookcentre.net/ComputerScience-Books-Download/Basics-of-Compiler-Design-(PDF-319P).html
E -TEXT BOOKS
https://www.pdfdrive.com/design-and-analysis-of-algorithm-books.html
MOOCS COURSES
https://onlinecourses.nptel.ac.in/noc20_cs13/preview https://www.edx.org/course/compilers

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
MACHINE LEARNING LAB

III B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG606PC	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

To learn

1) The objective of this lab is to get an overview of the various machine learning techniques and can able to demonstrate them using python

COURSE OUTCOMES

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

1. understand complexity of Machine Learning algorithms and their limitations;
2. understand modern notions in data analysis-oriented computing;
3. be capable of confidently applying common Machine Learning algorithms in practice and implementing their own;
4. Be capable of performing experiments in Machine Learning using real-world data.

LIST OF EXPERIMENTS

1. The probability that it is Friday and that a student is absent is 3 %. Since there are 5 school days in a week, the probability that it is Friday is 20 %. What is theprobability that a student is absent given that today is Friday? Apply Baye's rule in python to get the result. (Ans: 15%)
2. Extract the data from database using python
3. Implement k-nearest neighbours classification using python
4. Given the following data, which specify classifications for nine combinations of VAR1 and VAR2 predict a classification for a case where VAR1=0.906 and VAR2=0.606, using the result of kmeans clustering with 3 means (i.e., 3 centroids)

VAR1 VAR2 CLASS
1.713 1.586 0
0.180 1.786 1
0.353 1.240 1
0.940 1.566 0
1.486 0.759 1
1.266 1.106 0
1.540 0.419 1
0.459 1.799 1
0.773 0.186 1

5. The following training examples map descriptions of individuals onto high, medium and low

credit-worthiness.
medium skiing design single twenties no -> highRisk
high golf trading married forties yes -> lowRisk
low speedway transport married thirties yes -> medRisk
medium football banking single thirties yes -> lowRisk
high flying media married fifties yes -> highRisk
low football security single twenties no -> medRisk
medium golf media single thirties yes -> medRisk
medium golf transport married forties yes -> lowRisk
high skiing banking single thirties yes -> highRisk
low golf unemployed married forties yes -> highRisk
Input attributes are (from left to right) income, recreation, job, status, age-group, home-owner. Find the unconditional probability of `golf' and the conditional probability of `single' given `medRisk' in the dataset?
6. Implement linear regression using python.
7. Implement Naïve Bayes theorem to classify the English text
8. Implement an algorithm to demonstrate the significance of genetic algorithm
9. Implement the finite words classification system using Back-propagation algorithm

TEXT BOOKS

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

REFERENCE BOOKS

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

WEB REFERENCES

https://ml.utexas.edu/

E -TEXT BOOKS

https://www.bmc.com/forms/machine-learning-ebook.html

MOOCS COURSES

https://www.coursera.org/learn/machine-learning

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

FULL STACK DEVELOPMENT LAB (Professional Elective - III Lab)

III B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG607PE	B. Tech	0	0	3	1	30	70	100

COURSE OBJECTIVES

To learn

1) To implement Forms, inputs and Services using AngularJS
2) To develop a simple web application using Nodejs; Angular JS and Express
3) To implement data models using MongoDB

COURSE OUTCOMES

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

1. Develop a fully functioning website and deploy on a web server.
2. Gain Knowledge about the front end and back end Tools
3. Find and use code packages based on their documentation to produce working results in a project.
4. Create web pages that function using external data.

LIST OF EXPERIMENTS

1. Develop a Form and validate using AngularJS
2. Create and implement modules and controllers in AngularJS
3. Implement Error Handling in AngularJS
4. Create and implement Custom directives
5. Create a simple web application using Express, Node JS and Angular JS
6. Implement CRUD operations on MongoDB
7. Create a react application for the student management system having registration, login, contact, about pages and implement routing to navigate through these pages.
8. Create a service in react that fetches the weather information from openweathermap.org and the display the current and historical weather information using graphical representation using chart.js
9. Create a TODO application in react with necessary components and deploy it into github.
10. A. Develop an express web application that can interact with REST API to perform CRUD operations on student data. (Use Postman)
B. For the above application create authorized end points using JWT (JSON Web Token).

TEXT BOOKS

1. Web Design with HTML, CSS, JavaScript and JQuery Set Book by Jon Duckett Professional JavaScript for Web Developers Book by Nicholas C. Zakas. 2. Learning PHP, MySQL, JavaScript, CSS & HTML5: A Step-by-Step Guide to Creating Dynamic Websites by Robin Nixon. 3. Full Stack JavaScript: Learn Backbone.js, Node.js and MongoDB. Copyright © 2015 azat mardan.
REFERENCE BOOKS
1. Full-Stack JavaScript Development by Eric Bush. 2. Mastering Full Stack React Web Development Paperback – April 28, 2017 Tomasz Dyl , Kamil Przeorski, Maciej Czarnecki.
WEB REFERENCES
https://www.studocu.com/in/document/anna-university/computer-science-engg/full-stack-web-development-laboratory-manual/30269201
E -TEXT BOOKS
https://bookauthority.org/books/new-full-stack-development-ebooks
MOOCS COURSES
https://in.coursera.org/courses?query=full%20stack%20web%20development

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

INTERNET OF THINGS LAB (Professional Elective - III Lab)

III B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
EC614PE	B. Tech	0	0	3	1	30	70	100

COURSE OBJECTIVES

To learn

1) To introduce the raspberry PI platform, that is widely used in IoT applications.
2) To introduce the implementation of distance sensor on IoT devices

COURSE OUTCOMES

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

1. Ability to introduce the concept of M2M (machine to machine) with necessary protocols and get awareness in implementation of distance sensor.
2. Get the skill to program using python scripting language which is used in many IoT devices..

LIST OF EXPERIMENTS

1. Using raspberry pi
a. Calculate the distance using a distance sensor.
b. Basic LED functionality.
2. Using Arduino
a. Calculate the distance using a distance sensor.
b. Basic LED functionality.
c. Calculate temperature using a temperature sensor.
3. Using Node MCU
a. Calculate the distance using a distance sensor.
b. Basic LED functionality.
c. Calculate temperature using a temperature sensor.

TEXT BOOKS

1 1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547.
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759.

REFERENCE BOOKS

1 1. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-642-19156-5 e-ISBN 978-3-642-19157-2, Springer, 2016

2. N. Ida, Sensors, Actuators and Their Interfaces, Scitech Publishers, 2014.
WEB REFERENCES
https://iotlab.com/
E -TEXT BOOKS
https://link.springer.com/book/10.1007/978-3-319-69715-4
MOOCS COURSES
https://in.coursera.org/specializations/uiuc-iot

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

MODELING AND SIMULATION LAB (Professional Elective - III Lab)

III B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG608PE	B. Tech	0	0	3	1	30	70	100

COURSE OBJECTIVES

To learn

1) Define the basics of simulation modelling and replicating the practical situations in organizations
2) Generate random numbers and random variates using different techniques.
3) Develop a simulation model using heuristic methods.
4) Analysis of Simulation models using input analyser, and output analyser
5) Explain Verification and Validation of simulation model

COURSE OUTCOMES

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

1. Describe the role of important elements of discrete event simulation and modelling paradigm.
2. Conceptualize real world situations related to systems development decisions, originating
3. from source requirements and goals.
4. Develop skills to apply simulation software to construct and execute goal-driven system models.
5. Interpret the model and apply the results to resolve critical issues in a real-world environment.

LIST OF EXPERIMENTS

1. Modeling of some of the real-world systems like –Demand & Supply,
2. Modeling of dynamical systems like - Compartmental Models, Single population models, interacting population models., Chemical Reactor, Pray Predator model
3. Modeling of diffusion of Heat, RC model, Lag Models
4. Pseudo Random number generation and test
5. Random deviate generation of the following distribution:

a. Discrete
i. Bernoulli
ii. Uniform
iii. Binomial
iv. Poisson
v. Multinomial
b. Continuous

i. Uniform
ii. Exponential
iii. Gamma
iv. Normal
v. Beta
6. Monte Carlo Integration of Real-world problems like estimation of area of an agricultural plot, volume of a solid,
7. Simulation of Queuing system M/M/1, M/M/2, M/G/1
8. Simulation of Inventory System, News Boys Problem
9. Simulation of Telephone system
10. Simulation of PERT

TEXT BOOKS

1. J.N Kapur (1988) "Mathematical Modeling" New Age International (P) Limited Publications.
2. Geoffrey Gordon (2005) "System Simulation" Prentice-Hill of India Private Limited.
3. Donald W. Boyd (2001) "System Analysis and Modeling" Harcout India Private Ltd

REFERENCE BOOKS

1. Sankar Sangupta (2013) "System Simulation and Modeling" Dorling Kindersley (india) Pvt. Ltd.
2. Narsing Deo (1996) "System Simulation with Digital Computer" Prentice-Hall of India.
3. Jerry Banks, John S Carson II, Barry L Nelson and David M Nicol (2010) Dorling Kindersley(india) Pvt. Ltd.
4. Clive L. Dym (2004) "Principles of Mathematical Modeling" Elsevier, New Delhi, India.

WEB REFERENCES

https://www.mathworks.com/discovery/modeling-and-simulation.html

E -TEXT BOOKS

https://link.springer.com/book/10.1007/978-3-030-18869-6

MOOCS COURSES

https://www.coursera.org/lecture/modeling-simulation-natural-processes/modeling-and-simulation-F7vas

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

MOBILE APPLICATION DEVELOPMENT LAB (Professional Elective - III Lab)

III B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG611PE	B. Tech	0	0	3	1	30	70	100

COURSE OBJECTIVES

To learn

1) To learn how to develop Applications in android environment.
2) To learn how to develop user interface applications.
3) To learn how to develop URL related applications.

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 user interfaces.
3. Student will be able to develop, deploy and maintain the Android Applications

LIST OF EXPERIMENTS

1. Create an Android application that shows Hello + name of the user and run it on an emulator.
(b) Create an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user clicks the OK button.

2. Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button. Use (a) Linear Layout (b) Relative Layout and (c) Grid Layout or Table Layout.

3. Develop an application that shows names as a list and on selecting a name it should show the details of the candidate on the next screen with a “Back” button. If the screen is rotated to landscape mode (width greater than height), then the screen should show list on left fragment and details on right fragment instead of second screen with back button. Use Fragment transactions and Rotation event listener.

4. Develop an application that uses a menu with 3 options for dialing a number, opening a website and to send an SMS. On selecting an option, the appropriate action should be invoked using intents.

5. Develop an application that inserts some notifications into Notification area and whenever a notification is inserted, it should show a toast with details of the notification.

6. Create an application that uses a text file to store user names and passwords (tab separated fields and one record per line). When the user submits a login name and password through a screen, the details should be verified with the text file data and if they match, show a dialog

saying that login is successful. Otherwise, show the dialog with Login Failed message.
7. Create a user registration application that stores the user details in a database table.
8. Create a database and a user table where the details of login names and passwords are stored. Insert some names and passwords initially. Now the login details entered by the user should be verified with the database and an appropriate dialog should be shown to the user.
9. Create an admin application for the user table, which shows all records as a list and the admin can select any record for edit or modify. The results should be reflected in the table.
10. Develop an application that shows all contacts of the phone along with details like name, phone number, mobile number etc.
11. Create an application that saves user information like name, age, gender etc. in shared preference and retrieves them when the program restarts.
12. Create an alarm that rings every Sunday at 8:00 AM. Modify it to use a time picker to set alarm time.
13. Create an application that shows the given URL (from a text field) in a browser

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.

WEB REFERENCES

https://www.codingconnect.net/mobile-application-development-lab/

E -TEXT BOOKS

https://bookauthority.org/books/best-mobile-development-ebooks

MOOCS COURSES

https://www.mooclab.club/resources/categories/mobile-web-development.91/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

SOFTWARE TESTING METHODOLOGIES LAB (Professional Elective - III Lab)

III B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG612PE	B. Tech	0	0	3	1	30	70	100

COURSE OBJECTIVES

To learn

1) To provide knowledge of Software Testing Methods.
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 development model.

LIST OF EXPERIMENTS

1. Recording in context sensitive mode and analog mode
2. GUI checkpoint for single property
3. GUI checkpoint for single object/window
4. GUI checkpoint for multiple objects
5. a) Bitmap checkpoint for object/window

a) Bitmap checkpoint for screen area

6. Database checkpoint for Default check
7. Database checkpoint for custom check
8. Database checkpoint for runtime record check
9. a) Data driven test for dynamic test data submission

b) Data driven test through flat files

c) Data driven test through front grids

d) Data driven test through excel test

10. a) Batch testing without parameter passing

b) Batch testing with parameter passing

11. Data driven batch
12. Silent mode test execution without any interruption
13. Test case for calculator in windows application

TEXT BOOKS

1. Software Testing techniques - Baris Beizer, 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
https://www.codingconnect.net/mobile-application-development-lab/ http://www.innovativecodesacademy.in/mobile-application-development-laboratory-experiment/
E -TEXT BOOKS
https://link.springer.com/book/10.1007/978-3-030-18869-6
MOOCS COURSES
https://bookauthority.org/books/best-mobile-development-ebooks

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

Environmental Science

III B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
ES608BS	B. Tech	3	0	0	0	100	-	100

COURSE OBJECTIVES

To learn

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

COURSE OUTCOMES

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

1) Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development;.

UNIT-I	Ecosystems:	Classes: 12

Ecosystems: 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, ecosystem value, services and carrying capacity, Field visits.

UNIT-II	Natural Resources	Classes: 12

Natural Resources: Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. 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: 10

.Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV	Environmental Pollution and Control Technologies	Classes: 12

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of

pollution, Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Sources and types of pollution, drinking water quality standards. Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. Global Environmental Issues and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT-V	**Environmental Policy, Legislation & EIA**	**Classes: 12**

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act-1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socioeconomical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan.(EMP). Towards Sustainable Future: Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS

11 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2 Environmental Studies by R. Rajagopalan, Oxford University Press

REFERENCE BOOKS

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications

WEB REFERENCES

http://environmentalartilces.wordpress.com/bhopal-gas-tragedy-20-years-after/
http://www.newagepublishers.com/samplechapter/001281.pdf

E -TEXT BOOKS

https://www.hzu.edu.in/bed/E%20V%20S.pdf

MOOCS COURSES

https://www.my-mooc.com/en/categorie/environmental-science

https://www.edx.org/learn/environmental-science

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
DEEP LEARNING

IV B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG701PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To understand complexity of Deep Learning algorithms and their limitations.
2. To be capable of performing experiments in Deep Learning using real-world data

COURSE OUTCOMES

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

1. Implement deep learning algorithms, understand neural networks and traverse the layers of data.
2. Learn topics such as convolutional neural networks, recurrent neural networks, training deep networks and high-level interfaces.
3. Understand applications of Deep Learning to Computer Vision.
4. Understand and analyze Applications of Deep Learning to NLP.

UNIT-I	Introduction	Classes: 12

Introduction: Feed forward Neural networks, Gradient descent and the back-propagation algorithm, Unit saturation, the vanishing gradient problem, and ways to mitigate it. RelU Heuristics for avoiding bad local minima, Heuristics for faster training, Nestors accelerated gradient descent, Regularization, Dropout.

UNIT-II	Convolutional Neural Networks	Classes: 12

Convolutional Neural Networks: Architectures, convolution/pooling layers, Recurrent Neural Networks: LSTM, GRU, Encoder Decoder architectures. Deep Unsupervised Learning: Auto encoders, Variational Auto-encoders, Adversarial Generative Networks, Auto-encoder and DBM Attention and memory models, Dynamic Memory Models.

UNIT-III	Applications of Deep Learning to Computer Vision	Classes: 10

Applications of Deep Learning to Computer Vision: Image segmentation, object detection, automatic image captioning, Image generation with Generative adversarial networks, video to text with LSTM models, Attention Models for computer vision tasks...

UNIT-IV	Applications of Deep Learning to NLP	Classes: 12

Applications of Deep Learning to NLP: Introduction to NLP and Vector Space Model of Semantics, Word Vector Representations: Continuous Skip-Gram Model, Continuous Bag-of-Words mode(CBOW), Glove, Evaluations and Applications in word similarity.		
UNIT-V	**Analogy reasoning**	**Classes: 12**
Analogy reasoning: Named Entity Recognition, Opinion Mining using Recurrent Neural Networks: Parsing and Sentiment Analysis using Recursive Neural Networks: Sentence Classification using Convolutional Neural Networks, Dialogue Generation with LSTMs		

TEXT BOOKS

1. Deep Learning by Ian Goodfellow, Yoshua Bengio and Aaron Courville, MIT Press.
2. The Elements of Statistical Learning by T. Hastie, R. Tibshirani, and J. Friedman, Springer.
3. Probabilistic Graphical Models. Koller, and N. Friedman, MIT Press

REFERENCE BOOKS

1. Bishop, C, M., Pattern Recognition and Machine Learning, Springer, 2006.
2. Yegnanarayana, B., Artificial Neural Networks PHI Learning Pvt. Ltd, 2009.
3. Golub, G., H., and Van Loan, C. F., Matrix Computations, JHU Press, 2013.
4. Satish Kumar, Neural Networks: A Classroom Approach, Tata McGraw-Hill Education, 2004

WEB REFERENCES

https://www.aiche.org/resources/publications/cep/2018/june/introduction-deep-learning-part-1?gclid=EAIaIQobChMI67m32qf5_QIVhJNmAh0QzQ7DEAAYAiAAEgL2mPD_BwE

https://www.deeplearning.ai/

E -TEXT BOOKS

1. https://analyticsindiamag.com/8-free-e-books-to-learn-deep-learning/

MOOCS COURSES

1. https://in.coursera.org/specializations/deep-learning

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
INFORMATION SECURITY

IV B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG702PC	B. Tech	2	0	0	2	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
4. 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: 12

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 Cryptography Principles:	Classes: 12

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.

UNIT-III	Digital Signatures	Classes: 10

Digital Signatures, Authentication Protocols, Digital signature Standard, Authentication Applications,
Kerberos, X.509 Directory Authentication Service. Email Security: Pretty Good Privacy (PGP) and S/MIME...

UNIT-IV	**IP Security:**	**Classes: 12**
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	**intruders,**	**Classes: 12**
Intruders, Viruses and Worms Intruders, Viruses and related threats Firewalls: Firewall Design Principles, Trusted Systems, Intrusion Detection Systems.		

TEXT BOOKS

11. 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

WEB REFERENCES

1. https://securityscorecard.com/blog/the-7-best-cyber-security-websites/

E -TEXT BOOKS

1. https://www.pdfdrive.com/cyber-security-books.htmll

MOOCS COURSES

1 https://www.cyberdegrees.org/resources/free-online-courses/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

GRAPH THEORY (Professional Elective - IV)

IV B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG711PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Understand the basics of graph theory and their various properties.
2. Model problems using graphs and to solve these problems algorithmically.
3. Apply graph theory concepts to solve real world applications like routing, TSP/traffic control, etc.
4. Optimize the solutions to real problems like transport problems etc

COURSE OUTCOMES

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

1. Know some important classes of graph theoretic problems;
2. Be able to formulate and prove central theorems about trees, matching, connectivity, colouring and planar graphs;
3. Be able to describe and apply some basic algorithms for graphs;
4. Be able to use graph theory as a modelling tool.

UNIT-I	Introduction	Classes: 12

Introduction-Discovery of graphs, Definitions, Subgraphs, Isomorphic graphs, Matrix representations of graphs, Degree of a vertex, Directed walks, paths and cycles, Connectivity in digraphs, Eulerian and Hamilton digraphs, Eulerian digraphs, Hamilton digraphs, Special graphs, Complements, Larger graphs from smaller graphs, Union, Sum, Cartesian Product, Composition, Graphic sequences, Graph theoretic model of the LAN problem, Havel-Hakimi criterion, Realization of a graphic sequence

UNIT-II	Connected graphs and shortest paths	Classes: 12

Connected graphs and shortest paths - Walks, trails, paths, cycles, Connected graphs, Distance, Cut-vertices and cut-edges, Blocks, Connectivity, Weighted graphs and shortest paths, Weighted graphs, Dijkstra‟s shortest path algorithm, Floyd-Warshall shortest path algorithm

UNIT-III	Trees-	Classes: 10

Trees- Definitions and characterizations, Number of trees, Cayley‟s formula, Kirchoff-matrix-tree theorem, Minimum spanning trees, Kruskal‟s algorithm, Prim‟s algorithm, Special classes of graphs, Bipartite Graphs, Line Graphs, Chordal Graphs, Eulerian Graphs, Fleury‟s algorithm, Chinese Postman problem, Hamilton Graphs, Introduction, Necessary conditions and sufficient conditions....		
UNIT-IV	**Independent sets coverings and matchings**	**Classes: 12**
Independent sets coverings and matchings – Introduction, Independent sets and coverings: basic equations, Matchings in bipartite graphs, Hall‟s Theorem, K¨onig‟s Theorem, Perfect matchings in graphs, Greedy and approximation algorithms.		
UNIT-V	**Vertex Colorings**	**Classes: 12**
Vertex Colorings- Basic definitions, Cliques and chromatic number, Mycielski‟s theorem, Greedy coloring algorithm, Coloring of chordal graphs, Brooks theorem, Edge Colorings, Introduction and Basics, Gupta-Vizing theorem, Class-1 and Class-2 graphs, Edge-coloring of bipartite graphs, Class-2 graphs, Hajos union and Class-2 graphs, A scheduling problem and equitable edge-coloring		

TEXT BOOKS

1. J. A. Bondy and U. S. R. Murty. Graph Theory, volume 244 of Graduate Texts in Mathematics. Springer, 1st edition, 2008.
2. J. A. Bondy and U. S. R. Murty. Graph Theory with Applications

REFERENCE BOOKS

1. Lecture Videos: http://nptel.ac.in/courses/111106050/13.
2. Introduction to Graph Theory, Douglas B. West, Pearson.
3. Schaum's Outlines Graph Theory, Balakrishnan, TMH.
4. Introduction to Graph Theory, Wilson Robin j, PHI.
5. Graph Theory with Applications to Engineering and Computer Science, Narsing Deo, PHI.
6. Graphs - An Introductory Approach, Wilson and Watkins..

WEB REFERENCES

https://d3gt.com/unit.html
https://graphonline.ru/en/

E -TEXT BOOKS

https://www.pdfdrive.com/graph-theory-books.html
https://www.maths.ed.ac.uk/~v1ranick/papers/wilsongraph.pdf

MOOCS COURSES

https://in.coursera.org/learn/graphs

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

AUGMENTED REALITY AND VIRTUAL REALITY (Professional Elective - IV)

IV B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG712PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. The objective of this course is to provide a foundation to the fast-growing field of AR and make the students aware of the various AR devices.
2. To give historical and modern overviews and perspectives on virtual reality. It describes the fundamentals of sensation, perception, technical and engineering aspects of virtual reality systems.

COURSE OUTCOMES

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

1. Describe how AR systems work and list the applications of AR.
2. Understand and analyze the hardware requirement of AR.
3. Describe how VR systems work and list the applications of VR.
4. Understand the design and implementation of the hardware that enables VR systems to be built

UNIT-I	Introduction to Augmented Reality	Classes: 12

Introduction to Augmented Reality: What Is Augmented Reality - Defining augmented reality, history of augmented reality, The Relationship Between Augmented Reality and Other Technologies-Media, Technologies, Other Ideas Related to the Spectrum Between Real and Virtual Worlds, applications of augmented reality Augmented Reality Concepts- How Does Augmented Reality Work? Concepts Related to Augmented Reality, Ingredients of an Augmented Reality Experience

UNIT-II	AR Devices & Components	Classes: 12

AR Devices & Components: AR Components – Scene Generator, Tracking system, monitoring system, display, Game scene. AR Devices – Optical See- Through HMD, Virtual retinal systems, Monitor bases systems, Projection displays, Video see-through systems

UNIT-III	Introduction to Virtual Reality:	Classes: 10

Introduction to Virtual Reality: Defining Virtual Reality, History of VR, Human Physiology and Perception, Key Elements of Virtual Reality Experience, Virtual Reality System, Interface to the Virtual World-Input & output- Visual, Aural & Haptic Displays, Applications of Virtual Reality

UNIT-IV	Representing the Virtual World::	Classes: 12

Representing the Virtual World: Representation of the Virtual World, Visual Representation in VR, Aural Representation in VR and Haptic Representation in VR, Case Study: GHOST (General Haptics Open Software Toolkit) software development toolkit

UNIT-V	**Visual Perception & Rendering**	**Classes: 12**

Visual Perception & Rendering: Visual Perception - Perception of Depth, Perception of Motion, Perception of Color, Combining Sources of Information, Visual Rendering -Ray Tracing and Shading Models, Rasterization, Correcting Optical Distortions, Improving Latency and Frame Rates

TEXT BOOKS

. 1. Allan Fowler-AR Game Development‖, 1st Edition, A press Publications, 2018, ISBN 978-1484236178
2. Augmented Reality: Principles & Practice by Schmalstieg / Hollerer, Pearson Education India; First edition (12 October 2016), ISBN-10: 9332578494

REFERENCE BOOKS

1. Virtual Reality, Steven M. LaValle, Cambridge University Press, 2016
2. Understanding Virtual Reality: Interface, Application and Design, William R Sherman andAlan B Craig, (The Morgan Kaufmann Series in Computer Graphics)". Morgan Kaufmann Publishers, San Francisco, CA, 2002.
3. Developing Virtual Reality Applications: Foundations of Effective Design, Alan B Craig,William R Sherman and Jeffrey D Will, Morgan Kaufmann, 2009.
4. . Designing for Mixed Reality, Kharis O'Connell Published by O'Reilly Media, Inc., 2016, ISBN: 9781491962381.
5. Sanni Siltanen- Theory and applications of marker-based augmented reality. Julkaisija – Utgivare Publisher. 2012. ISBN 978-951-38-7449-0.
6. Gerard Jounghyun Kim, "Designing Virtual Systems: The Structured Approach", 2005.

WEB REFERENCES

https://arvr.google.com/
https://blog.feedspot.com/virtual_reality_blogs/

E -TEXT BOOKS

https://link.springer.com/book/10.1007/978-3-030-68086-2

MOOCS COURSES

https://link.springer.com/book/10.1007/978-3-030-68086-2

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
SOFT COMPUTING (Professional Elective - IV)

IV B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG713PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

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 modelling using Classification and Clustering techniques
4. Learn the concepts of Genetic algorithm and its applications
5. Acquire the knowledge of Rough Sets.

COURSE OUTCOMES

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

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: 12

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	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

UNIT-V	Rough Sets	Classes: 12
Rough Sets, Rough Sets, Rule Induction, and Discernibility Matrix, Integration of Soft Computing Techniques.		

TEXT BOOKS

. 1. Soft Computing – Advances and Applications - Jan 2015 by B.K. Tripathy and J. Anuradha – Cengage Learning.

REFERENCE BOOKS

1. S. N. Sivanandam & S. N. Deepa, "Principles of Soft Computing", 2nd edition, Wiley India, 2008.
2. David E. Goldberg, "Genetic Algorithms-In Search, optimization and Machine learning", Pearson Education.
3. J. S. R. Jang, C.T. Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing", Pearson Education, 2004.
4. G.J. Klir & B. Yuan, "Fuzzy Sets & Fuzzy Logic", PHI, 1995.
5. Melanie Mitchell, "An Introduction to Genetic Algorithm", PHI, 1998.
6. Timothy J. Ross, "Fuzzy Logic with Engineering Applications", McGraw- Hill International editions, 1995.

WEB REFERENCES

https://www.springer.com/journal/500?gclid=EAIaIQobChMIo5jkrbD5_QIVu5hmAh2AdwKPEAAYASAAEgImJfD_BwE
https://www.javatpoint.com/what-is-soft-computing

E -TEXT BOOKS

https://freecomputerbooks.com/Introduction-to-Soft-Computing.html

MOOCS COURSES

https://www.classcentral.com/course/swayam-introduction-to-soft-computing-10053

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
CLOUD COMPUTING (Professional Elective - IV)

IVB. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG714PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1) This course provides an insight into 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

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

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: 12

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	Cloud Computing Architecture and Management	Classes: 10

Cloud Computing Architecture and Management: Cloud architecture, Layer, Anatomy of the 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 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, SharePoint, 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, Manjrasoft, Aneka Platform		

TEXT BOOKS

1 1. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014.

REFERENCE BOOKS

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp 2011.

WEB REFERENCES

https://www.ibm.com/in-en/topics/cloud-computing

E -TEXT BOOKS

https://github.com/cloudcommunity/Free-Books

MOOCS COURSES

https://www.mooc-list.com/tags/cloud-computing

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
OPTIMIZATION TECHNIQUES (Professional Elective - IV)

IVB. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG715PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1) To introduce various optimization techniques i.e classical, linear programming, transportation problem, simplex algorithm, dynamic programming
2) Constrained and unconstrained optimization techniques for solving and optimizing electrical and electronic engineering circuits design problems in real world situations.
3) To explain the concept of Dynamic programming and its applications to project implementation

COURSE OUTCOMES

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

1. Explain the need of optimization of engineering systems.
2. Understand optimization of electrical and electronics engineering problems.
3. Apply classical optimization techniques, linear programming, simplex algorithm, transportation problem.
4. Apply unconstrained optimization and constrained non-linear programming and dynamic programming. Formulate optimization problems

UNIT-I	Introduction and Classical Optimization Techniques	Classes: 12

Introduction and Classical Optimization Techniques: Statement of an Optimization problem – design vector – design constraints – constraint surface – objective function – objective function surfac classification of Optimization problems. Linear Programming: Standard form of a linear programming problem – geometry of linear programming problems – definitions and theorems – solution of a system of linear simultaneous equations – pivotal reduction of a general system of equations – motivation to the simplex method – simplex algorithm

UNIT-II	Transportation Problem	Classes: 12

Transportation Problem: Finding initial basic feasible solution by north – west corner rule, least costmethod and Vogel's approximation method – testing for optimality of balanced transportation problems. Degeneracy. Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem; Traveling Salesman problem.

UNIT-III	Classical Optimization Techniques	Classes: 10
. Classical Optimization Techniques: Single variable Optimization – multi variable Optimization without constraints – necessary and sufficient conditions for minimum/maximum – multivariable Optimization with equality constraints: Solution by method of Lagrange multipliers – Multivariable Optimization with inequality constraints: Kuhn – Tucker conditions. Single Variable Nonlinear Unconstrained Optimization: Elimination methods: Uni Model function-its importance, Fibonacci method & Golden section method.		
UNIT-IV	**Multi variable nonlinear**	**Classes: 12**
Multi variable nonlinear unconstrained optimization: Direct search methods – Univariant method, Pattern search methods – Powell's, Hooke - Jeeves, Rosenbrock's search methods. Gradient methods radient of function & its importance, Steepest descent method, Conjugate direction methods: Fletcher- Reeves method & variable metric method.		
UNIT-V	**Dynamic Programming**	**Classes: 12**
Dynamic Programming: Dynamic programming multistage decision processes – types – concept of sub optimization and the principle of optimality – computational procedure in dynamic programming – examples illustrating the calculus method of solution - examples illustrating the tabular method of solution.		

TEXT BOOKS
1 1. Optimization Techniques & Applications by S.S.Rao, New Age International. 2. Optimization for Engineering Design by Kalyanmoy Deb, PHI.
REFERENCE BOOKS
1. George Bernard Dantzig, Mukund Narain Thapa, "Linear programming", Springer series in Operations Research 3rd edition, 2003. 2. H. A. Taha, "Operations Research: An Introduction", 8th Edition, Pearson/Prentice Hall, 2007. 3. Optimization Techniques by Belegundu & Chandrupatla, Pearson Asia. 4. Optimization Techniques Theory And Practice by M.C. Joshi, K. M. Moudgalya, Narosa Publications.
WEB REFERENCES
1. https://www.aicte-india.org/flipbook/p&ap/Vol.%20II%20UG/UG_2.html#p=8 2. https://www.britannica.com/topic/operations-research
E -TEXT BOOKS
https://www.pdfdrive.com/optimization-books.html
MOOCS COURSES
https://in.coursera.org/courses?query=mathematical%20optimization

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
COMPUTER GAME DESIGN AND PROGRAMMING (Professional Elective - V)

IV B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG721PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1) Provide students with practical ideas and techniques and get them ready to develop games
2) that are more inventive, entertaining, and satisfying.
3) Provide knowledge for computer game development

COURSE OUTCOMES

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

1. Understand the game design, Game systems, and its prototyping.
2. Explain the Game architecture, memory, debugging and prevention of bugs.
3. Illustrate Graphics and animation.
4. Describe Artificial intelligence developing computer games, understand Game Industry and IP.

UNIT-I	Games:	Classes: 12

Games: History and Society: The First Video Games, Games for the Masses, The Console Kings, Audience and Demographics, Societal Reaction to Games, Cultural Issues, Society within Games. Game Design: The Game Designer, A Model of Games, Game, Player and Experience, Play Mechanics, Interface, Game Systems, Design Work, Prototyping and Playtesting Cycles, Playtesting

UNIT-II	Programming Languages and Fundamentals	Classes: 12

Programming Languages and Fundamentals: C++ and Game Development, Java, Scripting Languages, Data Structures, Object-Oriented Design in Games, Component Systems, Design Patterns Game Architecture, Memory and Debugging: Bird's-Eye View of a Game, Initialization/Shutdown Steps, Main Game Loop, Game, Entities, Memory Management, File I/O, Game Resources, Serialization, The Five-Step Debugging Process, Expert Debugging Tips, Tough Debugging, Scenarios and Patterns, Understanding the Underlying System, Adding Infrastructure to Assist in Debugging, Prevention of Bugs.

UNIT-III	Graphics and Animation	Classes: 10

. Graphics and Animation: Introduction to 3D Modeling, Box Modeling with Polygons, NURBS, Subdivision Surfaces, 3D Sculpting, Reverse Engineering, BSP Modeling, Modeling Methodology, Texture Mapping, Mapping UV Coordinates, Animation, Motion Capture, Motion Extraction, Mesh

Deformation, Inverse Kinematics, Collision Detection, Real-Time Animation Playback, Character Animation, Facial Animation, Simulation Animation.		
UNIT-IV	**Artificial Intelligence for Games**	**Classes: 12**
Artificial Intelligence for Games: AI for Games, Game Agents, Finite-State Machines, Common AI Techniques, Search Space, Pathfinding, Audio and Network, Programming Basic Audio, Programming Music Systems, Programming Advanced Audio.		
UNIT-V	**Game Industry and IP:**	**Classes: 12**
Game Industry and IP: Game Developers, Publishers, Platform Holders, Deal Dynamics, Payment Negotiation, Advertising, Media, Publicity Opportunities, Marketing, IP Protection, The IP Content of Video Games, Patents, Copyrights, Trademarks, Transfers of IP Rights, Video Game Content Regulation.		

TEXT BOOKS

1. Steve Rabin, Introduction to Game Development, 2nd ed. Course Technology 2010, 978-1-58450-679-9.

REFERENCE BOOKS

1. Kenneth C. Finney, 3D Game Programming: All in One, 3rd Ed Course Technology 2013, 978- 1-4354- 5744-7.

WEB REFERENCES

https://www.gamedesigning.org/career/programming-languages/

E -TEXT BOOKS

https://freecomputerbooks.com/compscGameProgrammingBooks.html

MOOCS COURSES

https://www.coursera.org/courses?query=game%20design&utm_source=gg&utm_medium=sem&utm_campaign=B2C_INDIA__branded_FTCOF_courseraplus_arte_PMax&utm_content=Degree&campaignid=19607944793&adgroupid=&device=c&keyword=&matchtype=&network=x&devicemodel=&adpostion=&creativeid=&hide_mobile_promo&gclid=EAIaIQobChMI4fSZ3rX5_QIVkzUrCh3WEQPzEAAYASAAEgLwS_D_BwE

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

AGILE METHODOLOGY (Professional Elective - V)

IVB. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG722PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1) Knowledge on concepts of Agile development, releasing, planning and developing t

COURSE OUTCOMES

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

1. Understand basic concepts of agile methods and extreme programming.
2. Analyze real customer involvement and ubiquitous language.
3. Discuss risk management and iteration planning.
4. Summarize incremental requirements, refactoring, incremental design and architecture

UNIT-I	Introduction Extreme Programming (XP) - Agile Development	Classes: 12

Introduction Extreme Programming (XP) - Agile Development: Why Agile - Understanding Success, Beyond Deadlines, Importance of Organizational Success, Introduction to Agility How to Be Agile – Agile methods, Don't make your own method, Road to mastery Understanding XP (Extreme Programming) - XP life cycle, XP team, XP Concepts Adopting XP - Knowing whether XP is suitable, Implementing XP, assessing Agility Practicing XP - Thinking - Pair Programming, Energized work, Informative Workspace, Root cause Analysis, Retrospectives.

UNIT-II	Collaborating	Classes: 12

Collaborating: Trust, Sit together, Real customer involvement, Ubiquitous language, meetings, coding standards, Iteration demo, Reporting..

UNIT-III	Releasing:	Classes: 10

. Releasing: Bug free Release, Version Control, fast build, continuous integration, Collective ownership, Documentation.

UNIT-IV	Planning:	Classes: 12

Planning: Version, Release Plan, Risk Management, Iteration Planning, Slack, Stories, Estimating

UNIT-V	**Developing:**	**Classes: 12**
Developing: Incremental requirements, Customer tests, Test driven development, Refactoring, Incremental design and architecture, spike solutions, Performance optimization, Exploratory testing .		

TEXT BOOKS

1 1. The art of Agile Development, James Shore and Shane Warden, 11th Indian Reprint, O'Reilly, 2018.

REFERENCE BOOKS

1. Learning Agile, Andrew Stellman and Jennifer Greene, O'Reilly, 4th Indian Reprint, 2018.
2. Practices of an Agile Developer, Venkat Subramaniam and Andy Hunt, SPD, 5th Indian Reprint,2015.
3. Agile Project Management - Jim Highsmith, Pearson Low price Edition 2004

WEB REFERENCES

https://www.marceldigital.com/blog/what-is-agile-web-development-everything-you-need-to-know

E -TEXT BOOKS

https://elearningindustry.com/agile-guide-to-agile-development-free-ebook

MOOCS COURSES

https://in.coursera.org/courses?query=agile

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ROBOTIC PROCESS AUTOMATION (Professional Elective - V)

IV B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG723PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1) Aim of the course is to make learners familiar with the concepts of Robotic Process Automation.

COURSE OUTCOMES

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

1) Describe RPA, where it can be applied and how it's implemented.
2) Identify and understand Web Control Room and Client Introduction.
3) Understand how to handle various devices and the workload.
4) Understand Bot creators, Web recorders and task editors

UNIT-I	Introduction	Classes: 12

Introduction to Robotic Process Automation & Bot Creation Introduction to RPA and Use cases – Automation Anywhere Enterprise Platform – Advanced features and capabilities – Ways to create Bots

UNIT-II	Web Control Room	Classes: 12

Web Control Room and Client Introduction - Features Panel - Dashboard (Home, Bots, Devices, Audit Workload, Insights) - Features Panel – Activity (View Tasks in Progress and Scheduled Tasks) – Bots (View Bots Uploaded and Credentials)..

UNIT-III	Devices	Classes: 10

Devices (View Development and Runtime Clients and Device Pools) - Workload (Queues and SLA Calculator) - Audit Log (View Activities Logged which are associated with Web CR) – Administration (Configure Settings, Users, Roles, License and Migration) - Demo of Exposed API's – Conclusion – Client introduction and Conclusion.

UNIT-IV	Bot Creator Introduction	Classes: 12

Bot Creator Introduction – Recorders – Smart Recorders – Web Recorders – Screen Recorders – Task Editor – Variables - Command Library – Loop Command – Excel Command – Database Command -String Operation Command - XML Command

UNIT-V	Terminal Emulator Command	Classes: 12
Terminal Emulator Command - PDF Integration Command - FTP Command - PGP Command – Object Cloning Command - Error Handling Command - Manage Windows Control Command – Workflow Designer - Report Designer. .		

TEXT BOOKS
1. Learning Robotic Process Automation: Create Software robots and automate business processes with the leading RPA tool - UiPath: Create Software robots. with the leading RPA tool – UiPath Kindle Edition
REFERENCE BOOKS
1. Robotic Process Automation A Complete Guide - 2020 Edition Kindle Edition
WEB REFERENCES
https://www.automationanywhere.com/rpa/robotic-process-automation
E -TEXT BOOKS
https://www.digitechsystems.com/rpa-ebook/
MOOCS COURSES
https://in.coursera.org/courses?query=robotic%20process%20automation

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
EVOLUTIONARY COMPUTING (Professional Elective - V)

IVB. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG724PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Knowledge of evolutionary computation techniques and methodologies set in the context of modern heuristic methods.
2. An idea of how to apply these techniques to optimisation problems and problems that require machine learning..

COURSE OUTCOMES

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

1) Understand the Components of Evolutionary Computing
2) Analyze simulated Annealing and applications
3) Illustrate Genetic algorithms, GA operators
4) Understand particle swarm optimization, artificial bee colony optimization

UNIT-I	HISTORY	Classes: 12

Historical Development, Features, Classification and Components of Evolutionary Computing, Advantages, Applications.
Simulated Annealing: Annealing Schedule, Parameter Selection, Applications.
Hill Climbing: Mathematical Description, Local and Global Maxima, Ridges, Plateau, Applications.

UNIT-II	Genetic Algorithms:	Classes: 12

. Genetic Algorithms: Biological Background, Schema, Theorem, GA Operators: Crossover, Mutation and Its Types-GA Algorithm, Variations Of GA: Adaptive GA and Real Coded GA.

UNIT-III	Ant Colony Optimization:	Classes: 10

Ant Colony Optimization: Ant Foraging Behavior, Theoretical Considerations, Convergence Proofs, ACO Algorithm, ACO And Model Based Search, Variations Of ACO: Elitist Ant System (EAS), MinmaxAnt System (MMAS) And Rank Based Ant Colony System (RANKAS). .

UNIT-IV	Particle Swarm Optimization	Classes: 12

Particle Swarm Optimization: Principles of Bird Flocking and Fish Schooling, Evolution of PSO, Operating Principles, PSO Algorithm, Neighbourhood Topologies, Convergence Criteria, Variations of PSO.		
UNIT-V	**Artificial Bee Colony (ABC) Optimization:**	**Classes: 12**
. Artificial Bee Colony (ABC) Optimization: Behavior of Real Bees, ABC Algorithm, Variations of ABC: Abcgbest and Abcgbestdist Case Study: Traveling Salesman Problem, Knapsack Problem, N Queens.		

TEXT BOOKS

1 1. Goldberg D E, "Genetic Algorithms in search", Optimization and machine learning, Addison-Wesley 2005.
2. Kenneth A DeJong, "Evolutionary Computation a Unified Approach", Prentice Hall of India, New Delhi, 2006.

REFERENCE BOOKS

. 1Elaine Rich, Kevin Knight, "Artificial Intelligence" Tata McGraw Hill Education Private Limited, 2011.
2 Marco Dorigo and Thomas Stutzle, "Ant Colony optimization", Prentice Hall of India, New Delhi 2005.

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https://towardsdatascience.com/evolutionary-computation-full-course-overview-f4e421e945d9

E -TEXT BOOKS

https://warin.ca/ressources/books/2015_Book_IntroductionToEvolutionaryComp.pdf

MOOCS COURSES

https://www.mooc-list.com/tags/evolutionary-computation

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

VISUAL DESIGN AND COMMUNICATIONS (Professional Elective - V)

IV B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG725PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Apply appropriate communication skills across settings, purposes, and audiences.
2. Demonstrate knowledge of communication theory and application..

COURSE OUTCOMES

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

1) Demonstrate Designing for Experience.
2) Understand perceptual and cultural experience in Visual Design and Communications.
3) Analyze principles for orienting readers to the interpretation of information.
4) Illustrate the nature of Interaction and Interpretation, Legibility/ Readability, Denotation and Connotation.

UNIT-I	Designing for Experience:	Classes: 12

Designing for Experience: Making sense of experience, Experience and Time, Experience and Media, Denotation and Connotation.The Vocabulary of Visual Images: Elements, Composition.

UNIT-II	Getting Attention:	Classes: 12

. Getting Attention: Perceptual and cultural experience, Contrast, Figure - Ground, Color, Size Constancy, Scale, Proportion, Proximity, Focus, Layering, Symmetry/ Asymmetry, Closure, Continuity, Series and sequences, Pattern, Rhythm and Pacing, Motion

UNIT-III	Orienting for use and Interpretation:	Classes: 10

Orienting for use and Interpretation: Principles for orienting readers to the interpretation of information, Affordances, Channel, Medium/Format, Feedback, Wayfinding, Mapping, Hierarchy, Reading pattern, Grouping, Edge Relationships, Direction, point of view.

UNIT-IV	Interacting, Interpreting and Experiencing	Classes: 12

Interacting, Interpreting and Experiencing: The Nature of signs, The nature of Interaction and Interpretation, Legibility/ Readability, Denotation and Connotation, Framing, Abstraction, Icon, Index and symbol, Materiality, Substitution, Metaphor, Appropriation, Ambiguity, Cognitive dissonance

UNIT-V	Retaining and Extending meaning:	Classes: 12

.Retaining and Extending meaning: Memory and categorization, extending the impact of form, Stereotypes, Archetypes, Narrative, Mnemonics, Checking, Redundancy, Graphic Identity, Branding
TEXT BOOKS
1. Meredith Davis (Author), Jamer Hunt, Visual Communication Design: An Introduction to Design Concepts in Everyday Experience
REFERENCE BOOKS
1. Communication between cultures - Larry A. Samovar, Richard E. Porter, Edwin R. McDaniel & Carolyn Sexton Roy, Monica Eckman, USA, 2012. 2. Introduction to Communication studies - John Fiske & Henry Jenkins 3rd edition, Routledge, Oxon 2011. 3. An Introduction to communication studies - Sheila Steinberg, Juta & Co., Cape Town, 2007. 4. One World Many Voices: Our Cultures - Marilyn Marquis & Sarah Nielsen, Wingspan Press, California, 2010
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E -TEXT BOOKS
https://www.pdfdrive.com/visual-artist-or-visual-designer-visual-communication-design-e7109696.html
MOOCS COURSES
https://in.coursera.org/courses?query=visual%20design

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

OPERATING SYSTEMS (Open Elective - II)

IV B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG731OE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Introduce operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection).
2. Introduce the issues to be considered in the design and development of operating system.
3. Introduce basic Unix commands, system call interface for process management, inter process communication and I/O in Unix.

COURSE OUTCOMES

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

1) Will be able to control access to a computer and the files that may be shared
2) Demonstrate the knowledge of the components of computer and their respective roles in computing.
3) Ability to recognize and resolve user problems with standard operating environments.
4) Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively..

UNIT-I	Operating System	Classes: 12

Operating System - Introduction, Structures - Simple Batch, Multiprogram med, 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

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.
Inter process 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		

TEXT BOOKS

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Advanced programming in the UNIX environment, W.R. Stevens, Pearson education

REFERENCE BOOKS

1Operating Systems – Internals and Design Principles Stallings, Fifth Edition–2005, Pearson Education/PHI.
2. Operating System A Design Approach- Crowley, TMH.
3. Modern Operating Systems, Andrew S. Tanenbaum 2nd edition, Pearson/PHI.
4. UNIX programming environment, Kernighan and Pike, PHI/ Pearson Education.
5. UNIX Internals -The New Frontiers, U. Vahalia, Pearson Education

WEB REFERENCES

.https://www.tutorialspoint.com/operating_system/os_overview.htm.
https://www.javatpoint.com/operating-system
https://edu.gcfglobal.org/en/computerbasics/understanding-operating-systems/1/

E -TEXT BOOKS

https://sites.google.com/site/uopops/ebooks

MOOCS COURSES

https://www.udacity.com/course/introduction-to-operating-systems--ud923

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
SOFTWARE ENGINEERING (Open Elective - II)

IV B. TECH- I SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG732OE	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 requirements, 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 requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
2) Identify and apply appropriate software architectures and patterns to carry out high level desig 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

Introduction to 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

UNIT-II	Software Requirements	Classes: 12

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, behavioral models, data models, object models, structured methods.

UNIT-III	Design Engineering:	Classes: 10

.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, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams..		
UNIT-IV	**Testing Strategies**	**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.		
UNIT-V	**Metrics for Process and Products**	**Classes: 12**
Metrics for Process and Products: Software measurement, metrics for software quality. 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, software reliability, the ISO 9000 quality standards		

TEXT BOOKS

1 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 1. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
2. Software Engineering principles and practice- Waman S Jawadekar, The Mc Graw-Hill Companies.
3. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education..
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https://www.tutorialspoint.com/software_engineering/index.htm

E -TEXT BOOKS

https://engineering.futureuniversity.com/BOOKS%20FOR%20IT/Software-Engineering-9th-Edition-by-Ian-Sommerville.pdf

MOOCS COURSES

https://www.mooc-list.com/tags/software-engineering

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

DEEP LEARNING LAB

IV B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG703PC	B. Tech	0	0	3	1	30	70	100

COURSE OBJECTIVES

To learn

1. To Build the Foundation of Deep Learning.
2. To Understand How to Build the Neural Network.
3. To enable students to develop successful machine learning concepts..

COURSE OUTCOMES

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

1) Learn The Fundamental Principles of Deep Learning.
2) Identify The Deep Learning Algorithms for Various Types of Learning Tasks in various domains.
3) Implement Deep Learning Algorithms and Solve Real-world problems..

LIST OF EXPERIMENTS

1. Setting up the Spyder IDE Environment and Executing a Python Program.
2. Installing Keras, Tensorflow and Pytorch libraries and making use of them.
3. Applying the Convolution Neural Network on computer vision problems.
4. Image classification on MNIST dataset (CNN model with Fully connected layer).
5. Applying the Deep Learning Models in the field of Natural Language Processing.
6. Train a sentiment analysis model on IMDB dataset, use RNN layers with LSTM/GRU notes.
7. Applying the Autoencoder algorithms for encoding the real-world data.
8. Applying Generative Adversarial Networks for image generation and unsupervised tasks.

TEXT BOOKS

1. Deep Learning by Ian Goodfellow, Yoshua Bengio and Aaron Courville, MIT Press.
2. The Elements of Statistical Learning. Hastie, R. Tibshirani, J. Friedman, Springer.
3. Probabilistic Graphical Models. Koller, and N. Friedman, MIT Press

REFERENCE BOOKS

1. Bishop, C., M., Pattern Recognition and Machine Learning, Springer, 2006.
2. Yegnanarayana, B., Artificial Neural Networks PHI Learning Pvt. Ltd, 2009.
3. Golub, G., H., and Van Loan,C.,F., Matrix Computations, JHU Press,2013.
4. Satish Kumar, Neural Networks: A Classroom Approach, Tata McGraw-Hill Education, 2004.

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http://www.deeplearning.net ● https://www.deeplearningbook.org/ ● https://developers.google.com/machine-learning/crash-course/ml-intro ● www.cs.toronto.edu/~fritz/absps/imagenet.pdf ● http://neuralnetworksanddeeplearning.com/ /
E -TEXT BOOKS
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MOOCS COURSES
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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ORGANIZATIONAL BEHAVIOR

IV B. TECH- II SEMESTER

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 learn

1. The objective of the course is to provide the students with the conceptual framework and the theories underlying Organizational Behaviour.

COURSE OUTCOMES

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

1. To understand the conceptual framework of the discipline of OB and its practical applications in the organizational set up.
2. To deeply understand the role of individual, groups and structure in achieving organizational goals effectively and efficiently.
3. To critically evaluate and analyze various theories and models that contributes in the overall understanding of the discipline.
4. To develop creative and innovative ideas that could positively shape the organizations.
5. To accept and embrace in working with different people from different cultural and diverse background in the workplace

UNIT-I	Introduction to OB	Classes: 12

Introduction to OB - Definition, Nature and Scope – Environmental and organizational context – Impact of IT, globalization, Diversity, Ethics, culture, reward systems and organizational design on Organizational 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: 12

Cognitive Processes-II: Personality and Attitudes – Personality as a continuum – Meaning of personality Johari Window and Transactional Analysis - Nature and Dimension of Attitudes – Job satisfaction and organizational commitment-Motivational needs and processes- Work-Motivation Approaches Theories of Motivation- Motivation across cultures - Positive organizational behaviour: Optimism – Emotional intelligence – Self-Efficacy.

UNIT-III	Dynamics of OB-I:	Classes: 10

Dynamics of OB-I: 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 intraindividual conflict - strategies to cope with stress and conflict...		
UNIT-IV	**Dynamics of OB –III Power and Politics**	**Classes: 12**
Dynamics of OB –III Power and Politics: 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**
Leading High performance: 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. Luthans, Fred: Organizational Behaviour 10/e, McGraw-Hill, 2009
2. McShane: Organizational Behaviour, 3e, TMH, 2008
3. Nelson: Organizational Behaviour, 3/e, Thomson, 2008.
4. Newstrom W. John & Davis Keith, Organisational Behaviour-- Human Behaviour at Work, 12/e, TMH, New Delhi, 2009.

REFERENCE BOOKS

5. Pierce and Gardner: Management and Organisational Behaviour: An Integrated perspective, Thomson, 2009.
6. Robbins, P. Stephen, Timothy A. Judge: Organisational Behaviour, 12/e, PHI/Pearson, New Delhi, 2009.
7. Pareek Udai: Behavioural Process at Work: Oxford & IBH, New Delhi, 2009.
8. Schermerhorn: Organizational Behaviour 9/e, Wiley, 2008.
9. Hitt: Organizational Behaviour, Wiley, 2008.

WEB REFERENCES

1. https://aus.libguides.com/c.php?g=299635&p=2001459
2. https://onlinelibrary.wiley.com/journal/10991379

E -TEXT BOOKS

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2. https://uk.sagepub.com/en-gb/eur/organizational-behavior-interactive-ebook/book242890

MOOCS COURSES

1. https://in.coursera.org/courses?query=organizational%20behavior

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
COMPUTER VISION AND ROBOTICS (Professional Elective - VI)

IV B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG811PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To understand the Fundamental Concepts Related To sources, shadows and shading.
2. To understand the The Geometry of Multiple Views

COURSE OUTCOMES

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

1. Implement fundamental image processing techniques required for computer vision
2. Implement boundary tracking techniques
3. Apply chain codes and other region descriptors, Hough Transform for line, circle, and ellipse detections.
4. Apply 3D vision techniques and Implement motion related techniques.
5. Develop applications using computer vision techniques..

UNIT-I	Cameras:	Classes: 12

Cameras: Pinhole Camera Radiometry – Measuring Light: Light in Space, Light Surfaces, Important Special Cases. Sources, Shadows, And Shading: Qualitative Radiometry, Sources and Their Effects, Local Shading Models, Application: Photometric Stereo, Interreflections: Global Shading Models. Color: The Physics of Color, Human Color Perception, Representing Color, A Model for Image Color, Surface Color from Image Color.

UNIT-II	Linear Filters:	Classes: 12

Linear Filters: Linear Filters and Convolution, Shift Invariant Linear Systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing, Filters as Templates.
Edge Detection: Noise, Estimating Derivatives, Detecting Edges.
Texture: Representing Texture, Analysis (and Synthesis) Using Oriented Pyramids, Application: Synthesis by Sampling Local Models, Shape from Texture

UNIT-III	The Geometry of Multiple Views	Classes: 10

The Geometry of Multiple Views: Two Views. Stereopsis: Reconstruction, Human Stereposis, Binocular Fusion, Using More Cameras. Segmentation by Clustering: What Is Segmentation?, Human Vision: Grouping and Getstalt, Applications: Shot Boundary Detection and Background Subtraction, Image Segmentation by Clustering Pixels, Segmentation by Graph-Theoretic Clustering

UNIT-IV	Segmentation by Fitting a Model	Classes: 12

Segmentation by Fitting a Model: The Hough Transform, Fitting Lines, Fitting Curves, Fitting as a Probabilistic Inference Problem, Robustness.Segmentation and Fitting Using Probabilistic Methods: Missing Data Problems, Fitting, andSegmentation, The EM Algorithm in Practice. Tracking With Linear Dynamic Models: Tracking as an Abstract Inference Problem, Linear Dynamic Models, Kalman Filtering, Data Association, Applications and Examples.

UNIT-V	**Geometric Camera Models**	**Classes: 12**

Geometric Camera Models: Elements of Analytical Euclidean Geometry, Camera Parameters and the Perspective Projection, Affine Cameras and Affine Projection Equations. Geometric Camera Calibration: Least-Squares Parameter Estimation, A Linear Approach to Camera Calibration, Taking Radial Distortion into Account, Analytical Photogrammetry, An Application: Mobile Robot Localization Model- Based Vision :Initial Assumptions, Obtaining Hypotheses by Pose Consistency, Obtaining Hypotheses by pose Clustering, Obtaining Hypotheses Using Invariants, Verification, Application: Registration In Medical Imaging Systems, Curved Surfaces and Alignment.

TEXT BOOKS

1. David A. Forsyth and Jean Ponce: Computer Vision - A Modern Approach, PHI Learning (Indian Edition), 2009

REFERENCE BOOKS

1. E. R. Davies: Computer and Machine Vision – Theory, Algorithms and Practicalities, Elsevier (Academic Press), 4th edition, 2013.
2. R. C. Gonzalez and R. E. Woods “Digital Image Processing” Addison Wesley 2008.
3. Richard Szeliski “Computer Vision: Algorithms and Applications” Springer-Verlag London Limited 2011

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1. https://www.superannotate.com/blog/computer-vision-robotics
2. https://link.springer.com/book/10.1007/978-981-16-8225-4

E -TEXT BOOKS

1. https://bookauthority.org/books/best-computer-vision-ebooks

MOOCS COURSES

1 https://www.coursera.org/learn/robotics-perceptionk

2 https://www.edx.org/course/robotics-vision-intelligence-and-machine-learning

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

COMPUTER AIDED GEOMETRIC DESIGN (Professional Elective - VI)

IV B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG812PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Understand the significance of CAD tools, Geometric modeling, surface modeling, in computer aided geometric design.

COURSE OUTCOMES

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

1. Understand the functional areas of CAD, usage of CAD, and basics of geometric modelling.
2. Analyze curve, parametric representation of analytic curves and synthetic curves.
3. Illustrate surface representation methods, Parametric representation of analytic surfaces in surface modelling.
4. Understand solid modelling, 2-D and 3-D transformations.

UNIT-I	CAD Tools	Classes: 12

CAD Tools: Definition of CAD Tools, Graphics standards, Graphics software: requirements of graphics software, Functional areas of CAD, Efficient use of CAD software. Basics of Geometric Modeling: Requirement of geometric modeling, Geometric models, Geometric construction methods, Modeling facilities desired.

UNIT-II	Geometric modeling	Classes: 12

Geometric modelling: Classification of wireframe entities, Curve representation methods, Parametric representation of analytic curves: line, circle, arc, conics, Parametric representation of synthetic curves: Hermite cubic curve, Bezier curve, B-Spline curve, NURBS, Curve manipulations

UNIT-III	Surface Modeling	Classes: 10

Surface Modeling: Classification of surface entities, Surface representation methods, Parametric representation of analytic surfaces: plane surface, ruled surface, surface of revolution, tabulated cylinder, Parametric representation of synthetic curves: Hermite cubic surface, Bezier surface, B Spline surface, coon surface, Blending surface, Surface manipulations

UNIT-IV	Solid Modeling:	Classes: 12

Solid Modeling: Geometry and topology, Boundary representation, The Euler-Poincare formula, Euler operators, Constructive solid geometry: CSG primitives, Boolean operators, CSG expressions, Interior, Exterior, closure, Sweeping: linear and nonlinear, Solid manipulations		
UNIT-V	**Transformations:**	**Classes: 12**
Transformations: 2-D and 3-D transformations: translation, scaling, rotation, reflection, concatenation, homogeneous coordinates, Perspective projection, orthotropic projection, isometric projection, Hidden surface removal, shading, rendering. CAD/ CAM Data Exchange: Evaluation of data exchange format, Data exchange formats: IGES, PDES, CGM, STEP Dimensioning and tolerances: Linear, angular, angular dimensions, maximum material condition (MMC), Least material condition (LMC), Regardless of feature size (RFS).		

TEXT BOOKS

11. CAD/CAM Concepts and Applications/ Alavala/ PHI.
2. Mastering CAD/CAM / Ibrhim Zeid / Mc Graw Hill International.
3. CAD/CAM Principles and Applications/ P.N. Rao/TMH/3rd Edition.
4. CAD/CAM /Groover M.P./ Pearson education.

REFERENCE BOOKS

1. CAD / CAM / CIM, Radhakrishnan and Subramanian/ New Age.
2. Principles of Computer Aided Design and Manufacturing/ Farid Amirouche/ Pearson.
3. Computer Numerical Control Concepts and programming/ Warren S Seames/ Thomson.

WEB REFERENCES

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2. https://dblp.org/db/journals/cagd/index.html

E -TEXT BOOKS

https://www.kobo.com/us/en/ebook/handbook-of-computer-aided-geometric-design-1

MOOCS COURSES

https://www.coursera.org/lecture/interactive-computer-graphics/6-1-cantilever-iexk1

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
NATURE INSPIRED COMPUTING (Professional Elective - VI)

IV B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG813PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Knowledge on significance of intelligence, genetic algorithms Ant Colony algorithms..

COURSE OUTCOMES

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

1. Familiar with Genetic algorithm and its applications.
2. Compare different Ant Colony Optimization algorithmic models.
3. Compare different Artificial Bee Colony Optimization algorithmic models.
4. Illustrate Particle swam optimization algorithm with an example

UNIT-I	Models of Life and Intelligence	Classes: 12

Models of Life and Intelligence - Fundamentals of bio-inspired models and bio-inspired computing. Evolutionary models and techniques, Swarm models and its self-organization, swarm and evolutionary algorithms. Optimization problems – single and multi-objective optimization, heuristic, meta-heuristic and hyper heuristic functions.

UNIT-II	Genetic algorithms	Classes: 12

Genetic algorithms - Mathematical foundation, Genetic problem solving, crossover and mutation. genetic algorithms and Markov process, applications of genetic algorithms method

UNIT-III	Ant Colony Algorithms	Classes: 10

Ant Colony Algorithms - Ant colony basics, hybrid ant system, ACO in combinatorial optimisation, variations of ACO, case studies.

UNIT-IV	Particle Swarm algorithms:	Classes: 12

Particle Swarm algorithms - particles moves, particle swarm optimization, variable length PSO, applications of PSO, case studies. Artificial Bee Colony algorithms - ABC basics, ABC in optimization, multi-dimensional bee colony algorithms, applications of bee algorithms, case studies

UNIT-V	Selected nature inspired techniques	Classes: 12
Selected nature inspired techniques - Hill climbing, simulated annealing, Gaussian adaptation, Cuckoo search, Firey algorithm, SDA algorithm, bat algorithm, case studies. Other nature inspired techniques - Social spider algorithm, Cultural algorithms, Harmony search algorithm, Intelligent water drops algorithm, Artificial immune system, Flower pollination algorithm, case studies		

TEXT BOOKS

. 1. Albert Y.Zomaya - "Handbook of Nature-Inspired and Innovative Computing", Springer, 2006
2. Floreano, D. and C. Mattiussi -"Bio-Inspired Artificial Intelligence: Theories, methods and Technologies" IT Press, 2008.

REFERENCE BOOKS

11. Leandro Nunes de Castro - " Fundamentals of Natural Computing, Basic Concepts, Algorithms
and Applications", Chapman & Hall/ CRC, Taylor and Francis Group, 2007.
2. Marco Dorrigo, Thomas Stutzle -" Ant Colony Optimization", Prentice Hall of India, New Delhi,2005.
3. Vinod Chandra S S, Anand H S - "Machine Learning: A Practitioner's Approach", Prentice Hall of India, New Delhi, 2020..

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MOOCS COURSES

https://web.itu.edu.tr/~etaner/courses/NIC/index.html

https://in.coursera.org/courses?query=software%20engineering

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

HUMAN COMPUTER INTERACTION (Professional Elective - VI)

IV B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG814PE	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;
2. Become familiar with the vocabulary associated with sensory and cognitive systems as relevant to task performance by humans;
3. Be able to apply models from cognitive psychology to predicting user performance in various
4. human-computer interaction tasks and recognize the limits of human performance as they apply to computer operation;
5. Appreciate the importance of a design and evaluation methodology that begins with and maintains a focus on the user;
6. 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;
7. Understand the social implications of technology and their ethical responsibilities as engineers in the design of technological systems;
8. 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: 12

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 composition – amount of information – focus and emphasis – presentation information simply and meaningfully –

information retrieval on web – statistical graphics – Technological consideration in interface design, Quantum Entanglement, Interpretation, QKE.

UNIT-III	**Windows**	**Classes: 10**
Windows – New and Navigation schemes selection of window, selection of devices based and screenbased 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. 2. Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education
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
https://guides.lib.uw.edu/c.php?g=342011&p=2300158 https://www.hcii.cmu.edu/
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https://in.coursera.org/courses?query=human%20computer%20interaction **https://www.udacity.com/course/human-computer-interaction--ud400**

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
VFX ANIMATION (Professional Elective - VI)

IV B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG815PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1) Knowledge on concepts of Visual Effects before Computers, Digital Effects, The VFX Team, Basic VFX Technologies and Equipment, The VFX Bible and Database, Models and Miniatures design.

COURSE OUTCOMES

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

1. Understand Visual Effects before Computers and digital effects.
2. Analyze the VFX team and basic VFX Technologies and equipment.
3. Illustrate breakdowns scheduling and budgeting production support.
4. Describe On-Set Operations, On-Set References

UNIT-I	Visual Effects before Computers	Classes: 12

Visual Effects before Computers: Stop-Motion Animation, Puppets and Animatronics, Matte Paintings, Miniatures, In-Camera Miniatures, Hanging Miniatures with Live Action, Miniatures with Composited Elements, Front and Rear Projection, Forced Perspective with Live Action, Blue- or Green Screen Composites, Motion Control, In-Camera Practical Effects, Special (Mechanical) Effects and Visual Effects. Digital Effects: The 15-minute Version, Two-Dimensional (2D) vs. Three-Dimensional (3D) CGI, 2D CGI, 3D CGI, Creating a Digital Image, Building Digital Models, Texturing, Painting, and Lighting, CG Characters, Animation, Rendering, Compositing, Miniatures vs. Digital Models

UNIT-II	The VFX Team	Classes: 12

The VFX Team: The Visual Effects Supervisor, The Visual Effects Producer, First In—Last Out, What Does the VFX Producer Do?, VFX Producer's Abilities and Personal Qualities, VFX Producers and Guild Membership, The VFX Producer and Marketing, Visual Effects Production Coordinator, Visual Effects Data Coordinator, Visual Effects PA, Runner, and Similar Support Positions, Freelance Visual Effects Crew, First Assistant Director (AD), Visual Effects DP, Blue or Green Screen DP, Motion Control Technician, Miniature Pyrotechnicians, Other Special VFX Crew.
Basic VFX Technologies and Equipment: Blue and Green Screens, Lighting for Blue- or Greenscreen

Photography, Motion Control, When to Use Motion Control, EncodaCam, VistaVision Cameras, High- Speed Photography, Digital Video Assist with Compositing Capability, Motion Capture, SpaceCam, Wescam, Flying-Cam, Cyber scanning and Structured Light Scanning, Set Surveys, Lighting References and HDRI (High Dynamic Range Imaging), LIDAR (Light Detection and Ranging), Renting Equipment.

UNIT-III	**Breakdowns:**	**Classes: 10**

Breakdowns: Production Breakdowns, The First Go-Around: Generating a VFX Breakdown, Getting Started, Marking Up the Script, Numbering Visual Effects Shots, Constructing a Digital Cost Breakdown Spreadsheet, Estimating Digital Shot Costs, A Sampling of Ancillary Digital Costs, Facility Visual Effects Supervision and Management, Preliminary Bids: Getting a Handle on the Digital Shot Costs, Budget Guidelines for Digital Work, Casting and Evaluating Potential Vendors, Practical Steps in Checking Out a Vendor, The Importance of Artists, Bidding Guidelines: Comparing Apples to Apples, Following Up,
Budgeting Miniatures. Scheduling and Budgeting Production Support: The Production Support Breakdown Sheet, Using Movie Magic Scheduling, VFX Breakdown Sheets, Preparing the VFX Breakdown, Stand-Alone VFX Elements, Scheduling the Shooting of Your Effects, Collaborating with the 1st Unit, Communication— . Key to Smooth Sailing, Scheduling 1st Unit Shooting, Working with a Strip Board, Separating 1st Unit and VFX Unit Shooting, Designating Different Types of VFX Plates, Modifying the Strip Board Design, Keeping Up with Changes, Scheduling the VFX Unit, Refi ning the Schedule, Reports and More Reports, Modified Day-out-of-Days Report, Modified One-Liner

UNIT-IV	**The VFX Bible and Database**	**Classes: 12**

The VFX Bible and Database: Introduction to VFX Bible, Examples of Reports from a FileMaker Pro Database, Database Maintenance, Visual Aids, Storyboards, Animatics, Previs, A Case Study—Previs for The Guardian, Generating a Previs. On-Set Operations Production Meetings, The Visual Effects Review, More Meetings, Tech Scouts, Extended Location Scouts, Key to Success: Keep the ADs Informed, Influencing the 1st Unit Shooting Schedule, Motion Control: A Special Situation on Set, Production Calendars, Production Reports, When the Schedule Changes, Physical Support/1st Unit Support, Working on Sets,Laying the Groundwork, Support from Camera Assistants, Grips, Electrical, Paint and Construction, Digital Video Assist, Transportation.

UNIT-V	**On-Set References**	**Classes: 12**

On-Set References: Reference Photos; Art Department References, Element Data Sheets, Reference and Clean Background Plates, Performance References, Video References, Lighting Reference Tools, Tracking Markers, Tests. Models and Miniatures Introduction to Miniatures or CG Models, Early Estimates, Defining the Task, Miniatures on Contract, The Bidding Package, Monitoring Progress, Getting Things to Match, Filming Miniatures

TEXT BOOKS

1. Charles Finance, Susan Zwerman, The Visual Effects Producer, Understanding the Art and Business of VFX, focal press.

REFERENCE BOOKS

1 1. Wallace Jackson, VFX Fundamentals Visual Special Effects Using Fusion 8.0 2016 Edition, Apress.
2. Pakhira, Malay K, Computer Graphics, Multimedia and Animation, 2nd edition, Prentice Hall India Learning Private Limited..

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ALGORITHMS DESIGN AND ANALYSIS (Open Elective - III)

IV B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG841OE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1) Introduces the notations for analysis of the performance of algorithms.
2) Introduces the data structure disjoint sets.
3) Describes major algorithmic techniques (divide-and-conquer, backtracking, dynamic
4) programming, greedy, branch and bound methods) and mention problems for which each technique is appropriate.
5) Describes how to evaluate and compare different algorithms using worst-, average-, and best case analysis.
6) Explains the difference between tractable and intractable problems, and introduces the problems that are P, NP and NP complete..

COURSE OUTCOMES

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

1. Ability to analyze the performance of algorithms.
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.
4. Impact the performance of programs.

UNIT-I	Introduction:	Classes: 12

Introduction: Algorithm, Performance Analysis-Space complexity, Time complexity, Asymptotic Notations - Big oh notation, Omega notation, Theta notation and Little oh notation.
Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

UNIT-II	Disjoint Sets	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: 12
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**	**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 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
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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

INTRODUCTION TO COMPUTER NETWORKS (Open Elective - III)

IV B. TECH- II SEMESTER

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG842OE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1) The objective of the course is to equip the students with a general overview of the concepts and fundamentals of computer networks.
2) Familiarize the students with the standard models for the layered approach to communication between machines in a network and the protocols of the various layers

COURSE OUTCOMES

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

1. Gain the knowledge of the basic computer network technology.
2. Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
3. Obtain the skills of subnetting and routing mechanisms.
4. Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation

UNIT-I	Network hardware:	Classes: 12

Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet. Physical Layer: Guided Transmission media: twisted pairs, coaxial cable, fiber optics, Wireless transmission

UNIT-II	Data link layer	Classes: 12

Data link layer: Design issues, framing, Error detection and correction. Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an error-free channel, A simplex stop and wait protocol for noisy channel. Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat, Example data link protocols. Medium Access sublayer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols. Wireless LANs, Data link layer switching.

UNIT-III	Network Layer	Classes: 10

. Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service, Internetworking, The Network layer in the internet

UNIT-IV	**Transport Layer**	**Classes: 12**
Transport Layer: Transport Services, Elements of Transport protocols, Connection management, TCP and UDP protocols .		
UNIT-V	**Application Layer -**	**Classes: 12**
Application Layer - Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streaming audio and video.		

TEXT BOOKS

1. An Engineering Approach to Computer Networks-S. Keshav, 2nd Edition, Pearson Education.
2. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH.

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.

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https://www.studytonight.com/computer-networks/overview-of-computer-networks

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