JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
(Established by Govt. of A.P., Act. No. 30 of 2008)
ANANTHAPURAMU – 515 002 (A.P) INDIA

Course Structure & Syllabus for B.Tech. (Regular)
R13 Regulations

COMPUTER SCIENCE & ENGINEERING

B.Tech. I Year

S.No	Course code	Subject	Th	Tu/	Lab.	Credits
1.	13A52101	Communicative English	2	-	-	3
2.	13A56101	Engineering Physics	2	-	-	3
3.	13A51101	Engineering Chemistry	2	-	-	3
4.	13A54101	Mathematics - I	3	1	-	5
5.	13A05101	Problem Solving & Computer Programming	3	1	-	5
6.	13A54102	Mathematics - II	3	1	-	5
7.	13A99101	Basic Electrical & Electronics Engineering	3	1	-	5
8.	13A05102	Computer Programming Lab	-	-	3	4
9.	13A99102	Engineering Physics & Engineering Chemistry Lab *	-	-	3	4
10.	13A99103	Engineering & IT Workshop #	-	-	3	4
11.	13A52102	English Language Comm. Skills Lab	-	-	3	4
					Total Credits	45

Th = Theory; Tu = Tutorial & Lab = Laboratory:

* The students shall attend the Physics lab and Chemistry lab in alternate weeks. The end exam shall be conducted separately and average of the two exams shall be recorded by the University exam section.

The **s**tudents shall attend Engineering and IT work shop as a single lab every week and the end exam is conducted as a single lab. Sharing the Maximum marks and time for one task each from Engineering workshop and IT workshop. The sum of the marks awarded shall be recorded.

B.Tech. II - I Semester

S.No	Course code	Subject	Th	Tu /Drg /Lab	Credits
1.	13A03304	Engineering Graphics	1	- 3 -	3
2.	13A54303	Probability and Statistics	3	1 - -	3
3.	13A01403	Environmental Science		1 - -	3
4.	13A05301	Data Structures	3	1 - -	3
5.	13A04306	Digital Logic Design	3	1 - -	3
6.	13A05302	Discrete Mathematics	3	1 - -	3
7.	13A99304	Electrical & Electronics Engineering Lab	-	- - 3	2
8.	13A05303	Data Structures Lab	-	- - 3	2
Total Credits					22

B.Tech. II - II Semester

S.No	Course code	Subject	Theory	Tu / Lab	Credits
1.	13A05401	Computer Organization & Architecture	3	1 -	3
2.	13A05402	Database Management Systems	3	1 -	3
3.	13A05403	Java Programming	3	1 -	3
4.	13A05404	Formal Languages & Automata Theory	3	1 -	3
5.	13A05405	Principles of Programming Languages	3	1 -	3
6.	13A05406	Design And Analysis of Algorithms	3	1 -	3
7.	13A05407	Database Management Systems Lab	-	- 3	2
8.	13A05408	Java Programming Lab	-	- 3	2
9.	13A52301	Human Values & Professional Ethics (Audit Course)	2	- -	-
Total Credits					22

B.Tech. III - I Semester

S.No	Course code	Subject	Theory	Tu / Lab	Credits
1.	13A05501	Operating Systems	3	1 -	3
2.	13A05502	Compiler Design	3	1 -	3
3.	13A05503	Unix and Shell Programming	3	1 -	3
4.	13A05504	Software Engineering	3	1 -	3
5.	13A04507	Micro Processors & Interfacing	3	1 -	3
6.	13A52501	Managerial Economics and Financial Analysis	3	1 -	3
7.	13A05505	Operating Systems Lab	-	- 3	2
8.	13A05506	Compiler Design and Assembly Language Programming Lab	-	- 3	2
9.	13A52502	Advanced English language Comm. Skills Lab (Audit Course)	-	- 3	
Total Credits					22

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Revised Course Structure for B.Tech.- R13 Regulations

COMPUTER SCIENCE & ENGINEERING

III - II Semester

S.No	Course code	Subject	Theory	Tu / Lab	Credits
1.	13A05601	Computer Networks	3	1 -	3
2.	13A05602	Object Oriented Analysis, Design & Modeling	3	1 -	3
3.	13A05603	Data Mining	3	1 -	3
4.	13A05604	Web Technologies	3	1 -	3
5.	13A05605	Software Testing Methodologies	3	1 -	3
6.	13A05606 13A05607 13A05608	**Choice Based Credit Courses** 1. Big Data Technologies 2. Cloud Computing 3.Linux Administration & Programming	3	1 -	3
7.	13A05609	Unified Modeling Language and Testing Lab	-	- 3	2
8.	13A05610	Web Technologies & Data Mining Lab	-	- 3	2
9.	13A05611	Comprehensive Online Examination-II	-	- -	1
		Total	18	6 9	23

DIRECTOR
Academic & Planning
JNT University Anantapur,
Ananthapuramu-515 002.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

Course Structure for Computer Science and Engineering
B. Tech Course
(2013-14)

IV - I Semester

S.No	Course code	Subject	Theory	T	P	Credits
1.	13A05701	Software Architecture & Design Patterns	3	1	-	3
2.	13A05702	Cryptography & Network Security	3	1	-	3
3.	13A05703	Mobile Application Development	3	1	-	3
4.	13A52702	Management Science	3	1	-	3
5.	13A05704 13A05705 13A05706	**Choice Based Credit Courses** (Department specific) 1. Human Computer Interaction 2. Computer Graphics & Multimedia 3. Soft Computing	3	1	-	3
6.	13A05707 13A05708 13A05709	**Choice Based Credit Courses** (Department specific) 1. Artificial Intelligence 2. Information Retrieval Systems 3. Advanced Computer Architecture	3	1	-	3
7.	13A05710	Computer Networks and Network Security Laboratory	-		4	2
8.	13A05711	Mobile Application Development Laboratory	-		4	2
Total			**18**	**06**	**08**	**22**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

Course Structure for Computer Science and Engineering
B. Tech Course (2013-14)

IV - II Semester

S.No	Course code	Subject	Theory	Tu	Lab	Credits
1.	13A05801 13A05802	MOOC 1 1. Mobile Computing 2. Natural Language Processing	3	1	-	3
2.	13A05803 13A05804	MOOC 2 1. Parallel Algorithms 2. Real Time Systems	3	1	-	3
3.	13A05805 13A05806	MOOC 3 1. High Performance Computing 2. Python Programming	3	1	-	3
4.	13A05807	Technical Seminar	-	-	4	2
5.	13A05808	Project work	-	-	24	12
Total			**09**	**03**	**28**	**23**

3 Theory + 1 Technical Seminar + 1 Project work

***Either by MOOCS manner or Self study or Conventional manner**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B.Tech. I Year	**Th**	**Tu**	**C**
	2	**0**	**3**

Common to All Branches

(13A52101) COMMUNICATIVE ENGLISH

Preamble:

English is an international language as well as a living and vibrant one. People have found that knowledge of English is a passport for better career and for communication with the entire world. As it is a language of opportunities in this global age, English is bound to expand its domain of use everywhere. The syllabus has been designed to enhance communication skills of the students of Engineering and Technology. The prescribed books serve the purpose of preparing them for everyday communication and to face global competitions in future.

The first text prescribed for detailed study focuses on LSRW skills and vocabulary development. The teachers should encourage the students to use the target language. The classes should be interactive and student-centered. They should be encouraged to participate in the classroom activities keenly.

The text for non-detailed study is meant for extensive reading/reading for pleasure by the students. They may be encouraged to read some selected topics on their own, which could lead into a classroom discussion. In addition to the exercises from the texts done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements, promotional material etc.

Course Objective:

- *To enable the students to communicate in English for academic and social purpose.*
- *To enable the students to acquire structure and written expressions required for their profession.*
- *To develop the listening skills of the students.*
- *To inculcate the habit of reading for pleasure.*
- *To enhance the study skills of the students with emphasis on LSRW skills.*

Learning Outcome:

- *The students will get the required training in LSRW skills through the prescribed texts and develop communicative competence.*

UNIT I

Chapter entitled 'Humour' from "Using English"

Chapter entitled 'Biography - (Homi Jehangir Bhabha)' from "New Horizons"

Listening - Techniques - Importance of phonetics

L- Meet & Greet and Leave taking, Introducing Oneself and Others (Formal and Informal situations)

R- Reading Strategies -Skimming and Scanning

W- Writing strategies- sentence structures

G-Parts of Speech –Noun-number, pronoun-personal pronoun, verb- analysis

V-Affixes-prefix and suffix, root words, derivatives

UNIT II

Chapter entitled 'Inspiration' from "Using English"

Chapter entitled 'Biography - (Jagadish Chandra Bose)' from "New Horizons"

L- Listening to details

S- Apologizing, Interrupting, Requesting and Making polite conversations

R- Note making strategies

W- Paragraph-types- topic sentences, unity, coherence, length , linking devices

G-Auxiliary verbs and question tags

V- synonyms-antonyms, homonyms, homophones, homographs, words often confused

UNIT III

Chapter entitled 'Sustainable Development' from "Using English"

Chapter entitled 'Short Story - (The Happy Prince)' from "New Horizons"

L- Listening to themes and note taking

S- Giving instructions and Directions, making suggestions, Accepting ideas, fixing a time and Advising

R- Reading for details -1

W- Resume and cover letter

G- Tenses – Present tense, Past tense and Future tense

V-Word formation and One-Word Substitutes

UNIT IV

Chapter entitled 'Relationships' from "Using English"

Chapter entitled 'Poem - (IF by Rudyard Kipling)' from "New Horizons"

L- Listening to news

S- Narrating stories, Expressing ideas and opinions and telephone skills

R- Reading for specific details and Information

W- Technical Report writing-strategies, formats-types-technical report writing

G- Voice and Subject–Verb Agreement

V- Idioms and prepositional Phrases

UNIT V

Chapter entitled 'Science and Humanism' from "Using English"

Chapter entitled 'Autobiography - (My Struggle for an Education by Booker T.Washington)' from "New Horizons"

L- Listening to speeches

S- Making Presentations and Group Discussions

R- Reading for Information

W- E-mail drafting

G- Conditional clauses and conjunctions

V- Collocations and Technical Vocabulary and using words appropriately

Text Books:

1. ***Using English*** *published by Orient Black Swan.*
2. ***New Horizons*** *published by Pearson.*

Reference Books:

1. ***Raymond Murphy's English Grammar with CD,*** *Murphy, Cambridge University Press, 2012.*
2. ***English Conversation Practice*** *–Grant Taylor, Tata McGraw Hill, 2009.*
3. ***Communication Skills,*** *Sanjay Kumar & Pushpalatha Oxford University Press, 2012.*
4. ***A Course in Communication Skills****- Kiranmai Dutt & co. Foundation Books, 2012.*
5. ***Living English Structures****- William Standard Allen-Pearson, 2011.*
6. ***Current English Grammar and Usage,*** *S M Guptha, PHI, 2013.*
7. ***Modern English Grammar****-Krishna SWAMI,.McMillan, 2009.*
8. ***Powerful Vocabulary Builder****- Anjana Agarwal, New Age International Publishers, 2011.*

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B.Tech. I Year	**Th**	**Tu**	**C**
	2	**0**	**3**

Common to All Branches

(13A56101) ENGINEERING PHYSICS

Preamble:

There has been an exponential growth of knowledge in the recent past opening up new areas and challenges in the understanding of basic laws of nature. This helped to the discovery of new phenomena in macro, micro and nano scale device technologies. The laws of physics play a key role in the development of science, engineering and technology. Sound knowledge of physical principles is of paramount importance in understanding new discoveries, recent trends and latest developments in the field of engineering.

To keep in pace with the recent scientific advancements in the areas of emerging technologies, the syllabi of engineering physics has been thoroughly revised keeping in view of the basic needs of all engineering branches by including the topics like optics, crystallography, ultrasonics, quantum mechanics, free electron theory. Also new phenomenon, properties and device applications of semiconducting, magnetic, superconducting and nano materials along with their modern device applications have been introduced.

Course Objective:

- *To evoke interest on applications of superposition effects like interference and diffraction, the mechanisms of emission of light, achieving amplification of electromagnetic radiation through stimulated emission, study of propagation of light through transparent dielectric waveguides along with engineering applications.*
- *To enlighten the periodic arrangement of atoms in crystals, direction of Bragg planes, crystal structure determination by X-rays and also to understand different types of defects in crystals adnoun-destructive evaluation using ultrasonic techniques.*
- *To get an insight into the microscopic meaning of conductivity , classical and quantum free electron model, the effect of periodic potential on electron motion, evolution of band theory to distinguish materials and to understand electron transport mechanism in solids.*
- *To open new avenues of knowledge and understanding on semiconductor based electronic devices, basic concepts and applications of semiconductor and magnetic materials have been introduced which find potential in the emerging micro device applications.*
- *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 and their fascinating applications. Considering the significance of microminiaturization of electronic devices and significance of low dimensional materials, the basic concepts of nanomaterials, their synthesis, properties and applications in modern emerging technologies are elicited.*

Learning Outcome:

- *The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fibre optics.*
- *The important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction are focused along with defects in crystals and ultrasonic non-destructive techniques.*
- *The discrepancies between the classical estimates and laboratory observations of physical properties exhibited by materials would be lifted through the understanding of quantum picture of subatomic world.*
- *The electronic and magnetic properties of materials were successfully explained by free electron theory and focused on the basis for the band theory.*
- *The properties and device applications of semiconducting and magnetic materials are illustrated.*

- *The importance of superconducting materials and nanomaterials along with their engineering applications are well elucidated.*

UNIT 1

PHYSICAL OPTICS, LASERS AND FIBRE OPTICS:

Physical Optics: Introduction - Interference in thin films by reflection – Newton's Rings – Fraunhofer diffraction due to single slit, double slit and diffraction grating.

Lasers: Introduction - Characteristics of laser – Spontaneous and stimulated emission of radiation – Einstein's coefficients - Population inversion – Excitation mechanisms and optical resonator - Ruby laser - He-Ne 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 in communications, sensors and medicine.

UNIT II

CRYSTALLOGRAPHY AND ULTRASONICS:

Crystallography: Introduction – Space lattice –Unit cell – Lattice parameters –Bravias lattice – Crystal systems – Packing fractions of SC, BCC and FCC - Structures of NaCl and Diamond – Directions and planes in crystals – Miller indices – Interplanar spacing in cubic crystals – X-ray diffraction - Bragg's law –Laue and Powder methods – Defects in solids: point defects, line defects (qualitative) - screw and edge dislocation, burgers vector.

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 - Schrodinger's time independent and time dependent wave equation – Significance of wave function - Particle in a one dimensional infinite potential well - Eigen values and Eigen functions.

Free electron theory: Classical free electron theory –- Sources of electrical resistance - Equation for electrical conductivity - Quantum free electron theory – Fermi-Dirac distribution –Kronig-Penny model(qualitative) – 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 – Drift & diffusion currents and Einstein's equation – Hall effect - Direct and indirect band gap semiconductors – Working principle of p-n junction diode, LED, laser diode and photodiode.

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 – Flux quantization – London penetration depth – ac and dc Josephson effects – BCS theory(qualitative) – High T_c superconductors - Applications of superconductors.

Physics of Nanomaterials**:** Introduction - Significance of nanoscale - Surface area and quantum confinement – Physical properties: optical, thermal, mechanical and magnetic properties – Synthesis of nanomaterials: ball mill, chemical vapour deposition, sol-gel, plasma arcing and thermal evaporation – Properties of Carbon nanotubes – High strength applications – Properties of graphene – Graphene based Field Effect Transistor - Applications of nanomaterials.

Text Books:

1. Engineering physics – S. ManiNaidu, Pearson Education, I Edition, 2012.
2. Engineering Physics – V. Rajendran, MacGraw Hill Publishers, I Edition,2008.

Reference Books:

1. Engineering Physics – V. Rajendran, K.Thyagarajan Tata MacGraw Hill Publishers, III Edition, 2012.
2. Engineering Physics – RV.S.S.N. Ravi Kumar and N.V. Siva Krishna, Maruthi Publications , 2013
3. Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish University Press, I Edition, 2009.
4. Engineering Physics – D K Pandey, S. Chaturvedi, Cengage Learning, I Edition, 2012
5. Engineering Physics – Hitendra K Mallik and AK Singh, McGraw Hill Education Pvt. Ltd, New Delhi , I Edition, 2010
6. Engineering Physics – M. Arumugam, Anuradha Publications II Edition, 1997.
7. Engineering physics – M.N. Avadhanulu and P.G. KshirSagar, Chand and Co, Revised Edition, 2013.
8. Solid State Physics – A.J. Dekkar, McMillan Publishers, Latest edition, 2012.
9. Engineering Physics – Gaur and Gupta Dhanapati, Rai Publishers , 7th Edition, 1992.
9. Text book of Nanoscience and Nanotechnology: B S Murthy, P.Shankar, Baldev Raj B B Rath, James Murday, University Press, I Edition, 2012.
10. Carbon Nanotubes and Graphene Device Physics – H.S. Philip Wong, Deji Akinwande, Cambridge University Press, 2011.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B.Tech. I Year	**Th**	**Tu**	**C**
	2	**0**	**3**

Common to All Branches

(13A51101) ENGINEERING CHEMISTRY

Preamble:

Knowledge in chemistry serves as basic nutrient for the understanding and thereby design of materials of importance in life. Thus the advancement in Engineering is depend on the outcome of basic sciences. Many advances in engineering either produce a new chemical demand as in the case of polymers or wait upon chemical developments for their applications as in the case of implants and alloys. Currently the electronics and computer engineers are looking forward for suitable biopolymers and nano materials for use in miniature super computers, the electrical materials engineers are in search of proper conducting polymers, the mechanical engineers are on lookout for micro fluids and the civil engineers are looking for materials that are environmental friendly, economical but long lasting.

Course Objective:

- *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.*
- *The course main aim is to impart in-depth knowledge of the subject and highlight the role of chemistry in the field of engineering.*
- *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.*
- *The extension of fundamentals of electrochemistry to energy storage devices such as commercial batteries and fuel cells is one such example.*
- *After the completion of the course, the student would understand about the concepts of chemistry in respect of Electrochemical cells, fuel cells, mechanism of corrosion and factors to influence, polymers with their applications, analytical methods, engineering materials and water chemistry.*

Learning Outcome:

The student is expected to:

- *Understand the electrochemical sources of energy*
- *Understand industrially based polymers, various engineering materials.*
- *Differentiate between hard and soft water. Understand the disadvantages of using hard water domestically and industrially. Select and apply suitable treatments domestically and industrially.*

UNIT 1

ELECTROCHEMISTRY:

Review of electrochemical cells, Numerical calculations, Batteries: Rechargeable batteries (Lead acid, Ni-Cd, Lithium Ion Batteries). Fuels cells: (Hydrogen-Oxygen and Methanol-Oxygen).

Electrochemical sensors: Potentiometric Sensors and voltammetric sensors. Examples: analysis of Glucose and urea.

Corrosion: Electrochemical Theory of corrosion, Factors affecting the corrosion. Prevention: Anodic and cathodic protection and electro and electroless plating.

UNIT II

POLYMERS:

Introduction to polymers, Polymerisation process, mechanism: cationic, anionic, free radical and coordination covalent, Elastomers (rubbers), Natural Rubber, Compounding of Rubber,Synthetic

Rubber: Preparation, properties and engineering applications of Buna-S, buna-N, Polyurethene, Polysulfide (Thiokol) rubbers. Plastomers: Thermosetting and Thermoplatics, Preparation, properties and Engineering applications , PVC, Bakelite, nylons.
Conducting polymers: Mechanism, synthesis and applications of polyacetyline, polyaniline. Liquid Crystals: Introduction, classification and applications.
Inorganic Polymers: Basic Introduction, Silicones, Polyphospazins (-(R)2-P=N-) applications.

UNIT III
FUEL TECHNOLOGY:
Classifications of Fuels – Characteristics of Fuels- Calorific Value – Units, Numerical Problems, Solid Fuels–Coal, Coke : Manufacture of Metallurgical Coke by Otto Hoffmann's by product oven processes.
Liquid Fuels: Petroleum: Refining of Petroleum, Gasoline: Octane Number, Synthetic Petrol: Bergius Processes, Fischer Troph's synthesis.
Power Alcohol: Manufacture, Advantages and Disadvantages of Power Alcohol
Gaseous Fuels: Origin, Production and uses of Natural gas, Producer gas, Water gas, Coal gas and Biogas. Flue Gas analysis by Orsat's apparatus, Solving of problems on Combustion.

UNIT IV
CHEMISTRY OF ENGINEERING MATERIALS:
Semiconducting and Super Conducting materials-Principles and some examples, Magnetic materials – Principles and some examples, Cement: Composition, Setting and Hardening (Hydration and Hydrolysis), Refractories: Classification, properties and applications, Lubricants: Theory of lubrication , properties of lubricants and applications, Rocket Propellants: Classification, Characteristics of good propellant

UNIT V
WATER TREATMENT:
Impurities in water, Hardness of water and its Units, Disadvantages of hard water, Estimation of hardness by EDTA method, Numerical problems on hardness, Estimation of dissolved oxygen, Alkalinity, acidity and chlorides in water, Water treatment for domestic purpose (Chlorination, Bleaching powder, ozonisation)
Industrial Use of water: For steam generation, troubles of Boilers: Scale & Sludge, Priming and Foaming, Caustic Embrittlement 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.
Demineralisation of brackish water: Reverse Osmosis and Electrodialysis

Text Books:

1. *Engineering Chemistry by KNJayaveera, GVSubba Reddy and C. Ramachandraiah, McGraw Hill Higher Education, New Delhi, Fourth Edition, 2012.*
2. *A Text book of Engineering Chemistry by S.S Dhara, S.S.Umare, S. Chand Publications, New Delhi, 12th Edition, 2010.*

Reference Books:

1. *A Text Book of Enigneering Chemistry, Jain and Jain, Dhanapath Rai Publishing Company, New Delhi, 15th Edition, 2010.*
2. *Engineering Chemistry by K.B.Chandra Sekhar, UN.Das and Sujatha Mishra, SCITECH, Publications India Pvt Limited, Chennai, 2nd Edition, 2012.*
3. *Concepts of Engineering Chemistry- Ashima Srivastava and N.N. Janhavi, Acme Learning Pvt Ltd, First Edition, 2013.*
4. *Text Book of Engineering Chemistry – C. Parameswara Murthy, C.V.Agarwal and Andra Naidu, BS Publications, Hyderabad, 3rd Edition, 2008.*
5. *Text Book of Engineering Chemistry, Shashichawla, Dhanapath Rai Publications, New Delhi, 4th Edition, 2011.*
6. *Engineering Chemistry, K. Sesha Maheswaramma and Mrudula Chugh, Pearson Education, First Edition, 2013.*

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B.Tech. I Year	**Th**	**Tu**	**C**
	3	**1**	**5**

Common to All Branches
(13A54101) MATHEMATICS – I

Course Objective:

- *To train the students thoroughly in Mathematical concepts of ordinary differential equations and their applications in electrical circuits, deflection of beams, whirling of shafts.*
- *To prepare students for lifelong learning and successful careers using mathematical concepts of differential, Integral and vector calculus, ordinary differential equations and Laplace transforms.*
- *To develop the skill pertinent to the practice of the mathematical concepts including the student abilities to formulate the problems, to think creatively and to synthesize information.*

Learning Outcome:

- *The students become familiar with the application of differential, integral and vector calculus, ordinary differential equations and Laplace transforms to engineering problems.*
- *The students attain the abilities to use mathematical knowledge to analyze and solve problems in engineering applications.*

UNIT I

Exact, linear and Bernoulli equations, Applications to Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax}, Sin ax, cos ax, polynomials in x, e^{ax} V(x), xV(x), method of variation of parameters. Applications to oscillatory electrical circuits, Deflection of Beams, whirling of shafts.

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, center of curvature, Involutes evolutes, envelopes.

UNIT III

Curve tracing – Cartesian, polar and parametric curves. Length of curves.

Multiple integral – Double and triple integrals – Change of Variables – Change of order of integration. Applications to areas and volumes, surface area of solid of revolution in Cartesian and polar coordinates using double integral.

UNIT IV

Laplace transform of standard functions – Inverse transform – First shifting Theorem, Transforms of derivatives and integrals – Unit step function – Second shifting theorem – Dirac's delta function – Convolution theorem – Laplace transform of Periodic function.

Differentiation and integration of transform – Application of Laplace transforms to ordinary differential equations of first and second order.

UNIT V

Vector Calculus: Gradient – Divergence – Curl and their properties; Vector integration – Line integral - Potential function – Area – Surface and volume integrals. Vector integral theorems: Green's theorem – Stoke's and Gauss's Divergence Theorem (Without proof). Application of Green's – Stoke's and Gauss's Theorems.

Text Books:

1. *Higher Engineering Mathematics, B.S.Grewal, Khanna publishers-42 Edition(2012)*
2. *Engineering Mathematics, Volume - I, E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher 1st Edition (2010)*

Reference Books:

1. *Engineering Mathematics Volume-I, by T.K.V. Iyengar, S.Chand publication-12th Edition(2013)*
2. *Engineering Mathematics, Volume - I, by G.S.S.Raju, CENGAGE publisher.(2013)*
3. *Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India-10thEdition(2012)*
4. *Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers(2008)*
5. *Advanced Engineering Mathematics, by Alan Jeffrey, Elsevier-1st Edition(2001)*

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B.Tech. I Year	**Th**	**Tu**	**C**
	3	**1**	**5**

(13A05101) PROBLEM SOLVING AND COMPUTER PROGRAMMING

Course Objective:

- *To understand the core aspects of computer problem solving techniques*
- *To understand the programming language constructs*
- *To understand the programming paradigms*
- *To understand the compound data types*
- *To understand dynamic memory allocation concepts*

Learning Outcome:

- *Able to design the flowchart and algorithm for real world problems*
- *Able to learn and understand new programming languages*
- *Able to construct modular and readable programs*
- *Able to write C programs for real world problems using simple and compound data types*
- *Adapt programming experience and language knowledge to other programming language contexts*
- *Employee good programming style, standards and practices during program development*

UNIT I

Introduction to Computers: Computer Systems, Computing Environment, Computer Languages, Creating and Running Programs, System Developments.

Introduction to the C Language: Introduction, C programs, Identifiers, Types, Variables, Constants, Input and Output, Programming Examples.

Introduction to Computer Problem Solving: Introduction , The Problem-Solving Aspect, Top-down Design, Bottom-up Approach, Flowcharts, Implementation of Algorithms, Program Verification, The Efficiency of Algorithms, The Analysis of Algorithms.

UNIT II

Structure of C program: Expressions, Precedence and Associativity, Evaluating Expressions, Type Conversion, Statements, Sample Programs.

Selections and Making Decisions: Logical Data and Operators, Two-way Selection, Multiway Selection.

Repetition: Concept of Loop, Pretest and Post-test Loops, Initialization and Updation, Event and Counter Controller Loop, Loops in C, Looping Applications.

Fundamental Algorithms: Exchanging the values between two variables, Counting, Summation of a set numbers, Factorial Computation, Sine Function Computation, Generation of the Fibonacci Sequence, Reversing the digits of a integer, Basic conversions, Character to Number Conversion

UNIT III

Factoring Methods: Finding Square root of a Number, The Smallest Deviser of an Integer, The GCD of two Integers, Generating Prime Numbers, Computing Prime Factor of an Integer, Computing the prime factors of an Integer, Generation of Pseudo Random Number, Raising the number to Large Power, Computing the n^{th} Fibonacci.

Functions: Introduction, User Defined Functions, Inter-Function Communication, Standard Functions, Scope, Programming Examples.

Array Techniques: Array Order Reversal, Array Counting, Finding the Maximum Number Set, Removal Duplicates from an Ordered Array, Partitioning an Array, Finding k^{th} smallest Element, Longest Monotone Subsequence.

Arrays: Introduction, Two Dimensional Arrays, Multi Dimensional Arrays, Inter Function Communication, Array Applications, Exchange Sort, Binary Search, Linear Search.

UNIT IV

Strings: String Concepts, C Strings, Sting Input/Output Functions, Arrays of Strings, String Manipulation Functions, String/Data Conversion.

Enumerated, Structure, and Union Types: The Type Definition, Enumerated Types, Structure, Unions, Programming Applications.

Bitwise Operators: Exact Size Integer Types, Logical Bitwise Operators, Shift Operators, Mask.

UNIT V

Pointers: Introduction, Pointers for Inter-Function Communication, Pointers to Pointers, Compatibility, Lvalue and Rvalue.

Pointer Applications: Array and Pointers, Pointer Arithmetic and Arrays, Passing an Array to a Function, Memory Allocation Functions, Array of Pointers, Programming Applications.

Binary Input/output: Text Versus Binary Streams, Standard Library Functions for Files, Converting File Type.

Linked List: Single Linked List, Insertion and Deletion

Text Books :

1. *How to Solve it by Computer by R.G. Dromey, Pearson*
2. *Computer Science, A Structured Programming Approach Using C by Behrouz A. Forouzan & Richard F. Gilberg, Third Edition, Cengage Learning*

Reference Books :

1. *Programming in C: A Practical Approach, Ajay Mittal, Pearson.*
2. *The C programming Language, B. W. Kernighan and Dennis M. Ritchi, Pearson Education.*
3. *Problem Solving and Programming Designs in C, J. R. Hanly and E.B. Koffman.,*
4. *Programming with C Rema Theraja, Oxford*
5. *Problem Solving with C, M.T.Somashekara, PHI*
6. *C Programming with problem solving, J.A. Jones & K. Harrow,Dreamtech Press*
7. *Programming with C, R.S.Bickar, Universities Press.*

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B.Tech. I Year	**Th**	**Tu**	**C**
	3	**1**	**5**

(13A54102) MATHEMATICS – II

Course Objective:

- *This course aims at providing the student with the concepts of Matrices, Fourier series, Fourier and Z-transforms and partial differential equations which find the applications in engineering.*
- *Our emphasis will be more on logical and problem solving development in Numerical methods and their applications.*

Learning Outcome:

- *The student becomes familiar with the application of Mathematical techniques like Fourier series, Fourier and z-transforms.*
- *The student gains the knowledge to tackle the engineering problems using the concepts of Partial differential equations and Numerical methods.*

UNIT I

Rank – Echelon form, normal form – Consistency of System of Linear equations. Linear transformations

Hermitian, Skew-Hermitian and Unitary matrices and their properties. Eigen Values, Eigen vectors for both real and complex matrices. Cayley – Hamilton Theorem and its applications – Diagonolization of matrix. Calculation of powers of matrix. Quadratic forms – Reduction of quadratic form to canonical form and their nature.

UNIT II

Solution of Algebraic and Transcendental Equations: The Bisection Method – The Method of False Position– Newton-Raphson Method.

Interpolation: Newton's forward and backward interpolation formulae – Lagrange's Interpolation formula.

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 III

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Methods – Predictor-Corrector Method – Milne's Method. Numerical solution of Laplace equation using finite difference approximation.

Fourier Series: Determination of Fourier coefficients – Fourier series – Even and odd functions – Fourier series in an arbitrary interval – Even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

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.

z-transform – Inverse z-transform – Properties – Damping rule – Shifting rule – Initial and final value theorems. Convolution theorem – Solution of difference equations by z-transforms.

UNIT V

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Method of separation of variables – Solutions of one dimensional wave equation, heat equation and two-dimensional Laplace's equation under initial and boundary conditions.

Text Books:

1. *Higher Engineering Mathematics, B.S.Grewal, Khanna publishers- 42 Edition(2012)*
2. *Introductory Methods of Numerical Analysis, S.S. Sastry, PHI publisher 5th Edition (2012)*

Reference Books:

1. *Engineering Mathematics, Volume - II, E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher-1st Edition (2010)*
2. *Engineering Mathematics, Volume - II, by G.S.S.Raju, CENGAGE publisher – 1st Edition(2013)*
3. *Mathematical Methods by T.K.V. Iyengar, S. Chand publication-8th Edition(2013)*
4. *Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers (2008)*
5. *Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India 10th Edition (2013)*

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B.Tech. I Year	**Th**	**Tu**	**C**
	3	**1**	**5**

(13A99101) BASIC ELECTRICAL & ELECTRONICS ENGINEERING

PART- A

Course Objective:

- This course introduces the basic concepts of circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline. The emphasis of this course is laid on the basic analysis of circuits which includes Circuit concepts, Machines etc

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, The J Operator and Phasor Algebra, Analysis of Ac Circuits With Single Basic Network Element, Single Phase Series and Parallel Circuits

UNIT II

Network Theorems: Thevenin's, Norton's, Maximum Power Transfer and Millman's Theorems for D.C and Sinusoidal Excitations. Tellegen's, Superposition, Reciprocity and Compensation Theorems for D.C And Sinusoidal Excitations.

Two Port Networks: Two Port Network Parameters – Impedance, Admittance, Transmission and Hybrid Parameters and Their Relations. Concept of Transformed Network - Two Port Network Parameters Using Transformed Variables

UNIT III

Rotating Machines

D.C. Generators: Principles of Operation –Constructional Details-Expression for Generated EMF-Applications of D.C.Generators.

D.C. Motors: Principles of Operation –Constructional Details-Back EMF- Armature Torque of a D.C. Motor - Characteristics of D.C. Motors -Applications of D.C.Motors

Induction Motors: Introduction to 3-Phase Induction Motor- Principle of Operation- Constructional Details – Slip- Expression for Torque -Torque-Slip Characteristics- Applications of 3 Phase Induction Motors.

PART-B

Course Objective:

- *The objective of this Course is to provide the students with an introductory and broad treatment of the field of Electronics Engineering.*

UNIT IV

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 V

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 VI

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 Engineering by D P KOTHARI & I J NAGRATH, Tata McGraw Hill, Second Edition, 2007.*
2. *Electrical Circuit Theory and Technology by JOHN BIRD, Routledge publisher, 4Th Edition, 2011.*
3. *Basic Electrical and Electronics Engineering, M.S.Sukhija, T.K.Nagsarkar, Oxford University Press, 1st Edition, 2012.*
4. *Basic Electrical and Electronics Engineering, S.K Bhattacharya, Pearson Education, 2012.*

Reference Books :

1. *Electrical & Electronic Technology by Edward Hughes, 10th Edition, Pearson, 2008*
2. *"Basic Electrical Engineering", Uma Rao, Sanguine-Pearson.*

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B.Tech. I Year **L** **C**
3 **4**

(13A05102) COMPUTER PROGRAMMING LAB

Week-1

1) Write an algorithm and draw a flowchart to make the following exchange between the variables a-> b -> c->d - > a
2) Write an algorithm and draw a flowchart to generate the first n terms of the sequence. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.

Week-2

1) Write an algorithm and draw a flowchart to carry out the arithmetic operations addition, subtraction, multiplication, and division between two variables
2) Write an algorithm and draw a flowchart for printing prime numbers between 1 and n.

Week-3

1) The packing department of a television set manufacturer has to prepare a requisition note listing the number of different boxes required for the different TV models that it has received from the production department. The list prepared has to be forwarded to the stores department so that the required boxes are issued to the packing department. The category and the number of boxes required for each type of TV model is given as follows:

Model type	Box type	Numbers
TV-LCD 17	1	98
TV-LCD 22	2	79
TV-LCD 26	3	65
TV-LCD 32	4	43
TV-LCD 37	5	17

2) Write a program that reads 10 integers and prints the first and last on one line, the second and the ninth on the next line, the third and the seventh on the next line, and so forth. Sample input and the results are shown below.

Please enter 10 numbers :
10 31 2 73 24 65 6 87 18 9
Your numbers are :
10 9
31 18
2 87
73 6
24 65

Week-4

1) Write a program that prompts the user to enter an integer and then prints the integer first as a character and then as a decimal and finally as a float. Use separate print statements.

Expected output
The number as a character : K
The number as a decimal : 75
The number as a float : 0.000000

2) Write a program to read two floating point numbers add these two numbers and assign the result to an integer. Finally display the value of all the three variables.
3) Write a program to demonstrate the results obtained by using the increment and decrement operators(++, --) along-with logical operators(&&, ||) on operands

Week-5

1) Write a program to demonstrate the results obtained by using the arithmetic operators for addition, subtraction, multiplication and division on integer data.
2) Write a program to evaluate the following expression

$$Y = 1 + \frac{nx}{1!} + \frac{n(n-1)x^2}{2!} + \frac{n(n-3)x^2}{3!} + \sqrt{\cos(x^2)}$$

Week-6

1) Write a C program to construct a multiplication table for a given number.
2) Write a program to reverse the digit of a given integer.
3) Write a C program to calculate the factorial of a given number

Week-7

Write a program to calculate tax, given the following conditions:

a) If income is less than 1,50,000 then no tax.
b) If taxable income is in the range 1,50,001 – 300,000 then charge 10% tax
c) If taxable income is in the range 3,00,001 – 500,000 then charge 20% tax
d) If taxable income is above 5,00,001 then charge 30% tax

Week-8

1) Write a program to print the calendar for a month given the first Week- day of the month.

Input the first day of the month (Sun=0,Mon=1,Tue=2,Wed=3,.....) :: 3
Total number of days in the month : 31

Expected output

Sun	*Mon*	*Tue*	*Wed*	*Thu*	*Fri*	*Sat*
-	-	-	*1*	*2*	*3*	*4*
5	*6*	*7*	*8*	*9*	*10*	*11*
12	*13*	*14*	*15*	*16*	*17*	*18*
19	*20*	*21*	*22*	*23*	*24*	*25*
25	*26*	*27*	*28*	*29*	*30*	*31*

Week-9

1) Write a program to print the Pascal triangle for a given number
2) Write a program to calculate the following expression for given x value

$$f(x) = a_0 + \sum_{n=1}^{\infty} \left(a_n \cos\frac{n\pi x}{L} + b_n \sin\frac{n\pi x}{L} \right)$$

Week-10

1. Write C code to define a function, median, that takes 3 numbers as its inputs, and returns the median.
2. Write a function to find the sum of the digit of a given number
3. Write a program to perform simple calculator operations(use functions: addition, subtraction, multiplication and division)

Week-11

1) Write C code to define a function cash_dispense, which takes an amount as its input, and returns the number of 1000, 500, 100, 50, 20, 10, 5, 2, 1 rupee denomination that make up the given amount.
2) Write C code to reverse the contents of the array. For example, [1,2,3,4,5] should become [5,4,3,2,1]
3) Write a program that will search and find out the position where the given key element exist in a user chosen array and print it as output.

Week-12

1) Write a program that uses the binary search algorithm to find out the position where the given key element exist in a user chosen array and print it as output
2) Write a program perform matrix multiplication between two matrices.

Week-13

1) Write C code to compute the frequency table of survey responses given by 20 users. The survey responses range from 1 to 5 and are stored in an array. For example, 10 responses are stored in the array [1,1,5,2,3,3,5,5,2,2]. The frequency table will be as shown below:
   a. 1 = 2
   b. 2 = 3
   c. 3 = 2
   d. 4 = 0
   e. 5 = 3
2) Write a program to define a function to sort an array of integers in ascending order by using exchange sort.

Week-14

1) Write a c program to define a function to find the largest and smallest numbers in list of integers.
2) Write a C program that uses a recursive function for generating the Fibonacci numbers.

Week-15

1) Write a C program to check whether a given string is a palindrome or not, without using any built-in functions
2) Write a function that accepts a string and delete the first character.
3) Write a function that accepts a string and delete all the leading spaces.

Week-16

Write a 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 string.

Week-17

Write a C program that uses functions to perform the following operations:

a) Reading a complex number
b) Writing a complex number
c) Addition of two complex numbers
d) Multiplication of two complex numbers

(Note: represent complex numbers using structures)

Week-18

1) Write a C program to define a union and structure both having exactly the same numbers using the sizeof operators print the sizeof structure variables as well as union variable
2) Declare a structure *time* that has three fields *hr, min, secs.* Create two variables, *start_time* and *end_time.* Input there values from the user. Then while *start_time* is not equal to *end_time* display GOOD DAY on screen.

Week-19

1) Write a function that flips the bits in an 16-bit unsigned integer.
2) Write a function that changes the first(leftmost) hexadecimal digit in a 32-bit unsigned integer. The function is to have two parameters. The first is the integer to be manipulated, the second the replacement digit.

Week-20

1) Write a program to read in an array of names and to sort them in alphabetical order. Use sort function that receives pointers to the functions strcmp, and swap, sort in turn should call these functions via the pointers.
2) Write a program to read and display values of an integer array. Allocate space dynamically for the array using the *malloc().*

Week-21 Write a program to calculate area of a triangle using function that has the input parameters as pointers as sides of the triangle.

Week-22

1) Two text files are given with the names text1 and text2. These files have several lines of text. Write a program to merge (first line of text1 followed by first line of text2 and so on until both the files reach the end of the file) the lines of text1 and text2 and write the merged text to a new file text3.
2) Write a 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.

Week-23 Write a program in C using structures which stores the code, name and price of an item stored in a file and perform the following operations:

a) Append item
b) Modify an item
c) Display all items
d) Delete n item

Week-24

1) Write a program that uses the functions to perform the following operations on a single linked list
   a. Creation
   b.Insertion
   c. Deletion
   d.Traversal

Reference Books:

1. *Computer Science, A Structured Programming Approach Using C by Behrouz A. Forouzan & Richard F. Gilberg, Third Edition, Cengage Learning*
2. *C Programming A Problem-Solving Approach, Behrouz A. Forouzan & E.V. Prasad, F. Gilberg, Third Edition, Cengage Learning*
3. *Programming with C Rema Theraja, Oxford*
4. *"C Test Your Skills", Kamthane, Pearson Education*
5. *Programming in C: A Practical Approach, Ajay Mittal, Pearson*
6. *Problem solving with C, M.T.Somasekhara, PHI*
7. *C Programming with problem solving, J.A. Jones & K. Harrow,Dreamtech Press*
8. *Programming with C, Byron S Gottfried, Jitender Kumar Chhabra, TMH, 2011*

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B.Tech. I Year	**L**	**C**
	3	**4**

Common to All Branches
(13A99102) ENGINEERING PHYSICS & ENGINEERING CHEMISTRY LAB

ENGINEERING PHYSICS LAB

LIST OF EXPERIMENTS

Any 10 of the following experiments has to be performed:

1. Determination of wavelengths of various colours of mercury spectrum using diffraction grating in normal incidence method
2. Determination of dispersive power of the prism
3. Determination of thickness of thin object by wedge method
4. Determination of radius of curvature of lens by Newton's Rings
5. Laser : Diffraction due to single slit
6. Laser : Diffraction due to double slit
7. Laser: Determination of wavelength using diffraction grating
8. Determination of Numerical aperture of an optical fiber
9. Meldes experiment: Determination of the frequency of tuning fork
10. Sonometer: Verification of the three laws of stretched strings
11. Energy gap of a material using p-n junction diode
12. Electrical conductivity by four probe method
13. Determination of thermistor coefficients (α, β)
14. Hall effect : Determination of mobility of charge carriers in semiconductor
15. B-H curve
16. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
17. Determination of lattice constant using X-ray spectrum.

ENGINEERING CHEMISTRY LAB
Preamble:
The experiments are designed in a manner that the students can validate their own theory understanding in chemistry by self involvement and practical execution. Thus the execution of these experiments by the student will reinforce his/her understanding of the subject and also provide opportunity to refine their understanding of conceptual aspects. As a result, the student gets an opportunity to have feel good factor at the laboratory bench about the chemical principles that he/she learned in the classroom.

***Course Objective**:*

- *Will learn practical understanding of the redox reaction*
- *Will able to understand the function of fuel cells, batteries and extend the knowledge to the processes of corrosion and its prevention*
- *Will learn the preparation and properties of synthetic polymers and other material that would provide sufficient impetus to engineer these to suit diverse applications*
- *Will also learn the hygiene aspects of water would be in a position to design methods to produce potable water using modern technology*

Learning Outcome:

- *Would be confident in handling energy storage systems and would be able combat chemical corrosion*
- *Would have acquired the practical skill to handle the analytical methods with confidence.*

- *Would feel comfortable to think of design materials with the requisite properties*
- *Would be in a position to technically address the water related problems.*

LIST OF EXPERIMENTS

Any 10 of the following experiments has to be performed:

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. Determination of Copper by Iodometry
5. Estimation of iron (II) using diphenylamine indicator (Dichrometry – Internal indicator method).
6. Determination of Alkalinity of Water
7. Determination of acidity of Water
8. Preparation of Phenol-Formaldehyde (Bakelite)
9. Determination of Viscosity of oils using Redwood Viscometer I
10. Determination of Viscosity of oils using Redwood Viscometer II
11. Conductometric titration of strong acid Vs strong base (Neutralization titration).
12. Conductometric titration of Barium Chloride vs Sodium Sulphate (Precipitation Titration)
13. Determination of Corrosion rate and inhibition efficiency of an inhibitor for mild steel in hydrochloric acid medium.
14. Estimation of Chloride ion using potassium Chromite indicator (Mohrs method)

References:

1. *Vogel's Text book of Quantitative Chemical Analysis, J. Mendham et al, Pearson Education, Sixth Edition, 2012.*
2. *Chemistry Practical – Lab Manual by K.B.Chandra Sekhar, G.V. Subba Reddy and K.N.Jayaveera, SM Publications, Hyderabad, 3rd Edition, 2012.*

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B.Tech. I Year	**L**	**C**
	3	**4**

Common to All Branches

(13A99103) ENGINEERING & I.T. WORKSHOP

ENGINEERING WORKSHOP

Course Objective:

The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially he should know the labour involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students

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 out of 300 x 40 x 25 mm 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 guage G.I. sheet
d. House-wiring– Two jobs (exercises) from: wiring for ceiling rose and two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, wiring for a 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. *Engineering Practices Lab Manual, Jeyapoovan, SaravanaPandian, 4/e Vikas*
4. *Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.*

I.T. WORKSHOP

Course Objective:

- *To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations*
- *To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system*
- *To learn about Networking of computers and use Internet facility for Browsing and Searching.*

Learning Outcome:

- *Disassemble and Assemble a Personal Computer and prepare the computer ready to use.*
- *Prepare the Documents using Word processors*
- *Prepare Slide presentations using the presentation tool*
- *Interconnect two or more computers for information sharing*
- *Access the Internet and Browse it to obtain the required information*
- *Install single or dual operating systems on computer*

Preparing your Computer (5 weeks)

Task 1: 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.

Task 2: 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.

Task 3: 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.

Task 4: **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.

Networking and Internet (4 weeks)

Task 5: 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.

Task 6: 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.

Task 7: Antivirus: Students should download freely available Antivirus software, install it and use it to 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.

Productivity tools (6 weeks)

Task 8: 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 and paste 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.

Task 9: 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.

Task 10: 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.

Optional Tasks:

Task 11: Laboratory Equipment: Students may submit a report on specifications of various equipment that may be used by them for the laboratories in their curriculum starting from I B.Tech to IV. B.Tech. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

- Desktop computer
- Server computer
- Switch (computer science related)
- Microprocessor kit
- Micro controller kit
- Lathe machine
- Generators
- Construction material
- Air conditioner
- UPS and Inverter
- RO system
- Electrical Rectifier
- CRO
- Function Generator
- Microwave benches

Task 12: Software: Students may submit a report on specifications of various software that may be used by them for the laboratories in their curriculum starting from I B.Tech to IV. B.Tech. The software may be proprietary software or Free and Open source software. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

- Desktop operating system
- Server operating system
- Antivirus software
- MATLAB
- CAD/CAM software
- AUTOCAD

References:

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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B.Tech. I Year

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Common to All Branches

(13A52102) ENGLISH LANGUAGE COMMUNICATION SKILLS (ELCS) LAB

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

Course Objective:

- *To train students to use language effectively in everyday conversations.*
- *To expose the students to a varied blend of self-instructional learner-friendly modes of language learning through computer-aided multi-media instruction.*
- *To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.*
- *To help the second language learners to acquire fluency in spoken English and neutralize mother tongue influence*
- *To train students to use language appropriately for interviews, group discussion and public speaking*

Learning Outcome:

- *Becoming active participants in the learning process and acquiring proficiency in spoken English of the students*
- *Speaking with clarity and confidence thereby enhancing employability skills of the students*

PHONETICS

Importance of speaking phonetically correct English
Speech mechanism-Organs of speech
Uttering letters-Production of vowels sounds
Uttering letters -Production of consonant sounds
Uttering words-Stress on words and stress rules
Uttering sentences-Intonation-tone group

LISTENING

Listening as a skill
Listening activities

PRESENTATIONAL SKILLS

Preparation
Prepared speech
Impromptu speech
topic originative techniques
JAM (Just A Minute)
Describing people/object/place
Presentation-
Stage dynamics
Body language

SPEAKING SKILLS

Telephone skills
Role plays
Public Speaking

GROUP ACTIVITIES

Debates
Situational dialogues

MINIMUM REQUIREMENT FOR ELCS LAB:

The English Language Lab shall have two parts:

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.
- 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:
  - P – IV Processor
  - Speed – 2.8 GHZ
  - RAM – 512 MB Minimum
  - Hard Disk – 80 GB
  - Headphones of High quality

SUGGESTED SOFTWARE:

- Clarity Pronunciation Power – Part I (Sky Pronunciation)
- Clarity Pronunciation Power – part II
- K-Van Advanced Communication Skills
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- *DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.*
- Lingua TOEFL CBT Insider, by Dreamtech
- English Pronunciation in Use (Elementary, Intermediate, Advanced) CUP
- Cambridge Advanced Learners' English Dictionary with CD.
- Oxford Advanced Learner's Compass, 8th Edition
- Communication Skills, Sanjay Kumar & Pushp Lata. 2011. OUP

References:

1. *Strengthen Your Steps, Maruthi Publicaions, 2012.*
2. *A Course in Phonetics and Spoken English, Dhamija Sethi, Prentice-Hall of India Pvt.Ltd.*
3. *A Textbook of English Phonetics for Indian Students 2nd Ed T. Balasubramanian. (Macmillian),2012.*
4. *Speaking English Effectively, 2nd Edition Krishna Mohan & NP Singh, 2011. (Mcmillan).*
5. *Listening in the Language Classroom, John Field (Cambridge Language Teaching Library),2011*
6. *A Hand Book for English Laboratories, E.Suresh Kumar, P.Sreehari, Foundation Books,2011*
7. *English Pronunciation in Use. Intermediate & Advanced, Hancock, M. 2009. CUP.*
8. *Basics of Communication in English, Soundararaj, Francis. 2012.. New Delhi: Macmillan*
9. *Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.*
10. *English Pronouncing Dictionary, Daniel Jones, Current Edition with CD.Cambridge, 17th edition, 2011.*

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B.Tech. II - I Sem.	**Th**	**Drg**	**C**
	1	**3**	**3**

(13A03304) ENGINEERING GRAPHICS

Course Objective:

- *By studying the engineering drawing, a student becomes aware of how industry communicates technical information. Engineering drawing teaches the principles of accuracy and clarity in presenting the information necessary about objects.*
- *This course develops the engineering imagination i.e., so essential to a successful design, By learning techniques of engineering drawing changes the way one things about technical images.*
- *It is ideal to master the fundamentals of engineering drawing first and to later use these fundamentals for a particular application, such as computer aided drafting. Engineering Drawing is the language of engineers, by studying this course engineering and technology students will eventually be able to prepare drawings of various objects being used in technology.*

UNIT I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance-Conventions in Drawing-Lettering – BIS Conventions. Curves used in Engineering Practice.

a) Conic Sections including the Rectangular Hyperbola- General method only,
b) Cycloid, Epicycloid and Hypocycloid

UNIT II

Projection of Points & Lines: Principles of orthographic projection – Convention – First angle projections, projections of points, lines inclined to one or both planes, Problems on projections, Finding True lengths.

UNIT III

Projections of Planes: Projections of regular plane surfaces- plane surfaces inclined to one plane.
Projections of Solids: Projections of Regular Solids with axis inclined to one plane.

UNIT IV

Sections and Developments of Solids: Section Planes and Sectional View of Right Regular Solids-Prism, cylinder, Pyramid and Cone. True shapes of the sections. Development of Surfaces of Right Regular Solids-Prism, Cylinder, Pyramid, Cone.

UNIT V

Isometric and Orthographic Projections: Principles of isometric projection- Isometric Scale-Isometric Views- Conventions- Isometric Views of lines, Planes Figures, Simple solids (cube, cylinder and cone). Isometric projections of spherical parts. Conversion of isometric Views to Orthographic Views.

Text Books*:*

1. *Engineering Drawing, N.D. Bhatt, Charotar Publishers*
2. *Engineering Drawing, K.L. Narayana& P. Kannaih, Scitech Publishers, Chennai*

Reference Books*:*

1. *Engineering Drawing, Johle, Tata McGraw-Hill Publishers*
2. *Engineering Drawing, Shah and Rana,2/e, Pearson Education*
3. *Engineering Drawing and Graphics, Venugopal/New age Publishers*
4. *Engineering Graphics, K.C. John, PHI,2013*
5. *Engineering Drawing, B.V.R. Guptha, J.K. Publishers*

Suggestions:

1. *Student is expected to buy a book mentioned under 'Text books' for better understanding.*
2. *Students can find the applications of various conics in engineering and application of involute on gear teeth. The introduction for drawing can be had on line from:*
    - *Introduction to engineering drawing with tools – youtube*
    - *Http-sewor. Carleton.ca /- g kardos/88403/drawing/drawings.html*
    - *Conic sections-online. red woods.edu*

The skill acquired by the student in this subject is very useful in conveying his ideas to the layman easily.

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B.Tech. II - I Sem.	**Th**	**Tu**	**C**
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(13A54303) PROBABILITY AND STATISTICS

Course Objective:

- *To help the students in getting a thorough understanding of the fundamentals of probability and usage of statistical techniques like testing of hypothesis, ANOVA, Statistical Quality Control and Queuing theory*

Learning Outcome:

- *The student will be able to analyze the problems of engineering & industry using the techniques of testing of hypothesis, ANOVA, Statistical Quality Control and Queuing theory and draw appropriate inferences*

UNIT I

Conditional probability – Baye's theorem. Random variables – Discrete and continuous Distributions – Distribution functions. Binomial and poison distributions Normal distribution – Related properties.

UNIT II

Test of Hypothesis: Population and Sample - Confidence interval of mean from Normal distribution - Statistical hypothesis - 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 III

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

UNIT IV

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.

UNIT V

Queuing Theory: Pure Birth and Death process, M/M/1 & M/M/S & their related simple problems.

Text Books:

1. *Probability & Statistics for engineers by Dr. J. Ravichandran WILEY-INDIA publishers.*
2. *Probability & Statistics by T.K.V. Iyengar, S.Chand publications.*

Reference Books:

1. *Probability & Statistics by E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.*
2. *Statistical methods by S.P. Gupta, S.Chand publications.*
3. *Probability & Statistics for Science and Engineering by G.Shanker Rao, 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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B.Tech. II - I Sem.	**Th**	**Tu**	**C**
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(13A01403) ENVIRONMENTAL SCIENCE

Course Objective:

- *To make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save earth from the inventions by the engineers.*

UNIT I

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES: – Definition, Scope and Importance – Need for Public Awareness.

NATURAL RESOURCES : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest 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, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

UNIT II

ECOSYSTEMS: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological sucession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

BIODIVERSITY AND ITS CONSERVATION: Introduction 0 Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-soports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT III

ENVIRONMENTAL POLLUTION: Definition, Cause, effects and control measures of :

a. Air Pollution.
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

SOLID WASTE MANAGEMENT: Causes**,** effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT IV

SOCIAL ISSUES AND THE ENVIRONMENT: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT V

HUMAN POPULATION AND THE ENVIRONMENT: Population growth, variation among nations. Population explosion – Family Welfare Programme – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

FIELD WORK: Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, birds – river, hill slopes, etc..

***Text Books**:*

1. *Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press, 2005.*
2. *Environmental Studies by Palanisamy, Pearson education, 2012.*
3. *Environmental Studies by R.Rajagopalan, Oxford University Press, 2nd edition, 2011.*

Reference Books:

1. *Textbook of Environmental Studies by Deeksha Dave and E.Sai Baba Reddy, Cengage Pubilications, 2nd edition, 2012.*
2. *Text book of Environmental Science and Technology by M.Anji Reddy, BS Publication, 2009.*
3. *Comprehensive Environmental studies by J.P.Sharma, Laxmi publications, 2nd edition, 2006.*
4. *Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Printice hall of India Private limited, 2nd edition, 1996.*
5. *Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Printice hall of India Private limited, 3rd edition, 2007.*

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B.Tech. II - I Sem.	**Th**	**Tu**	**C**
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(13A05301) DATA STRUCTURES

Course Objective:

- *To develop skills to design and analyze linear and non linear data structures.*
- *Develop algorithms for manipulating linked lists, stacks, queues, trees and graphs.*
- *Develop recursive algorithms as they apply to trees and graphs.*
- *To develop a base for advanced computer science study.*

Learning Outcome:

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

- *Study variety of advanced abstract data type (ADT) and data structures and their Implementations.*
- *Identify and apply the suitable data structure for the given real world problem*

UNIT I

Introduction and Overview: System Life Cycle, Definition, Overview of Data Structures

Linked Lists: Single Linked Lists – Insertion and Deletion, Double Linked Lists – Insertion and Deletion.

Stacks: Definition, The Abstract Data Type, Array Representation, Linked Representation, Applications.

Queues: Definition, The Abstract Data Type, Array Representation, Linked Representation, Circular Queues, Applications.

UNIT II

Sorting: Motivation, Quick Sort, Merge Sort, Insertion Sort, and Heap Sort.

Trees: Introduction, Representation of Trees, Binary Trees, Binary Tree Traversal and Tree Iterators, Additional Binary Tree Operations, Threaded Binary Trees, Binary Search Trees, Selection Trees.

UNIT III

Graphs: The Graph Abstract Data Type, Elementary Graph Operations.

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

UNIT IV

Priority Queues: Definition and Applications, Single and Double Ended Priority Queues, Linear Lists, Heaps, 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, Algorithms and Applications in C++ by Sartaj Sahni, Universities Press, Second Edition*

Reference Books:

1. *Data Structures and Algorithms Using C++ by Ananda Rao Akepogu and Radhika Raju Palagiri, Pearson Ed.*
2. *Classic Data Structure by D. Samanta, Eastern Economy Edition.*
3. *Data Structures and Algorithms Made Easy by Narasimha Karumanchi, Second Edition, Written in C/C++, CareerMonk Publications, Hyderabad*
4. *ADTs, Data Structures and Problem Solving with C++, Larry Nyhoff, Pearson*
5. *Data Structures using C++, D.S.Malik, 2nd Edition, Cengage Learning*
6. *Data Structures through C++, Yashavant P.Kanetkar, BPB Publication*
7. *Data Structures using C and C++, Yedidyah Langsam.Moshe J.Augenstein Aaron M.Tenenbaum, 2nd Edition,PHI*
8. *Data Structures using C & C++, Rajesh K.Shukla, Wiley-India*

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B.Tech. II - I Sem.	**Th**	**Tu**	**C**
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(13A04306) DIGITAL LOGIC DESIGN

Course Objective:

- *Acquire the skills to manipulate and examine Boolean algebraic expressions, logical operations, Boolean functions and their simplifications.*
- *Understand the fundamental principles of digital design.*
- *Acquaint with classical hardware design for both combinational and sequential logic circuits.*

Learning Outcome:

- *Ability to interpret, convert and represent different number systems and binary arithmetic.*
- *Able to design sequential and combinational circuits*
- *Able to design different units of a digital computer.*

UNIT I

Binary Systems: Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Compliments, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Binary Logic.

Boolean Algebra And Logic Gates: Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates, Integrated Circuits

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, Other Minimization Methods

UNIT III

Combinational Logic: Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, 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, Other counters

UNIT V

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

Digital Logic Circuits: RTL and DTL Circuits, Transistor-Transistor Logic (TTL), Emitter-Coupled Logic (ECL), MOS, CMOS Logic, Comparisons of Logic Families

Text Books*:*

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

***Reference Books**:*

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*
3. *Fundamentals of Logic Design, 5/e, Roth, Cengage*
4. *Switching and Finite Automata Theory,3/e,Kohavi, Jha, Cambridge.*
5. *Digital Logic Design, Leach, Malvino, Saha,TMH*
6. *Modern Digital Electronics, R.P. Jain, TMH*

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B.Tech. II - I Sem.	**Th**	**Tu**	**C**
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(13A05302) DISCRETE MATHEMATICS

Course Objective:

- *Understand the methods of discrete mathematics such as proofs, counting principles, number theory, logic and set theory.*
- *Understand the concepts of graph theory, binomial theorem, probability distribution function in analysis of various computer science applications.*

Learning Outcome:

- *Able to apply mathematical concepts and logical reasoning to solve problems in different fields of Computer science and information technology.*
- *Able to apply the concepts in courses like Computer Organization, DBMS, Analysis of Algorithms, Theoretical Computer Science, Cryptography, Artificial Intelligence, etc.,*

UNIT I

The Language of Logic: Propositions, Logical Equivalences, Quantifiers, Arguments, Proof Methods.
The Language of Sets: The Concepts of a Set, Operations with Sets, Computer Operations with Sets, The Cardinality of a Set, Recursively Defined Sets.
Functions: The concept of Functions, Special Functions, Properties of Functions, The Pigeonhole principle, Composite Functions, Sequences and the Summation Notation.

UNIT II

Relations: Boolean Matrices, Relations and Digraphs, Computer Representations of Relations, Properties of Relations, Operations on Relations, Transitive Closure, Equivalence Relations, Partial and Total Ordering.
Lattices & Boolean Algebra: Lattices as Partially Ordered Sets, Properties of Lattices, Lattices as Algebraic Systems, Sublattices, Direct Product and Homomorphism, Boolean Algebra, Boolean Functions

UNIT III

Algebraic Structures: Algebraic Systems, Semigroups and Monoids, Groups - Subgroups and Homomorphism, Cosets and Lagrange's theorem, Normal Subgroups.
Combinatorics: The Fundamental Counting Principles, Permutations, Derangements, Combinations, Permutations and Combinations with Repetitions, The Binomial Theorem, The Generalized Inclusion-Exclusion Principle.

UNIT IV

Induction and Algorithms: The Division Algorithm, Divisibility Properties, Nondecimal Bases, Mathematical Induction, Algorithm Correctness, The Growth Functions, Complexity of Algorithms.
Recursion: Recursively Defined Functions, Solving Recurrence Relations, Generating Functions, Recursive Algorithms, Correctness of Recursive Algorithms, Complexities of Recursive Algorithms.

UNIT V

Graphs: Computer Representation of Graphs, Isomorphic Graphs, Paths, Cycles, and Circuits, Eulerian and Hamiltonial Graphs, Planar Graphs, Graph Coloring, Digraphs, Dags, Weighted Digraphs, DFS and BFS Algorithms.
Trees: Trees, Spanning Trees, Minimal Spanning Trees, Kruskal's and Prim's Algorithm

Text Books:

1. *Discrete Mathematics with Applications, Thomas Koshy, 2003, Elsevier Academic Press.*
2. *Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay and R. Manohar, 1975, TMH.*

Reference Books:

1. *Discrete and Combinatorial Mathematics, Fifth Edition, R. P. Grimaldi, B.V. Ramana, Pearson*
2. *Discrete Mathematics Theory and Applications, D.S Malik and M.K. Sen, Cengage Learning*
3. *J .L.Mott, A.Kandel, T.P .Baker, Discrete Mathematics for Computer Scientists and Mathematicians, second edition 1986, Prentice Hall of India*
4. *C.L.Liu, Elements of Discrete Mathematics, Second Edition 1985, McGraw-Hill Book Company. Reprinted 2000*
5. *Discrete Mathematics, Norman L. Biggs, Second Edition, OXFORD Indian Edition.*
6. *K.H.Rosen, Discrete Mathematics and applications, 5th Edition 2003, TataMcGraw Hillpublishing Company*
7. *Graph Theory with Applications to Engineering & Computer Science: Narsingh Deo, PHI (2004)*
8. *"Discrete Mathematical Structures" Jayant Ganguly, Sanguine*

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B.Tech. II - I Sem. **L C**
3 2

(13A99304) ELECTRICAL & ELECTRONICS ENGINEERING LAB

PART- A: ELECTRICAL LAB

1. Verification of Superposition Theorem.
2. Verification of Thevenin's Theorem.
3. Open Circuit Characteristics of D.C.Shunt Generator.
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 LAB
(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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B.Tech. II - I Sem. **L** **C**
3 **2**

(13A05303) DATA STRUCTURES LAB

Week 1
a) Write a Program to Implement Stack Operations by using Array and Linked Lists.
b) Write a Program to Implement the Operations of Double Linked Lists

Week 2
a) Write a C program that uses stack operations to convert a given infix expression into its postfix
b) Write a Program to Implement Queue Operations by using Array and Linked Lists.

Week 3
Write a Program to Implement Circular Queue Operations by using Array and Linked Lists.

Week 4
Write a Program to Sort the set of elements by using
i) Quick Sort ii) Heap Sort. iii) Merge Sort

Week 5
Write a Program to Implement the Binary Search Tree Operations.

Week 6
Write a Program to Perform the Tree Traversal Techniques by using the Iterative Method

Week 7
Write C programs for implementing the following graph traversal algorithms:
a)Depth first traversal b)Breadth first traversal

Week 8
Write a Program to Implement All functions of a Dictionary by using Hashing

Week 9
Write a Program to Implement Skip List Operations.

Week 10
Write a Program to Implement Insertion, Deletion and Search Operations on SPLAY Trees.

Week 11
Write a program to Implement Insertion and Deletion Operations on AVL Trees
Week 12
Write a Program to Implement Insertion and Deletion Operations on B – Trees

Note: Use Classes and Objects to implement the above programs.

References:

1. *Object Oriented Programming with ANSI & Turbo C++, Ashok N.Kamthane, Pearson Education*
2. *Data Structures using C++, D.S.Malik, 2nd Edition, Cengage Learning*
3. *Data Structures through C++, Yashavant P.Kanetkar, BPB Publication*
4. *Data Structures using C and C++, Yedidyah Langsam.Moshe J.Augenstein Aaron M.Tenenbaum, 2nd Edition,PHI*
5. *Data Structures using C & C++, Rajesh K.Shukla, Wiley-India*
6. *ADTs, Data Structures and Problem Solving with C++, Larry Nyhoff, Pearson*

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(13A05401) COMPUTER ORGANIZATION AND ARCHITECTURE

Course Objective:

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

Learning Outcome:

- *Ability to use memory and I/O devices effectively*
- *Able to explore the hardware requirements for cache memory and virtual memory*
- *Ability to design algorithms to exploit pipelining and multiprocessors*

UNIT I

Introduction to Computer Organization and Architecture

Basic Computer Organization – CPU Organization – Memory Subsystem Organization and Interfacing – I/O Subsystem Organization and Interfacing – A Simple Computer Levels of Programming Languages, Assembly Language Instructions, Instruction Set Architecture Design, A simple Instruction Set Architecture

UNIT II

CPU Design and Computer Arithmetic

CPU Design: Instruction Cycle – Memory – Reference Instructions – Input/output and Interrupt – Addressing Modes – Data Transfer and Manipulation – Program Control.

Computer Arithmetic: Addition and Subtraction – Multiplication Algorithms – Division Algorithms – Floating-Point Arithmetic Operations – Decimal Arithmetic unit.

UNIT III

Register Transfer Language and Design of Control Unit

Register Transfer: Register Transfer Language – Register Transfer – Bus and Memory Transfers – Arithmetic Micro operations – Logic Micro operations – Shift Micro operations.

Control Unit: Control Memory – Address Sequencing – Micro program Example – Design of Control Unit.

UNIT IV

Memory and Input/output Organization

Memory Organization: Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory.

Input/output Organization: Input-Output Interface – Asynchronous Data Transfer – Modes of Transfer – Priority Interrupt – Direct Memory Access (DMA).

UNIT V

Pipeline and Multiprocessors

Pipeline: Parallel Processing – Pipelining – Arithmetic Pipeline – Instruction Pipeline.

Multiprocessors: Characteristics of Multiprocessors – Interconnection Structures – Inter Processor Arbitration – Inter Processor Communication and Synchronization.

Text Books:

1. *"Computer Systems Organization and Architecture", John D. Carpinelli, PEA, 2009.*
2. *"Computer Systems Architecture", 3/e, M. Moris Mano, PEA, 2007.*

Reference Books:

1. *"Computer Organization", Carl Hamacher, Zvonks Vranesic, SafeaZaky, 5/e, MCG, 2002.*
2. *"Computer Organization and Architecture", 8/e, William Stallings, PEA, 2010.*
3. *"Computer Systems Architecture a Networking Approach", 2/e, Rob Williams.*
4. *"Computer Organization and Architecture" Ghoshal, Pearson Education, 2011.*
5. *"Computer Organization and Architecture", V. Rajaraman, T. Radakrishnan.*
6. *"Computer Organization and Design", P. Pal Chaudhuri, PHI*
7. *"Structured Computer Organization", Andrew S. Janenbaum, Todd Austin*
8. *"Computer Architecture" Parahmi, Oxford University Press*

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(13A05402) DATABASE MANAGEMENT SYSTEMS

Course Objective:

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

Learning Outcome:

- *Students can design the simple database, and can use the SQL instructions in developing the database applications.*
- *Can apply the ER concepts to design the databases.*
- *Advanced concepts like triggers, assertions and constraints can be applied effectively in designing the business applications.*

UNIT I

The Worlds of Database Systems -The Evolution of Database Systems - Overview of a Database Management System - Outline of Database System Studies.

The Entity-Relationship Model – Elements of E/R Model – Design Principles – The Modeling of Constraints – Weak Entity Sets.

The Relational Data Model – Basics of the Relational Model – From E/R Diagrams to Relational Designs – Converting Subclass Structures to Relations.

UNIT II

Functional Dependencies – Rules about Functional Dependencies -- Design of Relational Database Schemas – Multivalued Dependencies.

Relational Algebra and Calculus – Preliminaries, Relational algebra: Selection and Projection , Set Operations, Renaming, Joins, Division - Relational Calculus – Expressive power of Algebra and Calculus.

UNIT III

The Database Language SQL – Simple Queries in SQL – Queries Involving More than One Relation – Subqueries – Full Relation Operations – Database Modifications – Defining a Relation Schema in SQL – View Definitions - Transactions in SQL: Serializability, Atomicity, Transactions, Readonly Transactions, Dirty Reads, Other isolation levels.

Constraints and Triggers – Keys and Foreign keys – Constraints on Attributes and Tuples, Schema-level Constraints and Triggers.

UNIT IV

Representing Data Elements – Data Elements and Fields – Records – Representing Block and Record Addresses – Variable Length Data and Records – Record Modifications.

Index Structures – Indexes on Sequential Files – Secondary Indexes – B-Trees – Hash Tables.

UNIT V

Coping with System Failures – Issues and Models for Resilient Operation – Undo Logging – Redo Logging – Undo/Redo Logging – Protecting Against Media Failures.

Concurrency Control – Serial and Serializable Schedules – Conflict Serializability – Enforcing Serializability by Locks – Locking Systems with Several Lock Modes - Concurrency Control by Timestamps – Concurrency Control by Validation.

Text Books:

1. *"Database Systems, The Complete Book", Hector Garcia-Molina, Jeffrey D. Ullman and Jennifer Widom, 6th impression, 2011, Pearson.*
2. *"Data base Management Systems", Raghu Rama Krishnan, Johannes Gehrke, 3rd Edition, 2003, McGraw Hill.*

Reference Books:

1. *"Fundamentals of Database Systems", Elmasri Navrate, 6th edition, 2013, Pearson.*
2. *"Data base Systems design", Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.*
3. *"Introduction to Database Systems", C.J.Date, Pearson Education.*
4. *"Data base System Concepts", Silberschatz, Korth, McGraw Hill, V edition.*

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(13A05403) JAVA PROGRAMMING

Course Objective:

- *Study the syntax, semantics and features of Java Programming Language*
- *Learn the method of creating Multi-threaded programs and handle exceptions*
- *Learn Java features to create GUI applications & perform event handling*

Learning Outcome:

- *Ability to solve problems using object oriented approach and implement them using Java*
- *Ability to write Efficient programs with multitasking ability and handle exceptions*
- *Create user friendly interface*

UNIT I

Introduction to Java: The key attributes of object oriented programming, Simple program, The Java keywords, Identifiers, Data types and operators, Program control statements, Arrays, Strings, String Handling

UNIT II

Classes: Classes, Objects, Methods, Parameters, Constructors, Garbage Collection, Access modifiers, Pass Objects and arguments, Method and Constructor Overloading, Understanding static, Nested and inner classes.

Inheritance – Basics, Member Access, Usage of Super, Multi level hierarchy, Method overriding, Abstract class, Final keyword.

Interfaces – Creating, Implementing, Using, Extending, and Nesting of interfaces.

Packages – Defining, Finding, Member Access, Importing.

UNIT III

Exception handling: Hierarchy, Fundamentals, Multiple catch clauses, Subclass exceptions, Nesting try blocks, Throwing an exception, Using Finally and Throws, Built-in exceptions, User-defined exceptions.

I/O: Byte streams and Classes, Character streams and Classes, Predefined streams, Using byte streams, Reading and Writing files using byte streams, Reading and writing binary data, Random-access files, File I/O using character streams, Wrappers.

UNIT IV

Multithreading: Fundamentals, Thread class, Runnable interface, Creating multiple threads, Life cycle of thread, Thread priorities, Synchronization, Thread communication, Suspending, Resuming and Stopping threads. **Applets**: Basics, skeleton, Initialization and termination, Repainting, Status window, Passing parameters.

Networking: Basics, Networking classes and interfaces, InetAddress, Inet4Address and Inet6Address, TCP/IP Client Sockets, URL, URLConnection, HttpURLConnection, The URI class, Cookies, TCP/IP Server sockets, Datagrams.

UNIT V

Swings: The origin and design philosophy of swing, Components and containers, Layout managers, Event handling, Using a push button, jtextfield, jlabel and image icon, The swing buttons, Trees, An overview of jmenubar, jmenu and jmenuitem, Creating a main menu, Add mnemonics and accelerators to Menu items, showmessagedialog, showconfirmdialog, showinputdialog, showoptiondialog, jdialog, Create a modeless dialog.

Text Books:

1. *"Java Fundamentals - A Comprehensive Introduction", Herbert Schildt and Dale Skrien, Special Indian Edition, McGrawHill, 2013.*
2. *"Java The Complete Reference" Herbert Schildt, 8th Edition, 2011, Oracle press, TataMcGraw-Hill*

Reference Books:

1. *"Programming with Java" T.V.Suresh Kumar, B.Eswara Reddy, P.Raghavan Pearson Edition.*
2. *"Java – How to Program", Paul Deitel, Harvey Deitel, PHI.*
3. *"Core Java", Nageswar Rao, Wiley Publishers.*
3. *"Thinking in Java", Bruce Eckel, Pearson Education.*
4. *"A Programmers Guide to Java SCJP", Third Edition, Mughal, Rasmussen, Pearson.*
5. *"Head First Java", Kathy Sierra, Bert Bates, O'Reilly*
6. *"SCJP – Sun Certified Programmer for Java Study guide" – Kathy Sierra, Bert Bates, McGrawHill*
7. *"Java in Nutshell", David Flanagan, O'Reilly*
8. *"Core Java : Volume I – Fundamentals, Cay S. Horstmann, Gary Cornell, The Sun Micro Systems Press*

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(13A05404) FORMAL LANGUAGES AND AUTOMATA THEORY

Course Objective:

- *Understand formal definitions of machine models.*
- *Classify machines by their power to recognize languages.*
- *Understanding of formal grammars, analysis*
- *Understanding of hierarchical organization of problems depending on their complexity*
- *Understanding of the logical limits to computational capacity*
- *Understanding of undecidable problems*

Learning Outcome:

At the end of the course, students will be able to

- *Construct finite state diagrams while solving problems of computer science*
- *Find solutions to the problems using Turing machines*
- *Design of new grammar and language*

UNIT I

Introduction: Basics of set theory, Relations on sets, Deductive proofs, Reduction to definitions, Other theorem forms, Proving equivalences about sets, The Contrapositive, Proof by contradiction, Counter examples, Inductive proofs, Alphabets, Strings, Languages, Problems, Grammar formalism, Chomsky Hierarchy

Finite Automata: An Informal picture of Finite Automata, Deterministic Finite Automata (DFA), Non Deterministic Finite Automata (NFA), Applying FA for Text search, Finite Automata with Epsilon transitions (ϵ-NFA or NFA- ϵ), Finite Automata with output, Conversion of one machine to another, Minimization of Finite Automata, Myhill-Nerode Theorem.

UNIT II

Regular Languages: Regular Expressions (RE), Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic laws for Regular Expressions, The Arden's Theorem, Using Arden's theorem to construct RE from FA, Pumping Lemma for RLs, Applications of Pumping Lemma, Equivalence of Two FAs, Equivalence of Two REs, Construction of Regular Grammar from RE, Constructing FA from Regular Grammar, Closure properties of RLs, Decision problem's of RLS, Applications of REs and FAs

UNIT III

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

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, Two Stack PDA.

UNIT V

Turing Machines and Undecidability: Basics of Turing Machine (TM), Transitional Representation of TMs, Instantaneous description, Non Deterministic TM, Conversion of Regular Expression to TM, Two stack PDA and TM, Variations of the TM, TM as an integer function, Universal TM, Linear Bounded Automata, TM Languages, Unrestricted grammar , Properties of Recursive and Recursively enumerable languages, Undecidability, Reducibility, Undeciadable problems about TMs, Post's Correspondence Problem(PCP), Modified PCP.

Text Books:

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

Reference Books:

1. *Introduction to Languages and the Theory of Computation, John C Martin, TMH, Third Edition.*
2. *Theory of Computation, Vivek Kulkarni, OXFORD.*
3. *Introduction to the Theory of Computation., Michel Sipser, 2nd Edition, Cengage Learning*
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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(13A05405) PRINCIPLES OF PROGRAMMING LANGUAGES

Course Objective:

- *To study various programming paradigms.*
- *To provide conceptual understanding of High level language design and implementation.*
- *To introduce the power of scripting languages*

Learning Outcome:

- *Select appropriate programming language for problem solving*
- *Design new programming language.*
- *Gain Knowledge and comparison of the features of programming languages*

UNIT I

Preliminary Concepts: Reasons for studying, Programming domains, Language Evaluation Criteria, Influences on Language design, Language categories, Language design Trade-offs, Implementation methods, Programming environments.

Syntax and Semantics: Introduction, General problem of describing syntax, Formal methods of describing syntax, Describing the meaning of programs – Dynamic semantics.

Introduction to Programming concepts: Names, Variables, The concept of binding, Type checking, Strong typing, Type compatibility, Scope, Scope and lifetime, Referencing environments, Named constants

UNIT II

Data types: Introduction, primitive, Character string, user defined ordinal, array, associative array, record, union, pointer and reference types

Expressions: Arithmetic relational and Boolean expressions, Type conversions, Short circuit evaluation, Assignment Statements, Mixed-mode arithmetic.

Control Structures – Selection, Iterative, Unconditional branching, guarded commands.

UNIT III

Subprograms: Fundamentals of sub-programs, Design issues of subprograms, Local referencing environments, Parameter passing methods, Generic sub-programs: Generic functions in C++, Generic methods in Java, Design issues for functions, Coroutines, General semantics of Calls and Returns, Implementing Simple subprograms, Implementing subprograms with Stack-Dynamic Local variables, Nested subprograms.

UNIT IV

Concurrency: Why concurrency, Programs and processes, Problems with concurrency, Process interactions, Subprogram level concurrency, semaphores, monitors, massage passing, Java threads, C# threads, statement level concurrency.

Exception handling: Exceptions, exception Propagation, Exception handling in Java.

Logic Programming: Introduction, Introduction to Predicate calculus, Predicate calculus and proving theorems, Overview of logic programming, Origins of prolog, Basic elements of prolog, Deficiencies of prolog, Applications of logic programming

UNIT V

Functional Programming Languages: Introduction, Mathematical functions, Fundaments of functional programming languages, Fundamentals of LISP, Common lisp, Applications of Functional languages, Comparison of Functional and imperative languages.

Scripting Language: Pragmatics, Key Concepts, Case Study : Python – Values and Types, Variables , Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library

Text Books:

1. *Concepts of Programming Languages, Robert .W. Sebesta 10/e, Pearson Education,2008.*
2. *Programming Language Design Concepts, D. A. Watt, Wiley dreamtech,rp-2007.*

Reference Books :

1. *Programming Languages, 2nd Edition, A.B. Tucker, R.E. Noonan, TMH.*
2. *Programming Languages, K. C.Louden, 2nd Edition, Thomson, 2003.*
3. *LISP, Patric Henry Winston and Paul Horn, Pearson Education.*
4. *Programming in Prolog, W.F. Clocksin,& C.S.Mellish, 5th Edition, Springer.*
5. *Programming Python, M.Lutz, 3rd Edition, O'reilly, SPD, rp-2007.*
6. *Core Python Programming, Chun, II Edition, Pearson Education, 2007.*
7. *Guide to Programming with Python, Michael Dawson, Thomson, 2008*

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(13A05406) DESIGN AND ANALYSIS OF ALGORITHMS

Course Objective:

- *To know the importance of the complexity of a given algorithm.*
- *To study various algorithmic design techniques.*
- *To utilize data structures and/or algorithmic design techniques in solving new problems.*
- *To know and understand basic computability concepts and the complexity classes P, NP, and NP-Complete.*
- *To study some techniques for solving hard problems.*

Learning Outcome:

- *Analyze the complexity of the algorithms*
- *Use techniques divide and conquer, greedy, dynamic programming, backtracking, branch and bound to solve the problems.*
- *Identify and analyze criteria and specifications appropriate to new problems, and choose the appropriate algorithmic design technique for their solution.*
- *Able to prove that a certain problem is NP-Complete.*

UNIT I

Introduction: What is an Algorithm, Algorithm specification, Performance analysis.

Divide and Conquer: General method, Binary Search, Finding the maximum and minimum, Merge sort, Quick Sort, Selection sort, Stressen's matrix multiplication.

UNIT II

Greedy Method: General method, Knapsack problem, Job Scheduling with Deadlines, Minimum cost Spanning Trees, Optimal storage on tapes, Single-source shortest paths.

Dynamic programming: General Method, Multistage graphs, All-pairs shortest paths, Optimal binary search trees, 0/1 knapsack, The traveling sales person problem.

UNIT III

Basic Traversal and Search Techniques: Techniques for binary trees, Techniques for Graphs, Connected components and Spanning trees, Bi-connected components and DFS

Back tracking: General Method, 8 – queens problem, Sum of subsets problem, Graph coloring and Hamiltonian cycles, Knapsack Problem.

UNIT IV

Branch and Bound: The method, Travelling salesperson, 0/1 Knapsack problem, Efficiency considerations.

Lower Bound Theory: Comparison trees, Lower bounds through reductions – Multiplying triangular matrices, Inverting a lower triangular matrix, Computing the transitive closure.

UNIT V

NP – Hard and NP – Complete Problems: NP Hardness, NP Completeness, Consequences of being in P, Cook's Theorem, Reduction Source Problems, Reductions: Reductions for some known problems.

Text Books:

1. *"Fundamentals of Computer Algorithms", Ellis Horowitz, S. Satraj Sahani and Rajasekhran, 2nd edition, 2012, University Press.*
2. *"Design and Analysis of Algorithms", Parag Himanshu Dave, Himanshu Bhalchandra Dave, Second Edition, 2009, Pearson Education.*

Reference Books :

1. *"Introduction to Algorithms", secondedition,T.H.Cormen,C.E.Leiserson, R.L.Rivest,and C.Stein,PHI Pvt. Ltd./ Pearson Education*
2. *"Introduction to Design and Analysis of Algorithms A strategic approach", R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.*
3. *"Data structures and Algorithm Analysis in C++", Allen Weiss, Second edition, Pearson education.*
4. *"Design and Analysis of algorithms", Aho, Ullman and Hopcroft,Pearson education.*
5. *"Algorithms" – Richard Johnson baugh and Marcus Schaefer, Pearson Education*

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(13A05407) DATABASE MANAGEMENT SYSTEMS LAB

Course Objective:

- *To create a database and query it using SQL, design forms and generate reports.*
- *Understand the significance of integrity constraints, referential integrity constraints, triggers, assertions.*

Learning Outcome:

- *Design databases*
- *Retrieve information from data bases*
- *Use procedures to program the data access and manipulation*
- *Create user interfaces and generate reports*

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 primary key in department table and referential integrity constraint exists between employee and department tables. Perform the following operations on the 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 than 5000 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 is 1 jan, 1970.
    - When the employees called daily-wagers are to be added the constraint that salary should be greater than or equal to 5000 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 as 1000 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 atleast 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 them using 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 into 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
    - Super market management
    - Postal system
    - Banking system
    - Courier system
    - Publishing house system

References:

1. *"Learning Oracle SQL and PL/SQL", Rajeeb C. Chatterjee, PHI.*
2. *"Oracle Database 11g PL/SQL Programming", M.Mc Laughlin,TMH.*
3. *"Introduction to SQL", Rick F.Vander Lans, Pearson education.*
4. *"Oracle PL/SQL", B.Rosenzweig and E.Silvestrova, Pearson education.*

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(13A05408) JAVA PROGRAMMING LAB

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 ax2 + 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 StringToknizer 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 and a 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 EexceptionA and exception sub class ExceptionB and ExceptionC, where ExceptionB inherits from ExceptionA and ExceptionC inherits from ExceptionB. Write a java program to demonstrate that the catch block for type ExceptionA catches exception of type ExceptionB and ExceptionC

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 JOptionPane input and Message dialog box.
2. Write a Java Program to Addition, Division, Multiplication and subtraction using JOptionPane dialog Box and Textfields.

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 an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException 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.

Note: *In addition to the above experiments, the instructor may identify the experiments in the important concepts like Multi Threading (Producer Consumer Problem etc.) and Networking (Client-Server problem etc.).*

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*

Reference Books:

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.*
5. *Java Programming, D S Malik, Cengage Learning, India Edition*

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B.Tech. II - II Sem. **Th 2**

(13A52301) HUMAN VALUES & PROFESSIONAL ETHICS (AUDIT COURSE)

Course Objective:

- *This course deals with professional ethics which includes moral issues and virtues, social responsibilities of an engineer, right, qualities of Moral Leadership*

UNIT I
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 – Professions and Professionalism – Professional Ideals and Virtues – Uses of Ethical Theories

UNIT II
ENGINEERING AS SOCIAL EXPERIMENTATION
Engineering as Experimentation – Engineers as Responsible Experimenters – Research Ethics – Codes of Ethics – Industrial Standards – A Balanced Outlook on Law – The Challenger Case Study

UNIT III
ENGINEER'S RESPONSIBILITY FOR SAFETY
Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis – Reducing Risk – The Government Regulator's Approach to Risk – Chernobyl Case Studies and Bhopal

UNIT IV
RESPONSIBILITIES AND RIGHTS
Collegiality and Loyalty – 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 – Business Ethics – Environmental Ethics – Computer Ethics - Role in Technological Development – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Honesty –Moral Leadership – Sample Code of Conduct

Text Books:

1. *Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, New York 2005.*
2. *Charles E Harris, Michael S Pritchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Thompson Learning, 2000.*

Reference Books:

1. *Charles D Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico, 1999.*
2. *John R Boatright, "Ethics and the Conduct of Business", Pearson Education, 2003.*
3. *Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, 2001.*
4. *Prof. (Col) P S Bajaj and Dr. Raj Agrawal, "Business Ethics – An Indian Perspective", Biztantra, New Delhi, 2004.*
5. *David Ermann and Michele S Shauf, "Computers, Ethics and Society", Oxford University Press, 2003.*

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B.Tech. III - I Sem.	**Th**	**Tu**	**C**
	3	**1**	**3**

(13A05501) OPERATING SYSTEMS

Course Objective:

- *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.*
- *To get acquaintance with the class of abstractions afford by general purpose operating systems that aid the development of user applications.*

Learning Outcome:

- Able to use operating systems effectively.
- Write System and application programs to exploit operating system functionality.
- Add functionality to the exiting operating systems
- Design new operating systems

UNIT I

Operating Systems Overview: Operating system functions, Operating system structure, operating systems Operations, protection and security, Kernel data Structures, Computing Environments, Open-Source Operating Systems

Operating System Structure: Operating System Services, User and Operating-System Interface, systems calls, Types of System Calls, system programs, operating system structure, operating system debugging, System Boot.

Processes: Process concept, process Scheduling, Operations on processes, Inter process Communication, Examples of IPC systems.

UNIT II

Threads: overview, Multicore Programming, Multithreading Models, Thread Libraries, Implicit threading, Threading Issues.

Process Synchronization: The critical-section problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic problems of synchronization, Monitors, Synchronization examples, Alternative approaches.

CPU Scheduling: Scheduling-Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling, Real-Time CPU Scheduling, Algorithm Evaluation.

UNIT III

Memory Management: Swapping, contiguous memory allocation, segmentation, paging, structure of the page table.

Virtual memory: demand paging, page-replacement, Allocation of frames, Thrashing, Memory-Mapped Files, Allocating Kernel Memory

Deadlocks: System Model, deadlock characterization, Methods of handling Deadlocks, Deadlock prevention, Detection and Avoidance, Recovery from deadlock.

UNIT IV

Mass-storage structure: Overview of Mass-storage structure, Disk structure, Disk attachment, Disk scheduling, Swap-space management, RAID structure, Stable-storage implementation.

File system Interface: The concept of a file, Access Methods, Directory and Disk structure, File system mounting, File sharing, Protection.

File system Implementation: File-system structure, File-system Implementation, Directory Implementation, Allocation Methods, Free-Space management.

UNIT V

I/O systems: I/O Hardware, Application I/O interface, Kernel I/O subsystem, Transforming I/O requests to Hardware operations.

Protection: Goals of Protection, Principles of Protection, Domain of protection, Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability- Based systems, Language – Based Protection

Security: The Security problem, Program threats, System and Network threats, Cryptography as a security tool, User authentication, Implementing security defenses, Firewalling to protect systems and networks, Computer–security classifications.

Text Books:

1. *Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Ninth Edition, 2012, Wiley.*
2. *Operating Systems: Internals and Design Principles, Stallings, Sixth Edition, 2009, Pearson Education.*

Reference Books:

1. *Modern Operating Systems, Andrew S Tanenbaum, Second Edition, PHI.*
2. *Operating Systems, S.Haldar, A.A.Aravind, Pearson Education.*
3. *Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.*
4. *Operating Systems, A.S.Godbole, Second Edition, TMH.*
5. *An Introduction to Operating Systems, P.C.P. Bhatt, PHI.*
6. *Operating Systems, G.Nutt, N.Chaki and S.Neogy, Third Edition, Pearson Education.*
7. *Operating Systems, R.Elmasri, A,G.Carrick and D.Levine, Mc Graw Hill.*

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B.Tech. III-I Sem.	**Th**	**Tu**	**C**
	3	**1**	**3**

(13A05502) COMPILER DESIGN

Course Objective:

The objectives of the course are

- *To realize the computer science as the basis for real time applications*
- *To introduce the major concept areas of language translation and compiler design.*
- *To learn how a compiler works and know about the powerful compiler generation tools and techniques, which are useful to the other non-compiler applications.*
- *To know the importance of code optimization.*

Learning Outcome:

Upon completion of this course, students will be:

- *Able to design a compiler for a simple programming language*
- *Able to use the tools related to compiler design effectively a*nd efficiently
- *Able to write the optimized code*

UNIT I

Introduction: Language processors, Phases of a compiler, Pass and phase, Bootstrapping, Compiler construction tools, Applications of compiler technology, Programming language basics

Lexical Analysis: Role and Responsibility, Input buffering, Specification of tokens, Recognition of tokens, LEX tool, Design of a Lexical Analyzer generator

UNIT II

Syntax Analysis: Role of the parser, Context Free Grammars - Definition, Derivations, Parse trees, Ambiguity, Eliminating ambiguity, Left recursion, Left faltering.

TOP Down Parsing: Recursive descent parsing, Non-recursive predictive parsing, LL(1) grammars, Error recovery in predictive parsing.

Bottom Up Parsing: Handle pruning, Shift-Reduce parsing, Conflicts during shifts- reduce parsing, SLR Parsing, Canonical LR(1) parsers, LALR parsers, Using ambiguous grammars, YACC tool.

UNIT III

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

Intermediated Code Generation: Need for intermediate code, Types of intermediate code, Three address code, Quadruples, Triples, Type expressions, Type equivalence, Type checking, Translation of expressions, control flow statements, switch statement, procedures, back patching.

UNIT IV

Run Time Storage Organization: Scope and Life time of variable, Information associated with symbols in symbol table, Data Structures for symbol Table, Static vs dynamic storage allocation, Stack allocation of space, Access to non-local data on stack, Heap management, Introduction to garbage collection

Optimization: Need and objective of optimization, Places of optimization, Optimization at user level, Construction of Basic blocks and Processing, Data Flow analysis using flow graph, Data flow equations for blocks with back ward flow control, Principles source of optimization and transformations, Alias, Loops in flow graphs, Procedural optimization, Loop optimization

UNIT V

Code Generation: Issues in code Generation, Target machine architecture, Subsequent Use information, Simple code generator, Register allocation, DAG representation of basic blocks, Code generation from intermediate code, Peephole optimization, Code scheduling

Text Books :

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

Reference Books :

1. *Compiler Construction, K.V.N Sunitha, Pearson, 2013*
2. *Engineering a Compiler, Second Edition, Keith D. Cooper & Linda Torczon., Morgan Kaufmann, Elsevier.*
3. *Compilers Principles and Practice, Parag H. Dave, Himanshu B. Dave., Pearson*
4. *Compiler Design, Sandeep Saxena, Rajkumar Singh Rathore., S.Chand publications*
5. *Compiler Design, Santanu Chattopadhyay., PHI*
6. *Principals of Compiler Design, Nadhni Prasad, Elsevier.*

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B.Tech. III - I Sem.	**Th**	**Tu**	**C**
	3	**1**	**3**

(13A05503) UNIX AND SHELL PROGRAMMING

Course Objective:
This course is to provide a comprehensive introduction to Shell Programming.

Learning Outcome:
At the end of the course delegates will acquire

- *The fundamental skills required to write simple and complex Shell scripts to automate jobs and processes in the Unix environment.*

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*

Reference Books :

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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B.Tech. III - I Sem.	**Th**	**Tu**	**C**
	3	**1**	**3**

(13A05504) SOFTWARE ENGINEERING

Course Objective:

- *To understand the software life cycle models.*
- *To understand the software requirements and SRS document.*
- *To understand the importance of modeling and modeling languages.*
- *To design and develop correct and robust software products.*
- *To understand the quality control and how to ensure good quality software.*
- *To understand the planning and estimation of software projects.*
- *To understand the implementation issues, validation and verification procedures.*
- *To understand the maintenance of software*

Learning Outcome:

- *Define and develop a software project from requirement gathering to implementation.*
- *Ability to code and test the software*
- *Ability to plan, Estimate and Maintain software systems*

UNIT I

Software and Software Engineering: The Nature of Software, The Unique Nature of WebApps, Software Engineering, Software Process, Software Engineering Practice, Software Myths.

Process Models: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Terminology, Product and Process.

UNIT II

Understanding Requirements: Requirements Engineering, Establishing the Groundwork, Eliciting Requirements, Developing Use Cases, Building the Requirements Model, Negotiating Requirements, Validating Requirements.

Requirements Modeling: Requirements Analysis, Scenario-Based Modeling, UML Models That Supplement the Use Case, Data Modeling Concepts, Class-Based Modeling.

UNIT III

Design Concepts: Design within the Context of Software Engineering, Design Process, Design Concepts, The Design Model.

Architectural Design: Software Architecture, Architectural Genres, Architectural Styles, Architectural Design.

Component-Level Design: What is a Component, Designing Class-Based Components, Conducting Component-Level Design, Component-Level Design for WebApps.

UNIT IV

User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation.

Coding and Testing: Coding, Code Review, Software Documentation, Testing, Testing in the Large versus Testing in the Small, Unit Testing, Black-Box Testing, White-Box Testing, Debugging, Program Analysis Tools, Integration Testing, Testing Object-Oriented Programs, System Testing, Some General Issues Associated with Testing.

UNIT V

Software Project Management: Responsibilities of a Software Project Manager, Project Planning, Metrics for Project Size Estimation, Project Estimation Techniques, Empirical Estimation Techniques,

COCOMO-A Heuristic Estimation Technique, Halstead's Software Science-An Analytical Technique, Staffing Level Estimation, Scheduling, Organization and Team Structures, Staffing, Risk Management, Software Configuration Management. .

Software Maintenance: Characteristics of Software Maintenance, Software Reverse Engineering, Software Maintenance Process Models, Estimation of Maintenance cost.

Text Books :

1. *Software Engineering A practitioner's Approach, Roger S. Pressman, Seventh Edition, 2009, McGrawHill International Edition.*
2. *Fundamentals of Software Engineering, Rajib Mall, Third Edition, 2009, PHI.*

Reference Books:

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

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B.Tech. III - I Sem.	**Th**	**Tu**	**C**
	3	**1**	**3**

(13A04507) MICROPROCESSORS & INTERFACING

Course Objective:

- *Study the instruction set of 8086 microprocessor and its architecture*
- *Learn assembly language programming using 8086 microprocessor*
- *Interfacing 8051, 8255, 8237, and 8259*

Learning Outcome:

- *Program the 8086 microprocessor*
- *Interface the 8086 microprocessor with various devices and program them*

UNIT I

Microprocessors-Evolution and Introduction: Microprocessors and Micro Controllers, Microprocessor based system, Origin of Microprocessor, Classification of Microprocessors, Types of Memory, I/O Devices, Technology Improvements Adapted to Microprocessors and Computers, Introduction to 8085 processor, Architecture of 8085, Microprocessor instructions, classification of instructions, Instruction set of 8085.

Intel 8086 Microprocessor architecture, Features, and Signals: Architecture of 8086, Accessing memory locations, PIN details of 8086.

UNIT II

Addressing Modes, Instruction Set and Programming of 8086: Addressing modes in 8086, Instruction set of 8086, 8086 Assembly Language Programming, Modular Programming.

UNIT III

8086 Interrupts: Interrupt types in 8086, Processing of Interrupts by 8086, Dedicated interrupt types in 8086, Software interrupts-types 00H-FFH, Priority among 8086 interrupts, Interrupt service routines, BIOS interrupts or functional calls, Interrupt handlers, DOS services-INT 21H, System calls-BIOS services.

Memory and I/O Interfacing: Physical memory organization in 8086, Formation of system bus, Interfacing RAM and EPROM chips using only logic gates, Interfacing RAM/ EPROM chips using decoder IC and logic gates, I/O interfacing, Interfacing 8-bit input device with 8086, Interfacing output device using 8086, Interfacing printer with 8086, Interfacing 8-bit and 16-bit I/O devices or ports with 8086, Interfacing CRT terminal with 8086.

UNIT IV

Features and Interfacing of programmable devices for 8086 systems: Intel 8255 programmable peripheral interface, Interfacing switches and LEDS, Interfacing seven segment displays, Traffic light control, Interfacing analog to digital converters, Intel Timer IC 8253, Introduction to serial communication, 8259 programmable controller, 8237 DMA controller.

UNIT V

Introduction to 8051 Micro controllers: Intel's MCS-51 series micro controllers, Intel 8051 architecture, Memory organization, Internal RAM structure, Power control in 8051, Stack operation.

8051 Instruction Set and Programming: Introduction, Addressing modes of 8051, Instruction set of 8051, Hardware features of 8051: Introduction, Parallel ports in 8051, External memory interfacing in 8051, Timers, Interrupts, Serial ports.

Interfacing Examples: Interfacing 8255 with 8051, Interfacing of push button switches and LEDS, Interfacing of seven segment displays.

Text Books:

1. *"Microprocessor and Interfacing 8086,8051, 8096 and advanced processors", Senthil Kumar, Saravanan, Jeevanathan, Shah, 1st edition, 2nd impression, 2012, Oxford University Press.*
2. *"The X86 Microprocessors", Lyla B. Das. , 2010, Pearson.*

Reference Books:

1. *"Microprocessor and Interfacing: Programming and Hardware", Douglas V.Hall, McGrawHill*
2. *"8086 microprocessor: Programming and Interfacing the PC", Kenneth Ayala, Cengage Learning*
3. *"ARM system-on-chip architecture", Steve Furber, Addison-Wesley Professional*
4. *"The Intel Microprocessors", Barry B. Brey, Prentice Hall*

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B.Tech. III-II Sem. (C.S.E)	T	Tu	C
	3	1	3

(13A05601) COMPUTER NETWORKS

Course Objective

- *Study the evolution of computer networks and future direction*
- *Study the concepts of computer networks from layered perspective*
- *Study the issues open for research in computer networks*

Learning Outcome:

- *Use appropriate transmission media to connect to a computer network and Internet*
- *Work on the open issues for their project*
- *Start using the Internet effectively*
- *Able to design new protocols for computer network*

UNIT I

Introduction: Networks, Network Types, Internet History, Standards and Administration, Network Models: Protocol Layering, TCP/IP Protocol Suite, The ISO Model.

Introduction to physical layer: Data and Signals, Transmission impairment, Data rate limits, Performance, Transmission media: Introduction, Guided Media, Unguided Media, Switching: Introduction, Circuit Switched Networks, Packet switching.

UNIT II

Introduction to Data Link Layer: Introduction, Link layer addressing, Error detection and Correction: Cyclic codes, Checksum, Forward error correction, Data link control: DLC Services, Data link layer protocols, HDLC, Point to Point Protocol, Media Access control: Random Access, Controlled Access, Channelization, Connecting devices and virtual LANs: Connecting Devices.

UNIT III

The Network Layer: Network layer design issues, Routing algorithms, Congestion control algorithms, Quality of service, Internetworking, The network layer in the Internet: IPV4 Addresses, IPV6, Internet Control protocol, OSPF, BGP, IP, ICMPv4, IGMP.

UNIT IV

The Transport Layer: The Transport Service, Elements of Transport Protocols, Congestion Control, The internet transport protocols: UDP, TCP, Performance problems in computer networks, Network performance measurement.

UNIT V

Introduction to Application Layer: Introduction, Client Server Programming, WWW and HTTP, FTP, e-mail, TELNET, Secure Shell, Domain Name System, SNMP.

Text Books:

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

Reference Books:

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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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B.Tech. III-II Sem. (C.S.E)	T	Tu	C
	3	1	3

(13A05602) OBJECT ORIENTED ANALYSIS DESIGN & MODELING

Course Objective:

- *To understand how to solve complex problems*
- *Analyze and design solutions to problems using object oriented approach*
- *Study the notations of Unified Modeling Language*

Learning Outcome:

- *Ability to find solutions to the complex problems using object oriented approach*
- *Represent classes, responsibilities and states using UML notation*
- *Identify classes and responsibilities of the problem domain*

UNIT I

Introduction: The Structure of Complex systems, The Inherent Complexity of Software, Attributes of Complex System, Organized and Disorganized Complexity, Bringing Order to Chaos, Designing Complex Systems, Evolution of Object Model, Foundation of Object Model, Elements of Object Model, Applying the Object Model.

UNIT II

Classes and Objects: Nature of object, Relationships among objects, Nature of a Class, Relationship among Classes, Interplay of Classes and Objects, Identifying Classes and Objects, Importance of Proper Classification, Identifying Classes and Objects, Key abstractions and Mechanisms.

UNIT III

Introduction to UML: Why we model, Conceptual model of UML, Architecture, Classes, Relationships, Common Mechanisms, Class diagrams, Object diagrams.

UNIT IV

Structural and Behavioral Modeling: Advance Classes, Advance Relationships, Interfaces, Types & Roles, Packages, Interactions, Usecases, Usecase diagrams.

UNIT V

Advanced Behavioral and Architectural modeling: Activity diagrams, Events and Signals, State chart diagrams, Components and Component diagrams, Deployment & Deployment diagrams, Collaborations.

Text Books:

1. *"Object- Oriented Analysis And Design with Applications", Grady BOOCH, Robert A. Maksimchuk, Michael W. ENGLE, Bobbi J. Young, Jim Conallen, Kellia Houston, 3rd edition, 2013, PEARSON*
2. *"The Unified Modeling Language User Guide", Grady Booch, James Rumbaugh, Ivar Jacobson, 12th Impression, 2012, PEARSON.*

Reference Books:

1. *"Object-oriented analysis and design using UML", Mahesh P. Matha, PHI*
2. *"Head first object-oriented analysis and design", Brett D. McLaughlin, Gary Pollice, Dave West, O'Reilly*
3. *"Object-oriented analysis and design with the Unified process", John W. Satzinger, Robert B. Jackson, Stephen D. Burd, Cengage Learning*
4. *"The Unified modeling language Reference manual", James Rumbaugh, Ivar Jacobson, Grady Booch, Addison-Wesley*

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B.Tech. III-II Sem. (C.S.E)	T	Tu	C
	3	1	3

(13A05603) DATA MINING

Course Objectives

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

Course Outcomes

- Apply preprocessing statistical methods for any given raw data
- Select and applying proper Data mining algorithms to build analytical applications
- Develop practical work of Data Mining techniques and design hypotheses based on the analysis to conceptualize a Data Mining Solution to practical problem

Unit - I :

Introduction: What is Data Mining, Motivating Challenges, The Origins of Data Mining, Data Mining Tasks.

Data: Types of Data, Data Quality, Data Preprocessing, Measures of Similarity and Dissimilarity.

Exploring Data: Summary Statistics, OLAP and Multidimentional Data Analysis

Unit – II:

Basic Concepts, Decision Trees, and Model Evaluation: Preliminaries, General Approach to Solving a Classification Problem, Decision Tree Induction, Model Overfitting, Evaluating the Performance of a Classifier, Methods for Comparing Classifiers.

Unit – III :

Classification-Alternative techniques: Rule-Based Classifier, Nearest-Neighbor Classifiers, Bayesian Classifiers, Artificial Neural Networks, Support Vector Machines, Ensemble Methods, Class Imbalance Problem, Multiclass Problem

Unit – IV :

Association Analysis- Basic Concepts and Algorithms: Problem Definition, Frequent Itemset Generation, Rule Generation, Compact Representation of Frequent Itemsets, Alternative Methods for Generating Frequent Itemsets, FP-Growth Algorithm, Evaluation of Association Patterns, Effect of Skewed Support Distribution

Unit – V :

Cluster Analysis- Basic Concepts and Algorithms: Overview, k-means, Agglomorative Hierarchical Clustering, DBSCAN, Cluster Evaluation,

Cluster Analysis-Additional Issues and Algorithms: Characteristics of Data, Clusters, and Clustering Algorithms, Prototype-Based Clustering, Density-Based Clustering, Graph-Based Clustering-Minimum Spanning Tree (MST) Clustering, Chameleon, Scalable Clustering Algorithms-Scalability-General Issues and Approaches, BIRCH, CURE

Text Books :

1. Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbach, 2006, Pearson
2. Data Mining: Concepts and Techniques, Jiawei Han and Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, Second Edition, 2006

References :

1. Data Mining Principles &Applications, T.V. Suresh Kumar, B. Eswara Reddy, Jagadish S Kallimani, Elsevier
2. Data Mining Techniques and Applications an Introduction, Hongbo Du, Cengage Learning
3. Data Mining Techniques, Arun K Pujari, Second Edition, Universities Press
4. "Data Mining" Pudi, Oxford University Press

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B.Tech. III-II Sem. (C.S.E)	T	Tu	C
	3	1	3

(13A05604) WEB Technologies

Course Objectives:

- Learn the fundamentals of HTML and JavaScript
- Learn to communicate over a network using java
- Learn do design server side programs and access them from client side

Course Outcomes:

- Ability to design websites and do client side validations
- Share information over a network
- Ability to write server side programs

Unit I

Fundamentals: Introduction to the Web, Web servers and Clients, Resources, URL and its Anatomy, Message Format, Persistent and Non-persistent connections, Web Caching, Proxy, Java and the Net, Java Network Classes and Interfaces, Looking up Internet Address, Client/Server programs, Socket programming, e-mail client, POP3 programs, Remote method invocation, Example.

Unit II

HTML: HTML and its Flavours, HTML basics, Elements, Attributes and Tags, Basic Tags, Advanced Tags, Frames, Images, Meta tag, Planning of Web page, Model and Structure for a Website, Designing Web pages, Multimedia content.
Cascading style sheets: Advantages, Adding CSS, Browser compatibility, CSS and page layout, Selectors.

Unit III
JavaScript: Introduction, Variables, Literals, Operators, Control structure, Conditional statements, Arrays, Functions, Objects, Predefined objects, Object hierarchy, Accessing objects, Events, Event handlers, Multiple windows and Frames, Form object and Element, Advanced JavaScript and HTML, Data entry and Validation, Tables and Forms, DHTML with javascript.

Unit IV
Server side programming: Internet programming paradigm, Sever-side programming, Languages for CGI, Applications, Server environment, Environment variables, CGI building blocks,CGI scripting using C, Shell script, Writing CGI program, CGI security, Alternatives and Enhancement to CGI, Server-side Java, Advantages over Applets, Servlet alternatives, Servlet strengths, Servlet architecture, Servlet life cycle, Generic and HTTPServelet, First servlet, Passing parameters to servlets, Retrieving parameters, Server-side include, Cookies, Fileters, Problems with servlet, Security issues, JSP and HTTP, JSP Engines, How JSP works, JSP and Servlet, Anatomy of a JSP page, JSP syntax, JSP components.

Unit – V

Sever side programming: continued: Beans, Session tracking, Users passing control and data between pages, Sharing session and Application data, Database connectivity, JDBC drivers, Basic steps, Loading a driver, Making a connection, Execute and SQL statement, SQL statements, Retrieving the result, Getting database information, Scrollable and updatable resultset, Result set metadata, Introduction to JavaBeans, Bean builder, Advantages of Java Beans, BDK introspection, Properties, BeanInfo interface, Persistence, Customizer, JavaBeans API, EJB, Introduction to Structs Framework.

Text Books:

1. "Web Technologies", Uttam K. Roy, 1st edition 7th impression, 2012, Oxford Higher Education.

References

1. "Java How to program", Paul deitel, Harvey deital, PHI
2. "Introduction to Java Programming", Y.Daniel Liang, 6th Edition, Pearson Education, 2007
3. "The J2EE Tutorial", Stephanie Bodoff et al, 2nd Edition, Pearson Education, 2004.
4. "Web Technologies", Roy, Oxford University Press
5. "Web Technologies" Srinivasan, Pearson Education, 2012
6. "Java EE 5 for Beginners", Ivan Bayross, Sharanam Shah, Cynthia Bayrossand Vaishali shai,SPD.
7. "Programming the Worldwide Web", Robert W.Sebesta, 7th edition, 2009, Pearson Education.

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B.Tech. III-II Sem. (C.S.E)	T	Tu	C
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(13A05605) SOFTWARE TESTING METHODOLOGIES

Course Objective:

- *Basic software debugging methods.*
- *Various testing methodologies.*
- *The procedure for designing test cases.*
- *The significance of software testing*

Learning Outcome:

- *Understand the basic testing procedures.*
- *Generating test cases and test suites.*
- *Test the applications manually and by automation using different testing methods.*

UNIT I

Introduction: Purpose of Testing, Dichotomies, Model for Testing, Consequences of Bugs, Taxonomy of Bugs.

Flow graphs and Path testing: Basics Concepts of Path Testing, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Application of Path Testing.

UNIT II

Transaction Flow Testing: Transaction Flows, Transaction Flow Testing Techniques.

Dataflow testing: Basics of Dataflow Testing, Strategies in Dataflow Testing, Application of Dataflow Testing.

UNIT III

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

UNIT IV

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

Logic Based Testing: Overview, Decision Tables, Path Expressions, KV Charts, Specifications.

UNIT V:

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

Graph Matrices and Application: Motivational Overview, Matrix of Graph, Relations, Power of a Matrix, Node Reduction Algorithm, Building Tools. (Student should be given an exposure to a tool like JMeter or Win-runner).

Text Books :

1. *Software testing techniques – Boris Beizer, Dreamtech, second edition.*
2. *Software Testing- Yogesh Singh, Camebridge*

Reference Books :

1. *The craft of software testing - Brian Marick, Pearson Education.*
2. *Software Testing, 3rd edition,P.C. Jorgensen, Aurbach Publications (Dist.by SPD).*
3. *Software Testing, N.Chauhan, Oxford University Press.*
4. *Introduction to Software Testing, P.Ammann&J.Offutt, Cambridge Univ.Press.*
5. *Effective methods of Software Testing, Perry, John Wiley, 2nd Edition, 1999.*
6. *Software Testing Concepts and Tools, P.Nageswara Rao, dreamtech Press.*

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(13A05606) Big Data Technologies

UNIT-I

Introduction to Big Data. What is Big Data. Why Big Data is Important. Meet Hadoop. Data. Data Storage and Analysis. Comparison with other systems. Grid Computing. A brief history of Hadoop. Apache hadoop and the Hadoop EcoSystem. Linux refresher; VMWare Installation of Hadoop.

UNIT-II

The design of HDFS. HDFS concepts. Command line interface to HDFS.Hadoop File systems. Interfaces. Java Interface to Hadoop. Anatomy of a file read. Anatomy of a file writes. Replica placement and Coherency Model. Parallel copying with distcp, Keeping an HDFS cluster balanced.

UNIT-III

Introduction. Analyzing data with unix tools. Analyzing data with hadoop. Java MapReduce classes (new API). Data flow, combiner functions, Running a distributed MapReduce Job. Configuration API. Setting up the development environment. Managing configuration. Writing a unit test with MRUnit. Running a job in local job runner. Running on a cluster.Launching a job. The MapReduce WebUI.

UNIT-IV

Classic Mapreduce. Job submission. Job Initialization. Task Assignment. Task execution .Progress and status updates. Job Completion. Shuffle and sort on Map and reducer side. Configuration tuning. Map Reduce Types. Input formats. Output formats, Sorting. Map side and Reduce side joins.

UNIT-V

The Hive Shell. Hive services. Hive clients. The meta store. Comparison with traditional databases. Hive Ql. Hbasics. Concepts. Implementation. Java and Map reduce clients. Loading data, web queries.

Text Books:

1. Tom White, Hadoop,"The Definitive Guide", 3rd Edition, O'Reilly Publications, 2012.
2. Dirk deRoos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutsch ,"Understanding Big Data Analytics for Enterprise Class Hadoop and Streaming Data", 1st Edition, TMH,2012.

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(13A05607) CLOUD COMPUTING

Course Objectives:

- To explain the evolving computer model called cloud computing.
- To introduce the various levels of services that can be achieved by cloud.
- To describe the security aspects in cloud.

Course Outcomes:

- Ability to create cloud computing environment
- Ability to design applications for Cloud environment

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, Migrating into a Cloud, Enriching the 'Integration as a Service' Paradigm 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, Building Content Delivery networks using Clouds, Resource Cloud Mashups.

UNIT- V

Governance and Case Studies

Organizational Readiness and Change management in the Cloud age, Data Security in the Cloud, Legal Issues in Cloud computing, Achieving Production Readiness for Cloud Services.

TEXT BOOKS:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, 2011, Wiley.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C.Fox, Jack J.Dongarra, 2012, Elsevier.

REFERENCE BOOKS:

1. Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill, rp2011.
2. Enterprise Cloud Computing, Gautam Shroff, 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, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

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(13A05608) LINUX Administration & Programming

Course Objectives:

- Understand Linux administration tasks
- Learn shell programming
- Learn about setting up different servers

Course Outcomes:

- Setup Linux based laboratory
- Control the Linux environment by programming

UNIT I

Introduction: Starting with Linux, Understanding the desktop, Starting the desktop, Boot to the desktop, Boot to login, Boot to test prompt, K desktop environment, Emailing and Web browsing: Using email, Choosing a web browser.

UNIT II

Shell Programming: Starting a shell, Choosing your shell, Exploring the shell, Using the shell in LINUX, Creating your shell environment, Working with LINUX File system, Pipes and Redirection, Shell as a programming language, Shell syntax, Using the GCC compiler, Automating builds with make.

UNIT III

Basic Administration: Graphic administration tools, Using root login, Exploring administration commands, Configuration files and Log files, Using Sudo and other Administrative logins, Administering your Linux system, Creating user accounts, Managing file system and disk space, Doing Remote system administration.

UNIT IV

Setting up Linux servers: Components of a LAMP Server, setting up your LAMP Server, Operating LAMP server, Running Fedora and Red Hat Enterprise LINUX, Running SUSE and openSUSE LINUX.

UNIT V

Running Severs: Running a Mail Server, Running a print server, Running a file server.

TEXT BOOKS:

1. "LINUX Bible", Christopher Negus, 2010 edition, Willey Publishing.
2. "Beginning LINUX Programming", Neil Matthew, Richard Stome, 4th edition, 2012, Wiley Publishing.

References:

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

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B.Tech. III-II Sem. (C.S.E) | **L** 3 | **C** 2

(13A05609) UNIFIED MODELING LANGUAGE AND TESTING LAB

UML PROGRAMS

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.

Problems that may be considered are

1. College information system
2. Hostel management
3. ATM system

Testing Lab Programs

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.

Reference Books :

1. *Object- Oriented Analysis And Design with Applications, Third Edition. Grady BOOCH, Robert A. Maksimchuk, Michael W. ENGLE, Bobbi J. Young, Ph.D, Jim Conallen, Kellia. Houston, Pearson*
2. *The Unified Modeling Language User Guide, Grady Booch, James Rumbaugh, Ivar Jacobson, Pearson*
3. "Effective Software Testing Methodologies by William E. Perry" third edition.

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(13A05610) WEB TECHNOLOGIES & DATA MINING LAB

Course Objectives:

- Learn the fundamentals of HTML and JavaScript
- Learn to communicate over a network using java
- Learn do design server side programs and access them from client side

Course Outcomes:

- Ability to design websites and do client side validations
- Share information over a network
- Ability to write server side programs

1) 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.
2) Write a JAVA program which establishes a connection between client and server and transfers data. Transfer the data without establishing the connection.
3) Write a Java Program to create an Employee class with the data members Emp_id, name, Department and create a member function to get the employee information, display the details.
4) Write a java program to create a package for simple arithmetic operations
5) Write a Java Program to create a user defined Exception called "StringNotMatchException" when the user entered input is not equal to "INDIA"
6) Write a HTML to create user registration form with following constraints; Validate the registration, user login, user profile and payment by credit card pages using Java Script
7) Create and save an XML document at the server, which contains 10 users information. Write a program which takes User ID as input and returns the user details by taking the user information from the XML document.
8) Write a XHTML form for Employee Information like Emp_id, Name, Department Name, Phone, E-mail. using java script check the validation for each Fields(The First Character of Emp_id character followed by number, name should accept 20 characters, phone max 8 digits, email)
9) Write a Java Servlet Program to display the Current time on the server.
10) To write html and servlet to demonstrate invoking a servlet from a html
11) Write a Java servlet program to change the Background color of the page by the color selected by the user from the list box.
12) Write a Java servlet to get the personal details about the user(Like name, Address, City, Age, E-mail id) and check whether the user is Eligible to vote or not.
13) Write a Java servlet Program to create a Cookie and keep it alive on the client for 30 minutes.
14) Write a java servlet program to display the various client information like Connection, Host, Accept-Encoding, User Agent.
15) To write java servlet programs to conduct online examination and to display student mark list available in a database

16) Write a Java servlet Program to implement the Book Information using JDBC
17) Write a Java Servlet Program to create a Session and display the various information like, Last accessed time, Modified time, Expiration)
18) Write a JSP Program to Display the number of visitors visited the page.
19) Write a JSP Program to implement the Book Information using Database.
20) Write a JSP Program to implement the Telephone Directory

Data Mining Lab

Course Objectives:

Learn how to build a data warehouse and query it (using open source tools like Pentaho Data Integration and Pentaho Business Analytics), Learn to perform data mining tasks using a data mining toolkit (such as open source WEKA), Understand the data sets and data preprocessing, Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering and regression, Exercise the data mining techniques with varied input values for different parameters.

Course Outcomes:

- Ability to build Data Warehouse and Explore WEKA
- Ability to perform data preprocessing tasks and Demonstrate performing association rule mining on data sets
- Ability to perform classification, clustering and regression on data sets
- Ability to design data mining algorithms

Data Warehousing

Experiments:

Build Data Warehouse and Explore WEKA

A. Build a Data Warehouse/Data Mart (using open source tools like Pentaho Data Integration tool, Pentoaho Business Analytics; or other data warehouse tools like Microsoft-SSIS, Informatica, Business Objects, etc.).
   (i). Identify source tables and populate sample data
   (ii). Design multi-dimensional data models namely Star, snowflake and Fact constellation schemas for any one enterprise (ex. Banking, Insurance, Finance, Healthcare, Manufacturing, Automobile, etc.).
   (iii). Write ETL scripts and implement using data warehouse tools
   (iv). Perform various OLAP operations such slice, dice, roll up, drill up and pivot
   (v). Explore visualization features of the tool for analysis like identifying trends etc.

B. Explore WEKA Data Mining/Machine Learning Toolkit
   (i). Downloading and/or installation of WEKA data mining toolkit.
   (ii). Understand the features of WEKA toolkit such as Explorer, Knowledge Flow

interface, Experimenter, command-line interface.

(iii). Navigate the options available in the WEKA (ex. Select attributes panel, Preprocess panel, Classify panel, Cluster panel, Associate panel and Visualize panel)

(iv). Study the arff file format

(v). Explore the available data sets in WEKA.

(vi). Load a data set (ex. Weather dataset, Iris dataset, etc.)

(vii). Load each dataset and observe the following:

i. List the attribute names and they types
ii. Number of records in each dataset
iii. Identify the class attribute (if any)
iv. Plot Histogram
v. Determine the number of records for each class.
vi. Visualize the data in various dimensions

Perform data preprocessing tasks and Demonstrate performing association rule mining on data sets

A. Explore various options available in Weka for preprocessing data and apply (like Discretization Filters, Resample filter, etc.) on each dataset
B. Load each dataset into Weka and run Aprori algorithm with different support and confidence values. Study the rules generated.
C. Apply different discretization filters on numerical attributes and run the Apriori association rule algorithm. Study the rules generated. Derive interesting insights and observe the effect of discretization in the rule generation process.

Demonstrate performing classification on data sets

A. Load each dataset into Weka and run Id3, J48 classification algorithm. Study the classifier output. Compute entropy values, Kappa statistic.
B. Extract if-then rules from the decision tree generated by the classifier, Observe the confusion matrix and derive Accuracy, F-measure, TPrate, FPrate, Precision and Recall values. Apply cross-validation strategy with various fold levels and compare the accuracy results.
C. Load each dataset into Weka and perform Naïve-bayes classification and k-Nearest Neighbour classification. Interpret the results obtained.
D. Plot RoC Curves
E. Compare classification results of ID3, J48, Naïve-Bayes and k-NN classifiers for each dataset, and deduce which classifier is performing best and poor for each dataset and justify.

Demonstrate performing clustering on data sets

A. Load each dataset into Weka and run simple k-means clustering algorithm with different values of k (number of desired clusters). Study the clusters formed. Observe the sum of squared errors and centroids, and derive insights.
B. Explore other clustering techniques available in Weka.
C. Explore visualization features of Weka to visualize the clusters. Derive interesting insights and explain.

Demonstrate performing Regression on data sets

A. Load each dataset into Weka and build Linear Regression model. Study the clusters formed. Use Training set option. Interpret the regression model and derive patterns and conclusions from the regression results.
B. Use options cross-validation and percentage split and repeat running the Linear

Regression Model. Observe the results and derive meaningful results.

C. Explore Simple linear regression technique that only looks at one variable.

Resource Sites:

1. **http://www.pentaho.com/**
2. **http://www.cs.waikato.ac.nz/ml/weka/**

Data Mining

Task 1: Credit Risk Assessment

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 must consider two opposing factors. On the one hand, a bank wants to make as 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 is 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.
In spite of the fact that the data is German, you should probably make use of it for this assignment. (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 90 cents Canadian (but looks and acts like a quarter).
• owns_telephone. German phone rates are much higher. So fewer people own telephones.
• foreign_worker. There are millions of these in Germany (many from Turrkey). 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 to 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 tab in Weka's GUI Explorer. Did removing these attributes have any significant effect?

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 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff 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 the misclassifcations 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. 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 rules obtained. 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 ? OneR 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 oneR.

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:
  - Introduction to Weka (html version) (download ppt version)
  - Download Weka
  - Weka Tutorial
  - ARFF format
  - Using Weka from command line

Task 2: Hospital Management System

Data Warehouse consists Dimension Table and Fact Table.

REMEMBER The following

Dimension

The dimension object (Dimension):

_ Name

_ Attributes (Levels) , with one primary key

_ Hierarchies

One time dimension is must.

About Levels and Hierarchies

Dimension objects (dimension) consist of a set of levels and a set of hierarchies defined over those levels. The levels represent levels of aggregation. Hierarchies describe parent-child relationships among a set of levels.

For example, a typical calendar dimension could contain five levels. Two hierarchies can be defined on these levels:

H1: YearL > QuarterL > MonthL > WeekL > DayL

H2: YearL > WeekL > DayL

The hierarchies are described from parent to child, so that Year is the parent of Quarter, Quarter the parent of Month, and so forth.

About Unique Key Constraints

When you create a definition for a hierarchy, Warehouse Builder creates an identifier key for each level of the hierarchy and a unique key constraint on the lowest level (Base Level)
Design a Hospital Management system data warehouse (TARGET) consistig of Dimensions Patient, Medicine, Supplier, Time. Where measures are ' NO UNITS', UNIT PRICE.
Assume the Relational database (SOURCE) table schemas as follows
TIME (day, month, year),
PATIENT (patient_name, Age, Address, etc.,)
MEDICINE (Medicine_Brand_name, Drug_name, Supplier, no_units, Uinit_Price, etc.,)
SUPPLIER :(Supplier_name, Medicine_Brand_name, Address, etc.,)
If each Dimension has 6 levels, decide the levels and hierarchies, Assume the level names suitably.
Design the Hospital Management system data warehouse using all schemas. Give the example 4-D cube with assumption names.

Reference Books:

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. *Java Script, D.Flanagan, O'Reilly, SPD.*
6. *Beginning Web Programming-Jon Duckett WROX.*
7. *Programming World Wide Web, R.W.Sebesta, Fourth Edition, Pearson.*
8. *Internet and World Wide Web – How to program, Dietel and Nieto, Pearson*
9. *Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbach, Pearson*

Data Mining: Concepts and Techniques, Jiawei Han and Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, Second Edition, 2006

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B.Tech. IV - I sem (C.S.E.) **T Tu C**
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(13A05701) SOFTWARE ARCHITECTURE & DESIGN PATTERNS

Course Objective:

- *To understand interrelationships, principles and guidelines governing architecture and evolution over time.*
- *To understand various architectural styles of software systems.*
- *To understand design patterns and their underlying object oriented concepts.*
- *To understand implementation of design patterns and providing solutions to real world software design problems.*
- *To understand patterns with each other and understanding the consequences of combining patterns on the overall quality of a system*

Learning Outcome:

- *Know concepts, principles, techniques, and methods for design, analysis, and maintenance of software architectures*
- *Know the underlying object oriented principles of design patterns.*
- *Understand the context in which the pattern can be applied*
- *Understand how the application of a pattern affects the system quality and its tradeoffs*

UNIT I

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.

UNIT II

Introduction: What Is a Design Pattern? Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNIT III

Structural Pattern Part-I: Adapter, Bridge, Composite.
Structural Pattern Part-II: Decorator, Facade, Flyweight, Proxy.

UNIT IV

Behavioral Patterns Part-I: Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer.

UNIT V

Behavioral Patterns Part-II: State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns.
A Case Study (Designing a Document Editor): Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations, Spelling Checking and Hyphenation.

Text Books :

1. *Design Patterns By Erich Gamma, Pearson Education*
2. *Software Architecture: Perspective on an Emerging Discipline By Mary Shaw, David Garlan, PHI.*

Reference Books :

1. *Software Architecture in Practice by Len Bass, Paul Clements, Rick Kazman, Third Edition, Pearson Education.*
2. *Head First Design Patterns By Eric Freeman-Oreilly-spd.*
3. *Design Patterns Explained By Alan Shalloway, Pearson Education.*
4. *Pattern Oriented Software Architecture, F.Buschmann&others, John Wiley & Sons*
5. *Pattern"s in JAVA Vol-I By Mark Grand, Wiley DreamTech.*
6. *Pattern"s in JAVA Vol-II By Mark Grand, Wiley DreamTech.*
7. *JAVA Enterprise Design Patterns Vol-III By Mark Grand, Wiley DreamTech*

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B.Tech. IV - I sem (C.S.E.) **T Tu C**
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(13A05702) CRYPTOGRAPHY & NETWORK SECURITY

Course Objective:

- *Extensive, thorough and significant understanding of the concepts, issues, principles and theories of computer network security*
- *Identifying the suitable points for applying security features for network traffic*
- *Understanding the various cryptographic algorithms and implementation of the same.*
- *Understanding the various attacks, security mechanisms and services*

Learning Outcome:

At the end of the course the students will be able to:

- *Protect the network from both internal and external attacks*
- *Understand and implement various public and private key cryptographic algorithms*
- *Design of new security approaches*

UNIT I

Computer Security concepts, The OSI Security Architecture, Security attacks, Security services and Security mechanisms, A model for Network Security, Classical encryption techniques- symmetric cipher model, substitution ciphers, transposition ciphers, Steganography, Modern Block ciphers, Modern Stream ciphers.

Modern Block Ciphers: Block ciphers principles, Data encryption standard (DES), Strength of DES, linear and differential cryptanalysis, block cipher modes of operations, AES, RC4

UNIT II

Introduction to Number theory : Integer Arithmetic, Modular Arithmetic, Matrices, Linear Congruence, Algebraic Structures, GF(2^n) Fields, Primes, Primarily Testing, Factorization, Chinese remainder Theorem, Quadratic Congruence, Exponentiation and Logarithm.

Public-key cryptography : Principles of public-key cryptography, RSA Algorithm, Diffie-Hellman Key Exchange, ELGamal cryptographic system, Elliptic Curve Arithmetic, Elliptic curve cryptography

UNIT III

Cryptographic Hash functions: Applications of Cryptographic Hash functions, Requirements and security, Hash functions based on Cipher Block Chaining, Secure Hash Algorithm (SHA)

Message Authentication Codes: Message authentication Requirements, Message authentication functions, Requirements for Message authentication codes, security of MACs, HMAC, MACs based on Block Ciphers, Authenticated Encryption

Digital Signatures : RSA with SHA & DSS

UNIT IV

Key Management and distribution: Symmetric key distribution using Symmetric Encryption, Symmetric key distribution using Asymmetric, Distribution of Public keys, X.509 Certificates, Public key Infrastructure.

User Authentication: Remote user Authentication Principles, Remote user Authentication using Symmetric Encryption, Kerberos, Remote user Authentication using Asymmetric Encryption, Federated Identity Management

Electronic mail security: Pretty Good Privacy (PGP), S/MIME

UNIT V

Security at the Transport Layer(SSL and TLS) : SSL Architecture, Four Protocols, SSL Message Formats, Transport Layer Security, HTTPS, SSH

Security at the Network layer (IPSec): Two modes, Two Security Protocols, Security Association, Security Policy, Internet Key Exchange.

System Security: Description of the system, users, Trust and Trusted Systems, Buffer Overflow and Malicious Software, Malicious Programs, worms, viruses, Intrusion Detection System(IDS), Firewalls

Text Books :

1. *Cryptography and Network Security: Principals and Practice, William Stallings, Fifth Edition, Pearson Education.*
2. *Cryptography and Network Security, Behrouz A. Frouzan and Debdeep Mukhopadhyay, 2nd edition, Mc Graw Hill Education*

Reference Books :

1. *Network Security and Cryptography, Bernard Menezes , Cengage Learning.*
2. *Cryptography and Security, C.K. Shymala, N. Harini and Dr. T.R. Padmanabhan, Wiley-India.*
3. *Applied Cryptography, Bruce Schiener, 2nd edition, John Wiley & Sons.*
4. *Cryptography and Network Security, Atul Kahate, TMH.*
5. *Introduction to Cryptography, Buchmann, Springer.*
6. *Number Theory in the Spirit of Ramanujan, Bruce C.Berndt, University Press*
7. *Introduction to Analytic Number Theory, Tom M.Apostol, University Press*

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B.Tech. IV - I sem (C.S.E.)

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(13A05703) MOBILE APPLICATION DEVELOPMENT

Course Objective:

- *To introduce the Android technology and its application.*
- *Design & program real working education based mobile application projects.*
- *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.*

Learning Outcome:

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

- *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*
- *Describe and apply the different types of application models/architectures used to develop mobile software applications*
- *Describe the components and structure of a mobile development frameworks (Android SDK and Eclipse Android Development Tools (ADT)) and learn how and when to apply the different components to develop a working system*
- *Describe and apply software patterns for the development of the application models described above*
- *Describe and work within the capabilities and limitations of a range of mobile computing devices*
- *Design, implement and deploy mobile applications using an appropriate software development environment*

UNIT I

J2ME Overview: Java 2 Micro Edition and the World of Java, Inside J2ME, J2ME and Wireless Devices. Small computing Technology: Wireless Technology, Radio Data Networks, Microwave Technology, Mobile Radio Networks, Messaging, Personal Digital Assistants.

J2ME Architecture and Development Environment: J2ME Architecture, Small Computing Device Requirements, Run – Time Environment, MIDlet programming, Java Language for J2ME, J2ME Software Development Kits, Hello World J2ME Style, Multiple MIDlets in a MIDlet Suite, J2ME wireless Toolkit.

UNIT II

J2ME Best Practices and Patterns: The Reality of Working in a J2ME World, Best Practices, **Commands, Items, and Event Processing:** J2ME User Interfaces, Display Class, The Palm OS Emulator, Command Class, Item Class, Exception Handling.

High – Level Display: Screens, Screen Class, Alert Class, Form Class, Item Class, List Class, Text Box Class, Ticker Class.

UNIT III

Low Level Display: The Canvas, User Interactions, Graphics, Clipping Regions, Animation. **Record Management System:** Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records, Searching Records, Record Listener.

UNIT IV

JDBC Objects: The Concept of JDBC, JDBC Driver Types, JDBC Packages. Overview of the JDBC process, Database Connection, Statement Objects, Result Set, Transaction Processing, Metadata, Data Types, Exceptions.

JDBC and Embedded SQL: Model programs, Tables, Indexing, Inserting Data into Tables, Selecting Data from a Table, Updating Tables, Deleting Data from a table.

Introduction Android Programming: What is Android, Activities, Linking Activities Using Intents, Fragments, Calling Built – in Applications using Intents, Displaying Notifications

UNIT V

Android User Interface: Understanding the Components of a Screen, Adapting to Display Orientation, Managing Changes to Screen Orientation, Utilizing the Action Bar, Listening for UI Notifications.
Designing User Interface with Views: Basic Views, Picker Views, Using List Views to Display Long Lists.

Text Books :

1. *J2ME: The Complete Reference, James Keogh, TMH.*
2. *Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India*

Reference Books :

1. *Enterprise J2ME: Developing Mobile Java Applications, Michael Juntao Yuan, Pearson Education, 2004.*
2. *Android Application Development for Java programming by James C. Sheusi, Cengage Learning*
3. *Android A Programmers Guide by Jerome DiMargio, TMH.*

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(13A52702) MANAGEMENT SCIENCE

Course Objective:

The objectives of this course are to equip the student the fundamental knowledge of Management Science and its application to effective management of human resources, materials and operations of an organization. It also aims to expose the students about the latest and contemporary developments in the field of management.

Learning outcome:

This course enables the student to know the principles and applications of management knowledge and exposure to the latest developments in the field. This helps to take effective and efficient managerial decisions on physical and human resources of an organization. Besides, the knowledge of Management Science facilitates for his/her personal and professional development.

UNIT I
INTRODUCTION TO MANAGEMENT

Definition of Management- Function of Management- Management as a Science and Art-Management as a Profession- Universality of Management- Henri Faylo's Administrative Theory –Elton Mayo's Human Relations Movement- Systems theory – Contingency theory- Monetary and non-monetary incentives to motivate work teams- Leadership –Definition- Qualities of successful leaders- Different leadership styles.

UNIT II
ORGANIZATION DESIGN AND STRUCTURE

Organization design and structure- Principles—Types of organization structure-Mechanic and Organic Structures- Line organization- Line & Staff organization- Functional Organization – Matrix organization structures- merits and demerits- Departmentation and Decentralization-Power and Authority- Delegation of authority-Principles for effective delegation of authority.

UNIT III
HUMAN RESOURCE AND MATERIALS MANAGEMENT

Concept of HRM-functions – Human Resource Planning-Job Analysis-Recruitment and Selection-Training and Development- Performance appraisal –methods- Wage and Salary Administration-Grievances handling Procedure-Material Management- Need for Inventory control- Economic order quantity- ABC analysis- Management of purchase, stores and stores records.-Marketing Management – Concept- Channels of distribution- Marketing mix and product mix.

UNIT IV
MANAGEMENT OF OPERATIONS & PROJECT MANAGEMENT

Nature of organizational control- Marketing control- HR control- effective control systems- Operations Management- Essentials of operations management- Trends in operational management- Designing operation system for effective management of an organization-Project Management –Network Analysis-PERT and CPM-Project crashing (Simple problems)

UNIT V
CONTEMPORARY MANAGEMENT ISSUES

Strategic Management-Concept- Mission-Vision-Core values-Setting objectives-Corporate planning – Environmental scanning-SWOT analysis- Steps in strategy formulation & implementation- Management

Information System (MIS)- Enterprise Resource Planning (ERP)-Just-in-Time (JIT)- Total Quality Management (TQM) – Supply Chain Management-Six Sigma-Business Process Outsourcing (BPO).

Text Books:

1. *Stoner, Freeman, Gilbert, Management, Pearson, Six Edition 2008*
2. *Aryasri: Management Science, Fourth Edition TMH, 2012.*

Reference Books:

1. Vijay Kumar & Apparo, Introduction to Management Science, Cengage, 2011.
2. Kotler Philip & Keller Kevin Lane: Marketing Management, 14th Edition, Pearson, 2012.
3. Aswathappa, Human Resource Management, Himalaya, 2012.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2011.
5. Schermerhorn, Capling, Poole & Wiesner: Management, Wiley, 2012.
6. Joseph M Putti, Management Principles, Mc Millan Publishers, 2012.

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(13A05704) HUMAN COMPUTER INTERACTION
CBCC-II

Course Objective:

- *Gain an overview of Human-Computer Interaction (HCI), with an understanding of user interface design.*
- *Become familiar with the vocabulary associated with sensory and cognitive systems as relevant to task performance by humans*
- *Be able to apply models from cognitive psychology to predicting user performance in various human-computer interaction tasks and recognize the limits of human performance as they apply to computer operation*
- *Be familiar with a variety of both conventional and non-traditional user interface paradigms*

Learning Outcome:

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

- *Find innovative ways of interacting with computers*
- *Help the disabled by designing non-traditional ways of interacting*
- *Use cognitive psychology in the design of devices for 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 information simply 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

UNIT IV

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 V

Graphics: Icons, Multimedia, Colour-what is it, Colour uses, Colour and Human vision, Choosing colours
Testing: The purpose and importance of usability testing, Scope of testing, Prototypes, Kinds of Tests, Developing and conducting the test

Text Books :

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

Reference Books :

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, Soren Lauesen, Pearson Education.*
6. *Human –Computer Interaction, Smith - Atakan, Cengage Learning*

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(13A05705) COMPUTER GRAPHICS AND MULTIMEDIA
(CBCC-II)

Course Objective:

- *To know about different graphics hardware*
- *To study different techniques and algorithms related to Computer Graphics.*
- *To make the students understand the creation, storage, and manipulation of models and images of objects.*
- *Understand the basic concepts of multimedia and gain the skills required to work with them*

Learning Outcome:

- *Ability to develop programs to control the content, structure and appearance of objects.*
- *Ability to design, organize and produce multimedia projects of all kinds*

UNIT I

Introduction: Computer-Aided design, Presentation graphics, Computer Art, Entertainment, Education and Training, Visualization, Image processing, Graphics user interfaces.

Graphics Systems: Video display devices, Raster scan systems, Random scan systems, Graphics monitors and workstations, Input devices, Hard-copy devices, Graphics software

UNIT II

Basic Graphic algorithms: Overview, Scan converting lines, Scan converting Circles, Scan converting Ellipse, Filling rectangles, Filling polygons, Filling ellipse Arcs, Pattern filling, Clipping lines, Clipping circles and ellipse, Clipping polygons, Generating characters.

Geometrical Transformations: 2D Transformation, Homogeneous co-ordinates and matrix representation of 2D transformations, Composition of 2D transformations, The window-to-view port transformation, Efficiency.

3D Transformations: Matrix representation of 3D transformations, Composition of 3D transformations, Transformations as a change in coordinate system.

UNIT III

Viewing in 3D: Projections, Specifying an arbitrary 3D view, Examples of 3D viewing.

Curves and surfaces: Polygon meshes, Parametric cubic curves: Hermite curves, Bezier curves, Uniform non rational B-splines, Non uniform Non rational B-splines
Parametric Bicubic surfaces: Hermite surfaces, Bezier surfaces, B-spline surfaces

Visual realism: Why realism, Fundamental difficulties, Rendering techniques for line drawings, Rendering techniques for shaded images, Dynamics.

UNIT IV

Visible surface determination: Functions of two variables, Techniques for efficient visible surface algorithms, Algorithms for visible-line determination, The z-buffer algorithm, List priority algorithms, Scan line algorithms.

Illumination and Shading: Illumination models, Shading models for polygons, Surface detail, Shadows, Transparency.

UNIT V

Multimedia: Where to use multimedia, Text: The power of meaning, About fonts and faces, Images: Before you start to create, Making still images, color, Sound: The power of sound, Digital audio, MIDI Audio, MIDI Vs Digital audio, Multimedia system sounds, Audio File formats, Animation, Video: Using video, How video works and is displayed, Digital video containers

Text Books :

1. *Computer Graphics C version, Donald Hearn and M. Pauline Baker, 2nd edition, 2011, Pearson.*
2. *Computer Graphics Principles and Practice in C, Foley, Dam, Feiner, John, 2nd Edition, 2013, Pearson.*
3. *Multimedia: Making It Work, Tay Vaughan, 8th Edition, 2011, Tata McGrawHill Edition*

Reference Books :

1. *Computer Graphics with Virtual Reality System, Rajesh K.Mourya, Wiley India.*
2. *Principles of Computer Graphics, Theory and Practice, Shalini, Govil Pai, Springer.*
3. *Multimedia Applications, Relp Stteinmetz, Kolara Nahrstedt, Springer International Edition.*
4. *Principles of Multimedia, Ranjan Parckh, Second Edition, Mc Graw Hill.*

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(13A05706) SOFT COMPUTING

(CBCC-II)

Course Objectives:
To give students knowledge of soft computing theories, i.e. Fundamentals of artificial and neural networks, fuzzy sets and fuzzy logic and genetic algorithms

Course Outcomes:
Learn the unified and exact mathematical basis as well as the general principles of various soft computing techniques

Unit-1

Fundamentals of Artificial Neural Network: Introduction, Model of Biological Neuron, Mathematical Model of Neuron, ANN Architecture, Learning Rules, Learning Paradigms, Perceptron Network, Adaline and madaline network, Applications of Neural network.

Feed forward Neural Network: Introduction, Back Propagation Network, parameter Selection in BPN, Local Minima and Global minima, Merits and demerits of Back Propagation, variants of Back Propagation, Applications of BPN, Radial Basis Function, Applications of RBF

Unit-2

Associate Models: Hopfield Network, Blotzmann Network, Simulated Annealing, Applications of Network.

Classical Sets and Fuzzy Sets: Crisp Sets, Fuzzy Sets: History and Origin, Basic concepts, Paradigm Shift, Representation of Fuzzy Sets, Alpha cuts, Basic Operations on Fuzzy sets, Fuzzy complements, Intersections and Unions, Extension Principles for Fuzzy sets, Intuitionistic fuzzy sets, Operations on Intuitionistic fuzzy sets, Alpha-beta cuts

Unit-3

Crisp Relations and Fuzzy Relations: Crisp Relations, Fuzzy Relations, Binary Fuzzy Relations, Intuitionistic Fuzzy Relations

Classical Logic and Fuzzy Logic: Logic, Interval Analysis, Fuzzy Numbers, Fuzzy logic.

Unit-4

Fuzzy Associative Memories: FAM – an Introduction, Single Association FAM, Fuzzy Hebb FAMs, FAM Involving a Rule base, FAM Rules with Multiple Antecedents/Consequents, Applications.

Fuzzy Logic Controlled Genetic Algorithms: Soft computing tools, Problem description of Optimum design, Fuzzy constraints, Illustrations, GA in Fuzzy logic controller design, Fuzzy logic controller, FLC-GA Based Structural Optimization.

Fuzzy Rule Based System: Linguistic variables and Hedges, Rule_based System, Convention Programs vs Rule based systems, Fuzzy Propositions, Fuzzification and Defuzzification, Approximate Reasoning.

Unit-5

Genetic Algorithms: History of Evolutionary Computing, Crossover and Mutation properties, Genetic Algorithm Cycle, Fitness Function, Applications of Genetic Algorithm.

Rough Sets, Rule Induction, and Discernibility Matrix: Knowledge Representation, Knowledge Representation System, Decision tables, Rule Induction, Discernibility Matrix.

Text Books:

1.Soft Computing advantages and applications by B.K Tripathy, J. Anuradha, Cengage Learning.

2.Neural Networks, Fuzzy logic, and Genetic Algorithms by S. Rajasekaran, G.A. Vijaya Lakshmi Pai, PHI.

Reference Books:

1. Bart Kosko, "Neural Networks and Fuzzy Systems," Prentice Hall of India, 2005.
   George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic: Theory and Application," Prentice Hall of India, 2001.

1. Vojislav Kecman, “Learning and Soft Computing,” Pearson Education (Asia) Pte. Ltd. 2004.
2. S. Haykin, "Neural Networks: A Comprehensive Foundation," Pearson Education (Asia) Pte. Ltd./Prentice Hall of India, 2003.

M.T. Hagan, H.B. Demuth and M. Beale, "Neural Network Design," Thomson Learning, 2002.

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(13A05707) ARTIFICIAL INTELLIGENCE
(CBCC-III)

Course Objective:

- *To learn the difference between optimal reasoning Vs human like reasoning*
- *To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities*
- *To learn different knowledge representation techniques*
- *To understand the applications of AI namely, Game Playing, Theorem Proving, Expert Systems, Machine Learning and Natural Language Processing*

Learning Outcome:

- *Possess the ability to formulate an efficient problem space for a problem expressed in English*
- *Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.*
- *Possess the skill for representing knowledge using the appropriate technique*
- *Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems, Machine Learning and Natural Language Processing*

UNIT I

Introduction: History, Intelligent Systems, Foundations of AI, sub areas of AI, applications. Problem solving – State – Space search and control strategies: Introduction, general problem solving, characteristics of problem, exhaustive searches, Heuristic search techniques, iterative-deepening A*, Constraint Satisfaction and Planning. Game Playing, Bounded Look-ahead strategy and use of Evaluation functions, Alpha-Beta Pruning

UNIT II

Logic concepts and Logic programming: - Introduction, Propositional Calculus, Propositional Logic, Natural Deduction System, Axiomatic System, Semantic Tableau System in propositional Logic, Resolution Refutation in Propositional Logic, Predicate Logic, Logic Programming. Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR, Knowledge Representation using Frames, advanced knowledge representation Techniques.

UNIT III

Expert System and Applications: Introduction, Phases in Building Expert systems, expert system architecture, expert systems Vs Traditional Systems, Truth Maintenance Systems, Application of Expert Systems, List of shells and tools. Uncertainty Measure – Probability Theory: - Introduction, Probability Theory, Bayesian Belief Networks, Certainty factor theory, Dempster-Shafer Theory

UNIT IV

Machine-Learning Paradigms: - Introduction, Machine Learning systems. Supervised and unsupervised learning. Inductive learning, learning decision Tree (Text Book 2), Deductive Learning. Clustering, Support Vector Machines. Artificial Neural Networks: - Introduction, artificial neural Networks, Single-Layer Feed-Forward Networks, Multi-Layer Feed-Forward Network, Radial-Basis Function Networks, Design Issues of Artificial Neural Networks, Recurrent Networks

UNIT V

Fuzzy Logic : - Fuzzy sets, Fuzzy sets, Evolutionary Programming, Genetic Programming Concepts, swarm Intelligence Ant colony Paradigm, Natural Language Processing

Text Books :

1. *Artificial Intelligence, Saroj Kaushik, Cengage Learning 2011*
2. *Artificial intelligence, A Modern Approach, Russell, Norvig, Pearson Education, Second Edition. 2004*

Reference Books :

1. *Artificial intelligence, Rich, Knight, Nair, Tata McGraw Hill, Third Edition 2009*

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(13A05708) INFORMATION RETRIEVAL SYSTEMS
(CBCC-III)

Course Objective:

- *To learn the different models for information storage and retrieval*
- *To learn about the various retrieval utilities*
- *To understand indexing and querying in information retrieval systems*
- *To expose the students to the notions of structured and semi structured data*
- *To learn about web search*

Learning Outcome:

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

- *store and retrieve textual documents using appropriate models*
- *use the various retrieval utilities for improving search*
- *do indexing and compressing documents to improve space and time efficiency*
- *formulate SQL like queries for unstructured data*

UNIT I

Introduction to Information Retrieval

Retrieval Strategies: Vector space model, Probabilistic retrieval strategies: Simple term weights, Non binary independence model, Language Models

UNIT II

Retrieval Utilities: Relevance feedback, Clustering, N-grams, Regression analysis, Thesauri.

UNIT III

Retrieval Utilities: Semantic networks, Parsing.

Cross-Language Information Retrieval: Introduction, Crossing the language barrier.

UNIT IV

Efficiency: Inverted index, Query processing, Signature files, Duplicate document detection

UNIT V

Integrating Structured Data and Text: A Historical progression, Information retrieval as a relational application, Semi-structured search using a relational schema.

Distributed Information Retrieval: A Theoretical model of distributed retrieval, Web search.

Text Books :

1. *Information Retrieval – Algorithms and Heuristics, David A. Grossman, Ophir Frieder, 2nd Edition, 2012, Springer, (Distributed by Universities Press)*

Reference Books :

1. *Modern Information Retrieval Systems, Yates, Pearson Education*
2. *Information Storage and Retrieval Systems, Gerald J Kowalski, Mark T Maybury, Springer, 2000*
3. *Mining the Web : Discovering Knowledge from Hypertext Data, Soumen Chakrabarti Morgan-Kaufmann Publishers, 2002*
4. *An Introduction to Information Retrieval, Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, , Cambridge University Press, Cambridge, England, 2009*

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(13A05709) ADVANCED COMPUTER ARCHITECTURE
(CBCC-III)

Course Objective:

- *Discuss the concept of parallel processing and the relationship between parallelism and performance*
- *Understand the organization of computer structures that can be electronically configured and reconfigured*
- *Discuss the performance advantages that multithreading can offer along with the factors that make it difficult to derive maximum benefits from this approach*

Learning Outcome:

- *Realize Parallelism and Parallel architectures*
- *Ability to use Instruction Level Parallelism*
- *Ability to use Thread level parallelism*

UNIT I

Evolution of Computer Architecture, System Attributes to performance; Shared Memory Multiprocessors, Distributed Memory Multiprocessors, A Taxonomy of MIMD Computers; architecture of Vector Super computers, operational model of SIMD computer, PRAM models and PRAM variants.

Conditions of Parallelism- data and resource dependencies, hardware and software parallelism, Program partitioning and Scheduling- grain sizes and latency, grain packing and scheduling, static multi processor scheduling, Program flow mechanisms- control flow vs data flow, demand driven mechanisms, comparison of flow mechanisms, System interconnect architectures- network properties and routing, static and dynamic connection networks

UNIT II

Principles of scalable performances- performance metrics and measures- parallelism profile in programs, mean performance, efficiency, utilization and quality, benchmarks and performance measures, characteristics of parallel processing applications, Speed up performance laws- Amdahl‘s law, Gustafson‘s law, memory bounded speed up model, Scalability metrics and goals,

Bus systems- back plane bus specification, Addressing and Timing protocols, Arbitration, transaction and interrupt, IEEE future bus standard requirement set, Shared memory organizations- Interleaved memory organization, band width and fault tolerance, memory allocation schemes, Atomicity and event ordering

UNIT III

Linear Pipeline Processors- asynchronous and synchronous models, clocking and timing control, speedup, efficiency, and throughput, Non linear pipeline processors- reservation and latency analysis, collision free scheduling, pipeline schedule optimization, Instruction pipe line design- instruction execution phases, mechanisms for instruction pipelining, dynamic instruction scheduling, branch handling techniques, static arithmetic pipelines.

Hierarchical bus system, cross bar switch and multiport memory, multistage and combining networks, multistage and combining networks, The cache coherence problem, message passing mechanism- message routing schemes, deadlock virtual channels, flow control strategies, multicast routing algorithms

UNIT IV

Vector processing principles- vector instruction types, vector access memory schemes, early super computers, Multi vector multiprocessors- performance directed design rules, architecture of Cray and MPP, Compound vector operations, vector loops and chaining, SIMD computer organizations

UNIT V

Latency-hiding techniques- shared virtual memory, prefetching techniques, distributed coherent caches, scalable coherence interface, relaxed memory consistency, principles of multithreading and context switching policies,
MPD architecture, The Tera multiprocessor system, Data flow computer architecture

Text Books :

1. *Kai Hwang & Naresh Jotwani, "Advanced Computer Architecture- Parallelism, Scalability, Programmability" Second Edition, Mc Graw Hill Publishing*

Reference Books :

1. *Hennessy Patterson, "Computer Architecture- A Quantitative Approach" Fifth Edition, Elsevier*
2. *Kai Hwang, "Advanced Computer Architecture- Parallelism, Scalability, Programmability", TMH.*
3. *Computer Architecture, Concepts and Evolutions, Garrit A Blaauw, PEA*

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(13A05710) COMPUTER NETWORKS AND NETWORK SECURITY LABORATORY

PART-A (Computer Networks)

1. submit a report on the computer network facility available in the college including the devices used, topology used, specification of all the equipment used
2. submit a report on the Internet facility available in the college including the specification of the devices used and logical configuration
3. Implement the algorithm for parity method for error control
4. Implement the algorithm on hamming method for error correction (both single and block errors)
5. Implement the algorithm for check sum computation
6. Implement the distance vector routing algorithm
7. Implement the link state routing algorithm
8. Study any simulator available in the market and submit a report containing executive summary of it and detail description of the features

PART-B (Network Security)

1. Working with Sniffers for monitoring network communication (Ethereal)
2. Understanding of cryptographic algorithms and implementation of the same in C or C++
3. Using openssl for web server - browser communication
4. Using GNU PGP
5. Performance evaluation of various cryptographic algorithms
6. Using IPTABLES on Linux and setting the filtering rules
7. Configuring S/MIME for e-mail communication
8. Understanding the buffer overflow and format string attacks
9. Using NMAP for ports monitoring
10. Implementation of proxy based security protocols in C or C++ with features like confidentiality, integrity and authentication

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(13A05711) MOBILE APPLICATION DEVELOPMENT LABORATORY

Common to CSE & IT

OBJECTIVES:

The student should be made to:

- Know the components and structure of mobile application development frameworks for
  Android and windows OS based mobiles.
- Understand how to work with various mobile application development frameworks.
- Learn the basic and important design concepts and issues of development of mobile applications.
- Understand the capabilities and limitations of mobile devices.

OUTCOMES:

At the end of the course, the student should be able to:

- Design and implement various mobile applications using emulators.
- Deploy applications to hand-held devices

LIST OF EXPERIMENTS:

1. Develop an application that uses GUI components, Font and Colours
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 Multi threading
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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(13A05801) MOBILE COMPUTING
(MOOCS 1)

Course Objectives:

- Understand mobile ad hoc networks, design and implementation issues, and available solutions.
- Acquire knowledge of sensor networks and their characteristics.

Course Outcomes:

- Students able to use mobile computing more effectively
- Students gain understanding of the current topics in MANETs and WSNs, both from an industry and research point of views.
- Acquire skills to design and implement a basic mobile ad hoc or wireless sensor network via simulations.

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, Other MAC 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, Sensor Network Architecture, Data Dissemination, Data Gathering, MAC Protocols for Sensor Networks, Location Discovery, Quality of a Sensor Network, Evolving Standards, Other Issues.

TEXT BOOKS:

1. Ad Hoc Wireless Networks: Architectures and Protocols - C. Siva Ram Murthy and B.S.Manoj, PHI, 2004.
2. Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control - Jagannathan Sarangapani, CRC Press

REFERENCE BOOKS:

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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(13A05802) NATURAL LANGUAGE PROCESSING
(MOOCS 1)

Objectives

- Understand and apply fundamental algorithms and techniques in the area of natural language processing (NLP).
- Understand approaches to syntax and semantics in NLP.
- Understand current methods for statistical approaches to machine translation.
- Understand language modeling.
- Understand machine learning techniques used in NLP.

Outcomes:

- Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
- Ability to design, implement and analyze NLP algorithms.

UNIT – I
Introduction to Natural Language Understanding, Syntactic Processing: Grammars and Parsing

UNIT-II:
Features and Augmented Grammars, Toward Efficient Parsing, Ambiguity Resolution

UNIT –III
Statistical Methods: Probabilistic Context-Free Grammars, Best-First Parsing.

UNIT-IV
Semantic Interpretation: Linking Syntax and Semantics, Ambiguity Resolution, other Strategies for Semantic Interpretation.

UNIT-V
Context and World Knowledge: Using World Knowledge, Discourse Structure, Defining a Conversational Agent.

TEXT BOOK:
1. Natural Language Understanding – James Allen, Second Edition, Pearson Education.

REFERENCE BOOKS:
1. Speech and Language Processing – Daniel Jurafsky, James H.Martin.
2. Foundations of Statistical Natural Language Processing – Christopher Manning, Hinrich Schutze, MIT Press.
3. Charniack, Eugene, Statistical Language Learning, MIT Press, 1993.
4. Jurafsky, Dan and Martin, James, Speech and Language Processing, 2nd Edition, Prentice Hall, 2013-2014
5. Manning, Christopher and Henrich, Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.

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(13A05803) PARALLEL ALGORITHMS
(MOOCS 2)

Course Objective:
The objective of this course is to make the students

- Familiar with the efficient parallel algorithms related to many areas of computer science:
  expression computation, sorting, graph-theoretic problems, etc.
- Familiar with the basic issues of implementing parallel algorithms.
- Familiar with the fundamentals of discrete probability theory;
- able to know the basic randomized algorithms and to analyze selected randomized algorithms;
- Familiar with the theory of Markov chains and their algorithmic applications; knowledgeable about selected randomized data structures;

Course Outcomes:
Students who complete the course will have demonstrated the ability to do the following:

- Argue the correctness of algorithms using inductive proofs and invariants.
- Analyze worst-case running times of algorithms using asymptotic analysis.
- Explain the different ways to analyze parallel and randomized algorithms.
- Compare between different randomized data structures. Pick an appropriate data structure for a design situation.

UNIT I
Sequential model, need of alternative model, parallel computational models such as PRAM, LMCC, Hypercube, Cube Connected Cycle, Butterfly, Perfect Shuffle Computers, Tree model, Pyramid model, Fully Connected model, PRAM-CREW, EREW models, simulation of one model from another one

UNIT II
Performance Measures of Parallel Algorithms, speed-up and efficiency of PA, Cost-optimality, An example of illustrate Cost- optimal algorithms- such as summation, Min/Max on various models

UNIT III
Parallel Sorting Networks, Parallel Merging Algorithms on CREW/EREW/MCC, Parallel Sorting Networks on CREW/EREW/MCC/, linear array
Parallel Searching Algorithm, Kth element, Kth element in X+Y on PRAM, Parallel Matrix, Transportation and Multiplication Algorithm on PRAM, MCC, Vector-Matrix Multiplication, Solution of Linear Equation, Root finding.

UNIT IV
Randomized Algorithms: Example, Randomized Quicksort and Mincut Algorithms, Moments and Deviations Markov and Chebyshev Inequalities; Chernoff Bounds, martingales, Markov Chains and Random walks

UNIT V
Randomized Data Structures, Randomized Search Trees, Game tree; Hashing, Random Graphs, Random Walks in graphs, Derandomization

Text Books :
1. Designing Efficient Algorithms for Parallel Computer, M.J. Quinn, McGrawHill.

2. Probability and Computing: Randomized algorithms and Probabilistic Analysis, Michael Mitzenmacher and Eli Upfal. Cambridge University Press, 2005

Reference Books :

1. The Design and Analysis of Parallel Algorithms, S.G.Akl, PHI, 1989.
2. Randomized Algorithms, Rajeev Motwani and Prabhakar Raghavan, Cambridge University Press.
3. Design and Analysis of Randomized Algorithms: Introduction to Design Paradigms. Juraj Hromkovic, Springer, 2005.
4. Introducti on to Parallel Algorithms and Architectures: Arrays, Trees, Hypercubes, F.T.Lei ghton, MK Publishers, San Mateo California, 1992

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(13A05804) REAL TIME SYSTEMS
(MOOCS 2)

Objectives:

- Acquire skills necessary to design and develop embedded applications by means of real-time operating systems
- Understand embedded real-time operating systems

Course Outcomes:

- Characterize real-time systems and describe their functions
- Analyze, design and implement a real-time system
- Apply formal methods to the analysis and design of real-time systems
- Apply formal methods for scheduling real-time systems
- Characterize and describe reliability and fault tolerance issues and approaches.

Unit-1

Typical Real time Applications: Digital control, High-level control, Signal processing, other Real-time Applications.

Hard versus Soft Real-Time Systems: Jobs and processors, Release time, dead lines and Timing constraints, Hard and soft timing constraints, Hard Real time systems, Soft Real-time Systems.

A Reference Model of Real Time Systems: Processors and resources, Temporal parameters of Real time workload, periodic task model, precedence constraints and data dependency, Functional parameter, Resource Parameters of Jobs and Parameters of Resources, Scheduling Hierarchy.

Commonly used Approaches to real time Scheduling: Clock-Driven Approach, Weighted Round-Robin Approach, Priority driven Approach, Dynamic vs Static Systems, Effective release time and deadlines, Optimality of the EDF and LST algorithms, Nonoptimality of the EDF and LST algorithms, Challenges in validating timing constraints in priority driven System, Off line vs On line scheduling, summary.

Unit-2

Clock-Driven Scheduling: Notations and Assumptions, static, Timer-Driven scheduler, General Structure of the Cyclic Scheduler, Improving the average response time of Aperiodic Jobs, Scheduling sporadic Jobs, Practical considerations and generalizations, Algorithm for generating Static Schedules, Pros and cons of Clock-driven scheduling, summary.

Unit-3

Priority-Driven Scheduling of periodic Tasks : Static Assumption, Fixed-priority vs Dynamic-priority Algorithms, Maximum Schedulable Utilization, Optimality of the RM and DM Algorithms, A Schedulability test for Fixed-priority tasks with Short Response time, A

Schedulability test for Fixed-priority tasks with arbitrary Response time, Sufficient Schedulability conditions for the RM and DM Algorithms, summary.

Unit-4

Scheduling Aperiodic and Sporadic Jobs in Priority Driven Systems: Assumptions and approaches, Diferrable servers, Sporadic Servers, Constant utilization, total bandwidth and weighted fair –Queueing servers, Slack stealing in Dead-line Driven System, Stack stealing in Fixed-priority systems, Scheduling of sporadic jobs, Real-time performance for jobs with soft timing constraints, A two-level scheme for Integrated scheduling.

Unit-5

Resources and Resource access control: Assumptions on Resources and their usage, Effects of Resource contention and resource access control, NonPreemptive critical section, Basic Priority inheritance protocol, Basic Priority ceiling protocol, Stack –based, Priority ceiling protocol, Use of priority ceiling protocol in Dynamic priority systems, pre-emption ceiling protocol, Controlling accesses to Multiple unit Resources, Controlling concurrent accesses to data objects.

Multiprocessor Scheduling, Resource access control, and Synchronization: Model of Multiprocessor and Distributed Systems, Task assignment, Multiprocessor Priority ceiling protocol, Elements of Scheduling Algorithms for End-to-End Periodic Tasks, Schedulability of Fixed-priority End-to-End periodic Tasks, End to End tasks in heterogeneous Systems, Predictability and validation of Dynamic Multiprocessor Systems, Summary

Text Book:

1) “Real-Time Systems” by Jane W.S Liu, Pearson Edition, 2006.

Reference Text Book:

1. Real-Time Systems: Scheduling, Analysis, and Verification, Cheng, A. M. K.: Wiley, 2002.
2. Z.: Scheduling in Real-Time Systems, by Cottet, F., Delacroix, J., Kaiser, C., Mammeri John Wiley & Sons, 2002.
3. Real-Time Systems, C. M., Shin, K. G. McGraw-Hill, Krishna 1997.

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(13A05805) HIGH PERFORMANCE COMPUTING (MOOCS 3)

Objectives:

This course deals with two interrelated issues in high-performance computing:

- Fundamental concepts and techniques in parallel computation structuring and design, including parallelization methodologies and paradigms, parallel programming models, their implementation, and related cost models;
- Architectures of high-performance computing systems, including shared memory multiprocessors, distributed memory multi computers, clusters, and others.

Course Outcomes:

At the end of the module, a student will have an understanding of

- Ability to measure, analyze, and assess the performance of HPC applications and their supporting hardware.
- Ability to design the parallel algorithms.

UNIT I:

Introduction to Parallel Computing:
Motivating parallelism, Scope of Parallel Computing.
Parallel Programming Platforms:
Implicit Parallelism: Trends in Microprocessor Architectures, Limitations of Memory System Performance, Dichotomy of Parallel Computing Platforms, Physical Organization of Parallel Platforms, Communication costs in Parallel Machines, Routing Mechanisms for Interconnection Networks, Impact of Process –Processor Mapping and Mapping Techniques.

UNIT II:
Principles of Parallel Algorithm Resign:
Preliminaries, Decomposition Techniques, Characteristics of tasks and Interactions, Mapping Techniques for Load Balancing, Methods for containing Interaction Overheads, Parallel Algorithm Models.
Basic Communication Operators:
One-to-All Broadcast and All-to-One Reduction, All-to-All Broadcast and Reduction, All-Reduce and Prefix-Sum Operations, Scatter and Gather, All-to-All Personalized Communication, Circular Shift, Improving the speed of Some Communication Operations.

UNIT III:
Programming Using Message-Passing Paradigm:
Principles of Message-Passing, The Building Blocks: Send and Receive Operations, MPI: The Message Passing Interface, Topologies and Embedding, Overlapping Communication with computation, Collective Communication and Computation Operations, Groups and

Communications.

Programming Shared Address Space Platforms:

Thread Basics, Why Threads?, The POSIX Thread, Thread Basics: Creation and Termination, Synchronization Primitives in Pthreads, Collecting Thread and Synchronization Attributes, Thread Cancellation, Tips for designing Asynchronous Programs, OpenMP: a Standard for Directive based parallel programming.

UNIT IV:

Dense Matrix Algorithms:

Matrix-Vector Multiplication, Matrix-Matrix Multiplication, Solving a System for Linear Equations.

Sorting:

Issues in Sorting on Parallel Computers, Sorting Networks, Bubble Sort and its Variants, Quick Sort, Bucket and Sample Sort, Other Sorting Algorithms.

UNIT V:

Graph Algorithms:

Definitions and Representation, Minimum Spanning Tree: Prim's Algorithm, Single Source Shortest path: Dijkstra's Algorithm, All-Pair Shortest Paths, Transitive Closure, Connected components, Algorithms for Space Graphs.

Search Algorithms For Discrete Optimization Problems:

Definitions and Examples, Sequential Search Algorithms, Search Overhead Factor, Parallel Depth-First Search, Parallel Best-First Search, Speedup Anomalies in Parallel Search Algorithms.

TEXT BOOKS:

1."Introduction to Parallel Computing" by Ananth Grama, Anshul Guptha, George Karypis and Vipin Kumar. Pearson, 2nd Edition.

REFFRENCE BOOKS:

1. "Parallel Programming- Techniques and applications using networked workstations and parallel computers" by Barry Wilkinson, Michael Allen , Pearson Education, 2nd Edition 2007.

2."Multi Core Programming – Increasing Performance through Software Multi-threading" by Shameem Akhter and Jason Roberts, Intel Press 2006.

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(13A05806) PYTHON PROGRAMMING
(MOOCS 3)

OBJECTIVES:

- Introduction of Scripting Language
- Exposure to various problem solving approaches of computer science

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;

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.

UNIT – IV:

Modules: Creating modules, import statement, from ..import statement, name spacing,

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: 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

Testing: Why testing is required ?, Basic concepts of testing, Unit testing in Python, Writing Test cases, Running Tests.

OUTCOMES:

- Making Software easily right out of the box.
- Experience with an interpreted Language.
- To build software for real needs.
- Prior Introduction to testing software

TEXT BOOKS

1. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
2. Learning Python, Mark Lutz, Orielly

Reference Books:

1. Think Python, Allen Downey, Green Tea Press
2. Core Python Programming, W.Chun, Pearson.
3. Introduction to Python, Kenneth A. Lambert, Cengage