R16

B.Tech – CSE

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
(Approved by AICTE, New Delhi& Affiliated to JNTUA, Ananthapuramu)
(Accredited by NBA for Civil, EEE, Mech., ECE & CSE
Accredited by NAAC with 'A' Grade)
Puttur -517583, Chittoor District, A.P. (India)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Regulation - R16

B. Tech - Course Structure & Syllabus

R16

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

INSTITUTE VISION

To be one among the premier institutions of the country producing ethically strong and technically sound engineers and managers to serve the nation.

INSTITUTE MISSION

To create sacred environment for the students to acquire knowledge through innovative and professional approach and utilize it for the welfare of the mankind.

DEPARTMENT VISION

"To produce innovative, qualified, and elegant technocrats who will provide global Services".

DEPARTMENT MISSION

"To employ qualified faculty, and state of the art resources, innovatively to produce world class technocrats".

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Program Outcomes

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-Long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Graduates with basic and advanced knowledge in science, mathematics, computer science and allied engineering, capable of analyzing, design and development of solutions for real life problems.

PEO2: Graduates who serve the Industry, consulting, government organizations, or who pursue higher education or research.

PEO3: Graduates with qualities of professional leadership, communication skills, team work, ethical values and lifelong learning abilities.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: **Mobile Apps:** Ability to design, develop and deploy mobile applications in Windows/ Google / Mac Apps Stores.

PSO2: **Architecture of Computer System:** Ability to visualize and articulate computer hardware and software systems for various complex applications.

PSO3: **Problem-Solving Skills:** The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

I B. Tech. – I Semester (CSE)

S.No.	Course Code	Subject	L	T	P/Drg	C
1.	16HS601	Functional English	3	-	-	3
2.	16HS602	Engineering Mathematics- I	3	1	-	3
3.	16HS604	Engineering Chemistry	3	1	-	3
4.	16CS501	Computer Programming	3	1	-	3
5.	16ME302	Engineering Graphics	-	-	6	3
6.	16HS607	English Language and Communication Skills Lab	-	-	4	2
7.	16HS609	Engineering Chemistry Lab	-	-	4	2
8.	16CS502	Computer Programming Lab	-	-	4	2
Contact Periods / Week			12	03	18	**21**
			Total/Week **33**			

I B. Tech. – II Semester (CSE)

S.No.	Course Code	Subject	L	T	P	C
1.	16HS610	Professional English	3	-	-	3
2.	16HS611	Engineering Mathematics-II	3	1	-	3
3.	16HS603	Engineering Physics	3	1	-	3
4.	16HS606	Human Values & Professional Ethics	3	-	-	3
5.	16CS503	Data Structures through C	3	1	-	3
6.	16HS608	Engineering Physics Lab	-	-	4	2
7.	16CS504	Data Structures through C Lab	-	-	4	2
8.	16ME301	Engineering & IT Workshop Lab	-	-	4	2
Contact Periods / Week			15	03	12	**21**
			Total/Week **30**			

II B. Tech. – I Semester (CSE)

S.No.	Course Code	Subject	L	T	P	C
1.	16HS612	Engineering Mathematics-III	3	1	-	3
2.	16HS605	Environmental Studies	3	-	-	3
3.	16CS505	Advanced Data Structures through C++	3	1	-	3
4.	16CS506	Digital Logic Design	3	1	-	3
5.	16CS507	Mathematical Foundations of Computer Science	3	1	-	3
6.	16EE207	Basic Electrical and Electronics Engineering	3	1	-	3
7.	16CS508	Advanced Data Structures through C++ Lab	-	-	4	2
8.	16EE208	Basic Electrical and Electronics Engineering Lab	-	-	4	2
Credit Course						
9.	COE-I	Comprehensive Online Examination-I	-	-	-	1
Audit Course						
10.	16CS538	Ethical Hacking	3	-	-	-
Contact Periods / Week			21	05	08	**23**
			Total/Week **34**			

II B. Tech. – II Semester (CSE)

S.No.	Course Code	Subject	L	T	P	C
1.	16HS613	Probability & Statistics	3	1	-	3
2.	16CS509	Object Oriented Programming	3	1	-	3
3.	16CS510	Computer Organization	3	1	-	3
4.	16CS511	Database Management Systems	3	1	-	3
5.	16CS512	Operating Systems	3	1	-	3
6.	16CS513	Object Oriented Programming Lab	-	-	4	2
7.	16CS514	Database Management Systems Lab	-	-	4	2
8.	16CS515	Operating Systems Lab	-	-	4	2
Credit Course						
9.	COE-II	Comprehensive Online Examination-II	-	-	-	1
Audit Course						
10.	16HS614	Comprehensive Soft Skills	3	-	-	-
Contact Periods / Week			18	5	12	**22**
			Total/Week **35**			

III B. Tech– I Semester (CSE)

S.No.	Course Code	Subject	L	T	P	C
1.	16CS516	Unix & Shell Programming	3	1	-	3
2.	16CS517	Formal Languages and Automata Theory	3	1	-	3
3.	16CS518	Software Engineering& Architecture	3	1	-	3
4.	16CS519	Web Technologies	3	1	-	3
5.	16CS520	Big Data	3	1	-	3
6.	16CS521	Design and Analysis of Algorithms	3	1	-	3
7.	16CS522	Unix & Shell Programming Lab	-	-	4	2
8.	16CS523	Web Technologies Lab	-	-	4	2
Credit Course						
9.	COE-III	Comprehensive Online Examination-III	-	-	-	1
Audit Course						
10.	16HS616	Aptitude Practice-I	3	-	-	-
Contact Periods / Week			21	6	08	**23**
			Total/Week 35			

III B. Tech – II Semester (CSE)

S.No.	Course Code	Subject	L	T	P	C
1.	16EC423	Microprocessors & Microcontrollers	3	1	-	3
2.	16CS524	Compiler Design	3	1	-	3
3.	16CS525	Software Testing	3	1	-	3
4.	16CS526	Object Oriented Analysis and Design	3	1	-	3
5.	16CS527	Computer Networks	3	1	-	3
6.	16CS528	Software Testing and CASE tools Lab	-	-	4	2
7.	16CS529	Computer Networks and Microprocessors & Micro Controllers Lab	-	-	4	2
8.	16HS615	Advanced English Language and Communication Skills Lab	-	-	4	2
Credit Course						
9.	COE-IV	Comprehensive Online Examination-IV	-	-	-	1
Audit Course						
10.	16HS617	Aptitude Practice-II	3	-	-	-
Contact Periods / Week			18	5	12	**22**
			Total/Week 35			

IV B. Tech – I Semester (CSE)

S.No	Course Code	Subject	L	T	P	C
1.	16MB750	Managerial Economics and Financial Analysis	3	1	-	3
2.	16CS530	Cyber Security	3	1	-	3
3.	16CS531	Data Warehousing and Data Mining	3	1	-	3
4.	16CS532	Mobile Application Development	3	1	-	3
5.	**Department Elective – I**		3	1	-	3
	16CS533	System Applications & Product				
	16CS534	Software Project Management				
	16CS535	Human Computer Interaction				
6.	**Open Elective**		3	-	-	3
	16CE145	Elements of Road Traffic Safety				
	16EE239	Neural Networks & Fuzzy Logic				
	16ME313	Non-Conventional Energy Resources				
	16EC443	Matlab Programming				
	16MB752	Intellectual Property Rights				
7.	16CS539	Data Warehousing and Data Mining Lab	-	-	4	2
8.	16CS540	Mobile Application development Lab	-	-	4	2
Contact Periods / Week			18	5	8	**22**
			Total/Week 31			

IV B. Tech – II Semester (E.C.E)

S.No.	Course Code	Subject	L	T	P	C
1.	16MB751	Entrepreneurship Development	3	-	-	3
2.	**Department Elective – II**		3	1	-	3
	16CS536	Data Science & Analytics				
	16CS537	Artificial Intelligence				
	16CS538	Cloud Computing				
3.	**Department Elective – III**		3	1	-	3
	16CS541	Mobile Computing				
	16CS542	Real Time Systems				
	16CS543	Python Programming				
4.	**Department Elective – IV**		-	-	-	3
	MOOCS	MOOC courses-offered by SWAYAM/ NPTEL/ NISTE-suggested by the department (online courses)				
5.	16CS547	Seminar	-	-	04	2
6.	16CS548	Project	-	-	20	10
Contact Periods / Week			09	02	24	**24**
			Total/Week 35			

<u>Note:</u> *L-Lecture hours, T-Tutorial, P-Practical, Drg: Drawing, C-Credit

Total credits:178

Year	**1st year**		**2nd year**		**3rd year**		**4th year**		**Total**
Semester	**I sem**	**II sem**	**I sem**	**II sem**	**I sem**	**II sem**	**I sem**	**II sem**	
Credits	21	21	23	22	23	22	22	24	**178**

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I B. Tech. – I Sem. (CSE)

L	T	C
3	0	3

(16HS601) FUNCTIONAL ENGLISH
(Common to All Branches)

COURSE OBJECTIVES

1. *To develop communication skills among the students.*
2. *To construct proficiency in academic and social purpose to improve their grammatical accuracy.*
3. *To understand LSRW skills and inculcate the habit of reading for pleasure.*
4. *To obtain study skills and communication skills in formal and informal situations.To use appropriate vocabulary*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Use LSRW skills through the prescribed text and develop their ability to communicate effectively.*
2. *Articulate well among the students with formal and informal activities.*
3. *Construct meaningful dialogues by using appropriate grammar components.*
4. *Develop accent among the students by practicing intonation.*
5. *Enhance reporting statements and comparing & contrast by practicing various examples.*
6. *Acquire the mastery of language to express ideas, views, feelings and experience in writing.*

UNIT I

MINDSCAPES (Environmental Consciousness: Pollution - How To Regain Green Cover):

1. Learning English Language through Literature (Secret of work- Swami Vivekananda)
2. Present, Past and Future aspects
3. Introducing oneself

Grammar: Parts of speech-Kinds of sentences-Tenses
Vocabulary: Synonyms & Antonyms-Affixes – Phrasal verbs
Listening & Reading Activities
Writing: Paragraph writing-Note taking & Note making
Phonetics- Syllabification

UNIT II

MINDSCAPES (Emerging Technologies: Solar Thermal Power- Nano Technology):

1. Learning English Language through Literature (Stopping by Woods on a Snowy Evening- Robert Frost)

2. Set in the Past

3. Inter-personal skills Grammar – Articles – Past Events – Voice & Impersonal passive voice – Gerund & -ing forms
to-infinitives
Vocabulary: Phrases – Idioms – word roots
Listening & Reading Activities
Writing: Letter writing-Informal-Formal
Phonetics – Accent

UNIT III

MINDSCAPES (Global Issues: Child Labor- E- Waste):

1. Learning English Language through Literature (What is my Name?-P.Satyavathi)
2. Describing a person, place and object
3. Possibilities

Grammar: Modals – Conditionals – Framing Questions – Compound nouns
Verbs
Vocabulary: One word substitute– Fixed expressions– Clauses
Listening & Reading Activities
Writing: Information transfer
Intonation: Falling & Rising

UNIT IV

MINDSCAPES (Space Trek: Hubble Telescope- Genesis of ISRO):

1. Learning English Language through Literature (Man in Black-Oliver Goldsmith)
2. Analytical thinking
3. Co-operative learning

Grammar: Concord–Reported speech-compare & contrast
Vocabulary: Numerical expressions-definitions-collocations
Listening & Reading
Writing: Summary-Essay writing-Making instructions
JAM

UNIT V

MINDSCAPES (Media Matters: History Of Media- Power of Media- Interviews):

1. Learning English Language through Literature (The Power of Prayer-Abdul Kalam)
2. Exploring creative ideas
3. Synthesis of sentences

Grammar: Simple, compound and complex-Spotting errors
Vocabulary: Discourse markers-Homonyms-Homophones-Homographs
Listening & Reading Activities
Writing: Writing recommendations-scrambled sentences
Convincing others

TEXT BOOKS:

1. *Mindscapes:* English for Technologists and Engineers- Orient Black Swan, 2014.
2. *Paths to Progress in English: Orient Black Swan*

REFERENCES:

1. *Raymond Murphy's Intermediate English Grammar with CD*, Raymond Murphy, Cambridge University Press, 2012.
2. *Communication Skills*, Sanjay Kumar & Pushpalatha, Oxford University Press, 2012.
3. *Writing Tutor*. Advanced English Learners' Dictionary, 9th Edition, Oxford University Press, 2015.
4. *Powerful Vocabulary Builder*, Anjana Agarwal, New Age International Publishers, 2011.
5. *Keep Talking*, F. Klippel, Cambridge University Press, 2013.
6. *Listening Extra*, Miles Craven, Cambridge University Press, 2008.
7. *Reading Extra*, Liz Driscoll, Cambridge University Press, 2004.
8. *Writing Extra*, Graham Palmer, Cambridge University Press, 2004.
9. *Speak Well*, Jayashree Mohanraj et al, Orient Blackswan, 2013.

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L	T	C
3	1	3

(16HS602) ENGINEERING MATHEMATICS-I
(Common to all Branches)

COURSE OBJECTIVES

1. *To train the students thoroughly in Mathematical concepts of ordinary differential equations, multiple integrals, Laplace Transforms and their applications*
2. *To prepare students for lifelong learning and successful careers using mathematical concepts of ordinary differential equations, multiple integrals, Laplace Transforms and their applications*
3. *To develop the skill pertinent to the practice of the mathematical concepts including the student abilities to formulate and modeling the problems, to think creatively and to synthesize information*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Recognize mathematical concepts of ordinary differential equations and their applications.*
2. *Compare the knowledge to find sum of series, to evaluate limits and used the approximate polynomial function.*
3. *Apply the mathematical concept of double and triple integrals with simple applications to areas and volumes.*
4. *Analyze the solution of complex integration by using the concept of change of order of integration and by change of variables.*
5. *Evaluate the knowledge on applications of RLC circuit analysis, transformation from the time to frequency domain, manipulate the algebraic equations to form a solution.*
6. *Improve the knowledge to convert any variable domain back to time domain or any basic domain back to time domain.*

UNIT I

DIFFERENTIAL EQUATIONS: Exact and Non-exact (Integrating factors), Linear and Bernoulli differential equations, Applications to first order equations: Orthogonal Trajectories, Newton‘s Law of Cooling, Natural Law of Growth and Decay. Linear Differential Equations of second and higher order with constant coefficients. Method of variation of parameters. Applications of linear differential equations- Simple electric circuits.

UNIT II

Taylor‘s and Maclaurin‘s Series, Functions of several variables, Jacobian, Maxima and Minima of functions of two variables, Lagrange‘s method of undetermined Multipliers with three variables only. Radius of curvature.

UNIT III

MULTIPLE INTEGRALS: Evaluation of Double and Triple integrals, Change of order of integration, Change of variables. Simple applications to areas.

UNIT IV

Laplace transform I: Laplace transforms of standard functions, First shifting Theorem, Transforms of derivatives and integrals, Unit step function, Second shifting theorem, Laplace transforms of Periodic functions.

UNIT V

LAPLACE TRANSFORM II: Inverse Laplace Transforms, Convolution theorem, Application of Laplace transforms to ordinary differential equations of first and second order.

TEXT BOOKS

1. *Higher Engineering Mathematics*, B.S.Grewal, Khanna publishers-42nd Edition (2012).
2 *Engineering Mathematics* Volume-I, by T.K.V. Iyengar, S.Chand publication-12thEdition.

REFERENCES

1. *Engineering Mathematics*, Volume - I, E. Rukmangadachari & E.Keshava Reddy, Pearson Publisher 1st Edition (2010)
2. *Engineering Mathematics*, Volume - I, by G.S.S.Raju, CENGAGE publisher (2013).
3. *Advanced Engineering Mathematics*, by Erwin Kreyszig, Wiley India-10th Edition (2012).
4. *Higher Engineering Mathematic*s, by B.V.Ramana, Mc Graw Hill publishers (2008).
5. *Advanced Engineering Mathematics*, by Alan Jeffrey, Elsevier-1st Edition (2001).

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3	1	3

(16HS604) ENGINEERING CHEMISTRY
(Common to ECE & CSE)

COURSE OBJECTIVES

1. *The Engineering Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications.*
2. *The course main aim is to impart in-depth knowledge of the subject and highlight the roleof chemistry in the field of engineering.*
3. *The lucid explanation of the topics will help students understand the fundamental concepts and apply them to design engineering materials and solve problems related to them. An attempt has been made to logically correlate the topic with its application.*
4. *The extension of fundamentals of electrochemistry to energy storage devices such as commercial batteries and fuel cells is one such example.*
5. *After the completion of the course, the student would understand the concepts of chemistry and apply to various materials for engineering applications.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the electro chemical sources of energy, process of corrosion &apply suitable control methods Understand the electrochemical sources of energy*
2. *Differentiates hard and soft water and understands various water treatments..*
3. *Understand classification of Fuels and combustion of fuels.*
4. *Understand characteristics and applications of fuels and Lubricants.*
5. *Understands industrially based polymers & their application in preparing various engineering materials.*
6. *Acquires the knowledge of various engineering materials and their applications*

UNIT I

ELECTROCHEMISTRY, CELL & CORROSION: Electrolytes- Strong and Weak electrolytes- Definition- examples. Electrolysis- Industrial applications of electrolysis. Cell- Galvanic cell, Batteries- Rechargeable batteries (Lead acid, Ni-Cd, Lithium Ion Batteries), Fuels cells - (Hydrogen-Oxygen and Methanol-Oxygen). Corrosion- Introduction, type of corrosion (Concentration cell corrosion, Galvanic corrosion), Chemical (Dry) and Electrochemical (Wet) Theory of corrosion, Galvanic series, factors affecting the corrosion (Metal and environment) Prevention- Cathodic protection (Sacrificial anode and impressed current), electroplating (Copper, nickel and chromium) and electroless plating (Copper and nickel).

UNIT II

WATER AND ITS TREATMENT: Hardness of water and its Units, Estimation of hardness by EDTA method.

Troubles of Boilers: Scale & Sludge, Priming and Foaming, and Boiler Corrosion.

Treatment of Boiler Feed water:

Internal Treatment: Colloidal, Phosphate, Carbonate, Calgon and sodium aluminate treatment.

External Treatment: Ion-Exchange and Permutit processes.

UNIT III

FUEL TECHNOLOGY AND LUBRICANTS: Fuel Technology- Introduction, classification, characteristics of a good fuel, calorific value, liquid fuels, petroleum, refining of petroleum, knocking, octane number, cetane number, power alcohol, synthetic petrol, gaseous fuels, important gaseous fuels.

Lubricants- Definition, functions of lubricants, mechanism of lubrication, properties of lubricants –viscosity, flash and fire points, cloud and pour points, aniline points,neutralization number and mechanical strength.

UNIT IV

POLYMERS: Introduction- Basic concepts of polymerization, types of polymerization (Chain Growth –Addition, step growth (Condensation), Mechanism: Cationic , anionic, free radical and coordination covalent.

Plastomers- Thermosetting and thermoplastics, preparation, properties and engineering applications of PVC, Teflon, Bakelite and nylons.

Elastomers-Natural rubber, processing of natural rubbers, compounding of rubber.

Synthetic rubber- Preparation, properties and engineering applications of Buna-S, Buna-N, polyurethane, polysulfide (Thiokol) rubbers.

Conducting polymers- mechanism, synthesis and applications of polyacetyline, polyaniline.

Inorganic polymers: Basic introduction, silicones, polyphospazines applications.

UNIT V

ENGINEERING MATERIALS: Cement- composition of Portland cement, preparation (dry and wet process) setting and hardening of cement.

Refractories- introduction, classification, properties and applications.

Nanomaterials- Introduction-Carbon Nano Tubes, Fullerenes. Semi conductors, superconductors and quantum dots.

TEXT BOOKS

1. *Engineering Chemistry*, First Edition, Jayaveera KN, Subba Reddy GV and Ramachandraiah C, McGraw Hill Higher Education, New Delhi, 2013.
2. *A Text Book of Enigneering Chemistry*, 15th Edition, Jain and Jain, Dhanapathi Rai Publications, New Delhi, 2013.

REFERENCES

1. *A Text book of Engineering Chemistry*, 12th Edition, SS Dhara, Uma, S. Chand Publications, New Delhi, 2010.
2. *Engineering Chemistry*, First edition, Chandra Sekhar K B, Das U N and Sujatha Mishra, SCITECH Publications India Pvt. Limited, 2010.
3. *Engineering Chemistry*, First edition, Seshamaheswaramma K and Mridula Chugh, Pearson Education, 2013.
4. *Concise Inorganic Chemistry*, 7th Edn, Lee J.D., Blackwel Science Publications Oxford, London, 2004.

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3	1	3

(16CS501) COMPUTER PROGRAMMING
(Common to all Branches)

COURSE OBJECTIVES
1. *To understand the core aspects of computer problem solving techniques*
2. *To understand the programming language constructs*
3. *To understand the programming paradigms*

COURSE OUTCOMES
On successful completion of this course, the student will be able to
1. *Able to design the flowchart and algorithm for real world problems*
2. *Analyze the control statements for solving real world problems*
3. *Design and implement Array concepts*
4. *Understand and implement String problems*
5. *Define and use the functions appropriately for solving the complex problems.*
6. *Apply the concepts of structures and files*

UNIT I
OVERVIEW OF COMPUTERS AND PROGRAMMING: Electronic Computers Then and Now – Computer Hardware - Computer Software - Algorithms - Flowcharts - Software Development Method - Applying the Software Development Method. C Language Elements- Variable Declarations & Data Types Executable Statements – General form of a C Program- Expressions - Precedence and Associativity- Operators and Expression – Type Conversions

UNIT II
DECISION STATEMENTS: If Statement, If-else Statement, Nested- If-else Statement, Else if Ladder, Switch case – break – continue – go to Statements – Example Programs Loop Control Statements – for loop – while loop - do while – Example Programs

UNIT III
ARRAYS: Declaring and referencing Arrays – Array Subscripts, Using for loops for sequential access – Using Array elements as Function arguments – Array arguments –Multidimensional Arrays – Example Programs
STRINGS: Introduction – Declaring and Initializing String variables – Reading Strings from Terminals – Writing Strings to Screen – Arithmetic Operations on Characters – Putting Strings together – Comparison of two Strings – String Handling Functions – Table of Strings-Other Features of Strings.

UNIT IV

FUNCTIONS: Definition – Function without Arguments – Functions with input arguments – Functions with simple output parameters – Communication among Functions – Scope – Storage clauses – Type Qualifiers – Recursion

Pointers: Introduction – Understanding Pointers – Accessing the address of a variable – Declaring Pointers variables- Initialization of Pointer variables – Accessing a variable through its Pointer – Chain of Pointers – Pointer Expressions – Pointer Increment & Scale Factors – Pointers and Arrays – Pointers and Character Strings – Array of Pointers – Pointers as Function Arguments .- Function returning Pointers – Pointers to Function.

UNIT V

STRUCTURES: Introduction – Defining a Structure – Declaring Structure Variables – Accessing Structure Members – Structure Initialization – Copying and Comparing Structure variables – Operations on Individual members – Arrays of Structures – Arrays with in Structures – Structures with in Structures – Structures and Functions – Unions –Bit fields – TYPEDEF – ENUM

File Management in C: Introduction – Types of Files – Defining and Opening a File – Closing a File – Input / Output Operations on Files – Error handling during IO Operations – Random access to files – Command line arguments. Preprocessor - #define and #include.

TEXT BOOKS:

1. Programming in C and Data Structures – Jeri R. Hanly, Elliot B Koffman, Ashok Kamthane, A Anand Rao – Pearson.(UNITS I, II and III)
2. Programming in C and Data Structures – E Balagurusamy - McGrawHill

REFERENCES:

1. Computer Fundamentals and C Programming - Dr. P. Chenna Reddy, ISBN: 9789351045885, Publisher: Pothi.com
2. Programming in C, Second Edition – Pradip Dey, Manas Ghosh, Oxford University Press.
3. ―C from Theory to Practice‖- George S. Tselikis- Nikolaos D. Tselikas- CRC Press.
4. ―Programming with C‖- R S Bichkar- University Press.
5. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A.AnandaRao, Pearson Education. (UNIT-I)

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

I B. Tech. – I Sem. (CSE)

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(16ME302) ENGINEERING GRAPHICS
(Common for CSE & ECE)

COURSE OBJECTIVES

1. *To familiarize the students in basic concept of conic sections, projections anddevelopments of Objects.*
2. *To develop the imagination and drafting skills of students.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Frame ideas based on the conceptual modelling and design*
2. *Provide good understanding of the methods involved in preparing various views in engineering drawings*
3. *Able to prepare 2D and 3D diagrams of various objects*
4. *Recognize the basic solids like cylinders, cones, prisms and pyramids and sketch the projections of them*
5. *Understand the basic principles of isometric and Orthographic Projections.*
6. *Construct the isometric and orthographic projections of simple objects.*

INTRODUCTION (**Not to be included for examination)**

Drawing instruments and their use – Lettering - Dimensioning – Simple Geometrical constructions.

UNIT I

CONIC SECTIONS: Construction of Ellipse, Parabola, Hyperbola (General and special methods). Special Curves: Cycloids, Involutes.

UNIT II

POINTS: Projections of points

LINES: Projections of straight lines - Determination of true lengths and true inclinations –line inclined to both reference planes., traces.

UNIT III

PLANES: Projections of planes – Surface inclined to both reference planes

SOLIDS: Projections of simple solids (Prisms, pyramids, cylinder and cone) - Axis inclinedto both the planes.

UNIT IV

SECTIONS: Sections of solids (prisms, pyramids, cylinder and cone) in simple vertical position by using cutting plane inclined to one reference plane and perpendicular to the other – true shape of the section.

DEVELOPMENTS: Development of lateral surfaces of simple and truncated solids –prisms, pyramids, cylinder and cone.

UNIT V

ISOMETRIC AND ORTHOGRAPHIC PROJECTIONS: Principles of Isometric projection- Isometric Scale- Isometric Views- Conversion of Isometric to orthographicviews– Isometric projection of simple solids (Cube, Cylinder and Cone)
INTERPENETRATION/INTERSECTIONS OF SOLIDS: Simple solids.
COMPUTER AIDED DRAFTING: Introduction to drafting packages - orthographic viewsand projections and Isometric projections (demonstration only)

TEXT BOOKS

1. *Engineering Drawing*, N.D.Bhatt, Charotar Publishers
2. *A text Book of Engineering Drawing*, K.L.Narayana, Kannaiah, Scitech Publishers, 2010
3. *Engineering Graphics with using AutoCAD,2007*. Jeyapoovan.T., Vikas Publishing House

REFERENCES

1. *Fundamentals of Engineering Drawing*, Warren J. Luzadder and Jon. M.Duff PrenticeHall of India Pvt., Ltd., Eleventh Edition, 2001.
2. *Engineering Graphics*, Bhattacharyya, S.C.Bera, I.K .International Pvt Ltd. 2009.
3. *A text Book of Engineering Drawing and Graphic*, K.Venugopal New Age PublishingNew Delhi, 2008,

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I B. Tech. – I Sem. (CSE)

(16HS607) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB
(Common to ECE & CSE)

COURSE OBJECTIVES

1. *To enable students to learn better pronunciation through stress on word accent, Intonation and rhythm.*
2. *To help the second language learners to acquire fluency in spoken English and neutralize mother tongue influence.*
3. *To train students to use language appropriately in both formal and informal situations.*
4. *To enhance written communication among the students.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Become active participants in the learning process and acquire proficiency in spoken English by learning phonetics.*
2. *Speak with clarity and confidence thereby enhances employability skills.*
3. *Develop effective communication skills by participating formal and informal conversations.*
4. *Enhance presentation skills through impromptu speech like JAM.*
5. *Improve describing skills by practicing simple descriptions.*
6. *Use effective communicative approaches by preparing job application, report and other kinds of writing correspondences.*

UNIT I

1. Phonetics -Importance
2. Introduction to Sounds of Speech
3. Vowels and Consonant sounds
4. Phonetic Transcription

UNIT II

5. Word Stress
6. Syllabification
7. Rules of Word Stress
8. Intonation

UNIT - III

9. Situational Dialogues/ Role Play
10. Telephonic Communication
11. JAM

UNIT IV

12. Describing Persons/ places/ things
13. Oral Presentations
14. Debate

UNIT V

15. Group Discussion
16. Job application
17. Interview skills

Minimum Requirements for ELCS Lab:

The English Language Lab shall have two parts:

1. Computer Assisted Language Learning (CALL) Lab: The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
2. The Communication Skills Lab with movable chairs and audio-visual aids with a P.A. system,

Projector, a digital stereo-audio & video system and camcorder etc.System Requirement (Hardware component):

Computer network with LAN with minimum 60 multimedia systems with the followingspecifications:

i) P – IV Processor
   a) Speed – 2.8 GHZ
   b) RAM – 512 MB Minimum
   c) Hard Disk – 80 GB

ii) Headphones of High quality

Suggested Software:

1. Clarity Pronunciation Power – Part I (Sky Pronunciation)
2. Clarity Pronunciation Power – part II
3. K-Van Advanced Communication Skills
4. Walden InfoTech Software.

REFERENCES

1.A Textbook of English Phonetics for Indian Students 2nd Ed T. Balasubramanian.Macmillian),2012.
2.A Course in Phonetics and Spoken English, Dhamija Sethi, Prentice-Hall of India Pvt.Ltd
3.Speaking English Effectively, 2nd Edition Krishna Mohan & NP Singh, 2011. (McMillan).
4.A Hand book for English Laboratories, E.Suresh Kumar, P.Sreehari, Foundation Books,2011.

5.Spring Board Success, Sharada Kouhik, Bindu Bajwa, Orient Blackswan, Hyderabad,2010.

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(16HS609) ENGNEERING CHEMISTRY LAB
(Common to ECE & CSE)

COURSE OBJECTIVES

1. *To provide students with practical knowledge of quantitative analysis of materials by classical and instrumental methods for developing experimental skills in building technicalcompetence.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results.*
2. *Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results.*
3. *To determine the viscosity of different liquid samples with Red wood viscometer.*
4. *Get more information about different water samples*
5. *Know about the types titrations and their usages.*
6. *Determine the amount of total hardness and dissolved oxygen in different water samples.*

Any 10 of the following experiments has to be performed during the I year I

Sem.List of Experiments:

1. Determination of total hardness of water by EDTA method.
2. Determination of Copper by EDTA method.
3. Estimation of Dissolved Oxygen by Winkler‘s method.
4. Estimation of iron (II) using diphenylamine indicator (Dichrometry –Internal indicator method).
5. Determination of Alkalinity of Water.
6. Determination of acidity of Water.
7. Preparation of Phenol-Formaldehyde (Bakelite).
8. Determination of Viscosity of oils using Redwood Viscometer I.
9. Determination of Viscosity of oils using Redwood Viscometer II.
10. Determination of calorific value of gaseous fuels by Junker‟ s Calorimeter.
11. Conductometric estimation of strong acid using standard sodium hydroxide solution.
12. Determination of Corrosion rate and inhibition efficiency of an inhibitor for mild steelin hydrochloric acid medium.
13. Potentio metric determination of iron using standard potassium dichromate.
14. Colorometric estimation of manganese.

15. pH meter calibration and measurement of pH of water and various other samples.

REFERENCES

1. *Vogel's Text book of Quantitative Chemical Analysis*, Sixth Edition – Mendham J et al,Pearson Education, 2012.
2. *Chemistry Practical– Lab Manual*, First edition, Chandra Sekhar KB, Subba Reddy GVand Jayaveera KN, SM Enterprises, Hyderabad, 2014.

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(16CS502) COMPUTER PROGRAMMING LAB
(Common to all Branches)

COURSE OBJECTIVES

1. *To make the student learn C Programming language.*
2. *To make the student solve problems, implement those using C & C++ programming languages.*
3. *To strengthen the ability to identify and apply the suitable data structure for the given real world problem.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the problem solving techniques of C programming language.*
2. *Use C language features effectively to implement solutions.*
3. *Use Array features effectively to solve problems.*
4. *Identify and develop string operations using various techniques for a given problem.*
5. *Implement modular programming and use pointers effectively for memory management.*
6. *Use structures to combine heterogeneous data types and implement basic file operations.*

LIST OF EXPERIMENTS/TASKS:

1. Practice DOS and LINUX Commands necessary for design of C Programs.
2. Practice programs: Finding the sum of three numbers, exchange of two numbers, maximum of two numbers, to read and print variable values of all data types of C language, to find the size of all data types, to understand the priority and associativity of operators using expressions, to use different library functions of C language.
3. Write a program to find the roots of a Quadratic equation.
4. Write a program to compute the factorial of a given number.
5. Write a program to check whether the number is prime or not.
6. Write a program to find the series of prime numbers in the given range.
7. Write a program to generate Fibonacci numbers in the given range.
8. Write a program to find the maximum and minimum of a set of numbers.
9. Write a program to reverse the digits of a number.
10. Write a program to find the sum of the digits of a number.
11. Write a program to find the sum of positive and negative numbers in a given set ofnumbers.
12. Write a program to check for number palindrome.
13. Write a program to evaluate the sum of the following series up to n termse^{x} =1+x+x2/2!+x3/3!+x4/4!+--------
14. Write a program to generate Pascal Triangle.

15. Write a program to read two matrices and print their sum and product in the matrixform.
16. Write a program to read matrix and perform the following operations.
    i. Find the sum of Diagonal Elements of a matrix.
    ii. Print Transpose of a matrix.
    iii. Print sum of even and odd numbers in a given matrix.
17. Write a program to accept a line of characters and print the number of Vowels, Consonants, blank spaces, digits and special characters.
18. Write a program to insert a substring in to a given string and delete few characters from the string. Don‘t use library functions related to strings.
19. Write a program to split a „file‟ in to two files, say file1 and file2. Read lines into thefile from standard input. File1 should consist of odd numbered lines and file2 should consist of even numbered lines.
20. Write a program to merge two files.
21. Write a program to read a set of strings and sort them in alphabetical order.
22. Write a program to read two strings and perform the following operations without using Built in string Library functions and by using your own implementations of functions.
    i. String length determination ii .Compare Two Strings
    ii. Concatenate them, if they are not equal iv. String reversing
23. Write programs using recursion for finding Factorial of a number, GCD, LCM, and solving Towers of Hanoi problem.
24. Write a program to exchange two numbers using pointers.
25. Write a program to read student records into a file. Record consists of roll no, name and Marks of a student in six subjects and class. Class field is empty initially. Compute the class of a student. The calculation of the class is as per JNTUA rules. Write the first class, second class, third class and failed students lists separately to another file.
26. A file consists of information about employee salary with fields employee id, name, Basic, HRA, DA, IT, other-deductions, Gross and Net salary. Initially only employee id, name, and basic have valid values. HRA is taken as 10% of the basic, DA is taken as 80% of basic, IT is 20% of the basic, other deductions are user specified. Compute the Gross and Net salary of the employee and update the file.
27. Write a program to perform Base (decimal, octal, hexadecimal,…) conversions.
28. Write a program to find the square root of a number without using built-in libraryfunction.
29. Write C program to convert a string to number.
30. Write C program to generate multiplication tables from 11 to 20.

REFERENCES

1. How to Solve it by Computer, R.G. Dromey, Pearson.
2. The C Programming Language, Brian W. Kernighan, Dennis M. Ritchie, Pearson.
3. Let us C Yeswant Kanetkar, BPB publications
4. Pointers in C, Yeswant Kanetkar, BPB publications.
5. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A.Ananda Rao, Pearson Education.

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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
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I B. Tech. – II Sem. (CSE)

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(16HS610) PROFESSIONAL ENGLISH
(Common to All Branches)

Course Description: The course content focuses on LSRW skills and vocabulary building to enrich their command over language. Relevant task based activities are also carried out to enhance their communication skills.

COURSE OBJECTIVES

1. *To develop communication skills among the students*
2. *To construct proficiency in academic and social purpose.*
3. *To improve their grammatical accuracy.*
4. *To understand LSRW skills and inculcate the habit of reading for pleasure.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Use LSRW skills through the prescribed text and develop their ability to communicate effectively.*
2. *Articulate well among themselves and with Faculty.*
3. *Construct compound sentences using common conjunctions.*
4. *Manage to organize and deliver oral presentations.*
5. *Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively*
6. *Get the mastery of language to express ideas, views, feelings and experience.*

UNIT I

MINDSCAPES (Lessons from the past: Importance of the Past)

1. Learning English Language through Literature (*Playing the English Gentleman* M.K.Gandhi)
2. Oral presentation
3. Effective writing

Grammar: Relative clauses-Adjectives
Vocabulary: Sequencing words
Listening & Reading Activities
Writing: Analytical paragraph writing-Minutes of meeting

UNIT II

MINDSCAPES (Energy: Renewable and Non-renewable Sources - Alternative Sources)

1. Learning English Language through Literature. (*The Portrait of a Lady* -Kushwant Singh)

2. Preparing and presenting slides, Telephone etiquette
3. Making drafts

Grammar: Adverbs - prepositions -cause and effect expressions
Vocabulary: phrasal verbs - Technical vocabulary-Extended definitions
Listening & Reading Activities
Writing: Report writing

UNIT III

MINDSCAPES (Engineering Ethics: Biotechnology - Protection from Natural Calamities)

1. Learning English Language through Literature (*La Belle Dame Sans Mercy*-John Keats)
2. Poster presentation, Debate
3. Technical drafting

Grammar: Using connectives-Gap filling exercise using appropriate tense form
Vocabulary: Acronyms & Abbreviations
Listening & Reading Activities
Writing: Writing projects

UNIT IV

MINDSCAPES (Travel and Tourism: Atithi Devo Bhava- Tourism in India)

1. Learning English Language through Literature (*A Marriage Proposal*-Anton Chekov)
2. Group Discussion
3. Reading comprehension

Grammar: Structure indicating purpose-Subject-verb agreement
Vocabulary: emoticons-cloze test
Listening & Reading
Writing: Intensive and extensive

UNIT V

MINDSCAPES (Getting Job Ready: SWOT Analysis- Preparing for Interviews)

1. Learning from Literature (*Bird Sanctuary* -Sarojini Naidu)
2. Interview etiquette
3. Job application

Grammar: Spotting errors, Gap filling exercises using ‒gerunds‖ & present participle forms
Vocabulary: verbal ability
Listening & Reading Activities
Writing: Covering letter, Resume, Curriculum vitae
Convincing others

TEXT BOOKS

1. *Mindscapes*: *English for Technologists and Engineers,* Orient Blackswan, 2014
2. *Paths to Progress in English:* Orient Black Swan

REFERENCES

1. *Effective Tech Communication***,** Rizvi,Tata McGraw-Hill Education, 2007.
2. *Technical Communication,* Meenakshi Raman, Oxford University Press.
3. *English Conversations Practice,* Grant Taylor, Tata Mc GrawHill publications,2013**.**
4. *Practical English Grammar,* Thomson an d Martinet, OUP, 2010.

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SIDDHARTH INSTITUTE OF ENGINEERING &TECHNOLOGY
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I B. Tech. – II Sem. (CSE)

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(16HS611) ENGINEERING MATHEMATICS-II

(Common to all Branches)

COURSE OBJECTIVES

1. *To train the students thoroughly in Mathematical concepts of Matrices, Vector calculus, Fourier series, Fourier transforms and Partial differential equations*
2. *To prepare students for lifelong learning and successful careers using mathematicalconcepts of Matrices, Vector calculus, Fourier series, Fourier transforms and Partialdifferential equations*
3. *To develop the skill pertinent to the practice of the mathematical concepts including the Student abilities to formulate and modeling the problems, to think creatively and to Synthesize information*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Enumerate the knowledge on applications of matrices in Graph theory, Linear combination of Quantum mechanics, computer graphics, solving linear equations, Cryptography.*
2. *Analyze the problems on Measures the rate and direction of change in scalar field, scalar of a source at a given point in a vector field, Measures the tendency to rotate about a point in a vector field, flow of heat within a body, the behavior of electric and magnetic fields, the mechanics of solids and the mechanics of fluids.*
3. *Apply the knowledge of Fourier series applications in electrical engineering, optics, signal processing, image processing, quantum mechanics, econometrics, thin-walled shell theory.*
4. *Utilize Fourier analysis in electronics, vibration analysis, acoustics and communications Ability to solve the system dynamics and mechanical vibrations.*
5. *Ability to Solve linear PDE's(heat conduction, wave propagation),Antenna Design, Signal processing.*
6. *Estimate the applications of the problems on the PDEs used in Engineering*

UNIT I

MATRICES: Rank of a matrix, Echelon form, Normal form, Consistency of system of linear equations (Homogenous and Non-homogeneous), Eigen values, Eigen vectors, Cayley Hamilton theorem (Only statement) and its applications. Quadratic forms, Diagonolization.

UNIT II

VECTOR CALCULUS: Gradient, Divergence, Curl of a vector and related properties, Line, Surface and Volume integrals, Green's, Stoke's and Gauss divergence theorems (Only statement) and its applications.

UNIT III

FOURIER SERIES: Determination of Fourier coefficients- Fourier series- Even and odd functions, Fourier Series in an arbitrary interval, Periodic function, Half range sine and cosine series, Harmonic Analysis.

UNIT IV

Fourier integral theorem (only statement), Fourier sine and cosine integrals. Fourier transform, Fourier sine and cosine transforms, properties, Inverse transforms, Finite fourier transforms.

UNIT V

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Method of separation of variables, Solution of one dimensional wave equation, Heat equation and two dimensional Laplace equation under initial and boundary conditions.

TEXT BOOKS

1. *Higher Engineering Mathematics,* B.S.Grewal, Khanna publishers
2. *Engineering Mathematics Volume-I,* by T.K.V. Iyengar, S.Chand publication
3. *Mathematical Methods* by T.K.V. Iyengar, S.Chand publication

REFERENCES

1. *Engineering Mathematics*, Volume - I, E. Rukmangadachari & E. Keshava Reddy,Pearson Publisher 1st Edition (2010)
2. *Fourier Series and Integral Transforms*, by S.Sreenadh & S. Ranganatham, S.ChandPublication (2014)
3. *Engineering Mathematics*, Volume - I, by G.S.S.Raju, CENGAGE publisher.(2013)
4. *Advanced Engineering Mathematics*, by Erwin Kreyszig, Wiley India-10th Edition (2012)
5. *Advanced Engineering Mathematics*, by Erwin Kreyszig, Wiley India-10th Edition (2012)
6. *Higher Engineering Mathematics*, by B.V.Ramana, Mc Graw Hill publishers (2008)
7. *Advanced Engineering Mathematics*, by Alan Jeffrey, Elsevier-1st Edition (2001)

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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
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I B. Tech. – II Sem. (CSE)

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(16HS603) ENGINEERING PHYSICS
(Common to ECE & CSE)

COURSE OBJECTIVES

1. *To evoke interest on applications of superposition effects like interference & diffraction, the mechanisms of emission of light, achieving amplification of electromagnetic radiation through stimulated emission, study of propagation of light through transparent dielectric wave guides along with engineering applications.*
2. *To enlighten the periodic arrangement of atoms in crystals, direction of Bragg planes, crystal structure determination by X-rays & non-destructive evaluation using ultrasonic techniques.*
3. *To get an insight into the microscopic meaning of conductivity, classical & quantum free electron model & evaluation of band theory to distinguish materials & to understand electron transport mechanism in solids.*
4. *To open new avenues of knowledge & understanding semiconductor based electronic devices, basic concepts and applications of semiconductors & magnetic materials have been introduced which find potential in the emerging micro device applications.*
5. *To give an impetus on the subtle mechanism of superconductors in terms of conduction of electron pairs using BCS theory, different properties exhibited by them & their fascinating applications. Considering the significance of microminiaturization of electronic devices & significance of low dimensional materials, the basic concepts of nanomaterials, theirsynthesis, properties & applications in emerging technologies are elicited.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the basic principles of physical optics, lasers and fibre optics.*
2. *Determine the structure of crystals based on X-ray diffraction and understand properties of acoustics & ultrasonics.*
3. *Distinguish the dual nature of mater waves based on quantum laws.*
4. *Understand the basic concepts of free electron theory and energy bands in solids.*
5. *Indentify the applications of semiconductors & magnetic material.*
6. *Understand the properties of superconducting materials and nanomaterials along with their engineering applications.*

UNIT I

PHYSICAL OPTICS, LASERS AND FIBRE OPTICS: Physical Optics: Interference - Introduction - Interference in thin films by reflection – Newton‘s Rings. Diffraction - Introduction- Fraunhofer diffraction due to single slit and diffraction grating.

LASERS: Introduction - Characteristics of laser – Spontaneous and stimulated emission of radiation –-Einstein‘s relation, Population inversion – Excitation mechanism & optical

resonator – ND: YAG laser - He-Ne laser, semiconductor diode laser -Applications of lasers.
FIBRE OPTICS: Introduction– Construction and working principle of optical fiber – Numerical aperture and acceptance angle – Types of optical fibers – Attenuation and losses in fibers -Optical fiber communication system – Applications of optical fibers incommunications, sensors and medicine.

UNIT II

CRYSTALLOGRAPHY, ACOUSTICS AND ULTROSONICS: Crystallography**:** Introduction – Space lattice –Unit cell – Lattice parameters –Bravias lattice –Crystal systems – Packing fractions of SC, BCC and FCC-Directions and planes in crystals – Miller indices – Inter planar spacing in cubic crystals – X-ray diffraction - Bragg‘s law.
Acoustics Intensity – Absorption coefficient and its determination –Reverberation – Reverberation time (qualitative treatment) – Factors affecting acoustics of buildings and their remedies. Ultrasonics Introduction – Production of ultrasonics by piezoelectric method – Properties and detection – Applications in non-destructive testing.

UNIT III

QUANTUM MECHANICS AND FREE ELECTRON THEORY: Quantum Mechanics**:** Introduction to matter waves – de‘Broglie hypothesis - Heisenberg‘s uncertainty principle and its applications - Schrödinger**’**s time independent and time dependent wave equation – Significance of wave function - Particle in a one dimensional infinite potential well .
Free Electron theory: Classical free electron theory - Equation for electrical conductivity - Quantum free electron theory - Origin of bands in solids – Classification of solids into conductors, semiconductors and insulators.

UNIT IV

SEMICONDUCTORS AND MAGNETIC MATERIALS: Semiconductor Physics: Introduction – Intrinsic and extrinsic semiconductors (qualitative treatment), Drift & diffusion currents - Einstein‘s relation– Hall effect Direct & indirect band gap semiconductors. Magnetic materials: Introduction and basic definitions – Origin of magnetic moments – Bohr magneton – Classification of magnetic materials into dia, para, ferro,antiferro and ferri magnetic materials – Hysteresis - Soft and hard magnetic materials and applications.

UNIT V

SUPERCONDUCTIVITY AND PHYSICS OF NANOMATERIALS: Superconductivity: Introduction – Meissner effect - Properties of superconductors- Type I and Type II superconductors- ac and dc Josephson effects BCS theory (qualitative) –Applications of superconductors. Physics of Nanomaterials: Introduction - Significance of nanoscale - Surface area and quantum confinement –Synthesis of nanomaterials: ball mill, chemical vapour deposition, sol-gel, plasma arcing –applications of nano materials

TEXT BOOKS

1. *Engineering Physics* – K.Thyagarajan, 5th Edition, McGraw Hill Publishers, NewDelhi,2014.
2. *Engineering Physics* - Gaur R.K. and Gupta S.L. Dhanpat Rai Publishers, 2009

REFERENCES

1. *Engineering Physics* - Mani Naidu S.,Pearson Publications, 2011.
2. *Engineering Physics* - Arumugam K.-PHI Learning Pvt., India, 2009.
3. *Engineering Physics* -Palanisamy P.K, SCITECH Publications, 2011.
4. *Engineering Physics* -Rajagopal K. PHI, New Delhi, 2011.
5. *Engineering Physics* – Dr. M.N. Avadhanulu & Dr. P.G. Kshirsagar, 10th Edition,S.Chandand Company, New Delhi, 2014

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I B. Tech. – II Sem. (CSE)

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(16HS606) HUMAN VALUES AND PROFESSIONAL ETHICS
(Common to ECE, CSE)

COURSE OBJECTIVES
1. *To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.*

COURSE OUTCOMES
On successful completion of this course, the student will be able to
1. *The student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society*
2. *Identify and analyse human values in their relevant field*
3. *Assess their own engineering ethics and have the social consciousness*
4. *Get knowledge on codes of ethics and on an utilitarian thinking*
5. *Identify safety, risks and an ethical concern in research and intellectual contexts*
6. *know necessity of computer and an environmental ethics, give a picture on weapons development*

UNIT I
Human Values - Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self-confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

UNIT II
Engineering Ethics - Senses of _Engineering Ethics‘ – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg‘s theory – Gilligan‘s theory – Consensus and Controversy – Models of professional roles - Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories

UNIT III
Engineering As Social Experimentation - Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

UNIT IV
Safety, Responsibilities And Rights- Safety and Risk – Assessment of Safety and Risk –Risk Benefit Analysis and Reducing Risk
Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination

UNIT V

Global Issues-Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership –Code of Conduct – Corporate Social Responsibility

TEXTBOOKS

1. Mike W. Martin and Roland Schinzinger, ‒Ethics in Engineering‖, Tata McGraw Hill, New Delhi, 2003.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, ‒Engineering Ethics‖, Prentice Hall of India, New Delhi, 2004.

REFERENCES

1. Charles B. Fleddermann, ‒Engineering Ethics‖, Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, ‒Engineering Ethics – Concepts and Cases‖, Cengage Learning, 2009
3. John R Boatright, ‒Ethics and the Conduct of Business‖, Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, ‒Fundametals of Ethics for Scientists and Engineers‖, Oxford University Press, Oxford, 2001

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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
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I B. Tech. – II Sem. (CSE)

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(16CS503) DATA STRUCTURES THROUGH C

COURSE OBJECTIVES

1. *Understand different data structures*
2. *Understand searching and sorting techniques*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the basic concepts of Arrays and implement Linked List Programs.*
2. *Analyze and apply stack and Queues operations in various applications.*
3. *Understand and implement the different types of trees.*
4. *Implement various operations on graph structures.*
5. *Understand and implement sorting techniques to solve real world problems.*
6. *Understand and implement searching techniques to solve real world problems.*

UNIT-I

Introduction and overview: One Dimensional array- Multi Dimensional array- pointer arrays. **Linked lists**: Definition- Single linked list- Circular linked list- Double linked list- Circular Double linked list- Application of linked lists.

UNIT-II

Stacks: Introduction-Definition-Representation of Stack-Operations on Stacks- Applications of Stacks. **Queues**: Introduction, Definition- Representations of Queues- Various Queue Structures- Applications of Queues.

UNIT-III

Trees: Basic Terminologies- Definition and Concepts- Representations of Binary Tree- Operation on a Binary Tree- Types of Binary Trees-Binary Search Tree, Heap Trees

Graphs: Introduction- Graph terminologies- Representation of graphs- Operations on Graphs- Application of Graph Structures: Shortest path problem- topological sorting.

UNIT-IV

Sorting : Sorting Techniques- Sorting by Insertion: Straight Insertion sort- List insertion sort- Binary insertion sort- Sorting by selection: Straight selection sort- Heap Sort- Sorting by Exchange- Bubble Sort- Shell Sort- Quick Sort-Sorting by Mergin: Simple Merging-Binary Merge-Merge Sort.

UNIT-V

Searching: Linear Search Techniques: Linear Search with Array- Linear Search with Linked List- Linear Search with ordered list- Binary Search- Fibonacci Search.

Tables: Hash Tables: Hashing Techniques- Collision Resolution Techniques- Closed Hashing- Open Hashing.

TEXT BOOKS

1. ―Classic Data Structures‖, Second Edition by Debasis Samanta, PHI.
2. ―Data Structures A Pseudo code Approach with C‖, Second Edition by Richard F. Gilberg, Behrouz A. Forouzan, Cengage Learning.

REFERENCES

1. Fundamentals of Data Structures in C – Horowitz, Sahni, Anderson-Freed, Universities Press, Second Edition.
1. Schaum‘ Outlines – Data Structures – Seymour Lipschutz – McGrawHill- Revised First Edition.
2. Data structures and Algorithms using C++, Ananda Rao Akepogu and Radhika Raju Palagiri, Pearson Education.

SIDDHARTH INSTITUTE OF ENGINEERING &TECHNOLOGY
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I B. Tech. – II Sem. (CSE)

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(16HS608) ENGINEERING PHYSICS LAB
(Common to ECE & CSE)

COURSE OBJECTIVES

1. *Will recognize the important of optical phenomenon like interference and diffraction. Will understand the role of optical fibre parameters and signal losses in communication. Will recognize the importance of energy gap in the study of conductivity and Hall- Effectin a semiconductor.*
2. *Will understand the application of B-H curve.*
3. *Will acquire a practical knowledge of studying the crystal structure in terms latticeconstant.*
4. *Will recognize the application of laser in finding the particle size and its role indiffraction studies.*
5. *Will learn to synthesis of the nanomaterials and recognize its importance by knowing itsnano particle size and its impact on its properties.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Operate various optical instruments.*
2. *Evaluate Energy gap of a Semiconductor diode.*
3. *Plot the intensity of the magnetic field of induction along the axis of circular coil carryingcurrent with distance.*
4. *Evaluate the acceptance angle of an optical fiber and numerical aperture.*
5. *Estimate wavelength of laser and particles size usinglaser.*
6. *Determine energyloss by B-H curve.*

Any 10 of the following experiments has to be performed during the I year II Sem.

1. Determination of radius of curvature of a Plano-convex lens by forming Newton‘s rings.
2. Determination of wavelength of given source using diffraction grating in normal incidencemethod.
3. Determination of Numerical aperture, acceptance angle of an optical fiber.
4. Determination of the Energy gap of a Semiconductor diode.
5. Hall-Effect – Determination of mobility of charge carriers.
6. B-H curve – Determination of hysteresis loss for a given magnetic material.
7. Determination of Crystallite size using X-ray pattern (Powder) using Debye-Scheerermethod.
8. Determination of particle size by using laser source.
9. Determination of dispersive power of a prism.
10. Determination of thickness of the thin wire using wedge Method.

11. Laser: Diffraction due to single slit.
12. Laser: Diffraction due to double slit.
13. Laser: Determination of wavelength using diffraction grating.
14. Magnetic field along the axis of a current carrying coil – Stewart and Gee‘s method.
15. Synthesis of nano material by any suitable method.

REFERENCES

1. *Engineering Physics Practicals* – NU Age Publishing House, Hyderabad.
2. *Engineering Practical Physics* – Cengage Learning, Delhi.

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(16CS504) DATA STRUCTURES THROUGH C LAB

COURSE OBJECTIVES

1. *To develop skills to analyze and program linear and nonlinear data structures.*
2. *Develop different data structures with effective usage of arrays and linked lists.*
3. *Develop recursive algorithms as they apply to trees and graphs*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Implement data structures like arrays, linked list like single , double, circular linked list*
2. *Implement stack, queue operations and also stack applications*
3. *Implement various non linear data structures*
4. *Implement the operations on graphs and applications of graphs.*
5. *Implement selection sort, bubble sort and heap sort problems.*
6. *Implement linear search and binary search and hash table problems.*

List of Experiments/Tasks

1. Write a program to sort the elements of an array using sorting by exchange.
2. Write a program to sort the elements of an array using Selection Sort.
3. Write a program to implement heap sort.
4. Write a program to perform Linear Search on the elements of a given array.
5. Write a program to perform Binary Search on the elements of a given array.
6. Write a program to convert infix expression to postfix expression and evaluate postfix expression.
7. Write a program to implement stack, queue, circular queue using arrays and linked lists.
8. Write a program to perform the operations creation, insertion, deletion, and traversing a Singly linked list.
9. Write a program to perform the operations creation, insertion, deletion, and traversing a Doubly linked list.
10. Write a program to remove duplicates from ordered and unordered arrays.
11. Write a program to sort numbers using insertion sort.
12. Write a program to implement quick sort using non-recursive
13. Write a program to search a word in a given file and display all its positions.
14. Write a program to perform Hash Based Searching.
15. Write a program to perform Warshall‘s Algorithm for Shortest Path.
16. Write a program to implement depth first search and breadth first search on graphs.
17. Write a program to perform different operations on Binary Search Trees.
18. Write a program to implement Binary Tree.

REFERENCES

1. Classic Data Structures‖, Second Edition by Debasis Samanta, PHI.
2. Data Structures A Pseudo code Approach with C‖, Second Edition by Richard F. Gilberg, Behrouz A. Forouzan, Cengage Learning

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(16ME301) ENGINEERING & IT WORK SHOP LAB
(Common to all Branches)

COURSE OBJECTIVES
ENGINEERING WORKSHOP

- The course provides hands-on training in the trades of Carpentry, Fitting, House-wiring, Tin Smithy, Foundry. Overview of metal cutting processes, plumbing and welding is provided through live demonstrations.

IT WORKSHOP

- This course deals with practice sessions on PC hardware, Internet, World Wide Web, MS-Word, Excel, Power Point and Publisher. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber- attacks are include.

COURSE OUTCOMES

ENGINEERING WORKSHOP

On successful completion of this course, the student will be able to

1. *Utilize workshop tools for engineering practice.*
2. *Employ skills for the production a component for real time applications.*
3. *Appreciate the hard work and intuitive knowledge of the manual workers.*

IT WORKSHOP

On successful completion of this course, the student will be able to

4. *Install the software in the computers*
5. *Apply skills for the development of application softwares*
6. *Able to protect personal computer from virus and other cyber attacks*

LIST OF EXPERIMENTS

1. TRADES FOR EXERCISES

a. Carpentry shop: Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, Cross lap joint, Mortise and tenon T joint, Bridle T joint from soft wood stock.

b. Fitting shop: Two joints (exercises) from: Square joint, V joint, Half round joint or Dove tail joint out of 100 x 50 x 5 mm M.S. stock.

c. Sheet metal shop: Two jobs (exercises) from: Tray, Cylinder, Hopper or Funnel from out of 22 or 20 gauge G.I. sheet.

d. House-wiring: Two jobs (exercises) from: Wiring for ceiling rose and two lamps (bulbs) with independent switch, two way switch, controls with or without looping, wiring for stair case lamp, wiring for water pump with single phase starter.

e. Foundry: Preparation of two moulds (exercises): for a single pattern and a double pattern.

f. Welding: Preparation of two welds (exercises): Single V butt joint, Lap joint, Double V butt joint or T fillet joint.

2. TRADES FOR DEMONSTRATION:

a. Plumbing

b. Machine Shop

c. Metal Cutting

Apart from the above the shop rooms should display charts, layouts, figures, circuits, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, Plastics, steels, meters, gauges, equipment, CD or DVD displays, First aid, shop safety etc. (though they may not be used for the exercises but they give valuable information to the student). In the class work or in the examination knowledge of all shop practices may be stressed upon rather than skill acquired in making the job.

REFERENCES:

1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009
2. Work shop Manual, P.Kannaiah & K.L.Narayana, SciTech Publishers.
3. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

IT WORKSHOP

LIST OF EXPERIMENTS

1. Preparing your Computer Knowledge (5 weeks)

2. **Learn about Computer**: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

3. **Assembling a Computer:** Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working

parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

4. **Install Operating system:** Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

5. **Operating system features**: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

6 Networking and Internet (4 weeks)

6.1 Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc should be done by the student. The entire process has to be documented.

6.2 Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email. They should get acquaintance with applications like Facebook, skype etc.
If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, and search process using different natural languages, and creating e-mail account.

7. Antivirus: Students should download freely available Antivirus software, install it and use itto check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc

8. Productivity tools (6 weeks)

8.1 Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the color, including images and tables in the word file, making page setup, copy andpaste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

8.2 Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

8.3 Presentations: Creating, opening, saving and running the presentations, selecting the style for slides, formatting the slides with different fonts, colors, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

REFERENCES

1. Introduction to Computers, Peter Norton, Mc Graw Hill
3. MOS study guide for word, Excel, Powerpoint & Outlook Exams‖, Joan Lambert, Joyce Cox, PHI.
4. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
5. Networking your computers and devices, Rusen, PHI
6. Trouble shooting, Maintaining& Repairing PCs‖, Bigelows, TMH

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SIDDHARTH INSTITUTE OF ENGINEERING &TECHNOLOGY
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(16HS612) ENGINEERING MATHEMATICS-III
(Common to all branches)

COURSE OBJECTIVES

1. *To train the students thoroughly in Mathematical concepts of Complex Analysis, Interpolation, Curve fitting, Numerical Differentiation and Integration and their applications*
2. *To prepare students for lifelong learning and successful careers using mathematical concepts of Complex Analysis, Interpolation, Curve fitting, Numerical Differentiation and Integration and their applications*
3. *To develop the skill pertinent to the practice of the mathematical concepts including the students abilities to formulate and modeling the problems, to think creatively and to synthesize information*

.

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand analytic functions of complex variables, complex integration, and contour integration.*
2. *Gain knowledge on the basics of residues, Evaluation of real integrals and conformal mappings*
3. *Apply techniques of solving any algebraic, transcendental equations and also to make effective use of the interpolation formulas to find the missing data using the given data*
4. *Estimate the best fit curve of the given data by the method of least squares*
5. *Able to do integration of a function within specified limits and differentiate a function at any particular point without actually doing integration*
6. *Solving of ordinary differential equations by various numerical techniques*

UNIT I

COMPLEX ANALYSIS-I: Analytic functions, Cauchy– Riemann equations, complexintegration, Cauchy‘s theorem, Integral formula, Evaluation of Integrals.

UNIT II

COMPLEX ANALYSIS-II: Singularities, poles, Residues, Residues theorem, Evaluation of real integrals of the types $\int_0^{2\pi} f(\cos\theta, \sin\theta)\,d\theta$, $\int_{-\infty}^{\infty} e^{imx} f(x)\,dx$ - conformal mapping – Bilinear

transformations- Transformation of e^z, Z^2, Sin z, and Cos z.

UNIT III

SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS: The Bisection Method, The Method of False Position, Newton-Raphson Method.

INTERPOLATION: Newton‘s forward and backward interpolation formula, Lagrange‘s interpolation formula.

UNIT IV

CURVE FITTING: Fitting of a straight line, Second degree curve, Exponentional curve, Power curve by method of least squares.

NUMERICAL DIFFERENTIATION AND INTEGRATION: Trapezoidal rule, Simpson‘s 1/3 Rule, Simpson‘s 3/8 Rule.

UNIT V

NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS: Solution by Taylor‘s series, Picard‘s Method of successive Approximations, Euler‘s Method, Runge-Kutta second and fourth order methods.

TEXT BOOKS

1. *Higher Engineering Mathematics*, B.S.Grewal, Khanna publishers.
2. *Advanced Engineering Mathematics*, Peter V.O‘Neil, CENGAGE publisher.

REFERENCES

1. Engineering *Mathematics III* by T.K.V. Iyengar, S.Chand publications.
2. *Mathematical Methods* by T.K.V. Iyengar, S.Chand publications.
3. *Engineering Mathematics, Volume - III*, E. Rukmangadachari & E. Keshava Reddy Pearson Publisher.
4. *Advanced Engineering Mathematics* by M.C. Potter, J.L. Goldberg, Edward F.Aboufadel, and Oxford.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
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II B. Tech. – I Sem. (CSE)

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(16HS605) ENVIRONMENTAL STUDIES
(Common to EEE, ECE & CSE)

COURSE OBJECTIVES

1. *Students have got an idea about the importance of pollution free air, water, soil andfood.*
2. *They know about global environmental problems like Acid Rains, Global Warming,Green House Effects, Ozone layer depletion.*
3. *To understand the impacts of developmental activities and mitigation measures alongwith the environmental policies and regulations.*
4. *To recognize major concepts in environmental studies and demonstrate in-depthunderstanding the environment.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Recognize the physical, chemical and biological components of the earth's systems and show how they function.*
2. *Characterize and analyze human impacts on the environment.*
3. *Integrate facts, concepts and methods from multiple disciplines and apply to environmental Problems.*
4. *Create informed opinions about how to interact with the environment on both a personal and a social level.*
5. *Perform independent research on human interactions with the environment.*
6. *Recognize the ecological basis for regional and global environmental issues*

UNIT- I

INTRODUCTION:

Definition, Scope and Importance-Need for Public Awareness

NATURAL RESOURCES:

Classification of resources-Forest resources: Use and over-exploitation, deforestation- Mining, dams and their effects on forests and tribal people – Water resources - Use and over utilization of surface and ground water- Floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources –Energy resources: Renewable and Non- Renewable sources of energy-Solar energy, Hydro electrical energy, Wind energy, Nuclear energy, etc.

UNIT-II

ECOSYSTEMS:

Concept of an ecosystem– structural features of ecosystem- Producers, Consumers and

Decomposers–-Biogeochemical cycles- Ecological succession-Food chains, food webs and ecological pyramids – Energy flow in the ecosystem-Types of ecosystems (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems.

UNIT-III

BIODIVERSITY AND ITS CONSERVATION:

Introduction, Definition, genetic, species and ecosystem diversity, Bio-geographical classification of India, India as a Mega-diversity Nation, Hot spots of biodiversity, Value of biodiversity, threats to biodiversity, endemic, endangered and extinct species of India, In-Situ and Ex-situ conservation of biodiversity.

UNIT-IV

ENVIRONMENTAL POLLUTION AND GLOBAL ENVIRONMENTAL ISSUES:

Natural Disasters: Droughts, Floods, Cyclone, Landslides, Earthquake,

Pollution episodes: Air pollution, Water pollution, Land pollution, Noise pollution, Automobile pollution and Nuclear pollution –Effects-Global warming, Acid Rain and Ozone layer depletion and controlling measures.

Global Environmental Issues: Population Growth, Urbanizations, Land Management, Water and Waste Water Management. Climate change and impacts on human environment

Solid Waste Management: causes, effects and control measures of Municipal solid wastes – E-waste and management, Role of an individual in prevention of pollution – pollution case studies.

UNIT-V

ENVIRONMENTAL LEGISLATION, LAWS, POLICIES FOR SUSTAINABLE DEVELOPMENT:

Environmental Legislation, Environmental Protection act – Air Prevention and Control of Pollution act–Water Prevention and control of Pollution act– Wildlife protection act – Forest conservation act – Municipal Solid Waste management, International conventions/Protocols : Earth summit, Kyoto protocol and Montreal Protocol. From Unsustainable to sustainable development, Role of NGO‘s for Sustainable development, Concepts of Green belt development, Role of IT in Environment-Remote Sensing and GIS methods for Sustainable development.

Field work- visit to a local area to document environmental assets-river forest grassland/hill, mountain and polluted sites (urban/rural/industrial/Agriculture) - study simple ecosystems (pond/river/hill slopes)

TEXT BOOKS

1. *A Text book on Environmental Sciences* by Kaushik A and Kaushik C P 5th edition, New age international publishers, 2015.
2. *Text Book of Environmental Science and Technology* by Anji Reddy M, BS Publications, 2007.

REFERENCES

1. *Environmental Studies,* Anil Kumar and Arnab Kumar De, New Age International Publishers, New Delhi, 3rd Edition 2015.
2. *Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards*, R.K. Trivedi, Vol. I and II, Enviro Media.
3. *Environmental Studies* by Mukkanthi K, S.Chand Publishers, 2010.
4. *Environmental Studies-From Crisis to Cure*, Rajagopalan.R Oxford University Press, 2005.
5. *Text Book of Environmental Studies*, Erach Bharucha, University Grants Commission, University Press (India) Pvt. Ltd., Hyderabad, 2010.

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(16CS505) ADVANCED DATA STRUCTURES THROUGH C++

COURSE OBJECTIVES

1. *This course is aimed to provide basic understanding of different data structures andalgorithms.*
2. *This Course covers C++, C++ features, various types of trees, graphs and their implementation and hashing.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the basic concepts of Class, Object, Constructor, method.*
2. *Analyze the generic programming concepts*
3. *Understand and draw the different trees like binary tree, selection tree*
4. *Understand the graph operations and implement basic operations on graphs.*
5. *Implement hash and heap concepts*
6. *Understand and implement B-tree and AVL trees.*

UNIT- I

C++ Class Overview: Class definition, Objects, class members, Access control, Class scope, Constructors and Destructors, Parameter passing methods, Inline functions, Static class members, This pointer, Friend functions, Dynamic memory allocation and De-allocation (new and delete), Exception handling.

UNIT- II

Function Over Loading, Operator Overloading, Generic Programming-Function and class templates, Inheritance basics, Base and derived classes, Inheritance types, Base class access control, Runtime polymorphism using virtual functions, abstract classes, streams I/O.

UNIT- III

Trees: Introduction, Representation of Trees, Binary Trees, Binary Tree Traversal, Threaded Binary Trees, Binary Search Trees, Selection Trees. **Graphs**: Introduction- Graph terminologies-Representation of graphs, Operations on Graphs, graph traversals,Applications of graph.

UNIT- IV

Dictionaries: Definition, Hash Table Representation, Static and Dynamic Hashing, Skip List Representation.

Priority Queues: Definition and Applications, Leftist Trees, Binomial Heaps, Fibonacci Heaps, Pairing Heaps.

UNIT- V

Efficient Binary Search Trees: Optimal Binary Search Trees, AVL Trees, Red – Black Trees, Splay Trees.

Multiway Search Trees: M – way Search Trees, B – Trees, B+ Trees

TEXT BOOKS

1. Fundamentals of Data Structures in C++ by Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, Universities Press, Second Edition.
2. Data structures and Algorithms using C++, Ananda Rao Akepogu and Radhika Raju Palagiri, Pearson Education.

REFERENCES

1. Data structures and Algorithms in C++, Michael T.Goodrich,R.Tamassia and .Mount, Wiley student edition, John Wileyand Sons.
2. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education.Ltd., Second Edition.
3. Data structures and algorithms in C++, 3rd Edition, Adam Drozdek, Thomson
4. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
5. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.

Data Structures using C++, D.S. Malik, Cengage Learning, India Edition

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(16CS506) DIGITAL LOGIC DESIGN

COURSE OBJECTIVES

The objectives of this course:

1. *To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.*
2. *To prepare students to perform the analysis and design of various digital electrnic circuits.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Compare various Number systems and implement Boolean Algebra operations*
2. *Design and implement Combinational and Sequential logic circuits*
3. *Implement Analog to Digital conversion and Digital to Analog conversion*
4. *Design and develop sequential logic circuits*
5. *Understand the working of logic families and logic gates*
6. *Implement the given logical problem using PLDs*

UNIT- I

Binary systems and Boolean algebra:

Digital Systems, Binary Numbers, Number Base Conversions, Octa land Hexa decimal Numbers, Complements, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Axiomatic Definition of Boolean Algebra, Basic Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates.

UNIT- II

Gate–Level Minimization: The Map Method, Four Variable Map, Five-Variable Map, Product of Sums Simplification, Don_t-Care Conditions, NAND and NOR Implementation, Other Two Level Implementations, EX-OR Function, Tabular Minimization method.

UNIT- III

Combinational Logic: Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, De-Multiplexers.

UNIT- IV

Synchronous Sequential Logic: Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Design Procedure, Registers, Shift Registers, Ripple counters, Synchronous counters, Ring Counter and Johnson Counter.

UNIT- V

Memory And Programmable Logic: Random access memory, memory decoding, Error Detection and Correction, Read-only Memory, Programmable Logic Array, Programmable Array Logic, Sequential Programmable Devices, Integrated circuits.

TEXT BOOKS

1. Digital Design, M.Morris Mano, Micheal D.Ciletti, 5 th Edition, 2013, Pearson.

REFERENCES

1. Digital Logic & State Machine Design, David J. Comer, Oxford University Press, 3rd Reprinted Indian Edition, 2012.
2. Digital Logic Design, R.D.Sudhakar Samuel, Elsevier Fundamentals of Logic Design, 5/e, Roth, Cengage

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(16CS507) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

COURSE OBJECTIVES

1. *To train the students thoroughly in Mathematical concepts of Mathematical logic, Relations, Algebraic structures, Recurrence Relation, Graph Theory.*
2. *To prepare students for lifelong learning and successful careers using mathematical concepts of Mathematical logic, Relations, Algebraic structures, Recurrence Relation, Graph Theory.*
3. *To develop the skill pertinent to the practice of the mathematical concepts including the students abilities to formulate and modeling the problems, to think creatively and to synthesize information.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Familiar with the methods of mathematics logics studied in logic has become important because various areas such as software engineering, mathematical biology and physics.*
2. *Understand and apply the power of discrete math to digital computer systems and other modern applications.*
3. *Understand combinatorics has an incredible amount of application of computer science.*
4. *Apply the Pigeonhole principle in different problems .*
5. *Solve a recurrence relation and find a resulting formula for a sequence given a set of initial conditions*
6. *Study Graph theoretical ideas are highly utilized by computer science application.*

UNIT-I

Mathematical Logic:

Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Quantifiers, universal quantifiers

Predicates:

Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of Contradiction, Automatic Theorem Proving.

UNIT-II

Relations: Properties of Binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram.

Functions: Inverse Function, Composition of functions, recursive Functions, Lattice and its Properties.

Algebraic structures: Algebraic systems examples and general properties, Semi groups and monads, groups, sub groups homomorphism, Isomorphism.

UNIT-III

Elementary Combinatorics:

Basis of counting, Enumerating Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion. Pigeon hole principles and its application

UNIT-IV

Recurrence Relation:

Generating Functions & Sequences, Calculating Coefficient of generating function, Recurrence relations, Solving Recurrence relation by substitution and Generating functions. Characteristic roots, solution of Inhomogeneous Recurrence Relation.

UNIT-V

Graph Theory:

Representation of Graph, DFS, BFS, Spanning Trees, planar Graphs

Graph Theory Applications: Basic Concepts Isomorphism and Sub graphs, Multi graphs andEuler circuits, Hamiltonian graphs, Chromatic Numbers

TEXT BOOKS

1. Elements of Discrete Mathematics- A Computer Oriented Approach, C.L.Liu, D.P. Mohapatra, 3/e, TMH.
2. Discrete Mathematics for Computer Scientists & Mathematicians, 2/e, J.L.Mott, A. Kandel, T.P. Baker, PHI

REFERENCES

1. Discrete Mathematical Structures with Application to Computer Science, Tremblay, Manohar McGraw Hill Publication
2. Discrete and Combinatorial Mathematics- An Applied Introduction, Ralph.P. Grimaldi,5/e, Pearson Education.
3. Discrete Mathematical Structures, Bernand Kolman, Robert C. Busby, Sharon CutlerRoss, PHI/ Pearson Education.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
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II B. Tech –I Sem. (CSE)

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(16EE207) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE OBJECTIVES

Basic Electrical Engineering contains basic Electrical Laws, Network theorems, AC & DC generators and motors which are widely used in industry are covered and their performance aspects will be studied.

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Student will gain various LAWs and principles associated with electrical systems.*
2. *Understand the various network theorems and analyze the various parameters for port networks*
3. *Understand and apply principles and operations of DC motors*
4. *Identify different types of semiconductor devices*
5. *Understand the characteristics of BJT and FET*
6. *Understand the various oscillators.*

UNIT – I INTRODUCTION TO ELECTRICAL ENGINEERING

Ohm‘s Law, Basic Circuit Components, Kirchhoff‘s Laws, Types of Sources, Resistive Networks, Inductive Networks, Capacitive Networks, Series Parallel Circuits, Star Delta and Delta Star Transformation. Principle of AC Voltages, Root Mean Square and Average Values of Alternating Currents and Voltage, Form Factor and Peak Factor, Phasor Representation of Alternating Quantities.

UNIT- II NETWORK THEOREMS & TWO PORT NETWORKS

Network Theorems: Thevenin‘s, Norton‘s, Maximum Power Transfer, Reciprocity and Superposition Theorems for DC Excitations.

Two Port Networks: Two Port Network Parameters – Impedance, Admittance, Transmission and Hybrid Parameters and Their Relations.

UNIT-III DC MOTORS and TRANSFORMERS

DC Motors: Principle of Operation of DC Motors, Types of DC Motors, Torque Equation, Losses and Efficiency Calculation in DC Motor- Swinburne‘s Test and Applications.

Transformers: Principles of Operation, EMF equation, Losses and Efficiency, Regulation of Transformer, Testing: OC & SC Tests.

Outcomes:

After going through this course the student gets a thorough knowledge on basics of Network theorems, Two port networks, DC Motors and Transformers with which he/she can able to apply the above conceptual things to real-world problems and applications.

TEXT BOOKS

1. Basic Electrical Engineering - By M.S.Naidu and S. Kamakshiah – TMH.
2. Basic Electrical Engineering –By T.K.Nagasarkar and M.S. Sukhija Oxford University Press.

REFERENCES

1. Theory and Problems of Basic Electrical Engineering by D.P.Kothari & I.J. Nagrath PHI.
2. Principles of Electrical Engineering by V.K Mehta, S.Chand Publications.
3. Fundamentals of Electrical Electronics Engineering by T.Thyagarajan, SCITECH Publications 5th Edition-2007
4. Electrical and Electronic Technology-By Hughes – Pearson Education.

PART-B

UNIT I

Semiconductor Devices: Intrinsic semiconductors-Electron-Hole Pair Generation, Conduction in Intrinsic Semiconductors, Extrinsic Semiconductors-N-Type and P-Type Semiconductors, Comparison of N-Type and P-Type Semiconductors. The p-n Junction – Drift and Diffusion Currents, The p-n Junction Diode-Forward Bias, Reverse Bias, Volt- Ampere Characteristics- Diode Specifications, Applications of Diode, Diode as a Switch. Diode as a Rectifier-Half-wave Rectifier, Full-Wave Rectifier, Full-Wave Bridge Rectifier, Rectifiers with Filters, Zener Diode- Volt-Ampere Characteristics, Zener Diode as Voltage Regulator.

UNIT II

BJT and FETs: Bipolar Junction Transistor (BJT) – Types of Transistors, Operation of NPN and PNP Transistors, Input-Output Characteristics of BJT-CB, CE and CC Configurations, Relation between I_C, I_B and I_E. Transistor Biasing- Fixed Bias, Voltage Divider Bias, Transistor Applications- Transistor as an Amplifier, Transistor as a Switch,. Junction Field Effect Transistor (JFET)- Theory and Operation of JFET, Output Characteristics, Transfer Characteristics, Configurations of JFET-CD, CS and CG Configurations, JFET Applications-JFET as an Amplifier, JFET as a Switch, Comparison of BJT and JFET,MOSFET-The Enhancement and Depletion MOSFET, Static Characteristics of MOSFET, Applications of MOSFET.

UNIT III

Oscillators and Op-Amps: Sinusoidal Oscillators, Barkhausen Criteria for Oscillator Operation, Components of an Oscillator-Transistor Amplifier Circuits, Feedback Circuits and Oscillator Circuits, Classification of Oscillators, LC Tuned, RC Phase Shift Oscillator circuits.
Operational Amplifiers(Op-Amps)-Symbol of an Op-Amp, single Input and Dual Input Op-Amps(Differential Amplifier), Characteristics of an Ideal Op-Amp, Basic Forms of Op- Amps-Inverting & Non-Inverting Amplifiers, Applications of Op-Amps, summing, Differential, Integrator, differentiator Amplifier.

TEXT BOOKS

1. Basic Electrical and Electronics Engineering, M.S.Sukhija, T.K.Nagsarkar, Oxford University Press, 1st Edition, 2012.
2. Basic Electrical and Electronics Engineering, S.K Bhattacharya, Pearson Education, 2012

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
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(16CS508) ADVANCED DATA STRUCTURES THROUGH C++ LAB

COURSE OBJECTIVES

1. *This course is aimed to provide basic understanding of different data structures andalgorithms.*
2. *This Course covers C++, C++ features, various types of trees, graphs and their implementation and hashing.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Develop problems on constructor, dynamic memory allocation*
2. *Develop Exception handling and abstract classes*
3. *Implement problems on binary search tree and tree traversal techniques.*
4. *Implement problems on BFS, DFS.*
5. *Implement operations on B-Tree and hash based search*
6. *Implement AVL Tree operations*

Week 1:

a) Write a C++ program implement area of circle using constructor.
b) Write a C++ program to implement inline functions.

Week 2:

a) Write a C++ program to implement friend function and this pointer.
b) Write a C++ program to perform student marks record using dynamic memory allocation (new and delete).

Week 3:

a) Write a C++ program to implement user-defined Exceptions.
b) Write a C++ program to implement Operator Overloading.

Week 4:

a) Write a C++ program to implement the Inheritance using class templates.
b) Write a C++ program to implement static and abstract classes.

Week 5:

Write a C++ program to perform the following operations:
a) Insert an element into a binary search tree.
b) Delete an element from a binary search tree.

c) Search for a key element in a binary search tree.

Week 6:

Write C++ programs that use recursive functions to traverse the given binary tree in a) Preorder b) inorderand c) postorder.

Week7 :

Write a C++ program to implement complete binary tree using arrays.

Week8 :

Write C++ programs for the implementation of BFS and DFS for a given graph.

Week9 :

Write a C++ program to implement hash based search.

Week10 :

Write a C++ program to perform the following operations
a) Insertion into a B-tree b) Deletion from a B-tree

Week11 :

Write a C++ program to perform the following operation
a) Insertion into an AVL-tree

Week12 :

Write a C++ program to implement all the functions of a dictionary (ADT) using hashing.

(Note: Use Class Templates in the above Programs)

TEXT BOOKS

1. Data structures and Algorithms using C++, AnandaRaoAkepogu and RadhikaRajuPalagiri, Pearson Education.
2. Data Structures A Pseudocode Approach with C++, India Edition, R.F.Gilberg and B.A.Forouzan, Cengage Learning.
3. Programming Principles and Practice using C++, B.Stroustrup,Addison-Wesley(Pearson education).
4. Data Structures and STL, W.J.Collins, McGrawHill,International edition.
5. Data structures and Algorithms with OODesign patterns in C++,B.R.Priess,John Wiley& sons. The Art,Philosophy, and Science of OOP with C++,Rick Miller,SPD

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(16EE208) ELECTRICAL AND ELECTRONICS ENGINEERING LAB

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Experimentally verify the basic circuit theorems*
2. *Measure power and power factor in ac circuits*
3. *Design and experiment potential divider circuits.*
4. *Verify the theoretical characteristics of diodes, transistors, O-Pamps and digital electronic components experimentally*
5. *Implement and analyze various circuits viz. Rectifiers, Voltage Regulators, Amplifier circuits, OpAmp based linear & nonlinear circuits*
6. *Verification of Logic Gates AND, OR, NOT, NAND, NOR, EXOR, EXNOR.*

PART – A

BASIC ELECTRICAL ENGINEERING LAB

PART- A : ELECTRICAL LAB

1. Verification of Superposition Theorem.
2. Verification of Thevenin‘s Theorem.
3. Determination of Open circuit and Short circuit parameters
4. Swinburne‘s Test on DC Shunt Machine (Predetermination of Efficiency of a Given DC Shunt Machine Working as Motor and Generator).
5. Brake Test on DC Shunt Motor. Determination of Performance Characteristics.
6. OC & SC Tests on Single-Phase Transformer (Predetermination of Efficiency and Regulation at Given Power Factors).

PART – B

ELECTRONICS LABORATORY

(Any Six Experiments)

1. P-N Junction Diode and Zener Diode Volt-Ampere Characteristics.
2. Bipolar Junction Transistor in CB Configuration-Input and Output Characteristics, Computation of α.
3. Half-Wave Rectifier- a) Without Filter b) With Capacitor Filter.
4. Full-Wave Rectifier- a) Without Filter b) With Capacitor Filter.
5. Bipolar Junction Transistor in CE Configuration-Input and Output Characteristics, Computation of β.
6. Junction field effect Transistor in Common Source Configuration Output and Transfer Characteristics.
7. Verification of Logic Gates- AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.

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(COE-1) COMPREHENSIVE ONLINE EXAMINATION -I

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(16CS538) ETHICAL HACKING

COURSE OBJECTIVES

1. *This course will function as an introduction to ethical hacking mechanisms.Students will understand about social engineering and types of attacks.*
2. *Students will begin by understanding how perimeter defenses work and then be leadinto scanning and attacking their own networks, no real network is harmed.*
3. *Students then learn how intruders escalate privileges and what steps can be taken tosecure a system.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand how intruders escalate privileges.*
2. *Understand Intrusion Detection, Policy Creation, Social Engineering, Buffer Overflows and different types of Attacks and their protection mechanisms.*
3. *Assess an computing environment using foot printing*
4. *Identify methods to gain access to systems for the purpose of security*
5. *Examine the tools for conducting ethical hacking*
6. *Acquire the knowledge about ethical laws and tests.*

UNIT- I

ETHICAL HACKING: Types of Data Stolen From the Organizations, Elements of Information Security, Authenticity and Non-Repudiation, Security Challenges, Effects of Hacking, Hacker – Types of Hacker, Ethical Hacker, Hacktivism - Role of Security and Penetration Tester, Penetration Testing Methodology, Networking & Computer Attacks – Malicious Software (Malware), Protection Against Malware, Intruder Attacks on Networks and Computers, Addressing Physical Security – Key Loggers and Back Doors.

UNIT- II

FOOT PRINTING AND SOCIAL ENGINEERING: Web Tools for Foot Printing, Conducting Competitive Intelligence, Google Hacking, Scanning, Enumeration, Trojans & Backdoors, Virus & Worms, Proxy & Packet Filtering, Denial of Service, Sniffer, Social Engineering – shoulder surfing, Dumpster Diving, Piggybacking.

UNIT-III

DATA SECURITY: Physical Security – Attacks and Protection, Steganography – Methods, Attacks and Measures, Cryptography – Methods and Types of Attacks, Wireless Hacking, Windows Hacking, Linux Hacking.

UNIT- IV

NETWORK PROTECTION SYSTEM & HACKING WEB SERVERS: Routers, Firewall & Honeypots, IDS & IPS, Web Filtering, Vulnerability, Penetration Testing, SessionHijacking, Web Server, SQL Injection, Cross Site Scripting, Exploit Writing, Buffer Overflow, Reverse Engineering, Email Hacking, Incident Handling & Response, Bluetooth Hacking, Mobiles Phone Hacking.

UNIT- V

ETHICAL HACKING LAWS AND TESTS : An introduction to the particular legal, professional and ethical issues likely to face the domain of ethical hacking, ethical responsibilities, professional integrity and making appropriate use of the tools and techniques associated with ethical hacking – Social Engineering, Host Reconnaissance, Session Hijacking, Hacking - Web Server, Database, Password Cracking, Network and Wireless, Trojan, Backdoor, UNIX, LINUX, Microsoft, NOVEL Server, Buffer Overflow, Denial of Service Attack, Methodical Penetration Testing.

TEXT BOOK

1. Michael T. Simpson, Kent Backman, James E. ‒Corley, Hands-On Ethical Hacking and Network Defense‖, Second Edition, CENGAGE Learning, 2010.

REFERENCES

1. Steven DeFino, Barry Kaufman, Nick Valenteen, ‒Official Certified Ethical Hacker Review Guide‖, CENGAGE Learning, 2009-11-01
2. Patrick Engebretson, ‒The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy‖, Syngress Basics Series – Elsevier, August 4, 2011.
3. Whitaker & Newman, ‒Penetration Testing and Network Defense‖, Cisco Press, Indianapolis, IN, 2006.

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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
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(16HS613) PROBABILITY & STATISTICS

COURSE OBJECTIVES

1. *To train the students thoroughly in Mathematical concepts fundamentals of probability, test of hypothesis, Test of significance and ANOVA*
2. *To prepare students for lifelong learning and successful careers using mathematical concepts of probability, test of hypothesis, Test of significance and ANOVA*
3. *To develop the skill pertinent to the practice of the mathematical concepts including the Student abilities to formulate and modeling the problems, to think creatively and to Synthesize information*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Predict various probabilistic situations based on various laws of probability and random variables.*
2. *Distinguish among the criteria of selection and application of Binomial, Poisson, Normal and Gamma distributions.*
3. *Apply sample test like Z-test for decision making regarding the population based on sample data.*
4. *To analyse the relationship between two or more groups at the same time.*
5. *Apply various sample tests like t-test, F-test and $\chi 2$ -test for decision making regarding the population based on sample data.*
6. *Apply Quality control Techniques to attain productivity optimization*

UNIT- I

Probability: Introduction, Conditional probability – Baye‘s theorem, Random variables – Discrete and continuous Distributions, Expectation, Varience, Moments, Moment generating functions

UNIT- II

Distributions-Binomial, Poisson, Normal, Uniform, Exponential and Gamma distributions – Related properties and applications

UNIT- III

Test of Hypothesis: Population and Sample, Confidence interval of mean from Normal distribution, Null and Alternative hypothesis, Level of significance

Test of significance: Test based on normal distribution, Z test for means and proportions, Small samples t- test for one sample and two sample problem and paired t-test, F-test and Chi-square test (testing of goodness of fit and independence).

UNIT- IV

Analysis of variance one way classification and two way classification (Latin square Design and RBD)

UNIT- V

Statistical Quality Control: Concept of quality of a manufactured product -Defects and Defectives - Causes of variations - Random and assignable - The principle of Shewhart Control Chart-Charts for attribute and variable quality characteristics- Constructions and operation of X- bar Chart, R-Chart, P-Chart and C-Chart.

TEXT BOOKS

1. *Statistical methods* by S.P. Gupta, S.Chand publications.
2. *Probability & Statistics* by T.K.V. Iyengar, S.Chand publications.

REFERENCES

1. *Probability & Statistics* by E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.
2. *Probability & Statistics for engineers* by Dr. J. Ravichandran WILEY-INDIA publishers.
3. *Probability & Statistics for Science and Engineering* by G.ShankerRao, Universities Press.
4. *Probability and Statistics for Engineering and Sciences* by Jay L.Devore, CENGAGE.
5. *Probability and Statistics* by R.A. Jhonson and Gupta C.B.

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(16CS509) OBJECT ORIENTED PROGRAMMING

COURSE OBJECTIVES

1. *Study the syntax, semantics and features of Java Programming Language*
2. *Learn the method of creating Multi-threaded programs and handle exceptions*
3. *Learn Java features to create GUI applications & perform event handling*
4. *Learn basics of Java Data Base Connectivity*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the basics of JAVA like data types ,variables, operators, statements.*
2. *Understand and analyze the concepts of methods , inheritance and packages.*
3. *Create own Exceptions and handle Exceptions.*
4. *Understand the multi thread, thread priorities concepts.*
5. *Develop Applet class and AWT Controls*
6. *Able to develop basic application projects and design Java Application to connect Database*

UNIT- I

The Java Language - The History and Evolution of Java – Security – Portability –Byte Code- The Java Buzzwords - An Overview of Java -Data Types Variables, and Arrays -Operators - Control Statements – Java‘s Selection Statements – Iteration Statements – Jump Statements

UNIT- II

Introducing Classes – Class Fundamentals – Declaring Objects – Introducing Methods – Constructors – Garbage Collection – Understanding static – Introducing final - Command line arguments –Varargs - Inheritance – Using Super – Method Overriding – DynamicMethod Dispatch- abstract classes – Packages and Interfaces

UNIT- III

Exception Handling – Exception Fundamentals - Exception Types -Uncaught Exceptions - Using try and catch - Nested try Statements -throw -throws –finally - Java‘s Built-in Exceptions -Creating Your Own Exception Subclasses - Chained Exceptions -Multithreaded Programming - The Java Thread Model -Thread Priorities - The Thread Class and theRunnable Interface - Creating Multiple Threads -Using isAlive( ) and join( ) - ThreadPriorities – Synchronization. String Handling.

UNIT-IV

The Applet Class – Event Handling – Two Event Handling Mechanism – The Delegation Event Model – Event Classes –Source of Events –Event Listener Interfaces - Event– Introducing the AWT - Using AWT Controls, Layout Managers, and Menus – Introducing Swing – Exploring Swing.

UNIT- V

Java.net package, basics of network programming, address ports, sockets, simple client- server program. Introduction to JDBC, java.sql package, JDBC architecture, Drivers, Connections, Statement, Prepared Statement, Example Programs.

TEXT BOOKS

1. The Complete Reference Java Eight Edition – Herbert Schildt – McGrawHill.
2. Introduction to Java programming – Y Daniel Liang – Que E & T.

REFERENCES

1. Java for Programmers, P.J. Deitel and H.M. Deitel, Pearson education (OR) Java: How to Program P.J. Deitel and H.M. Deitel, PHI.
2. Thinking in Java, Bruce Eckel, Pearson Education

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(16CS510) COMPUTER ORGANIZATION

COURSE OBJECTIVES

1. *To learn the fundamentals of computer organization and its relevance to classical andModern problems of computer design*
2. *To make the students understand the structure and behavior of various functionalmodules of a computer.*
3. *To understand the techniques that computers use to communicate with I/O devices.*
4. *To study the concepts of pipelining and the way it can speed up processing.*
5. *To understand the basic characteristics of multiprocessors*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the design of the various functional units and components of computers.*
2. *Define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.*
3. *Understand addressing modes, instruction formats and program control statements*
4. *Distinguish the organization of various parts of a system memory hierarchy*
5. *Analyze hardware requirements for cache memory and virtual memory*
6. *Describe various data transfer techniques in digital computer and the I/O interfaces*

UNIT-I

Basic Structure of Computers : Functional Units -Basic Operational Concepts - Assembly Language - Basic I/O Operations -Bus Structures - Instruction Cycle - Memory Reference Instructions - Data Transfer, Data Manipulation and Program Control- Addressing Modes.

UNIT-II

Arithmetic Unit: Addition and Subtraction ofSigned Numbers - Multiplication Algorithms- Signed Operand Multiplication and Fast Multiplication -Integer Division- Floating Point Numbers and Operations-Decimal Arithmetic unit.

UNIT-III

Basic Processing Unit: Register Transfer Language - Register Transfer - Bus and Memory Transfers -Arithmetic Micro operations-Logic Micro operations - Shift Micro operations- Hardwired Control - Micro Programmed Control - Address Sequencing.

UNIT-IV

Memory System: Basic Concepts -Memory Hierarchy - Main Memory - Auxiliary Memory - Cache Memories-Virtual Memory- Memory Management Requirements - Secondary Storage.

UNIT-V

I/O Organization: Parallel Processing - Pipelining - Multiprocessor - Interconnection Structures – Inter Processor Arbitration – Inter Processor Communication and Synchronization -Direct Memory Access (DMA)-Standard I/O Interfaces (PCI, SCSI and USB).

TEXT BOOKS

1. Computer Organization‖, Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Mcgraw- Hill, Fifth Edition, Reprint 2012.
2. Computer Systems Organization and Architecture‖, John D. Carpinelli, PEA, 2009.
3. Computer Systems Architecture‖, 3/e, M. Moris Mano, PEA, 2007.

REFERENCES

1. William Stallings, –Computer Organization and Architecture‖, Pearson Education, 7/e, 2006.
2. David A. Patterson and John L. Hennessy, –Computer Architecture- A Quantitative Approach‖, Elsevier, A Division of Reed India Private Limited, Fifth Edition, 2012.
3. John P. Hayes, –Computer Architecture and Organization‖, Tata Mcgraw Hill, 3/e, 1998.
4. Computer Systems Architecture a Networking Approach‖, 2/e, Rob Williams.
5. Computer Organization and Architecture‖ Ghoshal, Pearson Education, 2011.

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(16CS511) DATABASE MANAGEMENT SYSTEMS

COURSE OBJECTIVES

1. *To provide the student with clear conceptual understandings related to databases.*
2. *After this course, the student should gain knowledge in the relational model, SQL, database design storage & indexing, failure recovery and concurrency control.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the basic concepts of DBMS and its commands.*
2. *Design the databases using ER method for a given specification of requirements.*
3. *Apply Normalization techniques on given database.*
4. *Determine the transaction atomicity, consistency, isolation, and durability for a given transaction processing system.*
5. *Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.*
6. *Understand indexing like Tree structured, hash based indexing*

UNIT-I

Introduction-Database System Applications, Purpose of Database Systems, View of Data - Data Abstraction, Instances and Schemas, Data Models, Database Languages - DDL, DML, Database Architecture, Database Users and Administrators, History of Data base Systems.

Introduction to Data base design , ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises.

Relational Model: Introduction to the Relational Model - Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design,Introduction to Views Destroying/ altering Tables and Views.

UNIT-II

Relational Algebra and Calculus: Relational Algebra - Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus - Tuple relational Calculus - Domain relational calculus - Expressive Power of Algebra and calculus.

Form of Basic SQL Query - Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries, Set - Comparison Operators, Aggregate Operators, NULL values - Comparison using Null values - Logical connectives - AND, OR and NOT - Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT-III

Introduction to Schema Refinement - Problems Caused by redundancy, Decompositions - Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal

Forms - FIRST, SECOND, THIRD Normal forms - BCNF - Properties of Decompositions - Loss less join Decomposition, Dependency preserving Decomposition, Schema Refinementin Data base Design - Multi valued Dependencies - FOURTH Normal Form, Join Dependencies, FIFTH Normal form, Inclusion Dependencies.

UNIT-IV

Transaction Management - Transaction Concept - Transaction State - Implementation of Atomicity and Durability - Concurrent - Executions - Serializability - Recoverability - Implementation of Isolation - Testing for serializability.

Concurrency Control - Lock - Based Protocols - Timestamp Based Protocols - Validation - Based Protocols - Multiple Granularity.

Recovery System-Failure Classification-Storage Structure-Recovery and Atomicity - Log - Based Recovery - Recovery with Concurrent Transactions - Buffer Management - Failure with loss of nonvolatile storage - Advance Recovery systems - Remote Backup systems.

UNIT-V

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing - Clustered Indexes, Primary and Secondary Indexes, Index data Structures - Hash Based Indexing, Tree based Indexing, Comparison of File Organizations.

Tree Structured Indexing: Intuitions for tree indexes, Indexed Sequential Access Methods(ISAM) B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendible vs. Linear Hashing.

TEXT BOOKS

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, McGrawHillEducation, 3rd Edition, 2003.
2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw Hill, VIedition, 2006.

REFERENCES

1. Database Systems, 6th edition, RamezElmasri, Shamkat B. Navathe, Pearson Education,2013.
2. Database Systems Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.
3. Introduction to Database Systems, C.J. Date, Pearson Education.
4. Database Management Systems, G.K. Gupta, McGrawHill Education.

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(16CS512) OPERATING SYSTEMS

COURSE OBJECTIVES

1. *To make the students understand the basic operating system concepts such as processes, threads, scheduling, synchronization, deadlocks, memory management,file and I/O subsystems and protection.*
2. *To get acquaintance with the class of abstractions afford by general purposeoperating systems that aid the development of user applications.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Describe the important computer system resources and the role of operating system in their management policies and algorithms.*
2. *Understand the process management policies and scheduling of processes by CPU.*
3. *Analyze the requirement for process synchronization and coordination handled by operating system.*
4. *Describe and analyze the memory management and its allocation policies.*
5. *Categorize the storage management policies with respect to different storage management technologies*
6. *Criticize the need for special purpose operating system with the advent of new emerging technologies.*

UNIT-I

Introduction to OS: What Operating Systems do?, Computer System Organization, Computer System Architecture, Uni programming and Multi Programming, Process Management, Memory Management, Storage Management, Distributed Systems, Special- Purpose Systems, Computing Environments.

System Structures: Operating Systems Services, System Calls, Types of System Calls, System Programs, Operating Systems Structures.

UNIT-II

Process Management: Process Concept, Process Scheduling, Operations on Processes, Inter-Process Communication (IPC).

Process Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms-FCFS,SJF, Priority, Round Robin, Operating Systems Examples.

Introduction to Threads: Single and Multithreaded Process, Benefits, Multithreading Models, Threading Issues.

UNIT- III

Process Coordination: Synchronization, Background, The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Monitors.

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlocks, Operating Systems Examples.

UNIT-IV

Memory Management: Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation.

Virtual Memory Management: Background, Demand Paging, Page Replacement, PageReplacement Algorithms- FIFO, Optimal, LRU, allocation of Frames, Thrashing, Operating Systems Examples.

File Systems: File Concepts, Directory Concepts, File System Implementation- Implementation of Files, Implementation of Directories, Shared Files.

UNIT- V

Protection & Security: Protection: Definition, Protection Mechanisms, Protection Domains, Protection Matrix, Access Control Lists, Capabilities, Various Authentication Techniques, Insider attacks.

Security: Threats, Intruders, Accidental Data Loss, Basics of Cryptography- Secret Key and Public Key Cryptography, One-Way Functions, Digital Signatures, Trusted Platform Module.

TEXT BOOKS

1. Operating System Concepts- Abraham Silberschatz, Peter B. Galvin, Greg Gagne-8thEditon- Wiley Indian Edition (Units: 1,2,3.4th 1st Part).
2. Modern Operating Systems- Andrew S. Tenenbaum- 3rd Edition- Eastern EconomyEdition.

REFERENCES

1. Operating Systems- A Concept Based Approach- D.M.Dhamdhere- 2nd Edition-TMH.
2. Operating Systems: Internals and Design Principles- Stallings- 6th Edition- PearsonEducation.
3. Operating Systems- S.Haldar, A.A.Aravind- Pearson Education.
4. Principles of Operating Systems- B.L.Stuart- Cengage Learning, India Edition.
5. An Introduction to Operating Systems- P.C.P.Bhatt- PHI.

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(16CS513) OBJECT ORIENTED PROGRAMMING LAB

COURSE OBJECTIVES

1. *Study the syntax, semantics and features of Java Programming Language*
2. *Learn the method of creating Multi-threaded programs and handle exceptions*
3. *Learn Java features to create GUI applications & perform event handling*
4. *Learn basics of Java Data Base Connectivity*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Solve basic mathematical problems using object oriented concepts.*
2. *Understand and solve the problems on date, time and thread.*
3. *Write efficient programs to perform multitasking and exception handling.*
4. *Develop GUI Components.*
5. *Implement problems on Files and its operations*
6. *Develop Java applications to connect database.*

Week-1:

1. Use Eclipse or Netbean 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 java program to find prime numbers between 1 to n.

Week-2:

1. Write a Java program that prints all real and imaginary solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula.
2. Write a Java program for sorting a given list of names in ascending order
3. Write a java program to accept a string from user and display number of vowels, consonants, digits and special characters present in each of the words of the given text.

Week -3:

1. Write a java program to make rolling a pair of dice 10,000 times and counts the number of times doubles of are rolled for each different pair of doubles. *Hint: Math.random()*
2. Write java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it_s not a duplicate of any number already read display the complete set of unique values input after the user enters each new value.
3. Write a java program to read the time intervals (HH:MM) and to compare system time if the system time between your time intervals print correct time and exit else try again to repute the same thing. By using String Tokenizer class.

Week-4:

1. Write a java program to split a given text file into n parts. Name each part as the name of the original file followed by .part<n> where n is the sequence number of the part file.

2. Write java program to create a super class called Figure that receives the dimensions of two dimensional objects. It also defines a method called area that computes the area of an object. The program derives two subclasses from Figure. The first is Rectangle and second is Triangle. Each of the sub class overridden area() so that it returns the area of a rectangle anda triangle respectively.

3. Write a Java program that creates three threads. First thread displays ―Good Morning‖ every one second, the second thread displays ―Hello‖ every two seconds and the third thread displays ―Welcome‖ every three seconds

Week-5:

1. Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication

2. Write a java program to find and replace pattern in given file,

3. Use inheritance to create an exception super class called Exception A and exception sub class Exception B and Exception C, where Exception B inherits from Exception A and Exception C inherits from Exception B. Write a java program to demonstrate that the catch block for type Exception A catches exception of type Exception B and Exception C

Week-6:

1. Write a java program to convert an ArrayList to an Array.

2. Write a Java Program for waving a Flag using Applets and Threads

3. Write a Java Program for Bouncing Ball (The ball while moving down has to increase the size and decrease the size while moving up)

Week-7:

1. Write a Java Program for stack operation using Buttons and JOption Pane input and Message dialog box.

2. Write a Java Program to Addition, Division, Multiplication and subtraction using JOption Pane dialog Box and Text fields

Week-8:

1. Write a Java Program for the blinking eyes and mouth should open while blinking.

2. Implement a Java Program to add a new ball each time the user clicks the mouse. Provided a maximum of 20 balls randomly choose a color for each ball.

Week-9:

1. 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 Jtable component

2. Write a 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 Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not aninteger, 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.

Week-10:

1. Write a Java Program to implement the opening of a door while opening man should present before hut and closing man should disappear.

2. Write a Java code by using JtextField to read decimal value and converting a decimal number into binary number then print the binary value in another JtextField

Week-11:

1. 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.
2. Write a Java program for handling mouse events.

Week-12:

1. Write a java program establish a JDBC connection, create a table student with properties name, register number, mark1,mark2, mark3. Insert the values into the table by using the java and display the information of the students at front end.

TEXT BOOKS

1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
2. Java The Complete Reference‖ by Herbert Schildt, TMH, 8th Edition

REFERENCES

1. Introduction to Java programming, Sixth edition, Y.Daniel Liang, Pearson Education
2. Programming in Java, Sachine
3. Big Java, 2nd edition, Cay Horstmann, Wiley Student Edition, Wiley India Private Limited.
4. Introduction to Programming with Java, J.Dean&R.Dean, McGraw Hill education.

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(16CS514) DATABASE MANAGEMENT SYSTEMS LAB

COURSE OBJECTIVES

1. *To know the components of DBMS.*
2. *To understand design of ER Diagrams and represent using Relational model.*
3. *To understand the concept of normal forms in the design of databases.*
4. *To Understand representation of retrieval of data using relational algebra andcalculus.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Develop simple database tables using a tool and implement it using SQL.*
2. *Analyze the simple Database Commands like DML, DDL.*
3. *Apply basic database operations on Employee table.*
4. *Access normalization relations of relational model using normal forms*
5. *Apply all constrains to develop a business application using cursors, triggers*
6. *Develop some sample applications like Student information system, Banking system.*

LIST OF EXPERIMENTS:

1. Practice session: Students should be allowed to choose appropriate DBMS software, install it, configure it and start working on it. Create sample tables, execute some queries, use SQLPLUS features, use PL/SQL features like cursors on sample database. Students should be permitted to practice appropriate User interface creation tool and Report generation tool.
2. A college consists of number of employees working in different departments. In this context, create two tables **employee** and **department**. Employee consists of columns empno, empname, basic, hra, da, deductions, gross, net, date-of-birth. The calculation of hra, da are as per the rules of the college. Initially only empno, empname, basic have valid values. Other values are to be computed and updated later. Department contains deptno, deptname, and description columns. Deptno is the primarykey in department table and referential integrity constraint exists between employee and department tables. Perform the following operations on the database:
   - Create tables department and employee with required constraints.
   - Initially only the few columns(essential) are to be added. Add the remaining columns separately by using appropriate SQL command
   - Basic column should not be null
   - Add constraint that basic should not be less than 5000.
   -
   -

Calculate hra, da, gross and net by using PL/SQL program.

Whenever salary is updated and its value becomes less than5000 a trigger has to be raised preventing the operation.

The assertions are: hra should not be less than 10% of basic and da should not be less than 50% of basic.

- The percentage of hra and da are to be stored separately.
- When the da becomes more than 100%, a message has to be generated and with user permission da has to be merged with basic.
- Empno should be unique and has to be generated automatically.
- If the employee is going to retire in a particular month, automatically a message has to be generated.
- The default value for date-of-birth is1jan, 1970.
- When the employees called daily-wagers are to be added the constraint that salary should be greater than or equal to5000 should be dropped.
- Display the information of the employees and departments with description of the fields.
- Display the average salary of all the departments.
- Display the average salary department wise.
- Display the maximum salary of each department and also all departments put together.
- Commit the changes whenever required and rollback if necessary.
- Use substitution variables to insert values repeatedly.
- Assume some of the employees have given wrong information about date-of- birth. Update the corresponding tables to change the value.
- Find the employees whose salary is between 5000 and 10000 but not exactly 7500.
- Find the employees whose name contains _en‘.
- Try to delete a particular deptno. What happens if there are employees in it and if there are no employees.
- Create alias for columns and use them in queries.
- List the employees according to ascending order of salary.
- List the employees according to ascending order of salary in each department.
- Use_&&‘wherever necessary
- Amount 6000 has to be deducted as CM relief fund in a particular month which has to be accepted as input from the user. Whenever the salary becomes negative it has to be maintained as1000 and the deduction amount for those employees is reduced appropriately.
- The retirement age is 60 years. Display the retirement day of all the employees.
- If salary of all the employees is increased by 10% every year, what is the salary of all the employees at retirement time.
- Find the employees who are born in leap year.
- Find the employees who are born on feb 29.
- Find the departments where the salary of at least one employee is more than 20000.
- Find the departments where the salary of all the employees is less than 20000.
-

On first January of every year a bonus of 10% has to be given to all the employees. The amount has to be deducted equally in the next 5 months. Write procedures for it.

- As a designer identify the views that may have to be supported and create views.

  As a designer identify the PL/SQL procedures necessary and create the musing cursors.

- Use appropriate Visual programming tools like oracle forms and reports, visual basic etc. to create user interface screens and generate reports.

Note: As a designer identify other operations that may be required and add to the above list. The above operations are not in order. Order them appropriately. Use SQL or PL/SQL depending on the requirement.

3. Students may be divided in to batches and the following experiments may be given to them to better understand the DBMS concepts. Students should gather the required information, draw ER diagrams, map them to tables, normalize, create tables, triggers, procedures, execute queries, create user interfaces, and generate reports.

    - Student information system
    - APSRTC reservation system
    - Hostel management
    - Library management
    - Indian Railways reservation
    - Supermarket management
    - Postal system
    - Banking system
    - Courier system
    - Publishing house system

REFERENCES

1. Learning Oracle SQL and PL/SQL‖, Rajeeb C. Chatterjee,PHI.
2. Oracle Database11g PL/SQL Programming‖,M.McLaughlin,TMH.
3. Introduction to SQL‖,RickF.VanderLans, Pearson education.

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(16CS515) OPERATING SYSTEMS LAB

COURSE OBJECTIVES

1. *To understand the services provided by and to design an operating system.*
2. *To understand what a process is and how processes are scheduled.*
3. *To understand what a process is and how processes are synchronized*
4. *To understand different approaches to memory management.*
5. *To understand the structure and organization of the file system.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand and implement basic services and functionalities of the operating system using system calls*
2. *Implement modern operating system calls and synchronization libraries in software/ hardware interfaces*
3. *Develop algorithm for deadlock avoidance, detection and file allocation strategies*
4. *Analyze and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, and Priority*
5. *Implement memory management schemes and page replacement schemes*
6. *Produce algorithmic solutions to process synchronization problems*

1. Simulate the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority
2. Simulate all file allocation strategies
   a) Sequential b) Indexed c) Linked
3. Simulate all File Organization Techniques
   a) Single level directory b) Two level c) Hierarchical d) DAG
4. Simulate Bankers Algorithm for Dead Lock Avoidance.
5. Simulate Bankers Algorithm for Dead Lock Prevention.
6. Simulate the following page replacement algorithms
   a) FIFO b) LRU c) LFU
7. Simulate Paging Technique of memory management.
8. Write a program to implement protection access matrix using
   I. Access Control List (ACL)
   II. Capability List (CL)

9. Write a program to implement Dining Philosophers problem using
    I. Semaphors
    II. Monitors
10. Write a program to implement petersons solution for critical section problem
11. Write a program to implement Inter process communication using
    I. Direct Method
    II. In-Direct Method
12. Write a program to simulate contiguous memory allocation technique with

    I. Fixed partition
    II. Variable Partition

TEXT BOOKS

1. Operating System Concepts- Abraham Silberschatz, Peter B. Galvin, Greg Gagne- 8thEditon- Wiley Indian Edition (Units: 1,2,3.4th 1st Part).
2. Modern Operating Systems- Andrew S. Tenenbaum- 3rd Edition- Eastern EconomyEdition.

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(COE-II) COMPREHENSIVE ONLINE EXAMINATION -II

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(16HS614) COMPREHENSIVE SOFT-SKILLS
(Common to All Branches)

Course Description:
Soft Skills is an intangible idea in which the qualities like attitude, ability, integrity, reliability, positivity, flexibility, dependability, punctuality, management, cooperation, habits and practices are combined proficiently to capitalize on a person's work efficacy. Soft Skills do the work of combining all these components in accurate share into skills and shaping theminto competencies. Companies opt for, maintain and prop up persons, who are trustworthy, ingenious, principled and good communicators and who are prepared to work under stress. These lessons are developed with a view to create awareness of the importance of the soft skills and assist the learners to improve them.

COURSE OBJECTIVES
The main objectives of this course are:

1. *To help the students understand interpersonal skills.*
2. *To support them in building interpersonal skills.*
3. *To enhance the ability to work with others.*

COURSE OUTCOMES

1. *To know the importance of Soft Skills.*
2. *To apply Soft Skills in the different environment.*
3. *To enrich the different levels of Soft Skills to develop their personality.*

UNIT I:
Non verbal Communication – Body Cues – Smiling, Posture, Gesture, Eye-contact – Stage appearance –Interpersonal and Intrapersonal skill Telephonic Etiquette – Dos and Don'ts of Telephonic Conversation

UNIT II:
Self exploration – Self Discovery – Self acceptance – Self esteem – Self confidence – Personal grooming – Attitudes – Confidence building. Interpersonal relationship in the present context – Kinds of relationships – Team building – Formation of team

UNIT III:
Vision and Goal setting – Personal goal – Career goal – Types of Organization – Deep dive of company profiles – Win-win situation – Proactive skills – Entrepreneurial skills and model start-ups- Developing Mind skills – quizzes – General knowledge – Puzzles – Reading

Comprehension - Spell Bee - Seminar – Who is who? – Biographies

UNIT IV:

Flight Leadership: Assessing Leadership qualities – Experiential learning of leadership skills exercise in team work Time and Stress Management: Importance of Time Management – The art of prioritizing and scheduling – Stress and Source of Stress Types of Stress – Managing stress

UNIT V:

Change: Coping skills – Critical and Adaptive Mindsets – Changes in Career/ Life/ people – Just A Minute – Mock GDs and Mock Interviews

REFERENCES

1. *Business Communication*, Aruna Koneru
2. *Effective Tech Communication*, Rizvi, Tata McGraw – Hill Education, 2007.
3. *Reading Extra*, Liz Driscoll, Cambridge University Press, 2004.
4. *Speak Well*, Jayashree Mohanraj et al, Orient Blackswan, 2013.

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(16CS516) UNIX & SHELL PROGRAMMING

COURSE OBJECTIVES

This course is to provide a comprehensive introduction to Shell Programming

COURSE *OUTCOMES*

On successful completion of this course, the student will be able to

1. *Understand the basic set of commands and editors in Linux operating system*
2. *Identify and use UNIX/Linux utilities to create and manage simple file processing operations, organize directory structures with appropriate security, and develop shell scripts to perform more complex tasks.*
3. *Work with filters, pipes and user communication, ViEditor commands*
4. *Execute various commands related to regular expressions*
5. *Comprehend technical documentation, prepare simple readable user documentation and adhere to style guidelines using korn shell programming*
6. *Execute commands related to C shell and Collaborate in teams on system tasks.*

UNIT I

The UNIX Environment, Unix structure, Accessing UNIX, common and useful commands. The Vi Editor – Concepts, Modes and Commands. File Systems – File names and types, regular files and Directories and their implementation. Operations on directories, files and on both. Security levels, Changing permissions, Ownership and group

UNIT II

Shells- UNIX Session, standard streams, redirection, pipes tee Command, Command Execution and Substitution, Command-Line Editing, job control, Aliases, Variable Types and options, Shell Customization. Filters and Pipes – related Commands. Commands for Translating Characters, Files with duplicate Lines, Counting characters, words and Lines and Comparing files

UNIT III

User Communication, Electronic mail, Remote access, and File Transfer. Vi Editor – Local, Global and Range commands and Text manipulation in vi. Editor, and Over view of ex Editor. Atoms and Operators, grep – family and operations and searching for file contents. Overview of sed and awk

UNIT IV

Interactive korn shell and Korn shell Programming: An overview on sed. Korn shell -Features, Files, Variables, input and output. Environmental Variables and options. Startup Script, Command history and Execution process. Korn shell Programming- Script Concept, Expressions, Decision making and Repetition, Special Parameters and variables, Changing Positional parameters, Argument Validation, Debugging Scripts and Examples

UNIT V

Interactive C shell and C shell Programming: An overview on awk. C Shell – Features, Files and Variables, output, input, eval Command, environmental Variables, on-off Variables, Startup and Shutdown Scripts, Command history and execution Script. C Shell Programming – script Concepts, expressions, Decision making and repetition, Special Parameters, Changing Positional Parameters, argument Validation, Debugging Scripts and examples

TEXT BOOKS

1. UNIX and Shell Programming, Behrouz A. Forouzan and Richard F. Gilberg, cengage learning publications, Indian Reprint 2012
2. Unix: The Ultimate Guide, Sumitabha Das, Tat Mcgraw-Hill Edition, Indian reprint 2012

REFERENCES

1. UNIX and Linux System Administration Handbook, Evi Nemeth, Garth Snyder, Trent R. Hein and Ben Whaley, PHI.
2. Essential Linux Administration: A Comprehensive Guide for Beginners, Chuck Easttom, Cengage Learning
3. The Linux Programming Interface: A Linux and UNIX System Programming Handbook, Michael Kerrisk, No Starch Press
4. A Practical Guide to Linux Commands, Editors, and Shell Programming, 3rd Edition, Mark G. Sobell, PHI
5. Advanced Programming in the UNIX Environment, 3rd Edition, W. Richard Stevens and Stephen A. Rago, Addison-Wesley professional
6. UNIX Network Programming, W. Richard Stevens, PHI

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(16CS517) FORMAL LANGUAGES AND AUTOMATA THEORY

COURSE OBJECTIVES

1. *Understand formal definitions of machine models.*
2. *Classify machines by their power to recognize languages.*
3. *Understanding of formal grammars, analysis*
4. *Understanding of hierarchical organization of problems depending on their complexity*
5. *Understanding of the logical limits to computational capacity*
6. *Understanding of decidable problems*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the basic properties of formal languages and grammars*
2. *Design automata, regular expressions and context free grammars for accepting or generating a certain language.*
3. *Analyse the concepts of pumping lemma and its applications*
4. *Design Push Down Automata for simple tasks and its applications*
5. *Understand the Turing machines and computing with Turing Machines*
6. *Acquire concepts relating to the theory of computation and computational models including PCP and Undecidability.*

UNIT - I

Introduction: Basics of set theory, Relations on sets, Alphabets, Strings, Languages, Grammar formalism, Chomsky Hierarchy

Finite Automata: History of the Automata theory, Use of Automata, Characteristics of Automata, Graphical and Tabular Representation FA, Transitional system, DFA and NFA, Conversion of an NFA to DFA,NFA with ϵ(null)Move, Equivalence of DFA and NFA, Dead state, Finite Automata with Output, Conversion of one machine to another, Minimization of Finite Automata, Myhill-Nerode Theorem, Applications of FA, Limitations of FA.

UNIT - II

Regular Languages: Regular Expressions (RE), Basics of Regular Expressions, Identities of Regular Expression, The Arden_s Theorem, Using Arden_s theorem to construct RE from FA, Equivalence of Two FAs, Equivalence of Two REs, Construction of Regular Grammar from RE, Constructing FA from Regular Grammar, Pumping Lemma for RLs, Applications of Pumping Lemma, Closure properties of Regular Set, Decision problems of Reapplications of REs.

UNIT - III

Context Free Grammars and Languages: Definition of Context Free Grammars (CFG), Derivation sand Parse trees, Ambiguity in CFGs, Removing ambiguity, Left recursion and Left factoring, Simplification of CFGs, , Linear grammars, Normal Forms ,Closure propertiesfor CFLs, Pumping Lemma for CFLs, Decision problems for CFLs.

UNIT - IV

Push Down Automata (PDA): Informal introduction, The Formal Definition, Graphical notation, Instantaneous description, The Languages of a PDA, Equivalence of PDAs and CFGs, Deterministic Push Down Automata.

UNIT - V

Turing Machines and Un decidability: Basics of Turing Machine (TM), Transitional Representation of TMs, Instantaneous description, Non Deterministic TM, Conversion of Regular Expression to TM, Variations of the TM, Universal TM, Linear Bounded Automata, Post_s Correspondence Problem(PCP), Modified PCP.

TEXT BOOKS

1. *Introduction to Automata Theory, Formal Languages and Computation,* Shyamal endukandar, Pearson.
2. *Introduction to Automata Theory, Languages, and Computation,* Third Edition, John E. Hopcroft, Rajeev Motwani, Jeffery D. Ullman,Pearson.

REFERENCES

1. *Introduction to Languages and the Theory of Computation,* John C Martin, TMH,Third Edition.
2. *Theory of Computation,* VivekKulkarni,OXFORD.
3. *Introduction to the Theory of Computation.*, Michel Sipser, Learning 2 nd Edition, Cengage
4. *Theory of computer Science Automata, Languages and Computation,* K.L.P.Mishra, N.Chandrasekaran, PHI, Third Edition.
5. *Fundamentals of the Theory of Computation, Principles and Practice*, Raymond Greenlaw,H. James Hoover, Elsevier, Morgan Kaufmann.
6. *Finite Automata and Formal Language A Simple Approach,* A.M. Padma Reddy, Pearson

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(16CS518) SOFTWARE ENGINEERING & ARCHITECTURE

COURSE OBJECTIVES

1. *To understand the software life cycle models.*
2. *To understand the software requirements and SRS document.*
3. *To understand the importance of modeling and modeling languages.*
4. *To design and develop correct and robust software products.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the basic software engineering methods and various paradigms and their appropriate application.*
2. *Perform various framework activities like communication, planning, modelling, coding, Testing and deployment.*
3. *Implement various phases of requirements engineering analysis*
4. *Understand the various analysis modelling approaches and design concepts*
5. *Implement various testing approaches*
6. *Understand various architectural styles and information systems*

UNIT - I

SOFTWARE PROCESS MODELS - The Evolving role of Software – Software – The changing Nature of Software – Legacy software – A generic view of process– A layered Technology – A Process Framework – The Capability Maturity Model Integration (CMMI) – Process Assessment – Personal and Team Process Models – Product and Process – Process Models – The Waterfall Model – Incremental Process Models – Incremental Model – The RAD Model – Evolutionary Process Models – Prototyping – The Spiral Model – The Concurrent Development Model – Specialized Process Models – the Unified Process.

UNIT - II

REQUIREMENT ENGINEERING - Software Engineering Practice – communication Practice – Planning practice Modeling practice– Construction Practice –Deployment. Requirements Engineering - Requirements Engineering tasks – Initiating the requirements Engineering Process- Eliciting Requirements – Developing Use cases – Building the AnalysisModels – Elements of the Analysis Model – Analysis pattern – Negotiating Requirements – Validating Requirements.

UNIT - III

ANALYSIS MODELLING - Requirements Analysis – Analysis Modeling approaches –data modeling concepts – Object oriented Analysis – Scenario based modeling – Floworiented Modeling – Class based modeling

DESIGN & IMPLEMENTATION - Architectural Design – Detailed Design - Design process -Design Quality-Design model-User interface Design –

Implementation

UNIT - IV

TESTING & MAINTENANCE Testing strategies - Testing Tactics - strategies Issues for conventional and object oriented software -Verification and Validation - validation testing – system testing –Art of debugging. Software evolution - Critical Systems Validation - Metrics for Process, Project and Product - Quality Management - Process Improvement - Risk Management- Configuration Management – Software Cost Estimation

UNIT-V

Introduction: What is Software Architecture? An Engineering Discipline for Software, The Status of Software Architecture. **Architectural Styles:** Architectural Styles, Pipes and Filters, Data Abstraction and Object-Oriented Organization, Event-Based, Implicit Invocation, Layered Systems, Repositories, Interpreters, Process Control, Other Familiar Architectures, Heterogeneous Architectures. **Shared Information Systems:** Shared Information Systems, Database Integration, Integration in Software Development Environments, Architectural Structures for Shared Information Systems.

TEXT BOOKS

1. *Software Engineering A practitioner‟ s Approach*, Roger S. Pressman, SeventhEdition, 2009, McGrawHill International Edition.
2. Software Architecture: Perspective on an Emerging Discipline By Mary Shaw, DavidGarlan, PHI
3. *Fundamentals of Software Engineering,*Rajib Mall, Third Edition, 2009, PHI
4. *Design Patterns: Elements of Reusable Object Oriented Software*, Gamma, Belm,Johnson, 1995, PEA.

REFERENCES

1. *Software Engineering*,Ian Sommerville, 8th Edition, Pearson Education, 2008.
2. *Software EngineeringConcepts* ,Richard Fairley, McGraw Hill, 2004.
3. *Software Engineering*,Stephan Schach, Tata McGraw Hill, 2007.
4. *Software Engineering : Theory and Practice*, Pfleeger and Lawrence , PearsonEducation, 2nd, 2001

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(16CS519) WEB TECHNOLOGIES

COURSE OBJECTIVES

1. *Learn to access data bases using java*
2. *Learn to communicate over a network using java*
3. *Learn do design server side programs and access them from client side*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Create dynamic and interactive web sites using HTML*
2. *Gain knowledge of client side scripting using java script*
3. *Design and develop Cascading Style Sheets*
4. *Demonstrate about XML and parse and use the XML data*
5. *Able to do server side programming with Java Servelets, JSP and PHP*
6. *Design client presentation using AJAX*

UNIT-I

HTML-Introduction: Fundamentals of HTML, Working with Text, Organizing Text in HTML, Working with Links and URLs, Creating Tables, Working with Images, Canvas, Forms, Frames and Multimedia.HTML5: Introduction, HTML5 Document Structure, Creating Editable Content, Checking Spelling Mistakes, Exploring Custom Data Attributes, Client-Side Storage, Drag and Drop Feature, Offline Web Applications, Web Communications, Cross-Document Messaging and Desktop Notifications.

UNIT-II

CSS AND JAVASCRIPT:

CSS Introduction, CSS Selectors, Inserting CSS in an HTML document, Backgrounds, Fonts, and Text Styles, Creating Boxes, Displaying, Positioning and Floating Elements, Features of CSS3.JAVASCRIPT: Overview of JavaScript, JavaScript Functions, Events, Image Maps and Animations, JavaScript Objects, Working with Browser and Document Objects, JQuery - Introduction, JQuery Selectors, Events, Methods to access HTML elements and attributes.

UNIT-III

INTRODUCTION TO PHP:Introduction, Data Types, Variables, Constants, expressions, String Interpolation, Control Structures, Functions, Arrays, Embedding PHP Code in Web Pages, Object Oriented PHP, Sending Form Data to a Server, Working with Cookies and Session Handlers, PHP with MySQL - Interacting with the Database.

UNIT-IV

Python: Introduction, Setting up python, using python shell, writing Hello World, Adding Comments to the code, storing and processing of data, variables, different data types, operators, statements and syntax, input function advanced print, receive input from files, controlling flow of statements: conditional, loop statements, Creating functions and importingmodules.

UNIT-V

XML AND AJAX: XML-Introduction, Structure of XML Document, Document Type Definition, XML Namespaces, XML Schema, Working with DOM and SAX Parser, Working with XSLT.

AJAX: Overview, Exploring AJAX, XMLHTTP Request object.

TEXT BOOKS

1. *HTML 5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery*, Kogent Learning Solutions Inc, Dreamtech Press, 1st edition, 2011.
2. *Python Programming for Beginners: A Step-by-Step Guide to learning The basics of computer programming and python computer language*, Corey kidd, Kindle Edition.

REFERENCES

1. *The Complete Reference: HTML and CSS*, Thomas A. Powell, Tata McGraw Hill, 5th edition, 2010.
2. *Beginning PHP and My SQL*, W. Jason Gilmore, APress, 4th Edition, 2011.
3. *PHP and My SQL*, Andrea Tarr, Willy India, 1st Edition, 2012.

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(16CS520) BIGDATA

COURSE OBJECTIVES

1. *To understand about big data*
2. *To learn the analytics of Big Data*
3. *To Understand the Map Reduce fundamentals*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the building blocks of Big Data*
2. *List the components of Hadoop and Hadoop EcoSystem*
3. *Articulate the programming aspects of cloud computing(map Reduce etc)*
4. *Manage Job Execution in Hadoop Environment*
5. *Analyse the recent research trends related to Hadoop File System, Map Reduce and Google File System etc*
6. *Analyze knowledge about text mining*

UNIT - I

Big Data Analytics : What is big data, History of Data Management ; Structuring Big Data ; Elements of Big Data ; Big Data Analytics; Distributed and Parallel Computing for Big Data; Big Data Analytics: What is Big Data Analytics, What Big Data Analytics Isn‘t, Why this sudden Hype Around Big Data Analytics, Classification of Analytics, Greatest Challenges that Prevent Business from Capitalizing Big Data; Top Challenges Facing Big Data; Why BigData Analytics Important; Data Science; Data Scientist; Terminologies used in Big Data Environments; Basically Available Soft State Eventual Consistency (BASE); Open source Analytics Tools;

UNIT - II

Understanding Analytics and Big Data: Comparing Reporting and Analysis, Types of Analytics; Points to Consider during Analysis; Developing an Analytic Team; Understanding Text Analytics;

Analytical Approach and Tools to Analyze Data: Analytical Approaches; History of Analytical Tools; Introducing Popular Analytical Tools; Comparing Various Analytical Tools.

UNIT - III

Understanding MapReduce Fundamentals and HBase : The MapReduce Framework; Techniques to Optimize MapReduce Jobs; Uses of MapReduce; Role of HBase in Big Data Processing; **Storing Data in Hadoop :** Introduction of HDFS, Architecture, HDFC Files, File system types, commands, org.apache.hadoop.io package, HDF, HDFS High Availability; Introducing HBase, Architecture, Storing Big Data with HBase , Interacting with the Hadoop Ecosystem; HBase in Operations-Programming with HBase; Installation, Combining HBase

and HDFS;

UNIT - IV

Big Data Technology Landscape and Hadoop : NoSQL, Hadoop; RDBMS versus Hadoop; Distributed Computing Challenges; History of Hadoop; Hadoop Overview; Use Case of Hadoop; Hadoop Distributors; HDFC (Hadoop Distributed File System), HDFC Daemons, read, write, Replica Processing of Data with Hadoop; Managing Resources and Applications with Hadoop YARN.

UNIT - V

Social Media Analytics and Text Mining: Introducing Social Media; Key elements of Social Media; Text mining; Understanding Text Mining Process; Sentiment Analysis, Performing Social Media Analytics and Opinion Mining on Tweets;

Mobile Analytics: Introducing Mobile Analytics; Define Mobile Analytics; MobileAnalytics and Web Analytics; Types of Results from Mobile Analytics; Types of Applications for Mobile Analytics; Introducing Mobile Analytics Tools;

TEXT BOOKS

1. *BIG DATA and ANALYTICS*, Seema Acharya, Subhasinin Chellappan, Wiley publications.
2. *BIG DATA*, Black Book™, DreamTech Press, 2015 Edition.
3. *BUSINESS ANALYTICS*, 5e , BY Albright |Winston

REFERENCES

1. Business Intelligence –Practice, Technologies and Management Rajiv Sabherwal, Irma Becerra- Fernandez, John Wiley 2011.
2. Business Intelligence Roadmap, Lariss T. Moss, ShakuAtre, Addison-Wesley It Service.
3. Oracle Business Intelligence: The Condensed Guide to Analysis and Reporting , Yuli Vasiliev, SPD Shroff, 2012.

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(16CS521) DESIGN AND ANALYSIS OF ALGORITHMS

COURSE OBJECTIVES

1. *To know the importance of the complexity of a given algorithm.*
2. *To study various algorithmic design techniques.*
3. *To utilize data structures and/or algorithmic design techniques in solving newproblems.*
4. *To know and understand basic computability concepts and the complexity classes P,NP, and NP-Complete.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Determine the time complexity of an algorithm by solving the corresponding Recurrence equation*
2. *Apply the Divide and Conquer strategy to solve searching, sorting and matrix multiplication problems.*
3. *Analyze the efficiency of Greedy and Dynamic Programming design techniques to solve the optimization problems*
4. *Illustrate Backtracking technique for solving constraint satisfaction problems.*
5. *Differentiate the LC and FIFO branch and bound solutions for optimization problems, and compare the time complexities with Dynamic Programming techniques*
6. *Define and Classify deterministic and Nondeterministic algorithms; P, NP, NP–hard and NP-complete classes of problems.*

UNIT-I

Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis- Space Complexity, Time Complexity, Asymptotic Notation - Big (O) Notation, Omega notation, Theta notation, Recurrences.

Basic Traversal and Search Techniques: Techniques for Binary Trees, Techniques for Graphs, DISJOINT SETS - Disjoint set Operations, Union and Find Operations, Connected Components and Spanning Trees.

UNIT-II

Divide and Conquer: General Method, Applications-Binary Search, Merge sort, Quick Sort, Finding Max and Min, Strassen_s Matrix Multiplication.

Greedy Method: General Method, Applications-Knapsack Problem, Job Sequencing with Deadlines, Minimum Cost Spanning Trees-Prims and Kruskals, Optimal storage on Tapes, Single-Source Shortest Paths.

UNIT-III

Dynamic Programming: General Method, Applications-Multistage Graphs, All-Pairs Shortest Paths, Optimal Binary Search Trees, 0/1 Knapsack, The Traveling Sales Person Problem.

Backtracking: General Method,Applications-8-Queens problem, Sum of Subsets, GraphColoring and Hamiltonian Cycles, Knapsack Problem.

UNIT-IV

Branch and Bound: The Method, Applications-Travelling Sales Person Problem,0/ 1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

UNIT-V

NP–Hard and NP–Complete Problems: NP-hard and NP-complete problems- Basic concepts, Nondeterministic Algorithms, NP-Hard and NP-Complete Classes, Cook's Theorem, Reduction Source Problems.

TEXT BOOKS

1. *Fundamentals of Computer Algorithms*, Ellis Horowitz, Satraj Sahani and Sanguthevar Rajasekhran, 2nd Edition, 2012, Universities Press.

REFERENCES

1. *Data structures and Algorithm Analysis in C++*, Allen Weiss, Second edition, Pearson education.
2. *Design and Analysis of algorithms*, Aho, Ullman and Hopcroft, Pearson education.

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(16CS522) UNIX AND SHELL PROGRAMMING LAB

COURSE OBJECTIVES

The objectives of the course:

1. *To familiarize basic concepts of shell programming*
2. *To demonstrate use of system calls*
3. *To demonstrate Inter process communication*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Demonstrate installation of Linux operating system and understand the importance of Linux*
2. *To run various UNIX commands on a standard UNIX/LINUX Operating system*
3. *Implement shell programming on UNIX OS*
4. *understand and handle UNIX system calls*
5. *Implement C / C++ programs on UNIX.*
6. *Use shell script to create files and handle text documents*

1. Practice session: practice use of some basic Linux commands. Document the syntax and semantics of those commands. Practice programs on shell variables, control statements etc.
2. Practice session: Study the features of Linux environment and submit a report on it.
3. Write a shell script that accepts a name from the user and displays whether it is a file,directory or something else.
4. Write a shell script that creates users
5. Write a shell script that searches for a given string in a file
6. Write a shell script that compiles all C files in your home directory and creates executable files
7. Write a shell script that given a filename as argument, deletes all even lines in a file
8. Implement the grep command in C language
9. Write a shell script that removes duplicate lines from a file
10. Write a shell script that enhances find command by adding error messages that explainwhy the command failed.
11. Write a shell script to backup files in a specified directory
12. Write a shell script that finds all links to a file
13. Write an awk script to count the number of lines in a file that do not contain vowels.
14. Write an awk script to find the number of characters, words and lines in a file.
15. Write C programs that illustrate communication between two unrelated processes usingnamed pipe(FIFO File).
16. Write a C program in which a parent writes a message to a pipe and the child reads themessage.

17. Write a C program (sender.c) to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.
18. Write a C program (receiver.c) that receives the messages (from the above messagequeue and displays them.

REFERENCES

1. Unix and Shell programming, B.A.Forouzan and R.F.Gilberg, Cengage Learning.
2. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones,Wrox, Wiley
3. Advanced Unix Programming, N.B.Venkateswarulu, BS Publications.
4. Unix and Shell Programming, M.G. Venkatesh Murthy, Pearson Education.
5. Unix Shells by Example, 4th Edition, Elllie Quigley, Pearson Education.
6. Sed and Awk, O.Dougherty&A.Robbins, 2nd edition,SPD.
7. Unix shell Programming, S.G.Kochan and P.Wood, 3rd edition, Pearson Education.
8. Shell Scripting, S.Parker, Wiley India Pvt. Ltd.
9. Advanced Programming in the Unix Environment, 2nd edition, W.R.Stevens and S.A.Rago,Learson Education.
10. Linux System Programming, Robert Love, O‟ Reilly, SPD

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(16CS523) WEB TECHNOLOGIES LAB

COURSE OBJECTIVES

The objectives of the course:

1. *Create web pages using HTML,DHTML and CSS.*
2. *Develop a servelet program using Java servelets.*
3. *Develop online application using PHP*
4. *Implement simple web service using XML*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Create dynamic and interactive web sites using HTML*
2. *Design client side scripting using java script and DHTML*
3. *Implement servlet program using java servlets*
4. *Develop simple online application using servlets*
5. *Implement JDBC concepts*
6. *Design client programs using AJAX*

1. Install Dreamweaver software. Practice all the experiments using dream weaver.
2. Write a Java program which stores the user login information in database in a server, creates user interface for inserting, deleting, retrieving information from the database, accepts user login information and verifies it.
3. Write a Java Servlet Program to display the Current time on the server.
4. To write html and servlet to demonstrate invoking a servlet from a html.
5. Write a Java servlet program to change the Background color of the page by the colorselected by the user from the list box.
6. Write a Java servlet to get the personal details about the user(Like name, Address, City,Age, Email id) and check whether the user is Eligible to vote or not.
7. Write a Java servlet Program to create a Cookie and keep it alive on the client for 30minutes.
8. Write a java servlet program to display the various client information like Connection,Host, Accept-Encoding, User Agent.
9. To write java servlet programs to conduct online examination and to display student marklist available in a database
10. Write a Java servlet Program to implement the Book Information using JDBC.
11. Write a Java Servlet Program to create a Session and display the various information likeLast accessed time, Modified time, Expiration)
12. Write a JSP Program to Display the number of visitors visited the page.
13. Write a JSP Program to implement the Book Information using Database.
14. Write a JSP Program to implement the Telephone Directory.

15. Develop an Applet that draws Human Face.
16. Develop the applet that handles mouse and keyboard Events.
17. Develop the python program that implements Fibonacci series.
18. Develop the python program that implements prime numbers.
19. Develop the python program that implements class and objects concept.
20. Develop a java bean that can display a rectangle if its property is true. Otherwise draw thecircle in BDK bean.

REFERENCES

1. *Web Technologies*, Uttam K Roy, Oxford University Press
2. *The Complete Reference* PHP – Steven Holzner, Tata McGraw-Hill
3. *Web Programming*, building internet applications, Chris Bates 2nd edition, Wiley Dreamtech
4. *Java Server Pages*–Hans Bergsten, SPD O" Reilly
5. *Beginning Web Programming*-Jon Duckett WROX.
6. *Programming World Wide Web*, R.W.Sebesta, Fourth Edition, Pearson.

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(COE-III) COMPREHENSIVE ONLINE EXAMINATION-III

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(16HS616) APTITUDE PRACTICE-I

COURSE OBJECTIVES

After thorough learning of Quantitative Aptitude and Reasoning, a student:

1. *Will be able to critically evaluate various real life situations by resorting to Analysis of key issues and factors.*
2. *Will be able to read between the lines and understand various language structures.*
3. *Will be able to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.*

COURSE OUTCOMES

At the end of the course, students would be expected to:

1. *Have developed the subtle way of approaching in the candidate.*
2. *Have acquired the decision making with in no time.*
3. *Have acquired logical thinking during professional tenure.*
4. *Have obtained quick decision making skills.*

UNIT I

Numbers: Classification of numbers, Divisibility rules, finding the units digit, decimal fractions, simplifications, LCM and HCF Models. Square roots and Cube roots.
Averages: Averages, Mixtures and Allegations
Ages: Problems on Ages

UNIT II

Time and Distance: Relation between speed, distance and time, Converting kmph into m/s and vice versa, Problems on average speed, Relative speed, Trains, Boats and Streams, circular tracks and Races.
Time and Work: Problems on unitary method, Relation between Men, Days, Hours and Work. Problems on Man-Day-Hours method, Problems on alternate days, Problems on Pipes and Cisterns**.**

UNIT III

Percentages: Converting percentage into decimals and vice versa. Equivalent percentage of fractions.
Partnership: Introduction, Relation between capitals, Period of investments and shares
Ratio and proportion: Ratio and its properties, Comparison of ratios, Problems on ratios, Compound Ratio, Problems on proportion, Mean proportional and continued proportion.

UNIT IV

Profit and Loss: Problems on Profit and Loss, Relation between Cost Price and Selling price, Discount and Marked Price, Two different articles sold at same Cost Price, Two different articles sold at same Selling Price, Gain% and Loss%. .

Simple Interest: Definitions, Problems on interest and amount, Problems on rate of interest and time period.

Compound Interest: Definition and formula for amount in compound interest, Difference between simple interest and compound interest for 2 years on the same, Principle and time period.

UNIT V

Clocks: Finding the angle when the time is given, Finding the time when the angle is known, Relation between Angle, Minutes and Hours, Exceptional cases in clocks

Calendars: Definition of a Leap Year, Finding the number of Odd days, framing the year code for centuries, Finding the day of any random calendar date

Blood relations: Defining the various relations among the members of a family, Solving Blood Relation puzzles, solving the problems on Blood Relations using symbols and notations.

TEXT BOOKS

1. Thorpe's verbal reasoning, GL Barrons, McGraw Hills, LSAT Materials
2. A modern approach to Logical reasoning, R S Agarwal, S.Chand

REFERENCE BOOKS

1. Quantitative Aptitude, R S Agarwal, S Chand,
2. Quantitative Aptitude, G. L BARRONS
3. Quantitative Aptitude, AbhijitGuhaMcGraw Hills
4. Magical Book on Quicker Maths, Tyra, BSC publishing company.

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(16EC423) MICROPROCESSORS & MICRO CONTROLLERS

COURSE OBJECTIVES

The objectives of the course:

1. *To understand the architecture of 8085 microprocessor.*
2. *To learn 8086 architecture Instruction set*
3. *To learn and understand 8051 Architecture assembly Language programming*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the evolution of computers, processors, and its applications*
2. *Understand the various software and hardware parts of a microprocessors and computer*
3. *Understand the architectures of 8085 microprocessor and 8051 microcontroller system*
4. *Analyze the programming model of 8085 Microprocessor & 8051 microcontroller development environment.*
5. *Implement the techniques of interfacing memories, various I/O devices, sensors and actuators with microprocessor and microcontrollers*
6. *Design and develop various microprocessor/microcontrollerbased systems for the reallife problems*

UNIT - I

8085 architecture introduction-8085 Architecture-Block Diagram, Flag Register, Pin Diagram, Timing and Control Signals, System Timing Diagram, Instruction Set of 8085- Instruction & Data Formats- Addressing Modes- Instructions.

UNIT - II

8086 architecture 8086 Overview-Internal Architecture- Register Organization, Memory Segmentation, Flag Register, Pin Configuration, Physical Memory Organization,Features of some advanced Processors – 80286, 80386, Pentium

UNIT - III

Introduction to micro controllers 8051 Introduction, Architecture, Registers, Pin Description, Connections, I/O Ports, Memory Organization, Addressing Modes, Counters & Timers, Serial data Communication.

UNIT-IV

Programming the 8051- Assembly language Programming, Assembler directives, Instruction set - Moving Data, Logical operations – Byte level and bit level operations, Rotate and swap operations, Arithmetic operations, Jump and call Instructions, Interrupts & Returns

UNIT-V:

Interfacing of 8051 – keyboard, Displays, ADC converters, Multiple interrupts,– 8051 Data Communication modes

TEXT BOOKS

1. *Microprocessor architecture programming & applications with the 8085*,S.Ramesh Gaonkar, PRI Publishers. 6th Edition
2. *Advanced Microprocessors & Peripheral interfacing*, Ray Bhurchandi, 3rd edition, MCgraw hill Publications
3. *The INTEL Microprocessors*, Brey, 6th edition, PHI Publishers
4. *The 8051 Microcontroller and architecture,* Kenneth J. Ayala, PRI Publishers 2nd edition

REFERENCES

1. *Microprocessor and Microcontrollers*, N.Senthil Kumar, M.Saravanan, S.Jeevanathan,Oxford Publishers. 1st Edition, 2010
2. *The X86 Microprocessors , Architecture, Programming and* Inerfacing, Lyla B. Das,Pearson Publications, 2010

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(16CS524) COMPILER DESIGN

COURSE OBJECTIVES

The objectives of this course:

1. *Realize that computing science theory can be used as the basis for real applications*
2. *Introduce the major concept areas of language translation and compiler design.*
3. *Learn how a compiler works*
4. *Know about the powerful compiler generation tools and techniques, which are usefulto the other non-compiler applications*
5. *Know the importance of optimization and learn how to write programs that executefaster*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Specify and analyze the lexical, syntactic and semantic structures of advanced language features*
2. *Classify the lexical, syntactic and semantic analysis into meaningful phases for a compiler to undertake language translation*
3. *Implement various parsing techniques*
4. *Interpret fully processed source code for a novel language into machine code for a novel computer*
5. *Implement techniques for intermediate code and machine code optimization*
6. *Design the structures required for compiling advanced language features*

UNIT - I

Introduction: Language processors, The Structure of a Compiler, the science of building acomplier

Lexical Analysis: The Role of the lexical analyzer, Input buffering, Specification of tokens,Recognition of tokens, The lexical analyzer generator Lex, Design of a Lexical Analyzer generator.

UNIT - II

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, The Parser Generator Yacc.

UNIT - III

Syntax Directed Translation: Syntax Directed Definitions, Evaluation orders for SDD_s, Application of SDT, SDT schemes, Implementing L-attribute SDD_s.

Intermediate Code Generation: Variants of syntax trees, three address code, Types and declarations, Translations of expressions, Type checking, control flow statements.

UNIT - IV

Run Time Environment: Storage organization, Stack allocation of space - Activation trees, Activation Records, Calling Sequence, Access tonon-local data on stack - Data AccessWithout Procedures, Issues with Nested procedures , Heap management - The Memory Manager, The Memory Hierarchy of a Computer

Symbol Table: Introduction, symbol table entries, operations on the symbol table, symbol table organizations, non block structured language, block structured language.

UNIT - V

Code Generation: Issues in the design of a code generator, The Target language, Basic blocks and flow graphs, optimization of basic blocks, a simple code generator, register allocation and assignment, optimal code generation for expressions.

Code Optimization: Introduction, where and how to optimize, principle source of optimization, function preserving transformations, loop optimizations, global flow analysis, machine dependent optimization

TEXT BOOKS

1. *Compilers Principles*, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S.Lam, RaviSethi, Jeffrey D. Ullman., Pearson.
2. *Compiler Design*, K. Muneeswaran., Oxford University Press, 2012

REFERENCES

1. *Compiler Construction*, K.V.N Sunitha, Pearson, 2013
2. *Engineering a Compiler*, Second Edition, Keith D. Cooper & Linda Torczon., MorganKaufmann, Elsevier.
3. *Compilers Principles and Practice*, Parag H. Dave, Himanshu B. Dave., Pearson.

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(16CS525) SOFTWARE TESTING

COURSE OBJECTIVES

1. *Basic software debugging methods.*
2. *Various testing methodologies.*
3. *The procedure for designing test cases.*
4. *The significance of software testing*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *List a range of different software testing techniques and strategies and be able to apply specific(automated) unit testing method to the projects.*
2. *Distinguish characteristics of structural testing methods*
3. *Demonstrate the integration testing which aims to uncover interaction and compatibility problems as early as possible.*
4. *Discuss about the functional and system testing methods*
5. *Demonstrate various issues for object oriented testing.*
6. *Test the applications manually and by automation using different testing methods*

UNIT–I

Introduction: Purpose of testing, Dichotomies, model for testing, Taxonomy of Bugs - consequences of bugs, taxonomy of Bugs.

Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicatesand achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT–II

Transaction Flow Testing: Transaction flows, transaction flow testing techniques.

Dataflow testing:-Basics of data flow testing, strategies in dataflow testing, application ofdata flow testing.

UNIT–III

Domain Testing: Domains and Paths, Nice & Ugly Domains, Domain testing, Domains andInterface testing, Domains and Testability.

UNIT-IV

Paths, Path products and Regular expressions: Path Products & Path expressions, A Reduction Procedure, Applications, Regular Expressions and Flow Anomaly Detection.

Logic Based Testing: Overview, Decision Tables, Path Expressions Again, KVCharts, Specifications.

UNIT-V

States, State Graphs and Transition Testing: State graphs, Good & Bad State Graphs, State Testing, and Testability Tips.

Graph Matrices and Applications: Motivational Overview, The Matrix of Graph,Relations, The Power of a Matrix, Node-Reduction Algorithm, Building Tools.
(Student should be given an exposure to a tool like **Selenium, Watir, Windmill, Win Runner**).

TEXTBOOKS

1. *Software Testing techniques*- Boris Beizer, Dreamtech Publishers, second edition.
2. *Software Testing Tools*–Dr.K.V.K.K.Prasad, Dreamtech.

REFERENCES

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 Wile

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(16CS526) OBJECT ORIENTED ANALYSIS AND DESIGN

COURSE OBJECTIVES

1. *Introducing students to the fundamental concepts and terms used in the object- oriented approach to systems analysis and design.*
2. *To study on the importance of object-oriented analysis and design, principles of modeling and its limitations.*
3. *Showing how we apply the process of object-oriented analysis and design to development of software with the different applications.*
4. *Pointing out the importance and function of each UML model throughout the process of object-oriented analysis and design and explaining the notation of various elements in these models.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Explain OOAD concepts and various UML diagrams*
2. *Select an appropriate design pattern*
3. *Illustrate about domain models and conceptual classes*
4. *Implement Use cases, Interaction diagrams and Activity diagrams*
5. *Implement Behavioural Modelling*
6. *Design component diagrams and deployment diagrams*

UNIT-I

Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, and Software Development Life Cycle.

UNIT-II

Basic Structural Modeling: Classes, Relationships, Common Mechanisms, and diagrams. **Advanced Structural Modeling:** Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

UNIT-III

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.
Basic Behavioral Modeling-I: Interactions, Interaction diagrams. Use cases, Use case Diagrams, Activity Diagrams

UNIT-IV

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

UNIT-V

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

Case Study: The Unified Library application.

TEXT BOOKS

1. *The Unified Modeling Language User Guide*, Grady Booch, James Rumbaugh, Ivar Jacobson, Pearson Education.
2. *UML 2 Toolkit*, Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, WILEY-Dreamtech India Pvt. Ltd.

REFERENCES

1. *Fundamentals of Object Oriented Design in UML*, Meilir Page-Jones, Pearson Education.
2. *Modeling Software Systems Using UML2*, Pascal Roques, WILEY Dreamtech India Pvt. Ltd.
3. *Object Oriented Analysis and Design*, AtulKahate, The McGraw-Hill Companies.
4. *Object-Oriented Analysis and Design with the Unified Process,* John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.
5. *Learning UML 2.0*, Russ Miles and Kim Hamilton, O_Reilly, SPD.
6. *Appling UML and Patterns: An introduction to Object* – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
7. *UML and C++*, R.C.Lee and W.M.Tepfenhart, PHI.

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(16CS527) COMPUTER NETWORKS

COURSE OBJECTIVES

1. *Study the evolution of computer networks and future direction*
2. *Study the concepts of computer networks from layered perspective*
3. *Study the issues open for research in computer networks*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the terminology and concepts of OSI and TCP/IP Reference models and identify different physical media used for data transmission*
2. *Understand the services of Data link layer and various data link layer protocols*
3. *Implement various routing algorithms incorporated by network layer*
4. *Understand the congestion control mechanisms adopted by network layer*
5. *Interpret the essential services of transport layer, TCP and UDP protocols*
6. *Understand the functioning of various protocols of Application layer*

UNIT- I:

Introduction: Uses of computer networks, Network Hardware, Network Software, Reference Models: The OSI Reference Model, The TCP/IP Reference Model, A Comparison of the OSI and TCP/IP Reference Models, Example Networks.

The Physical Layer: The Theoretical bass for data communication, Guided Transmission Media, Wireless Transmission, The Public Switched Telephone Network.

UNIT- II:

The Data Link Layer: Data Link Layer design issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols, Example Data Link Protocols **The Medium Access Control Sub Layer:** The Channel Allocation Problem, Multiple Access Protocols, Ethernet, Data Link Layer switching.

UNIT- III:

The Network Layer: Network Layer Design Issues, Routing Algorithms, CongestionControl Algorithms, Quality of Service, Internetworking, The Network Layer in the Internet.

UNIT- IV:

The Transport Layer: The Transport Service, Elements of Transport Protocols, Congestion Control, The Internet Transport Protocols, Performance Issues.

UNIT-V:

Application Layer: Introduction, DNS, WWW and HTTP, FTP, E-mail, TELNET.

TEXT BOOKS

1. Computer Networks‖, 5th edition, 2010, Andrew S. Tanenbaum, Wetherall, Pearson.
2. Data communications and networking‖ 5th edition, 2012, Behrouz A. Forouzan, TMH.
2013- 2014

REFERENCES

1. Internetworking with TCP/IP – Principles, protocols, and architecture- Volume 1, Douglas E. Comer, 5th edition, PHI
2. Computer Networks‖, 5E, Peterson, Davie, Elsevier.
3. Introduction to Computer Networks and Cyber Security‖, Chawan- Hwa Wu, Irwin, CRC Publications.
4. Computer Networks and Internets with Internet Applications‖, Comer.

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(16CS528) SOFTWARE TESTING and CASE TOOLS LAB

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understands the Automation Testing Approach.*
2. *Write test suites for software.*
3. *Install Selenium server and demonstrate it using a script in Java/PHP*
4. *Create and test a program to login a specific web page.*
5. *Write the test cases for various real time applications*
6. *Implementing bug tracking and web testing tools*

1. Write programs in _C_ Language to demonstrate the working of the following constructs:
   i) do...while ii) while….do iii) if…else iv) switch v) for

2. ―A program written in _C_ language for Matrix Multiplication fails‖
   Introspect the causes for its failure and write down the possible reasons for its failure.

3. Take any system (e.g. ATM system) and study its system specifications and report the various bugs.

4. Write the test cases for any known application (e.g. Banking application)

5. Create a test plan document for any application (e.g. Library Management System)
6. Study of any testing tool (e.g. Win runner)

7. Study of any web testing tool (e.g. Selenium)

8. Study of any bug tracking tool (e.g. Bugzilla, bugbit)

9. Study of any test management tool (e.g. Test Director)

10. Study of any open source-testing tool (e.g. Test Link)

11. Take a mini project (e.g. University admission, Placement Portal) and execute it. During the Life cycle of the mini project create the various testing documents* and final test report document.

*Note: To create the various testing related documents refer to the text
―Effective Software Testing Methodologies by William E. Perry‖

Case Tools

Students are divided into batches of 5 each and each batch has to draw the following diagrams using UML for an ATM system whose description is given below.
UML diagrams to be developed are:

1. Use Case Diagram.
2. Class Diagram.
3. Sequence Diagram.
4. Collaboration Diagram.
5. State Diagram
6. Activity Diagram.
7. Component Diagram
8. Deployment Diagram.
9. Test Design.

Description for an ATM System

The software to be designed will control a simulated automated teller machine (ATM) having a magnetic stripe reader for reading an ATM card, a customer console (keyboard and display) for interaction with the customer, a slot for depositing envelopes, a dispenser for cash (in multiples of Rs. 100, Rs. 500 and Rs. 1000), a printer for printing customer receipts, and a key-operated switch to allow an operator to start or stop the machine. The ATM will communicate with the bank's computer over an appropriate communication link. (The software on the latter is not part of the requirements for this problem.)

The ATM will service one customer at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN) - both of which will be sent to the bank for validation as part of each transaction. The customer will then be able to perform one or more transactions. The card will be retained in the machine until the customerindicates that he/she desires no further transactions, at which point it will be returned - exceptas noted below.

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(16CS529) COMPUTER NETWORKS & MICROPROCESSOR AND MICROCONTROLLER LABORATORY

Part A (Computer Networks Laboratory)

COURSE OBJECTIVES

1. *To understand the functionalities of various OSI Layers.*
2. *To understand the routing algorithms and concepts.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Implement various framing techniques*
2. *Implement various data link layer protocols*
3. *Implement various Routing Algorithms and Congestion control algorithms*

1. Implement the data link layer framing methods such as character stuffing and bit stuffing.
2. 2.To write a program for implementing on a data set characters the three CRC polynomials – CRC 12, CRC16 and CRC CCIP
3. Implement Dijkstra‘s algorithm to compute the shortest path through graph.
4. Take an example subnetgraph with weights indicating delay between nodes. Now obtain Routing table art each node using distance vector routing algorithm.
5. Take an example subnet of hosts. Obtain broadcast tree for it.
6. Write a program for Hamming Code generation for error detection and correction.
7. Write a program for congestion control using Leaky bucket algorithm.

Part B (Microprocessor& Microcontrollers Laboratory)

COURSE OBJECTIVES

1. *To become skilled in Assembly Language programming.*
2. *To understand and learn 8051 microcontroller.*
3. *To learn 8051 Programming.*

COURSE OUTCOMES

1. *Able to write Assembly Language programs.*
2. *Able to develop 8051 Programs.*
3. *Able to understand Peripheral devices interfacing.*

Minimum **Ten** Experiments to be conducted (**Five** from each section)

I) Practice on Microprocessor fundamentals

1) Micro processors and Architectures
2) Registers
3) Addressing Modes
4) Instruction set

II) Microcontroller 8051 Trainer kit

Programs using the following Instruction set

1. Arithmetic operations.
2. Logic operations
3. Bit Manipulation operations
4. Conditional & Unconditional Branching operations

Interfacing using 8051 Trainer kit:

1. Keypad
2. Displays
3. Sensors
4. Traffic Light controller
5. Actuators

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(16HS615) ADVANCED ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

COURSE DESCRIPTION

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

COURSE OBJECTIVES

1. *Acquire vocabulary and use it contextually*
2. *Listen and speak effectively*
3. *Develop proficiency in academic reading and writing*
4. *Increase possibilities of job prospects*
5. *Communicate confidently in formal and informal contexts*
6. *To speak with clarity and confidence thereby enhances employability skills and to prepare effective job application*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Acquire rapid reading techniques to decode written text, evaluate significance of spoken text, and spot errors for effective transmission of ideas.*
2. *Innovate perfect design for technical report, resume and job application.*
3. *Improve presentational skills; extempore and prepared speeches.*
4. *Apply various means of communicative methods such as PPT, Poster and Oral presentation.*
5. *Project employability, meet the existing corporate requirements..*
6. *Brainstorm ideas and views through various activities such as group discussion and debate.*

UNIT I

COMMUNICATIVE COMPETENCY:

1. Functional English(Introducing yourself & others, Making Requests, Agreeing, Disagreeing)
2. Reading Comprehension
3. Listening Comprehension
4. Vocabulary for competitive purpose

UNIT II

TECHNICAL WRITING

1. Curriculum vitae
2. Cover Letter
3. E-mail writing

UNIT III
PRESENTATIONAL SKILLS

1. Oral presentation
2. Power point presentation
3. Extempore – Public Speaking
4. Stage Dynamics

UNIT IV
CORPORATE SKILLS

1. Dress code
2. Telephonic skills
3. Net-etiquette
4. Personality Development

UNIT V
GETTING READY FOR JOB

1. Group Discussion
2. Interview skills
3. JAM

Outcomes

- Flair in Writing and felicity in written expression.
- To enhance job prospects.
- Improving Effective Speaking Abilities.
- To prepare effective Interview techniques.

Minimum Requirements for Advanced Professional Communication Skills Lab:

The English Language Lab shall have two parts:

1. Computer Assisted Language Learning (CALL) Lab: The Computer Aided Language Lab for 60 Students with 60 systems one Master Console, LAN facility and English Language Software for self-study by learners.
2. The Communication Skills Lab with movable chairs and audio visual aids with a P. A. system, Projector, a Digital stereo audio & video system and Camcorder etc.
   System Requirement (Hardware component):
   Computer network with: LAN with minimum 60 multimedia systems with the following.
   Specifications:
   i) P- IV Processor
      a) Speed 2.8 GHZ
      b) RAM – 512 MB Minimum
      c) Hard Disk – 80 GB
   ii) Headphones of High quality

Suggested Software:

1. Clarity Pronunciation Power – Part I (Sky Pronunciation)
2. Clarity Pronunciation Power – Part II
3. K – Van Advanced Communication Skills
4. Walden Info Tech Software.

REFERENCES

1. *Effective Tech Communication*, Rizvi, Tata McGraw – Hill Education, 2007.
2. *Communication skills*, Sanjay Kumar & Pushpalatha, Oxford University Press, 2012.
3. *Writing Tutor. Advanced English Learners'* Dictionary, 9th Edition, Oxford University Press, 2015.
4. *Powerful Vocabulary Builder*, Anjana Agarwal, New Age International Publishers, 2011.
5. *Listening Extra*, Miles Craven, Cambridge University Press, 2008.
6. *Reading Extra*, Liz Driscoll, Cambridge University Press, 2004.
7. *Writing Extra*, Graham Palmer, Cam Cambridge University Press, 2004.
8. *Speak Well*, Jayashree Mohan raj et al, Orient Black swan, 2013.

Mode of Evaluation: Written Examination, Day-to-day Assessment

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(COE-IV) COMPREHENSIVE ONLINE EXAMINATION-IV

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(16HS617) APTITUDE PRACTICE-II

COURSE OBJECTIVES:

After thorough learning of Quantitative Aptitude and Reasoning, a student:

1. *Will be able to critically evaluate various real life situations by resorting to analysis of*
2. *key issues and factors.*
3. *Will be able to read between the lines and understand various language structures.*
4. *Will be able to demonstrate various principles involved in solving mathematical problems*
5. *and thereby reducing the time taken for performing job functions.*

COURSE OUTCOMES:

At the end of the course, students would be expected to:

1. *Have developed the subtle way of approaching in the candidate.*
2. *Have acquired the decision making with in no time.*
3. *Have acquired logical thinking during professional tenure.*
4. *Have obtained quick decision-making skills.*

UNIT I

Permutations and Combinations: Definition of permutation, Problems on Permutations, Definition of Combinations, Problems on Combinations.

Probability: Definition of Probability, Problems on coins, Dice, Deck of Cards.

UNIT II

Menstruation: Areas, Volumes of different solids, Problems on Areas, Volumes and Surface Areas.

UNIT III

Cubes: Basics of a cube, Formulae for finding volume and surface area of a cube, finding the minimum number of cuts when the number of identical pieces are given, Finding the maximum number of pieces when cuts are given, Problems on painted cubes of same and different colors, Problems on cuboids, Problems on painted cuboids, Problems on diagonal cuts.

UNIT IV

Number and letter series: Difference series, Product series, Squares series, Cubes series, Alternate series, Combination series, miscellaneous series, Place values of letters

Number and Letter Analogies: Definition of Analogy, Problems on number analogy,

Odd man out: Problems on number Odd man out, Problems on letter Odd man out, Problems on verbal Odd man out

UNIT V

Coding and decoding: Coding using same set of letters, Coding using different set of letters, Coding into a number, Problems on R-model.

Directions: Solving problems by drawing the paths, finding the net distance travelled, finding the direction, Problems on clocks, Problems on shadows, Problems on damaged compass, Problems on direction sense using symbols and notations.

Critical Reasoning: Problems on assumption, Problems on conclusions, Problems on inferences, Problems on strengthening and weakening of arguments, Problems on principle, Problems on paradox.

TEXT BOOKS:

1. Thorpe's verbal reasoning, GL Barrons, McGraw Hills, LSAT Materials
2. A modern approach to Logical reasoning, R S Agarwal, S.Chand ,

REFERENCE BOOKS:

1. Quantitative Aptitude,R S Agarwal, S Chand,
2. Quantitative Aptitude - G. L BARRONS
3. Quantitative Aptitude - AbhijitGuhaMcGraw Hills
4. Magical Book on Quicker Maths, Tyra, BSC publishing company

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(16MB750) MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS

COURSE OBJECTIVES

The objectives of this course are to equip the student with the basic inputs of Managerial Economics and Economic Environment of business and to enrich analytical skills in helping them take sound financial decisions for achieving higher productivity.

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the nature of managerial economics and the role of it in business firms*
2. *Identify the determinants of demand and apply cost analysis under different market conditions*
3. *Integrate the concepts of price and output decisions of business firms*
4. *Appreciate the importance of market structures and implement appropriate price and output decisions*
5. *To assess the financial statements of a firm and the financial performance of the firm through the financial statements*
6. *To measure operating, investing and financial performance of a firm*

UNIT - I - INTRODUCTION TO MANAGERIAL ECONOMICS

Managerial Economics - Definition, nature and scope – contemporary importance of Managerial Economics - Demand Analysis: Determinants- Law of Demand - Elasticity of Demand. Significance – Types – measurement of elasticity of demand - Demand forecasting- factors governing demand Forecasting- methods of demand forecasting –Relationship of Managerial Economics with Financial Accounting and Management.

UNIT - II - THEORY OF PRODUCTION AND COST ANALYSIS

Production Function – Short-run and long- run production - Isoquants and Isocosts, MRTS, least cost Combination of inputs - Cobb-Douglas production function - laws of returns - Internal and External Economies of scale - **Cost Analysis**: Cost concepts - Break-Even Analysis (BEA) – Managerial Significance and limitations of BEA - Determination of Break Even Point (Simple Problems)

UNIT -III - INTRODUCTION TO MARKETS AND NEW ECONOMIC ENVIRONMENT

Market structures: Types of Markets - Perfect and Imperfect Competition - Features, Oligopoly -Monopolistic competition. Price-Output determination - Pricing Methods and Strategies. New Economic Environment- Economic systems – Economic Liberalization – Privatization and Globalization

UNIT - IV - CAPITAL AND CAPITAL BUDGETING

Concept of Capital - Over and under capitalization – Remedial measures - Sources of Short term and Long term capital - Estimating Working Capital requirement – Capital budgeting – Features of Capital Budgeting proposals – Methods and Evaluation of Capital budgeting – Pay Back Method – Accounting Rate of Return (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method (simple problems)

UNIT - V - INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS

Financial Accounting – Concept - emerging need and importance - Double-Entry Book Keeping- Journal - Ledger – Trial Balance - Financial Statements - - Trading Account – Profit & Loss Account – Balance Sheet (with simple adjustments). Financial Analysis – Ratios – Techniques – Liquidity, Leverage, Profitability, and Activity Ratios (simple problems).

TEXT BOOKS

1. *Managerial Economics and Financial Analysis,* Aryasri, 4/e, TMH, 2009.
2. *Managerial Economics,* Varshney & Maheswari, Sultan Chand, 2009.

REFERENCES

1. *Financial Accounting and Analysis, Premchand Babu, Madan Mohan,* Himalaya, 2009
2. *Managerial Economics and Financial Analysis,S.A. Siddiqui and A.S. Siddiqui,* New Age International,. 2009.
3. *Principles of Business Economics, Joseph G. Nellis and David Parker,* Pearson, 2/e, New Delhi.
4. *Managerial Economics in a Global Economy, Domnick Salvatore,* Cengage, 2009.
5. *Managerial Economics, H.L.Ahuja,* S.Chand, 3/e, 2009

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(16CS530) CYBER SECURITY

COURSE OBJECTIVES

1. *Understanding of various cyber crimes*
2. *Understanding viruses*
3. *Understanding crime Investigation*
4. *Understanding Digital Forensics*
5. *Understanding Laws and Ethics*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Identify the fundamentals of cybercrimes.*
2. *Analyze the cyber offenses.*
3. *Understand the various cyber threats, attacks, vulnerabilities and its defensive mechanism.*
4. *Understand the Tools and Methods Used in Cybercrime.*
5. *Design suitable security policies for the given requirements.*
6. *Survey the industry practices and tools to be on par with the recent trends.*

UNIT – I

INTRODUCTION: Introduction to Cyber Crime, Classification of Cybercrimes, Cyber Crime The Legal Perspective, Cybercrime The Indian Perspective, Cyber Crime the Indian ITA 2000, A Global Perspective on Cybercrime.

Cyber Offences: How Criminals Plan Them: Introduction, How the Criminals plan the Attacks, Social Engineering, Cyberstalking, Cybercafé and Cybercrimes, Botnets, Cloud Computing.

UNIT-II

Cybercrime: Mobile and Wireless Devices- Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges posed by Mobile Devices, Registry settings for Mobile Devices, Authentication Service Security, Attacks on Mobiles / Cell Phones, Mobile Devices Security Implications for Organizations, Organizational Measures for handling Mobile Devices related Issues, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT –III

Tools and Methods used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, KeyLoggers, Spywares, Virus and Worms, Trojan Horse and BackDoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks.

UNIT – IV

Cybercrimes and Cybersecurity: The Legal Perspective – Cybercrime and the Legal Landscape around the world, Why do we need Cyber laws: The Indian Context, The IndianIT Act, Challenges to Indian Law and Cybercrime Scenario in India, Digital Signatures and Indian IT Act, Amendments to the Indian IT Act, Cybercrime and Punishment, Cyberlaw, Technology, and Students: Indian Scenario.

UNIT – V

Understanding Computer Forensics: Introduction, History background of cyber Forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, chain of custody Concepts, Network Forensics, Approaching a Computer Forensics Investigation, Challenges in Computer Forensics, Special Tools and Techniques, Forensics Auditing.

TEXT BOOKS

1. *Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives*, Nina Godbole and Sunil Belapure, Wiley INDIA.
2. *Introduction to Cyber Security*, Chwan- Hwa(john) Wu,J.DavidIrwin. CRC Press T&F Group

REFERENCES

1. *Cyber Security Essentials*, James Graham, Richard Howard and Ryan Otson, CRC Press.
2. *Computer Forensics and Investigations*, Nelson Phillips and Enfinger Steuart, Cengage Learning, New Delhi, 2009.
3. *Incident Response and Computer Forensics*, Kevin Mandia, Chris Prosise, Matt Pepe, Tata McGraw -Hill, New Delhi, 2006.
4. *Software Forensics*, Robert M Slade, Tata McGraw -Hill, New Delhi, 2005.
5. *Cybercrime*, Bernadette H Schell, Clemens Martin, ABC –CLIO Inc, California, 2004, ‖Understanding Forensics in IT –, NIIT Ltd, 2005.

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(16CS531) DATA WAREHOUSING AND DATA MINING

COURSE OBJECTIVES

1. *To learn the concepts of database technology evolutionary path which has led to the need for data mining and its applications*
2. *To learn Data mining algorithms to build analytical applications*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the basic concepts of data warehouse and data mining*
2. *Apply preprocessing techniques for data cleansing*
3. *Analyze and evaluate performance of algorithms for Association Rules*
4. *Analyze Classification and Clustering algorithms*
5. *Implement various Data Mining techniques*
6. *Apply Data mining algorithms to build analytical applications.*

UNIT - I

Introduction:

What Motivated Data Mining? Why is it important? What is Data Mining? Data Mining-On What Kind of Data? Data Mining Functionalities- What Kinds of Patterns can be Mined? Classification of Data mining Systems, Data Mining Task Primitives, Major Issues in Data Mining.

Data Preprocessing: Data Preprocessing: Why Preprocess the Data? Data Cleaning, Data Integration, Data Reduction , Data Transformation and Data Discretization.

UNIT - II

Data Warehouse and OLAP Technology: An Overview, What is a Data Warehouse? A Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehouse to Data Mining, Attribute Oriented Induction.

Data Warehousing Case studies in Government: Data Mining Applications, customer data warehouse of the world‘s first and largest online bank in the united kingdom, A German super market EDEKA‘s Data warehouse, Data Warehouse for the Government of Andhra Pradesh, Data Warehousing in the Tamilnadu Government, A Highly available Data Warehouse-Atypical Business data Warehouse for a Trading company.

UNIT - III

Mining Frequent Patterns, Associations and Correlations:

Basic Concepts and a Road Map, Efficient and Scalable Frequent Item Set Mining Methods, Mining various kinds of Association rules, From Association Mining to Correlation Analysis, Constraint based Association Mining.

UNIT - IV

Classification and Prediction: What is Classification? What is Prediction? Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian

Classification, Rule-Based Classification, Classification by Back propagation.
Prediction: Prediction, Accuracy and Error Measures, Evaluating the Accuracy of a Classifier or Predictor.

UNIT - V

Cluster Analysis: What is Cluster Analysis? Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density Based Methods, Grid Based Methods, Model Based Clustering Methods, Outlier Analysis, Applications of Data mining.

TEXT BOOKS

1. *Data Mining: Concepts and Techniques*, Jiawei Han and Micheline Kamber, Elsevier, Second Edition,
2. *Data Ware housing: Concepts, Techniques, Products and Applications*, Prabhu C.S.R., Prentice Hall of India, 2011

REFERENCES

1. *Introduction to Data Mining* – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson Education.
2. *Data Mining Techniques*, Arun K Pujari, University Press,2001.

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(16CS532) MOBILE APPLICATION DEVELOPMENT

COURSE OBJECTIVES

1. *To introduce the Android technology and its application.*
2. *Design & program real working education based mobile application projects.*
3. *Become familiar with common mobile application technologies and platforms; open files, save files, create and program original material, integrate separate files into a mobile application project, create and edit audio sound effects & music.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand Android platform and it's environment*
2. *Know and apply the components of the screen*
3. *Describe the limitations and challenges of working in a mobile and wireless environment as well as the commercial and research opportunities presented by these technologies*
4. *Correlate and apply the different types of application models/architectures used to develop mobile software applications*
5. *Illustrate the components and structure of a mobile development frameworks (Android SDK and Eclipse Android Development Tools (ADT))*
6. *Identify how and when to apply the different components to develop a working system*

UNIT - I

The Android Platform: Introduction to the Android platform, Required tools, Setting up environment, creating Hello world Application; Understanding activities, Linking activities using Intents, Fragments.

UNIT - II

Understanding the Components of a Screen, Adapting to Display Orientation, Managing Changes to Screen Orientation, Utilizing the Action Bar.

UNIT - III

Designing user interface with views: Basic views, Picker Views, List views; Pictures and menus with views.

UNIT - IV

Data Persistence: Saving and loading user preferences, Persisting data to files, creating and using databases.

Content providers**:** Sharing Data in Android, Using a Content Provider, Creating Own

Content Providers.

UNIT - V

Messaging**:** Sending SMS Messages Programmatically, Getting Feedback after Sending a message, Sending SMS Messages Using Intent, Receiving SMS Messages, Caveats and Warnings.

Developing and Publishing Android Applications**:** Creating Your Own Services, Establishing Communication between a Service and an Activity, Binding Activities to Services, Understanding Threading**;** Preparing for Publishing, Deploying APK Files.

TEXTBOOKS

1. *Beginning Android 4 Application Development* , Wei-Meng Lee, Wrox Publications.
2. *Android Programming with Android Studio*, J.F.Dimarzio, @p2p.wrox.com, 4th Edition

REFERENCES

1. *Introduction to android application development*, 4th edition, Addision Wesley by Joseph Annuzzi Jr., Lauren Darcey, Shane Conder.
2. *Android: A programmer's guide*, Jerome Dimarzio, McGrawHill

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(16CS533) SYSTEM APPLICATIONS & PRODUCT (SAP)
DEPARTMENT ELECTIVE-I

COURSE OBJECTIVES

1. *Understand the role of enterprise systems in supporting business processes.*
2. *Identify key integration points between financial accounting and other processes.*
3. *Understand the role of the credit management process in fulfillment.*
4. *Analyze the key concepts associated with material planning.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Develop software projects by applying various process models.*
2. *Demonstrate knowledge of project management terms and techniques*
3. *Perform PERT computations and evaluate the critical path*
4. *Perform CPM computations and identify the critical path*
5. *Describe main cost management process types.*
6. *Illustrate role of staffing in software project management.*

UNIT-I:

Introduction to Business Processes: The Functional Organizational Structure, Business Processes, Global Bike Incorporated (GBI). Introduction to Enterprise Systems: Enterprise Systems, Data in an Enterprise System, Reporting. Introduction to Accounting: Organizational Data, Master Data, Key Concepts, Processes, Reporting.

UNIT-II:

The Procurement Process: Organizational Data, Master Data, Key Concepts, Process, Reporting.

UNIT – III:

The Fulfillment Process: Organizational Data, Master Data, Process, Credit Management Process, Reporting.

UNIT – IV:

The Production Process: Master Data, Process, Reporting. Inventory and Warehouse Management Processes: Inventory Management, Organizational Data in warehouse Management, Master Data in Warehouse Management, Processes in Warehouse Management, Reporting.

UNIT – V:

The Material Planning Process: Master Data, Process, Reporting, Process Integration: Procurement, Fulfillment, and IWM Processes, Procurement, Fulfillment, Production, and IWM Processes.

TEXT BOOK

1. Integrated Business Processes with ERP systems || SimhaR.Magal, Jeffery word, JOHN WILEY & SON S, INC

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(16CS534) SOFTWARE PROJECT MANAGEMENT
DEPARTMENT ELECTIVE-I

COURSE OBJECTIVES

1. *To outline the need for Software Project Management*
2. *To highlight different techniques for software cost estimation and activity planning.*
3. *To identify main elements of software project*
4. *To explain the purpose of a project's planning documents*
5. *To construct the scope statement and the work breakdown structure*
6. *To approach the project planning in an organized step-by-step manner*
7. *To construct project network diagrams and use critical path analysis*
8. *To portray how the software can assist in project management*
9. *To describe main cost management process types*
10. *To articulate what is involved in quality assurance, planning and control on projects*
11. *To demonstrate RUP, Microsoft project 2007 & open source software project management tools*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Develop software projects by applying various process models.*
2. *Demonstrate knowledge of project management terms and techniques*
3. *Perform PERT computations and evaluate the critical path*
4. *Perform CPM computations and identify the critical path*
5. *Describe main cost management process types.*
6. *Illustrate role of staffing in software project management.*

UNIT - I: PROJECT EVALUATION AND PROJECT PLANNING

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

UNIT - II : PROJECT LIFE CYCLE AND EFFORT ESTIMATION

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

UNIT - III : ACTIVITY PLANNING AND RISK MANAGEMENT

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

UNIT - IV : PROJECT MANAGEMENT AND CONTROL

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

UNIT - V : STAFFING IN SOFTWARE PROJECTS

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

TEXT BOOKS

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

REFERENCES

1. *Managing Global Projects*, Ramesh, Gopalaswamy, "", Tata McGraw Hill, 2001.
2. *Software Project Management*, Royce, Pearson Education, 1999.
3. *Software Project Management in Practice*, Jalote, Pearson Education, 2002.
4. *Software Project Management: A Unified Framework*, 2010 Edition, Walker Royce

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(16CS535) HUMAN COMPUTER INTERACTION
DEPARTMENT ELECTIVE-I

COURSE OBJECTIVES

1. *Gain an overview of Human-Computer Interaction (HCI), with an understanding of user interface Design*
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 human computer interaction tasks and recognize the limits of human performance as they apply to computer operation*
4. *Be familiar with a variety of both conventional and non-traditional user interface paradigms*

COURSE OUTCOMES

At the end of the course students will be assessed to determine whether they are able to:

1. *Prioritize innovative ways of interacting with computers*
2. *Illustrate the disabled by designing non traditional ways of interacting*
3. *Use cognitive psychology in the design of devices for interaction*
4. *Apply conventional and non traditional user interface Paradigms*
5. *Describe how testing is applied in computer interaction*
6. *Understand different software tools used in computer interaction*

UNIT - I

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 – Understanding how people interact with computers, importance of human characteristics human consideration, Human interaction speeds, and understanding business functions.

Screen Designing: Design goals – Screen meaning 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 informationsimply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design

UNIT - III

System menus: Structures of Menus, Functions of Menus, Content of Menus, Kinds of Graphical menus

Windows: Window characteristics, Components of a window, Window presentation styles, Types of windows, Windom management

Controls: Characteristics of device based controls, Selecting the proper device based controls, Operable controls, Text Entry/Read-only controls, Selection controls, Combination Entry/selection controls, Selecting the proper controls

UNIT - IV

Graphics: Icons, Multimedia, Color-what is it, Color uses, Color and Human vision, Choosing colors

Testing: The purpose and importance of usability testing, Scope of testing, Prototypes, Kinds of Tests, Developing and conducting the test.

UNIT - V

Software tools – Specification methods, interface – Building Tools.

Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

TEXT BOOKS

1. *The essential guide to user interface design*, Wilbert O Galitz, 2nd edition, 2013, Wiley.

REFERENCES

1. *Designing the user interface*, 3rd Edition Ben Shneidermann, Pearson Education Asia.
2. *Human –Computer Interaction*, D.R.Olsen, Cengage Learning.
3. *Human – Computer Interaction*, I.Scott Mackenzie, Elsevier Publishers.
4. *Interaction Design*, Prece, Rogers, Sharps, Wiley Dreamtech.
5. *User Interface Design*, SorenLauesen, Pearson Education.
6. *Human –Computer Interaction*, Smith - Atakan, Cengage Learning
7. *Human – Computer Interaction*. Alan dix, janet fincay, gre goryd, abowd, russell bealg, pearson.

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(16CE145) ELEMENTS OF ROAD TRAFFIC SAFETY
(OPEN ELECTIVE)

COURSE OBJECTIVES

The main objective of this course is to make student aware about the accident statistics globally and in India specifically, its causes and measure to overcome the situation. The traffic regulation, parking problems, understanding of road signs, signals and marking arealso taught; so that the student is well informed about all safety measures that a traffic engineer need to understand.

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Identify the causes for road accidents and can implement measures to prevent road accidents*
2. *Describe traffic regulations and implement parking methods*
3. *Classify different traffic signal and can design traffic signal system*
4. *List and illustrate various traffic signs*
5. *List and discuss various road markings*
6. *Discuss importance of street lighting and classify various street lighting system*

UNIT – I

ROAD ACCIDENTS – CAUSES & PREVENTION: Road Accidents & TrafficEngineering – Accident Situation in India – International Comparison of Road Accidents – Road & its Effects on Accidents – The Vehicle – The Driven – Skidding – Speed in Relation of Safety – Weather & its Effects on Accidents – Pedestrian Safety -Cyclists – Motor Cycle& Scooter Rider – Parking & Its Influence on Accident – Legislation, Enforcement, Education & Propaganda – Cost of Road Accidents

UNIT – II

REGULATIONS OF TRAFFIC: Basic Principals of Regulation – Regulation of Speed – Regulation of Vehicles – Regulations Concerning the Driver – Regulations ConcerningTraffic – Parking Regulations – Enforcement of Regulations

PARKING: Traffic & Parking Problems – Ill-Effects of Parking – Zoning & Parking Space Requirement Standards – Design Standards for On-Street Parking Facilities – Traffic Regulatory Measures for On-Street Parking – Off-Street Parking Facilities – Peripheral Parking Schemes – Loading & Unloading Facilities – Truck Terminals – Long Distance Bus Terminals

UNIT – III

TRAFFIC SIGNS: Importance of Traffic Signs – Need for International Standardization – The Situation in India – General Principals of Traffic Signing – Types of Traffic Signs – Danger

Signs (Warning Signs or Cautionary Signs) – Prohibitory Signs – Mandatory Signs – Informatory Sings – Indication Signs – Direction Signs, Advance Direction Signs & Place Identification Signs – Overhead Sings – Route Marker Sings – Location, Height & Maintenance of Traffic Sings

UNIT – IV

TRAFFIC SIGNALS: Advantages & Disadvantages of Traffic Signals – Signal Indications – Signal Face – Illustration of the Signals – Number & Location of Signals Faces – Amber Period, Red/Amber Period & Inter Green Period – Fixed Time Signals & Vehicle Actuated Signals – Determination of Optimum Cycle Length & Signal Settings for an Intersection with Fixed Time Signals – Warrants for Signals – Co-ordinated Control of Signals – Signal Approach Dimensions – Area Traffic Control – Delay at Signalized Intersection

UNIT – V

ROAD MARKINGS: Function – Types of Road Marking – General Principals of Longitudinal Pavement Markings – Material & Color – Centre Lines – Traffic Lane Lines – No Overtaking Zone Markings – Pavement Edge Lines – Carriageway Width Reduction Transition Marking – Obstruction Approach Markings – Stop Lines – Pedestrian Crossings – Cyclist Crossings – Route Direction Arrows – Word Messages – Markings at Approaches to Intersections – Parking Space Limits – Object Markings

STREET LIGHTING: Need for Street Lighting – Definition of Common Terms – Some Laws of Illumination – Mounting Height – Spacing – Lantern Arrangements – Type of Lamps – Lamp Installation of _T' Junctions & Cross Roads – Illumination of Traffic Rotaries – Lighting of Bends – Lighting of Dual Carriageways – Lighting of Roads Carrying Only Local Traffic – Lighting Bridges – Tunnel Lighting – Maintenance of Lighting Installation

TEXT BOOKS

1. *Traffic Engineering & Transport Planning* by K. R. Kadiyali 8th Edition, Khanna Publishers

REFERENCES

1. *Highway Engineering* by Dr S.K. Khanna& Dr. C.E.G. Justo, 8thEdition, New Chand & Bros, Roorkee

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(16EE239) NEURAL NETWORKS & FUZZY LOGIC
OPEN ELECTIVE

COURSE OBJECTIVES

This course introduces the basics of Neural Networks and essentials of Artificial Neural Networks with Single Layer and Multilayer Feed Forward Networks.

1. *It deals with Associate Memories and introduces Fuzzy sets and Fuzzy Logic systemcomponents.*
2. *The Neural Network and Fuzzy Network system application is presented. This subjectis very important and useful for doing Project Work.*
3. *The main objective of this course is to provide the student with the basicunderstanding of neural networks and fuzzy logic fundamentals.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the basic concept of biological neural networks and learning strategies in NN*
2. *Analyze various supervised and unsupervised learning networks*
3. *Comprehend the concepts of feed forward networks .*
4. *Understand the basic concepts of fuzzy logic.*
5. *Create Fuzzy models by applying fuzzy operations.*
6. *Analyze the application of fuzzy logic control to real time systems*

UNIT - I
FUNDAMENTALS OF ARTIFICIAL NEURAL NETWORKS

Neural networks - introduction, artificial neural network, advantages, biological neural network, architectures of artificial neural networks -activation functions, important terminologies of ANN, McCulloch - Pitts neuron model, learning strategies - supervised, unsupervised, reinforced.

UNIT - II
SUPERVISED, UNSUPERVISED NETWORKS

Learning rules - Hebbian learning rule, perceptron learning rule, delta learning rule, widrow - hoff learning rule, Back propagation neural network-architecture, training algorithm, learning factors - initial weights, leaning constant, Perceptron Neural Network- architecture, training algorithm. Applications of Neural Networks (any one problem).

UNIT - III
ASSOCIATIVE MEMORIES

Associative memories: concepts, Bidirectional Associative Memory (BAM) - architecture, discrete BAM - testing algorithm, analysis of hamming distance, energy function and storage capacity. Discrete Hopfield network architecture and training algorithm.

UNIT - IV

CLASSICAL AND FUZZY SETS

Introduction to classical sets-properties–Fuzzy vscrsip-Fuzzy sets , Membership functions, basic fuzzy set operation ,properties of fuzzy sets- Fuzzy relations –Fuzzy Cartesian product, operations on fuzzy relations.

UNIT -V

FUZZY LOGIC SYSTEMS

Fuzzification – Fuzzy quantifiers, fuzzy inference, fuzzy rule based system - development of rule base and decision making system - Defuzzification to crisp sets - Fuzzification and Defuzzification methods. Applications of Fuzzy logic systems (any one problem)

TEXT BOOKS

1. *Principles of Soft computing,* S.N. Sivanandam, S.N. Deepa, Wiley India private Ltd., 2nd Edition, 2013.
2. *Fuzzy Logic with Engineering Application,* Timothy J Ross,, McGraw Hill Inc.1997.

REFERENCES

1. *Introduction to Artificial Neural Networks*, Jacek M. Zurada, Jaico Publishing House.
2. *Neural Networks - A Comprehensive Foundation*, Simon Haykin, Prentice- Hall Inc, 1999

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(16ME313) NON- CONVENTIONAL ENERGY RESOURCES (OPEN ELECTIVE)

COURSE OBJECTIVES

1. *To Understand and analyze the pattern of renewable energy resources Suggest methodologies / technologies for its utilization Economics of the utilization and environmental aspects.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Identify the new methodologies / technologies for effective utilization of renewable energy sources.*
2. *Understand the need of energy conversion and the various methods of energy storage*
3. *Analyse the field applications of solar energy*
4. *Identify Winds energy as alternate form of energy and to know how it can be tapped*
5. *understand bio gas generation and its impact on environment*
6. *Understand the Geothermal &Tidal energy, its mechanism and Illustrate the concepts of Direct Energy Conversion systems & their applications.*

UNIT I: Introduction -World Energy Use – Classification of Energy‘s-Reserves of Energy Resources – Environmental Aspects of Energy Utilization– Need of Renewable Energy– Renewable Energy Scenario in Andrapradesh, India and around the World.

UNIT II: Solar Energy -Solar Radiation – Measurements of Solar Radiation - Flat Plate and Concentrating Collectors – Solar direct Thermal Applications – Solar thermal Power Generation - Fundamentals of Solar Photo Voltaic Conversion – Solar Cells – Solar PV Power Generation – Solar PV Applications.

UNIT III: Wind Energy - Wind Data and Energy Estimation – Types of Wind Energy Systems – Performance – Site Selection – Details of Wind Turbine Generator – Safety and Environmental Aspects.

UNIT IV: Bio – Energy- Biomass direct combustion – Biomass gasifiers – Biogas plants – Digesters – Ethanol production – Bio diesel – Cogeneration - Biomass Applications

UNIT V: **Other Sources of Energy** - Tidal energy – Wave Energy – Open and Closed OTEC Cycles – Small Hydro-Geothermal Energy – Hydrogen and Storage - Fuel Cell Systems – Hybrid Systems.

TEXT BOOKS

1. Rai. G.D., "Non-Conventional Energy Sources", Khanna Publishers, New Delhi, 2011.
2. Twidell, J.W. & Weir, A., "Renewable Energy Sources", EFN Spon Ltd., UK, 2006.

REFERENCES

1. Sukhatme. S.P., "Solar Energy", Tata McGraw Hill Publishing Company Ltd., NewDelhi, 1997.
2. Godfrey Boyle, "Renewable Energy, Power for a Sustainable Future", Oxford University Press, U.K., 1996.
3. Tiwari. G.N., Solar Energy – "Fundamentals Design, Modelling & Applications", Narosa Publishing House, New Delhi, 2002.
4. Freris. L.L., "Wind Energy Conversion Systems", Prentice Hall, UK, 1990.
5. Johnson Gary, L. "Wind Energy Systems", Prentice Hall, New York, 1985
6. David M. Mousdale – "Introduction to Biofuels", CRC Press, Taylor & Francis Group,USA 2010
7. Chetan Singh Solanki, Solar Photovoltaics, "Fundamentals, Technologies and Applications", PHI Learning Private Limited, New Delhi, 2009.

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(16EC443) MATLAB PROGRAMMING
(OPEN ELECTIVE)

COURSE OBJECTIVES

1. *Understand the MATLAB Desktop, Command window and the Graph Window*
2. *Be able to do simple and complex calculation using MATLAB*
3. *Be able to carry out numerical computations and analyses*
4. *Understand the mathematical concepts upon which numerical methods*
5. *Ensure you can competently use the MATLAB programming environment*
6. *Understand the tools that are essential in solving engineering problems*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the MATLAB Desktop, Command window and the Graph Window Be able to do simple and complex calculation using MATLAB*
2. *Apply numeric techniques and computer simulations to solve engineering related problems using arrays and structures.*
3. *Apply a top down, modular, and systematic approach to design, write, test, and debug sequential MATLAB programs to achieve computational objectives using Functions and file management.*
4. *Demonstrate understanding and use of fundamental data structures (classes)*
5. *Create and control simple plot and user interface graphics objects in MATLAB.*
6. *Understand and implement Linear Algebraic using various methods in MAT LAB*

UNIT-I

Introduction to MATLAB, MATLAB Interactive Sessions, Menus and the toolbar, computing with MATLAB, Script files and the Editor Debugger, MATLAB Help System, Programming in MATLAB.

UNIT-II

Arrays Arrays, Multidimensional Arrays, Element by Element Operations, Polynomial Operations Using Arrays, Cell Arrays, Structure Arrays.

UNIT-III

Functions & Files Elementary Mathematical Functions, User Defined Functions, Advanced Function Programming, Working with Data Files.

UNIT-IV

Programming with MATLAB Program Design and Development Relational Operators and Logical Variables Logical Operators and Functions Conditional Statements for Loops while Loops the switch Structure Debugging MATLAB Programs Applications to Simulation, Problems

UNIT-V

Plotting Functions Additional Commands and Plot Types Interactive Plotting in MATLAB Three-Dimensional Plots Summary, Problems

TEXT BOOKS

1. G.H.Golub and C.F.Van Loan, ‐Matrix Computations‖, 3rd Ed., Johns Hopkins University Press, 1996.
2. B.N.Datta, ‐Numerical Linear Algebra and Applications‖, Brooks/Cole, 1994 (out of print)
3. L. Elden, ‐Matrix Methods in Data Mining and Pattern Recognition‖, SIAM Press, 2007 Misc.

REFERENCES

1. NA-digest, http://www.netlib.org/na-digest-html
2. Society for Industrial and Applied Mathematics (SIAM), see http://www.siam.org
3. Google ‐MATLAB Primer‖ or ‐MATLAB Tutorial‖ and you should be able to access lots of free MATLAB.

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(16MB752) INTELLECTUAL PROPERTY RIGHTS
(OPEN ELECTIVE)

COURSE OBJECTIVES

1. *Aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights*
2. *Identify different types of intellectual properties, ownership rights and the scope of the protection*
3. *Get an adequate knowledge on patents, trademarks, copy rights and to get property rights for their intellectual work*
4. *Able to identify, apply, and assess ownership rights, registration processes for IP rights*
5. *To discern the approaches for intellectual property management and intellectual property audits*
6. *Demonstrate knowledge and understanding on unfair competition and latest developments in IP rights at international level*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights*
2. *Identify different types of intellectual properties, ownership rights and the scope of the protection*
3. *Get an adequate knowledge on patents, trademarks, copy rights and to get property rights for their intellectual work*
4. *Able to identify, apply, and assess ownership rights, registration processes for IP rights*
5. *To discern the approaches for intellectual property management and intellectual property audits*
6. *Demonstrate knowledge and understanding on unfair competition and latest developments in IP rights at international level*

UNIT - I

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

UNIT - II

Trade Marks: Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT - III

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

UNIT - V

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, international development in trade secrets law.

TEXT BOOKS

1. *Intellectual property right*, Deborah, E. Bouchoux, cengage learning.

REFERENCES

1. *Intellectual property right - Unleashing the knowledge economy*, prabuddhaganguli, Tata McGraw Hill Publishing Company Ltd.

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(16CS539) DATA WAREHOUSING AND DATA MINING LAB

COURSE OBJECTIVES

The objectives of the course:

1. *Learn to perform data mining tasks using a data mining toolkit (such as open sourceWEKA)*
2. *Explain the data sets and data preprocessing*
3. *Demonstrate the working of algorithms for data mining tasks such association rule mining,classification, clustering and regression*
4. *Exercise the data mining techniques with varied input values for different parameters*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Explore WEKA tool*
2. *Perform data preprocessing tasks*
3. *Demonstrate association rule mining on datasets*
4. *Implement classification techniques on datasets*
5. *Implement clustering and regression techniques on datasets*
6. *Design and implement data mining algorithms*

Description: The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans mustconsider two opposing factors. On the one hand, a bank wants to makes many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient. To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.
2. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

The German Credit Data:

Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data (Down load from web). In spite

of the fact that the data is German, you should probably make use of it for thisassignment. (Unless you really can consult a real loan officer !)

A few notes on the German dataset

- DM stands for Deutsche Mark, the unit of currency, worth about 90cents Canadian (but looks and acts like a quarter).
- Owns telephone. German phone rates are much higher than in Canadaso fewer people own telephones.
- Foreign worker. There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.
- There are 20 attributes used in judging a loan applicant. The goal is the classify the applicant into one of two categories, good or bad.

Subtasks : (Turn in your answers to the following tasks)

1. List all the categorical (or nominal) attributes and the real-valued attributes separately.
2. What attributes do you think might be crucial in making the credit assessment? Come up with some simple rules in plain English using your selected attributes.
3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training.
4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly ? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy ?
5. Is testing on the training set as you did above a good idea ? Why or Why not ?
6. One approach for solving the problem encountered in the previous question is using cross validation ? Describe what is cross validation briefly. Train a Decision Tree again using cross validation and report your results. Does your accuracy increase/decrease ?Why ?
7. Check to see if the data shows a bias against "foreign workers"(attribute 20),or "personal-status" (attribute 9). One way to do this(perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tabinWeka's GUI Explorer. Did removing these attributes have any significant effect? Discuss.
8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the raff data file to get all the attributes initially before you start selecting the ones you want.)
9. Sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting them is classifications equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6

(using equal cost)?

10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees How does the complexity of a Decision Tree relate to the bias of the model ?
11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain ? Also, report your accuracy using the pruned model. Does your accuracy increase ?
12. (Extra Credit): How can you convert a Decision Trees into "if-then else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules. PART, train this model and report the set of rulesobtained. Sometimes just one attribute can be good enough in making the decision, yes, just one ! Can you predict what attribute that might be in this dataset ?One R classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and one R.

Task Resources:

Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)

- Decision Trees (Source: Tan, MSU)
- Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)
- Weka resources:
    1. Introduction to Weka (html version) (download ppt version)
    2. Download Weka
    3. Weka Tutorial
    4. ARFF format
    5. Using Weka from command line

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(16CS540) MOBILE APPLICATION DEVELOPMENT LAB

COURSE OBJECTIVES

The student should be made to:

1. *Know the components and structure of mobile application development frameworks for Android and windows OS-based mobiles.*
2. *Understand how to work with various mobile application development frameworks. Learn the basic and important design concepts and issues of development of mobile applications.*
3. *Understand the capabilities and limitations of mobile devices.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Develop mobile applications using GUI and Layouts*
2. *Create mobile applications Even Listeners*
3. *Write mobile applications using Database*
4. *Demonstrate mobile applications using RSS feed, SMS*
5. *Illustrate mobile applications using Multithreading and GPS*
6. *Analyze and discover own mobile app for simple needs*

LIST OF EXPERIMENTS:

1. Develop an application that uses GUI components, Font and Colors.
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of database.
6. Develop an application that makes use of RSS Feed.
7. Implement an application that implements Multithreading.
8. Develop a native application that uses GPS location information.
9. Implement an application that writes data to the SD card.
10. Implement an application that creates an alert upon receiving a message.
11. Write a mobile application that creates alarm clock.

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(16MB751) ENTREPRENEURSHIP DEVELOPMENT

COURSE OBJECTIVE: *The objective of the course is to make the students aware of the importanceof entrepreneurship opportunities available in the society for the entrepreneur.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *The ability to discern distinct entrepreneurial traits and identify the successful elements of successful entrepreneurial ventures*
2. *Consider the legal and financial conditions for starting a venture and to assess the opportunities and constraints for new ventures*
3. *Design strategies for the successful implementation of ideas*
4. *Comprehend the evaluation of business opportunity from the prospective of an investor*
5. *Identify the most suitable sources of finance for startups*
6. *Write and Execute their own Business plan*

UNIT-I

Introduction to Entrepreneurship: Concept of Entrepreneur‘s, Enterprise and Entrepreneurship; Characteristics, Qualities, Functions of entrepreneur and Advantages of Entrepreneurship; Role of entrepreneurship in Economic development, Challenges faced by entrepreneurs, Entrepreneurial scenario in India and Abroad; Elements of Social Entrepreneurship, Women Entrepreneurship, Corporate Entrepreneurship and Intrapreneurship, Rural and Urban Entrepreneurship.

UNIT-II

Small Business and its importance: Introduction, Need, Classification of Micro, Small and Medium Enterprises (MSMEs), Role of MSMEs, Problems of MSMEs, Steps for Starting MSMEs, The role of government in supporting MSMEs in India.

Forms of Business Organization: Evaluation of Form of Business organization : Sole Proprietorship, Partnership, Joint Hindu Family, Joint Stock Company and Co-operative Society. Special forms of business ownership: Licensing, Franchising and Leasing.

UNIT-III

Innovation and Idea Generation in Entrepreneurship: Concept of Invention and Innovation, types of innovation, Sources of Innovation, Importance of Innovation in Entrepreneurship. Sources of new ideas, Methods of generating ideas and Opportunity recognition and idea generation in entrepreneurship. Intellectual Property Rights (IPRs): Patents, trademarks, copyrights, and trade secrets. E-commerce and Business Start-ups,

Sources of information for Start-up Entrepreneurs in India. Problems of Start-ups without IPRs

UNIT-IV

Entrepreneurial Motivation: Concept of Motivation and Factors influencing the entrepreneurs; Motivational Theories-Maslow's Need Hierarchy Theory, McClelland's Acquired Need Theory. Entrepreneurship Development Programs (EDPs) - Need and Role of EDPs. Opportunities for entrepreneurship in present scenario. Successful entrepreneurs.

Financing of Enterprises: Source of financing - Debt capital, seed capital, venture capital, Loans available for starting ventures in India, Role of government agencies in small business financing. Role of consultancy organizations.

UNIT-V

Project Planning and Feasibility Study: Meaning of Project, Project Life Cycle, Stages of Planning Process. Project Planning and Feasibility, Project proposal and report preparation.

TEXT BOOKS

1. *Entrepreneurship*, 8/e, Robert D Hisrich, Mathew J.Manimala, Michael P Peters, Dean A Shepherd, McGraw Hill Education.
2. *The Dynamics of Entrepreneurial Development and Management*, Vasanth Desai, Himalaya Publishing House, Mumbai.

REFERENCES

1. *Entrepreneurial Development*, S.S. Khanka, S. Chand and Company Limited.,
2. *Fundamentals of Entrepreneurship*, H. Nandan, PHI.
3. *Entrepreneurship Management – text and cases*, Bholanath Dutta, Excel Books.
4. *Entrepreneurship – New venture Creation*, Holt, PHI.
5. *Entrepreneurial Development*, Ramachandran, Tata McGraw Hill, New Delhi.
6. *Entrepreneurial Development*, Gupta and Srinivasan, S Chand & Sons, New Delhi

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(16CS536) DATA SCIENCE & ANALYTICS
DEPARTMENT ELECTIVE-II

COURSE OBJECTIVES

1. *This course provides foundation level training that enables immediate and effectiveparticipation in big data and other analytics projects.*
2. *It includes an introduction to database management and big data analytics.*
3. *The course provides grounding in basic analytic methods and an introduction to big dataanalytics technology and tools.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the basics of Database Management Systems and SQL,PL/SQL*
2. *Apply Big data analytics in various real world applications*
3. *Understand the Life cycle of Data Analytics*
4. *Deploy the Data Analytics Lifecycle to address big data analytics projects*
5. *Understand the basics of R tool and implement data visualization using it*
6. *Analyse Advanced analytics concepts : clustering, classification and regression*

UNIT I:

Data Base Management System: Introduction to Database Management Systems, Purpose of Database Systems, Database-System Applications, View of Data, Database Languages, Database System Structure. Introduction to NoSQL Database, Types and examples of NoSQL Database- Key value store, document store, graph, Performance, Structured verses unstructured data, Comparative study of SQL and NoSQL.

SQL AND PL/SQL: Tables: Creating, Modifying, Deleting, Views: Creating, Dropping, Updating using Views, Indexes, SQL DML Queries. **PL/SQL:** Concept of Stored Procedures & Functions, Cursors, Triggers, Assertions, Dynamic SQL.

UNIT II:

Introduction to Big Data Science: Definition of Big Data, Big data characteristics & considerations, Data repositories- analyst perspective, Business drivers for analytics, Typical analytical architecture, Business Intelligence Vs Data science, Drivers of Big data analytics, Role of data scientist in Big data ecosystem, Applications of Big data analytics

UNIT III:

Data Analytics Lifecycle: Need of Data analytic lifecycle, Key roles for successful analytic projects, **various phases of Data analytic lifecycle:** Discovery, Data Preparation, Model Planning, Model Building, Communicating Results, Operationalization.

UNIT IV:

Basic Data Analytics methods using R: Introduction to R: GUI of R, Getting data into & out of R, Data types in R, Basic operations, Basic statistics, Generic functions, Data visualization using R, Data exploration & presentation, Statistics for model building & evaluation.

UNIT V:

Advanced Analytics- Theory & Methods: K-means Clustering, Association Rules, Apriori algorithm, Linear Regression, Logistics Regression, Naïve Bayesian classifiers, Decision Trees, Time series analysis, Text analysis.

TEXT BOOKS

1. Silberschatz A., Korth H., Sudarshan S., "Database System Concepts", McGraw Hill Publishers, ISBN 0-07-120413-X, 6th edition
2. David Dietrich, Barry Hiller, –Data Science & Big Data Analytics‖, EMC education services, Wiley publications, 2012
3. Trevor Hastie, Robert Tibshirani, Jerome Friedman, "The Elements of Statistical Learning", Springer, Second Edition, 2011.

REFERENCES

1. C J Date, –An Introduction to Database Systems‖, Addison-Wesley, ISBN: 0201144719
2. Mark gardner, –Beginning R: The Statistical Programming Language‖, Wrox Publication
3. Adam Fowler, –NoSQL For Dummies‖, John Wiley & Sons, ISBN-1118905628

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(16CS537) ARTIFICIAL INTELLIGENCE
DEPARTMENT ELECTIVE-II

COURSE OBJECTIVES

1. *To learn the difference between optimal reasoning vs human like reasoning*
2. *To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities*
3. *To learn different knowledge representation techniques*
4. *To understand the applications of Al: namely Game Playing, Theorem Proving, ExpertSystems, Machine Learning and Natural. Language Processing*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the basics of Artificial Intelligence*
2. *Apply various searching methods like Informed and Uninformed for problem solving*
3. *Understand the Reasoning Patterns in Propositional Logic*
4. *Infer first order logic , Forward Chaining and Backward Chaining in Artificial Intelligence*
5. *Analyse knowledge representation and learning terms in AI*
6. *Understand the Statistical Learning Methods: Neural Networks and Fuzzy logic*

UNIT - I

What is Artificial Intelligence: The AI Problems, The Underlying Assumption, What is an AI Technique?, The Levels of the Model, Criteria of Success.
Problem Spaces and Search: Defining the Problem as a State Space Search, Production Systems, Problem Characteristics, Production System Characteristics, Issues in the Design of Search Programs.

UNIT - II

Problem-Solving**:** Uninformed Search Strategies, Avoiding Repeated States. Informed Search and Exploration: Informed (Heuristic) Search Strategies, Heuristic Functions, Local Search Algorithms and Optimization Problems, Local Search in Continuous Spaces, Backtracking Search for CSPs.

UNIT - III

Knowledge and Reasoning: Logical Agents, Knowledge–Based Agents, The Wumpus World problem, Logic: Propositional Logic a Very Simple Logic, Reasoning Patterns inPropositional Logic, Effective Propositional Inference, Agents Based on Propositional Logic.
First-Order Logic: Syntax and Semantic of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic.

Inference in First-Order Logic: Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.

UNIT - IV

Knowledge Representation: Ontological Engineering, Categories and Objects, Actions, Situations, and Events, Mental Events and Mental Objects, The Internet Shopping World, Reasoning Systems for Uncertain Knowledge and Reasoning: Uncertainty, Acting Under Uncertainty, Basic Probability Notation, The Axioms of Probability, Inference Using Full Joint Distributions, Independence, Bayes_ Rule and Its Use.

Learning: Learning from Observations, Forms of Learning, Inductive Learning, Learning Decision Trees, Ensemble Learning, Why Learning Works: Computational Learning Theory, Knowledge in Learning: A Logical Formulation of Learning.

UNIT - V

Statistical Learning Methods: Neural Networks. Fuzzy Logic Systems: Introduction, Crisp Sets, Fuzzy Sets, Some Fuzzy Terminology, Fuzzy Logic Control, Sugeno Style of Fuzzy Inference Processing, Fuzzy Hedges, α Cut Threshold.

TEXT BOOKS

1. *Artificial Intelligence*, Third Edition, Elaine Rich, Kevin Knight and Shivashankar B Nair Tata McGraw Hill.
2. *Artificial Intelligence A Modern Approach*, Second Edition , Stuart Russell and Peter Norvig Pearson Education.

REFERENCES

1. *Artificial Intelligence-Structures and Strategies for Complex Problem Solving*, Fifth Edition, George F. Luther, Pearson Education.
2. *Introduction to Artificial Intelligence*, Eugene Charniak and Drew McDermott, Pearson Education.

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(16CS538) CLOUD COMPUTING
DEPARTMENT ELECTIVE-II

COURSE OBJECTIVES

1. *Cloud computing has evolved as a very important computing model, which enables information, software, and shared resources to be provisioned over the network as services in an on-demand manner.*
2. *This course provides an insight into what is cloud computing and the various services cloud is capable.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Apply suitable virtualization concept*
2. *Understanding the systems, protocols and mechanisms to support cloud computing.*
3. *Illustrate different models in the cloud environment.*
4. *Develop applications for cloud computing.*
5. *Summarize the knowledge of mobile cloud computing.*
6. *Design and implement a novel cloud computing applications*

UNIT –I

Systems Modeling, Clustering and Virtualization
Distributed System Models and Enabling Technologies, Computer Clusters for Scalable Parallel Computing, Virtual Machines and Virtualization of Clusters and Data Centers.

UNIT – II

Foundations: Introduction to Cloud Computing, Migration into a Cloud, Enriching the _Integration as a Service ‘P a r a d i g m for the Cloud Era, The Enterprise Cloud Computing Paradigm.

UNIT –III

Infrastructure as a Service (IAAS) & Platform and Software as a Service (PAAS / SAAS)
Virtual machines provisioning and Migration services, On the Management of Virtual machines for Cloud Infrastructures, Enhancing Cloud Computing Environments using a cluster as a Service, Secure Distributed Data Storage in Cloud Computing.
Aneka, Comet Cloud, T-Systems, Workflow Engine for Clouds, Understanding Scientific Applications for Cloud Environments.

UNIT –IV

Monitoring, Management and Applications: An Architecture for Federated Cloud Computing, SLA Management in Cloud Computing, Performance Prediction for HPC on Clouds, Best Practices in Architecting Cloud Applications in the AWS cloud, BuildingContent Delivery

networks using Clouds, Resource Cloud Mashups.

UNIT – V

Mobile Cloud Computing: Definition of Mobile Cloud Computing, Architecture of Mobile Cloud Computing, Benefits of Mobile Cloud Computing, Mobile Cloud Computing Challenges

TEXT BOOKS

1. *Cloud Computing: Principles and Paradigms* by Rajkumar Buyya, James Broberg and AndzejM. Goseinski, 2011 , Wiley.
2. *Distributed and Cloud Computing*, Kai Hwang, Geoffery C.Fox, Jack J.Dongarra, 2012 , Elsevier.
3. *Cloud Computing Black Book Dreamtech* Publication, Kailash Jayaswal, Jagannath Kallakurchi, Donald J. Houde, Dr. Deven Shah, Kogent Learning Solutions

REFERENCES

1. *Cloud Computing : A Practical Approach*, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill, rp2011.
2. *Enterprise Cloud Computing*, GautamShroff, Cambridge, University Press, 2010.
3. *Cloud Computing: Implementation, Management and Security,* John W.Rittinghouse, James F.Ransome, CRC Press, rp2012.
4. *Cloud Application Architectures: Building Applications and Infrastructure in the Cloud*, George Reese, O'Reilly, SPD, rp2011.
5. *Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance*, Tim Mather, SubraKumaraswamy, ShahedLatif, O'Reilly, SPD, rp2011.

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(16CS541) MOBILE COMPUTING
DEPARTMENT ELECTIVE-III

COURSE OBJECTIVES

1. *Understand mobile ad hoc networks, design and implementation issues, and available solutions.*
2. *Acquire knowledge of sensor networks and their characteristics.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Explain the basics of Mobile Computing*
2. *Describe the functionality of Mobile IP and Transport Layer*
3. *Classify different types of mobile telecommunication systems*
4. *Demonstrate the Adhoc networks concepts and its routing protocols*
5. *Make use of mobile operating systems in developing mobile applications*
6. *Obtain knowledge of sensor networks and their characteristics*

UNIT - I

Wireless LANS and PANS: Introduction, Fundamentals of WLANS, IEEE 802.11 Standards, HIPERLAN Standard, Bluetooth, Home RF.

Wireless Internet: Wireless Internet, Mobile IP, TCP in Wireless Domain, WAP, Optimizing Web over Wireless.

UNIT- II

AD HOC Wireless Networks: Introduction, Issues in Ad Hoc Wireless Networks, AD Hoc Wireless Internet.

MAC Protocols for Ad Hoc Wireless Networks: Introduction, Issues in Designing a MAC protocol for Ad Hoc Wireless Networks, Design goals of a MAC Protocol for Ad Hoc Wireless Networks, Classifications of MAC Protocols, Contention - Based Protocols, Contention - Based Protocols with reservation Mechanisms, Contention – Based MAC Protocols with Scheduling Mechanisms, MAC Protocols that use Directional Antennas, OtherMAC Protocols.

UNIT - III

Routing Protocols: Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of Routing Protocols, Table –Driven Routing Protocols, On – Demand Routing Protocols, Hybrid Routing Protocols, Routing Protocols with Efficient Flooding Mechanisms, Hierarchical Routing Protocols, Power – Aware Routing Protocols.

Transport Layer and Security Protocols: Introduction, Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocol for Ad Hoc Wireless Networks, Security in Ad Hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, Secure Routing in Ad Hoc Wireless Networks.

UNIT – IV

Quality of Service: Introduction, Issues and Challenges in Providing QoS in Ad Hoc Wireless Networks, Classification of QoS Solutions, MAC Layer Solutions, Network Layer Solutions, QoS Frameworks for Ad Hoc Wireless Networks.

Energy Management: Introduction, Need for Energy Management in Ad Hoc Wireless Networks, Classification of Ad Hoc Wireless Networks, Battery Management Schemes, Transmission Power Management Schemes, System Power Management Schemes.

UNIT – V

Wireless Sensor Networks: Introduction, Background of Sensor Network Technology, Basic Overview of the Technology, Basic Sensor Network Architectural Elements, Brief Historical Survey of Sensor Networks, Challenges and Hurdles.

Applications of Sensor Networks: Home Control, Building Automation, Industrial Automation, Medical Applications, Sensor and Robots, Highway Monitoring, Civil and Environmental Engineering Applications and Habitat Monitoring.

TEXT BOOKS

1. *Ad Hoc Wireless Networks: Architectures and Protocols*, C. Siva Ram Murthy and B.S.Manoj, PHI, 2004.
2. *Wireless Sensor Networks Technology, Protocols and Applications* - KAZEM SOHRABY,DANIEL MINOLI, TAIEB ZNATI, Wiley Interscience, A John Wiley and Sons Inc. Publications, 2007
3. *Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control*, Jagannathan ,Sarangapani, CRC Press

REFERENCES

1. *Ad hoc Mobile Wireless Networks*, Subir Kumar sarkar, T G Basvaraju, C Puttamadappa, Auerbach Publications,2012.
2. *Wireless Sensor Networks*, C. S. Raghavendra, Krishna M. Sivalingam, 2004, Springer.
3. *Ad- Hoc Mobile Wireless Networks: Protocols & Systems*, C.K. Toh , Pearson Education.

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(16CS542) REAL TIME SYSTEMS
DEPARTMENT ELECTIVE-III

COURSE OBJECTIVES

1. *Develop an understanding of the technologies behind the embeddedcomputing systems*
2. *Technology capabilities and limitations of the hardware, software components*
3. *Methods to evaluate design trade-offs between different technology choices.*
4. *Design methodologies*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand concepts of Real Time systems and Embedded systems*
2. *Understand communication bus protocols used for embedded and real time systems*
3. *Classify and exemplify scheduling algorithms*
4. *Apply software development process to a given RTOS application*
5. *Design a given RTOS based application*
6. *Ability to use commercial tools to develop RTOS based applications in real time*

UNIT-I

Introduction to Embedded systems: What is an embedded system Vs. General computing system, history, classification, major application areas, and purpose of embedded systems. Core of embedded system, memory, sensors and actuators, communication interface, embedded firmware, other system components, PCB and passive components.

UNIT – II

8—bit microcontrollers architecture: Characteristics, quality attributes application specific, domain specific, embedded systems. Factors to be considered in selecting a controller, 8051 architecture, memory organization, registers, oscillator unit, ports, source current, sinking current, design examples.

UNIT – III

RTOS and Scheduling, Operating basics, types, RTOS, tasks, process and threads, multiprocessing and multitasking, types of multitasking, non-preemptive, preemptive scheduling. Task communication of RTOS, Shared memory, pipes, memory mapped objects, message passing, message queue, mailbox, signaling, RPC and sockets, task communication/synchronization issues, racing, deadlock, live lock, the dining philosopher‘s problem.

UNIT – IV

The producer-consumer problem, Reader writers problem, Priority Inversion, Priority ceiling,

Task Synchronization techniques, busy waiting, sleep and wakery, semaphore, mutex, critical section objects, events, device, device drivers, how to clause an RTOS, Integration and testing of embedded hardware and fire ware.

UNIT – V

Simulators, emulators, Debuggers, Embedded Product Development life cycle (EDLC), Trends in embedded Industry, Introduction to ARM family of processor.

TEXT BOOK:

1. *Introduction to embedded systems,* Shibu. K.V, TMH, 2009.

REFERENCES:

1. *The 8051 Microcontroller & Embedded Systems using Assembly and C,* Ayala &Gadre, CENGAGE
2. *Embedded Systems,* Rajkamal, TMH, 2009.
3. *Embedded Software Primer,* David Simon, Pearson.
4. *The 8051 Microcontroller and Embedded Systems,* Mazidi, Mazidi, Pearson

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(16CS543) PYTHON PROGRAMMING
DEPARTMENT ELECTIVE-III

COURSE OBJECTIVES

1. *Introduction of Scripting Language*
2. *Exposure to various problem solving approaches of computer science*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand control structures, input and output statements and solve the problems*
2. *Summarize the features of lists, tuples, dictionaries, strings and files*
3. *Understand the usage of standard libraries, objects, and modules*
4. *Implement Object Oriented Programming Concepts*
5. *Build the software for real time applications using python 6.*
6. *Installation of various Python packages*

UNIT – I

Introduction: History of Python, Need of Python Programming, Applications Basics of Python Programming Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation. Types - Integers, Strings, Booleans; Documentation Strings - Decorators - Source code Encoding

UNIT – II

Operators and Expressions: Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations

Data Structures: Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries,Sequences, Comprehensions.

UNIT – III

Control Flow - if, if-elif-else, for, while, break, continue, pass

Functions - Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables.

Modules: Creating modules, import statement, from ..import statement, name spacing

UNIT – IV

Python packages, Introduction to PIP, Installing Packages via PIP, Using Python Packages Error and Exceptions: Difference between an error and Exception, Handling Exception, try except block, Raising Exceptions, User Defined Exceptions

Object Oriented Programming OOP in Python: Terminology - Object Identity and Type - Reference Counting and Garbage Collection - References and Copies - Built-in Types – The None Type - Numeric Types - Sequence Types - Mapping Types - Set Types, Classes, Classic Classes – Meta classes, 'self variable', Methods, Constructor Method, Inheritance, Overriding Methods, Data Hiding,

UNIT – V

Brief Tour of the Standard Library - Operating System Interface - String Pattern Matching, Mathematics, Internet Access, Dates and Times, Data Compression, Multi Threading, GUI Programming, Turtle Graphics, Threads - Network Programming.

Testing: Why testing is required ?, Basic concepts of testing, Unit testing in Python, Writing Test cases, Running Tests.

TEXT BOOKS

1. *Python Programming: A Modern Approach*, VamsiKurama, Pearson
2. *Learning Python*, Mark Lutz, Orielly
3. *Python Essential Reference,* David M Beazley – Third Edition, Sam‘s Publishing, 2006

REFERENCES

1. *Python: Complete Reference,* Martin C Brown, 2001, OSBORNE Tata McGraw Hill
2. *Introducing Python: Modern Computing in Simple Packages*, Bill Lubanovic, O‘Reilly Publications, 2014
3. *Think Python,* Allen Downey, Green Tea Press
4. *Core Python Programming*, W.Chun, Pearson.
5. *Introduction to Python*, Kenneth A. Lambert, Cengage

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MOOCS
DEPARTMENT ELECTIVE-IV

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(16CS548) PROJECT

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