NOOURL ISLAM CENTRE FOR HIGHER EDUCATION

NOORUL ISLAM UNIVERSITY, KUMARACOIL

B.E. COMPUTER SCIENCE AND ENGINEERING

CURRICULUM & SYLLABUS

SEMESTER I

(Common for All B.E/B.Tech. Programmes Except Marine Engineering)

Sl. No	Course Code	Course Title	L	T	P	C
THEORY						
1.	EG1101	Technical English – I	3	1	0	4
2.	MA1101	Engineering Mathematics – I	3	1	0	4
3.	PH1101	Engineering Physics – I	3	0	0	3
4.	CH1101	Engineering Chemistry - I	3	0	0	3
5.	ME1101	Engineering Graphics	3	0	0	3
6.	CS1101	Fundamentals of Computing and Programming	3	0	0	3
PRACTICAL						
7.	CS1171	Computer Practice Lab - I	0	1	2	2
8.	ME1171	Computer Aided Drafting and Modeling Lab	0	1	2	2
9.	PH1171	Physics Lab – I	0	0	2	1
10.	CH1171	Chemistry Lab - I	0	0	2	1
TOTAL			18	4	8	26

*** Those who have admitted from the Academic Year 2013-2014 onwards**

EG1101 TECHNICAL ENGLISH – I 3 1 0 4

UNIT-I 9

Verb-Tenses -12 Tenses-8 Passive Forms- Word formation with prefixes and suffixes

UNIT-II 9

Expansion of Compound Nouns – Punctuation - Definitions of Technical Terms - Changing words from one form to another - Imperatives and Instructions - Conditional clauses.

UNIT-III 9

Interrogatives and Question Tags - Asking Questions - Comprehension – Discourse Markers

UNIT –IV 9

Concord - Identifying Common Errors - Cause and Effect Expressions – Paragraph Writing – Copy Writing: Slogans and Captions - Writing Instructions - Letter Writing (Formal Letters)

UNIT –V 9

Creative Writing – Transcoding: Bar Chart, Flow Chart - Pie Chart - Tree Diagram - Tabular Column

L: 45 + T: 15, TOTAL: 60 PERIODS

TEXT BOOK:

Department of Humanities and Social Sciences, Anna University, English for Engineers and Technologists, Combined Edition (Volumes 1 @ 2), Chennai: Orient Black Swan Pvt.Ltd.,2006 Themes 1-4 (Resources, Energy, Computer, Transport)

EXTENSIVE READING:

A.P.J.Abdul Kalam with Arun Tiwari, Wings of Fire: An Autobiography, University Press (India) Pvt.Ltd, 1999, 30 Impression 2007

***NOTE*:**

The book given under Extensive Reading is meant for inculcating the reading habit of the students. They need not be used for testing purposes.

MA1101 ENGINEERING MATHEMATICS - I 3 1 0 4

AIM:

To impart the fundamental knowledge of Engineering Mathematics to the students in order to achieve a well founded knowledge about the principles of Mathematics.

OBJECTIVE:

The course objective is to develop the required skill of the students in the area of

Engineering Mathematics with special emphasis on the characteristic equation of matrices, differential calculus, Beta and Gamma functions and to develop basic knowledge to the students in double and triple integration.

UNIT I MATRICES 9

Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of eigen values and eigen vectors(without proof)– Cayley Hamilton theorem (statement only), verification and its applications – Orthogonal and Symmetric matrices and their properties(excluding proof)- Orthogonal transformation of a symmetric matrix to diagonal form.

UNIT II DIFFERENTIAL CALCULUS 9

Curvature – Cartesian co-ordinates and parametric form -Centre and radius of curvature, Circle of curvature – Evolutes.

UNIT III FUNCTIONS OF SEVERAL VARIABLES 9

Partial derivatives – Total derivatives – Jacobians – Properties – Maxima and minima for functions of two variables–Lagrange Multiplier method- Taylor's expansion.

UNIT IV BETA AND GAMMA INTEGRALS 9

Evaluation of improper integrals- Beta and Gamma functions – Properties – Relation between Beta and Gamma functions - Evaluation of integrals using Beta and Gamma functions.

UNIT V MULTIPLE INTEGRALS 9

Evaluation of double and triple integrals – Area as double integral in cartesian and polar co-ordinates– Change of order of integration- Transformation of Cartesian coordinates into polar coordinates.

L: 45 + T: 15, TOTAL: 60 PERIODS

TEXT BOOK:

Grewal B.S., "Higher Engineering Mathematics"- 40th Edition , Khanna Publishers, Delhi 2007.

REFERENCES:

1 Veerarajan T, " Engineering Mathematics (for first year)", Tata McGraw- Hill Publishing Company Ltd.,New Delhi , 2007
2 Erwin Kreyszig, " Advanced Engineering Mathematics", 7th Edition, Wiley India, 2007.
3 P.Kandasamy , K.Thilagavathy , K.Gunavathy" Engineering Mathematics" Vol,1 S.Chand & Company Ltd.2002
4. B.V. Ramana,"Higher Engineering Mathematics" Tata McGraw- Hill, Publishing Company Ltd.,New Delhi, 2006

PH1101 ENGINEERING PHYSICS – I 3 0 0 3

AIM:

To provide a sound knowledge on the principles of Physics and its practical applications in various areas of Engineering and Technology.

OBJECTIVE:

At the end of the course students would be exposed to

- The mechanical properties of matter and its engineering applications
- Application of ultrasonics in Industry and Medical field
- The important properties of light and their application
- Application of laser and fiber optics in communication and technology
- The fundamentals of heat- energy conversion and its application.

UNIT I Properties of matter 9

Elasticity – Poisson's ratio – Stress-strain diagram – factors affecting elasticity – bending of beams – cantilever – bending moment – theory and experiment of Young's modulus determination – Uniform and non-uniform bending – I shaped girders – twisting couple – hollow cylinder – shaft – torsion pendulum – determination of rigidity modulus

UNIT - II Ultrasonics 9

Introduction-production of ultrasonic waves- magnetostriction effect- magnetostriction generator-piezoelectric effect-piezoelectric generator-detection of ultrasonic waves-properties - velocity measurement - acoustic grating-industrial applications-drilling, welding, soldering and cleaning- SONAR- non destructive testing pulse echo system-medical applications-sonograms.

UNIT –II Optics 9

Interference: air wedge- theory and experiment-testing of flat surfaces- Michelson's Interferometer-types of fringes- applications (determination of wavelength and thickness of thin transparent medium).

Polarization: Introduction- double refraction, quarter and half wave plates- production of plane, circularly and elliptically polarized light-detection of plane, circularly & elliptically polarized light.

Photoelasticity- Stress-optic law- photoelastic bench

UNIT- IV Lasers & Fiber Optics 9

Introduction- principle of spontaneous emission and stimulated emission, Einsteins A and B coefficients-derivation- population inversion, pumping, types of lasers- Nd-YAG, CO_2-applications.

Principle and propagation of light in optical fibre- numerical aperture and acceptance angle- types of optical fibres (material, refractive index, mode)- double crucible technique of fibre drawing, fibre optic communication system (Block diagram)-fibreoptic sensors.

UNIT – V Heat and Thermodynamics **9**

Thermal conductivity- Forbe's and Lee's disc methods-radial flow of heat- thermal conductivity of rubber and glass-thermal insulation in buildings - Laws of thermodynamics- Carnot's cycle as heat engine – efficiency, Otto engine & Diesel engine (qualitative).

TOTAL: 45 PERIODS

TEXT BOOKS:

1. R.K. Gaur and S.L.Gupta, 'Engineering Physics' Dhanpat Rai publications, New Delhi.
2. Marikani A, 'Engineering Physics' PHI learning pvt ltd, III Edition, New Delhi.
3. Palanisamy.P.K., 'Engineering Physics' Scitech publications, Chennai.
4. M.N. Avadhanulu and PG Kshirsagar. ' A Text book of Engineering Physics', S.Chand and company, Ltd., New Delhi.

REFERENCES:

1. Serway and Jewett, 'Physics for Scientists and Engineers with Modern Physics', 6th Edition, Thomson Brooks/Cole, Indian reprint.
2. Brijlal and Subrahmanyam 'Heat and Thermodynamics' S. Chand , Limited.
3. Ajoy Ghatak, ' Optics' Tata McGraw Hill Publications, New Delhi.
4. Brijlal and Subrahmanyam 'Properties of Matter' S. Chand , Limited.

CH1101 ENGINEERING CHEMISTRY-I 3 0 0 3

AIM

To have a thorough knowledge of the basics of chemistry particularly engineering oriented topics to engineering students.

OBJECTIVES

To make the students conversant with the principles of the following topics: (i) Water Technology, (ii) Engineering Materials and Polymers,(iii) Surface Chemistry and Nanomaterials,(iv) Analytical Techniques and (v) Chemical Kinetics

UNIT I WATER TECHNOLOGY 9

Water as a universal solvent – hard and soft water – reasons for hardness – disadvantages of hard water in washing and industrial purposes - estimation of hardness by EDTA method, problems; boiler feed water – characteristics- softening methods - external conditioning – demineralization (ion exchange) process, desalination by reverse osmosis method- internal conditioning (phosphate, calgon and carbonate conditioning methods); stages in domestic water treatment – disinfection by chlorination, ozone and UV treatments.

UNIT-II ENGINEERING MATERIALS AND POLYMERS 9

Abrasives – Natural & synthetic – Moh's scale, diamond, carborundum – Refractories – classification and properties – Cement – Manufacture. Lubricants- Types – properties of lubricants – oiliness, fire & flash points, pour & cloud point (definition only) – solid lubricants – Graphite and MoS_2.

Polymer and polymerization (definition only)- examples for natural & synthetic polymers, Preparation, properties and uses of Kevlar, Nomex, Rubber – natural and synthetic – neoprene, butyl rubber- vulcanization of rubber,Introduction to Conducting polymers and Liquid crystal polymers.

UNIT III SURFACE CHEMISTRY AND NANOMATERIALS 9

Adsorption – classification- adsorption of gases on solids- adsorption isotherms- Freundlich and Langmuir adsorption isotherms- adsorption of solutes from solution- application of adsorption-catalysis and pollution control-Nanomaterials – introduction – carbon nanotubes (CNT) and their applications.

UNIT IV ANALYTICAL TECHNIQUES 9

Importance of spectroscopic techniques- Beer-Lambert's law (problem) – UV-visible spectroscopy and IR spectroscopy – principles – instrumentation (block diagram only) – flame photometry – principle – instrumentation (block diagram only) – estimation of sodium by flame photometry – atomic absorption spectroscopy – principles – instrumentation (block diagram only) – estimation of nickel by atomic absorption spectroscopy. Thermal Analysis- TGA and DTA- principles- thermogram of calcium oxalate monohydrate.

UNIT-V CHEMICAL KINETICS 9

Introduction – rate, rate constant, order & molecularity of reactions –First order reaction – Derivation of rate constant – Second order reactions – rate constant (no derivation, equation and problem only) - activation energy – concept-Arrhenius equation-derivation- steady state approximation.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. P.C. Jain and Monica Jain, Engineering Chemistry DhanpatRai Pub, Co., New Delhi (2002)
2. S.S. Dara, A text book of engineering chemistry S. Chand & C. Ltd., New Delhi (2006)
3. B. Sivasankar Engineering Chemistry Tate McGraw- Hill Pub. Co. Ltd, New Delhi (2008)

REFERENCES:

1. B. K. Sharma Engineering Chemistry Krishna Prakasan Media (P) Ltd., Meerut (2001)
2. R. Gopalan, D. Venkappayya, Sulochana Nagarajan, Engineering Chemistry Vikas Pub, Co., New Delhi (2006)
3. Principles of physical chemistry by Samuel Glasstone,Van Nostrand pub.comp, Newyork.
4. Principles of physical chemistry by Puri & Sharma,Vikas pub.comp,2008

ME1101 ENGINEERING GRAPHICS 3 0 0 3

OBJECTIVE

- To know the fundamental principles of geometrical drawing
- To visualize the various machine components

Unit I - Introduction 9

Introduction to Engineering Drawing, Drawing Standard, ISI code of practice, Drawing covering, Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales;

Unit II - Orthographic Projection (Points, Lines & Planes) 9

Principles of orthographic projection-projection of points, straight lines, traces and projection of planes inclined to both planes Orthographic projection of simple engineering components-missing view exercises.

Unit III - Orthographic Projection (Solids) 9

Projection of solids – Inclined to one plane - Sections and Sectional Views of Right Angular Solids covering - Prism, Cylinder, Pyramid, Cone – Auxiliary Views

Unit IV - Pictorial Projections 9

Principles of pictorial views, isometric view of simple solids. Free hand sketching of orthographic views from pictorial views. Free hand sketching of isometric views from given two or three views.

Unit V - Development Of Surfaces & Perspective Projection 9

Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Perspective Projection of Planes and Solids

L: 45 + T: 15, TOTAL: 60 PERIODS

TEXT BOOKS:

1. Venugopal K and Prabhu Raja V, “Engineering Graphics”, New Age International Publishers, 2007.
2. . Luzadder W J, “Fundamentals of Engineering Drawing”, Prentice Hall Book Co., New York, 1998
3. Bhat, N.D.& M. Panchal , *Engineering Drawing*, Charotar Publishing House,2008

REFERENCES:

1. Kumar M S, “Engineering Graphics”, Ninth Edition, DD Publications, Chennai, 2007.
2. Bureau of Indian Standards, “Engineering Drawing Practices for Schools and Colleges SP 46-2003”, BIS, New Delhi, 2003.
3. Shah, M.B. & B.C. Rana , *Engineering Drawing and Computer Graphics*, Pearson *Education,2008*

CS1101 FUNDAMENTALS OF COMPUTING AND PROGRAMMING 3 0 0 3

AIM:

To provide an awareness to Computing and Programming

OBJECTIVES:

- To enable the student to learn the major components of a computer system
- To know the correct and efficient ways of solving problems
- To learn to use office automation tools
- To learn to program in C

UNIT - I Introduction to Computers 9

Introduction – Characteristics of Computers – Evolution of Computers - Computer Generations – Classification of Computers – Basic Computer organization – Number Systems

UNIT -II Computer Software 9

Computer Software –Types of Software – Software Development Steps – Internet Evolution - Basic Internet Terminology – Getting connected to Internet Applications.

UNIT – III Problem Solving and Office Application Software 9

Planning the Computer Program – Purpose – Algorithm – Flow Charts – Pseudocode - Application Software Packages- Introduction to Office Packages (not detailed commands for examination).

UNIT – IV Introduction to C 9

Overview of C – Constants, Variables and Data Types – Operators and Expressions – Managing Input and Output operators – Decision Making - Branching and Looping.

UNIT – V Functions and Pointers 9

Handling of Character Strings – User-defined Functions – Definitions – Declarations - Call by reference – Call by value – Structures and Unions – Pointers – Arrays – The Preprocessor – Developing a C Program : Some Guidelines

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Ashok.N.Kamthane,“ Computer Programming”, Pearson Education (India) (2008).
2. Behrouz A.Forouzan and Richard.F.Gilberg, “A Structured Programming Approach Using C”, II Edition, Brooks-Cole Thomson Learning Publications, (2007).

REFERENCES:

1. Pradip Dey, Manas Ghoush, “Programming in C”, Oxford University Press. (2007).
2. Byron Gottfried, “Programming with C”, 2nd Edition, (Indian Adapted Edition), TMH publications, (2006).
3. Stephen G.Kochan, “Programming in C”, Third Edition, Pearson Education

India, (2005).
4. Brian W.Kernighan and Dennis M.Ritchie, “The C Programming Language”, Pearson Education Inc., (2005).
5. E.Balagurusamy, “Computing fundamentals and C Programming”, Tata McGraw-Hill Publishing Company Limited, (2008).
6. S.Thamarai Selvi and R.Murugan, “C for All”, Anuradha Publishers, (2008).

CS1171 COMPUTER PRACTICE LAB - I 0 1 2 2

LIST OF EXERCISES

a) Word Processing **15**

1. Document creation, Text manipulation with Scientific notations.
2. Table creation, Table formatting and Conversion.
3. Mail merge and Letter preparation.
4. Drawing - flow Chart

b) Spread Sheet **15**

5. Chart - Line, XY, Bar and Pie.
6. Formula - formula editor.
7. Spread sheet - inclusion of object, Picture and graphics, protecting the document and sheet.
8. Sorting and Import / Export features.

c) Simple C Programming * **15**

9. Data types, Expression Evaluation, Condition Statements.
10. Arrays
11. Structures and Unions
12. Functions

*** For programming exercises flow chart and pseudo code are mandatory.**

TOTAL: 45 PERIODS

Hardware / Software required for a batch of 30 Students

Hardware

LAN System with 33 nodes (OR) Standalone PCs– 33 Nos.
Printers– 3 Nos.

Software

OS– Windows / UNIX Clone
Application Package– Office suite
Compiler– C

ME1171 COMPUTER AIDED DRAFTING AND MODELING LAB

L-T-D: 0-0-2 Credits: 2

(i) Introduction to computer aided drafting and solid modeling: software and hardware.

(ii) Understand basic 2D geometric construction techniques.
a. Cartesian and polar coordinate systems: locating points, coordinate entry methods, units and limits.
b. Object generation: lines, arcs, polylines, and multilines; rectangles, circles, polygons, and ellipses.
c. Transformations: move, copy, rotate, scale, mirror, offset and array; trim, extend, fillet, chamfer
d. Layers: creation, naming, properties manager.
e. Blocks: create, edit, import and explode.
f. Text: creating and editing, formatting, text styles.
g. Dimensions: creating and editing, dimension styles.

(iii) Exercise on basic drafting principles to create technical drawings.
a. Create orthographic views of machine parts from pictorial views.
b. Create isometric views of machine parts from orthographic views
c. Create hatched sectional views of machine parts.

(iv) Understanding basic solid modeling techniques
a. Creation of solid primitives
b. Boolean operations
c. Extrude, Revolve operations
d. 3D Views

(v) Exercise on basic modeling to create machine parts Create solid models from pictorial views

TOTAL: 45 PERIODS

University Examination:

Question paper may contain two parts. Part A shall contain 2D drafting which carries 40% marks, Part B shall contain 3D drafting which carries 40% marks and 20% marks is for viva voce conducted during the exam.

PH1171 **PHYSICS LAB- I** **0 0 2 1**

LIST OF EXPERIMENTS

(Any five experiments)

1. (a) Particle size determination using Diode Laser
   (b) Determination of Laser parameters- Wavelength and Numerical aperture
2. Determination of velocity of sound and compressibility of liquid- Ultrasonic Interferometer.
3. Determination of thermal conductivity of a bad conductor- Lee's Disc method
4. Determination of thickness of a thin wire- Airwedge
5. Torsional Pendulum- Determination of rigidity modulus
6. Compound pendulum- Determination of acceleration due to gravity
7. Determination of Young's Modulus- Non-Uniform bending

Reference: Physics lab manual- Department of Physics

CH1171 **CHEMISTRY LAB - I** **0 0 2 1**

List of Experiments

1. Determination of total hardness of water by EDTA method.
2. Determination of alkalinity (titrimetry method)
3. Determination of percentage purity of washing soda
4. Conductometric titration of a strong acid with a strong base
5. Determination of strength of hydrochloric acid (p^Hmetry)
6. Determination of the amount of Na^+ in water sample (Flame photometry)
7. Determination of molecular weight and degree of polymerization of a polymer
8. Determination of the amount of Ca^{2+} in water sample .
9. Determination of iron in rust by Permanganometry.

Minimum five experiments shall be offered.

References:

1. J. Bassette, R. B. Deanen& G. H. Jeffery & J. Mendham, Text book of Vogel Quantitative Inorganic Analysis, ELBS, England.

TOTAL: 45 PERIODS

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B.E. COMPUTER SCIENCE AND ENGINEERING

CURRICULUM & SYLLABUS

SEMESTER II

(Common for All B.E/B.Tech Programmes Except Marine Engineering)

Sl. No	Course Code	Course Title	L	T	P	C
Theory						
1.	EG1102	Technical English – II	3	0	0	3
2.	MA1102	Engineering Mathematics – II	3	1	0	4
3.	PH1102	Engineering Physics – II	3	0	0	3
4.	CH1102	Engineering Chemistry – II	3	0	0	3
5.	ME1102	Engineering Mechanics	3	0	0	3
6.	BE1101	Basic Engineering - I (Basic Electrical and Electronics Engineering)	3	1	0	4
7.	BE1102	Basic Engineering – II (Basic Mechanical and Civil Engineering)	3	1	0	4
Practical						
8.	CS1172	Computer Practice Lab - II	0	1	2	2
9.	PH1172	Physics Lab – II	0	0	2	1
10	CH1172	Chemistry Lab - II	0	0	2	1
11.	BE1171	Basic Engineering Lab – I (Basic Electrical and Electronics Engineering Lab)	0	0	4	2
12.	BE1172	Basic Engineering Lab – II (Basic Mechanical and Civil Engineering Lab)	0	0	4	2
TOTAL			21	4	14	32

***Those who have admitted from the Academic Year 2013-2014 onwards.**

EG1102 TECHNICAL ENGLISH - II 3 0 0 3

UNIT-I **9**

Technical Vocabulary - Active and Passive Vocabulary – Articles - Prepositions – Expansion of Abbreviations and Acronyms

UNIT-II **9**

Phrases- Adverbs –Different grammatical forms of the same word –Active Voice-Passive Voice

UNIT-III **9**

Phonemes - Vowels, Consonants and Diphthongs – Word Stress and Intonation

UNIT-IV **9**

Writing Recommendations – Checklists - Essay Writing - Business Letters: - Letter Calling for quotation, Letter Placing Order, Letter of Complaint, Letter Seeking Clarification - Business Proposal Writing

UNIT-V **9**

Numerical Adjectives – CV/Resume Writing – One Word Substitutes – Virtual Communication: E-Mail Writing

TOTAL: 45 PERIODS

TEXT BOOK:

Department of Humanities and Social Sciences, Anna University, English for Engineers and Technologists, Combined Edition (Volumes 1 @ 2), Chennai: Orient Black Swan Pvt.Ltd. 2006 Themes 5-8 (Technology, Communication, Environment, Industry)

EXTENSIVE READING:

Shiv Khera, You Can Win, Milan, Delhi, 2004

OR

CanField Jack, Chicken Soup for the Soul, Westland, Chennai, 1999.

***NOTE*:**

The book given under Extensive Reading is meant for inculcating the reading habit of the students. They need not be used for testing purposes.

MA1102 ENGINEERING MATHEMATICS II 3 1 0 4

AIM:

To impart the fundamental knowledge of Engineering Mathematics to the studentsin order to achieve a well founded knowledge about the principles of Mathematics.

OBJECTIVE:

To develop basic knowledge to the students in differential equations and vector calculus. This subject is further broadened to the functions of complex variables and complex integration. A thorough knowledge about Laplace transforms is also covered to aid the students solve the differential equations.

UNIT I ORDINARY DIFFERENTIAL EQUATIONS 9

Linear differential equations of second order with constant and variable coefficients- Cauchy's and Legendre's linear equations – Method of variation of parameters

UNIT II COMPLEX VARIABLES 9

Functions of a complex variable – Analytic function – Necessary conditions- Cauchy-Riemann equations in cartesian and polar co-ordinates - Sufficient conditions(excluding proof) –Properties of analytic function – Harmonic and its conjugate – Construction of analytic function by Milne Thomson method – Conformal mappings
$w = z + c$, cz , $1/z$ and Bilinear transformation.

UNIT III COMPLEX INTEGRATION 9

Statement and applications of Cauchy's integral theorem and Cauchy's integral formula – Laurent's expansion – Singular points – Residues – Cauchy's Residue theorem – Evaluation of real definite integral using contour integration(excluding poles on the real axis) - $\int_0^{2\pi} f(\cos\theta, \sin\theta)d\theta$ and $\int_{-\infty}^{\infty} \frac{f(x)}{g(x)}dx$

UNIT IV VECTOR CALCULUS 9

Gradient, Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green's theorem in a plane, Gauss divergence theorem and stokes' theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelopipeds.

UNIT V LAPLACE TRANSFORMS 9

Laplace transform –Existence condition– Transforms of elementary functions – Basic properties – Transforms of derivatives and integrals – Transform of Periodic functions. Inverse Laplace transform – Convolution, Initial and Final value theorems (statement only) – Solutions of linear ordinary differential equation of second order with constant coefficients using Laplace transform techniques.

L: 45 + T: 15, TOTAL: 60 PERIODS

TEXT BOOK:

Grewal B.S., "Higher Engineering Mathematics"- 40th Edition , Khanna Publishers, Delhi 2007.

REFERENCES:

1. Erwin Kreyszig, " Advanced engineering Mathematics", 7th Edition, Wiley India, 2007
2. Veerarajan T, " Engineering Mathematics (for first year)", Tata McGraw- Hill Publishing Company Ltd.,New Delhi,2007.
3. P.Kandasamy , K.Thilagavathy , K.Gunavathy" Engineering Mathematics" S.Chand & Company Ltd.2002.
4. B.V. Ramana,"Higher Engineering Mathematics" Tata McGraw- Hill Publishing Company Ltd.,New Delhi,2006.

PH1102 ENGINEERING PHYSICS – II 3 0 0 3

AIM:

To enable the students' understand the Physics behind various engineering materials and correlate it to technological applications.

OBJECTIVE:

At the end of the course students would be exposed to

- Fundamentals of quantum mechanics and its application to electron microscopy
- Various crystal structures and their defects
- The synthesis, properties and applications of various engineering materials

UNIT –1 Quantum Mechanics 9

Matter waves- de-Broglie wavelength - Schrodinger's wave equation-time independent and time dependent equations- physical significance of wave function- particle in a one dimensional box- electron microscope- scanning electron microscope- transmission electron microscope.

UNIT II Elementary crystal physics 9

Lattice – Unit cell, Bravais lattice ,lattice planes-Miller indices ,d-spacing in cubic lattice. Calculation of number of atoms per unit cell,atomic radius, coordination number and packing
factor for SC,BCC,FCC and HCP structures- diamond cubic, NaCl and ZnS structures. Crystal defects.

UNIT- III Conducting & Semiconducting Materials 9

Conducting materials – Drawbacks of classical theory – Quantum theory – Fermi distribution function – Effect of temperature on Fermi Function – Density of energy states Semiconducting materials: intrinsic semiconductor-carrier concentration derivation

- fermi level - electrical conductivity- band gap determination, extrinsic semiconductors, compound semiconductors (qualitative), Hall effect -determination of hall coefficient - applications.

UNIT- IV Magnetic, Superconducting and Dielectric Materials 9

Magnetic Materials: Origin of magnetic moment-Bohr magneton - ferromagnetism – magnetic domains- hysteresis-soft and hard magnetic materials- applications.

Superconductivity: Properties-types of super conductors - BCS theory of superconductivity (qualitative) - applications of superconductors.

Dielectric materials - active and passive dielectrics - types of polarization- dielectric loss- dielectric breakdown – uses of dielectric materials.

UNIT- V New Engineering Materials 9

Metallic glasses: preparation, properties and applications. Shape Memory Alloys (SMA): characteristics, properties and applications.

Nanomaterials -synthesis-top-down approach (Ball milling), bottom-up approach (CVD)- properties and applications.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Rajendran, V, and Marikani A, 'Materials science' TMH publications, New Delhi
2. Palanisamy P.K "Materials Science", Scitech publications Pvt Ltd, Chennai
3. Arumugam M, "Materials Science", Anuradha publications, Kumbakonam
4. R.K. Gaur and S.L.Gupta, 'Engineering Physics' Dhanpat Rai publications, New Delhi

REFERENCES:

1. Charles Kittel ," Introduction to solid state physics ", John Wiley & sons, 8ed.
2. Charles P.Poole and Frank J. Owner, " Introduction to Nanotechnology, Wiley India.
3. Pillai, S.O. 'Solid state physics' NewAge international pubishers, Chennai.

CH1102 ENGINEERING CHEMISTRY-II 3 0 0 3

AIM

To have a thorough knowledge of the basics of chemistry particularly engineering oriented topics to engineering students

OBJECTIVES

To make the students conversant with the principles of the following topics: (i) Fuels And Combustion,(ii) Electrochemistry And Corrosion, (iii) Energy Sources And Batteries, (iv) Phase Rule And Alloys And (v) Thermodynamics.

UNIT I FUELS AND COMBUSTION 9

Classification of fuels with examples– characteristics of a good fuel- fossil fuels- Coal – proximate and ultimate analysis- metallurgical coke – manufacture by Otto-Hoffmann method – Petroleum processing and refining – cracking (definition only) - knocking – octane number and cetane number – synthetic petrol – Bergius process- Calorific value –GCV, LCV (problems)- Gaseous fuels- water gas and producer gas, Flue gas analysis – Orsat apparatus – theoretical air for combustion (problems).

UNIT-II ELECTROCHEMISTRY AND CORROSION 9

Electrochemical cells – reversible and irreversible cells – EMF – measurement of emf – single electrode potential – Nernst equation– reference electrodes – Standard Hydrogen electrode -Calomel electrode – Ion selective electrode – glass electrode and measurement of pH – electrochemical series – significance- Electrochemical corrosion – protective coatings – paints – constituents and functions.

UNIT –III ENERGY SOURCES AND BATTERIES 9

Renewable & non-renewable energy sources- wind energy, solar energy and solar cell- Nuclear reactions – Fission and fusion – nuclear reactors – light water and breeder nuclear reactors (elementary ideas only) – Nuclear power plants in India.

Batteries- primary and secondary cells- alkaline battery- lead acid battery- nickel cadmium battery- lithium battery (Li-TiS_2)- H_2-O_2 fuel cell.

UNITV PHASE RULE AND ALLOYS 9

Statement and explanation of terms involved – one component system – water system – condensed phase rule – simple eutectic system (lead-silver system only) – alloys – importance, ferrous alloys – nichrome, invar and stainless steel – heat treatment of steel, non-ferrous alloys – brass, bronze and solder.

UNIT-V THERMODYNAMICS 9

Introduction- I law of thermodynamics (statement only)- Relation between ΔE & ΔH -II law of thermodynamics (statement only)- concept of entropy – Clausius-Clapeyron equation (no derivation)- Importance, terms involved (problem) -Free energy changes- ΔG – Gibbs Helmoltz equation (derivation) - III law of thermodynamics- concept of absolute entropy- zeroth law of thermodynamics (statement only).

TOTAL: 45 PERIODS

TEXT BOOKS:

1 P.C. Jain and Monica Jain, Engineering Chemistry DhanpatRai Pub, Co., New Delhi (2002)

2 S.S. Dara, A text book of engineering chemistry S. Chand & C. Ltd., New Delhi (2006)

3. B. Sivasankar Engineering Chemistry Tate McGraw- Hill Pub. Co. Ltd, New Delhi (2008).

REFERENCES:

1 B. K. Sharma Engineering Chemistry Krishna Prakasan Media (P) Ltd., Meerut (2001)
2 Principles of physical chemistry by Samuel Glasstone,Van Nostrand pub.comp, Newyork.
3 Principles of physical chemistry by Puri & Sharma,Vikas pub.comp,2008.

ME1102 ENGINEERING MECHANICS 3 0 0 3

OBJECTIVE

This is a basic engineering course common to all branches to inculcate in the students, problem
solving abilities and to enhance their analytical abilities.

Unit I - Statics of Particles 10

Statics –Basics Concepts, Fundamental principles & concepts: Vector algebra, Newton‟s laws, gravitation, force (external and internal, transmissibility), couple, moment (about point and about axis), Varignon‟s theorem, resultant of concurrent and non-concurrent coplanar forces, static equilibrium, free body diagram, reactions. Problem formulation concept; 2-D statics, two and three force members, alternate equilibrium equations, constraints and static determinacy; 3-D statics.

Unit II - Application of Statics & Friction 9

Analysis of Structures- Trusses: Assumptions, rigid and non-rigid trusses; Simple truss (plane and space), analysis by method of joints. Analysis of simple truss by method of sections;

FRICTION: Friction- Coulomb dry friction laws, simple surface contact problems, friction angles, types of problems, wedges. Sliding friction and rolling resistance

Unit III - Centroid, Centre of Gravity and Moment of Inertia 8

Moment of Inertia- First moment of mass and center of mass, centroids of lines, areas, volumes, composite bodies. Area moments- and products- of inertia, radius of gyration, transfer of axes, composite areas. Rotation of axes, principal area-moments-of-inertia,. Second moment of mass, Mass moments- and products- of inertia, radius of gyration, transfer of axes, flat plates (relation between area- and mass- moments- and products- of inertia), composite bodies. Rotation of axes, principal mass-moments-of-inertia.

Unit IV - Particle Dynamics 8

Rectilinear motion; Plane curvilinear motion (rectangular, path, and polar coordinates). 3-D curvilinear motion; Relative and constrained motion; Newton’ s 2nd law (rectangular, path, and polar coordinates). Work-kinetic energy, power, potential energy. Impulse-momentum (linear, angular); Impact (Direct and oblique).

Unit V Kinematics & Kinetics of Rigid Bodies: 10

Plane kinematics of rigid bodies- Rotation; Parametric motion. Relative velocity,

instantaneous center of rotation. Relative acceleration, rotating reference frames. Rotating reference frames, 3-part velocity and 5-part acceleration relations, Coriolis acceleration. Plane kinetics of rigid bodies- Kinetics of system of particles and derivation of moment equation. Translation. Fixed axis rotation; General planar motion.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Beer F P and Johnson E R, "Vector Mechanics for Engineers, Statics and Dynamics", Tata Mc-Graw Hill Publishing Co. Ltd., New Delhi, 2006.
2. Tayal A K, "*Engineering Mechanics- Statics and Dynamics*" , Umesh Publications, Delhi,2004
3. Irving H. Shames, Engineering Mechanics, Prentice Hall, New Delhi 1997.

REFERENCES:

1. Bansal R K, "Engineering Mechanics", Laxmi Publications Pvt. Ltd., New Delhi, 2006.
2. Bhavikatti S S, "Engineering Mechanics", New Age International Pvt. Ltd., New Delhi, 2003.
3. Young D H and Timashenko S, "Engineering Mechanics", Tata Mcgraw-Hill, Fourth Edition, 2006.
4. Jivan Khachane, Ruchi Shrivastava, "Engineering Mechanics: Statics and Dynamics", ANE Books, 2006.
5. Rajasekaran S and Sankarasubramanian G, "Engineering Mechanics-Statics and Dynamics", Vikas Publishing House Pvt. Ltd., New Delhi, 2006.
6. NPTEL courses: *http://nptel.iitm.ac.in/courses.php*, web and video resources on *Engineering Mechanics*.

BE1101 BASIC ENGINEERING - I 3 1 0 4

(Basic Electrical and Electronics Engineering)

Objectives:

- To understand the basic solutions of AC and DC circuits.
- To study the basic principle and operation of AC and DC machines.
- To study the fundamental operations of measuring instruments.
- To study the layout of power system.

Unit: 1 – Electrical circuits 9

Ohms Law, Kirchhoff's laws, Mesh and Nodal Analysis for DC Circuits.
Introduction to AC Circuits, Faraday's Law of Electromagnetic Induction, Lenz law, Inductor, Capacitor, Power factor, Waveforms and RMS value, Average Value, Peak factor and Form factor, Single phase circuits- Series and Parallel, Three phase balanced circuits. Fundamentals of wiring and earthing.

Unit: II – Electrical Measurements, Machines and Power system 9

Operating principles of Moving coil and Moving iron instruments (Ammeter and voltmeter), Dynamometer type watt meter and Energy meter, Errors in Measurements. Construction, Principle of operation and Applications of DC Generators, DC Motors, Single phase transformers. Structure of power system

UNIT- III Semiconductor devices and applications 9

Characteristics of PN Junction diode-Zener Effect-Zener diode and its characteristics-Half wave and Full wave Rectifiers-Voltage regulation,Bipolar Junction transmitter-CB,CE,CC Configuration and characteristics.

UNIT-IV Digital Electronics 9

Binary number system-logic gates-Boolean algebra-Combinational Circuit-half and Full adder,Sequential Circuit-Flip flops-Shift Registers(SIPO,SISO,PIPO,PISO) – Counters: Synchronous and Asynchronous –A/D conversion-Successive approximation,D/A conversion-Weighted Resistor

UNIT – V Fundamentals of Communication Engineering 9

Types of Signals: Analog and Digital Signals – Modulation and Demodulation – Principles of Amplitude and Frequency modulation – Communication Systems: Radio, TV, Fax, Microwave, Satellite and Optical Fiber (Block Diagram)

L: 45 + T: 15, TOTAL: 60 PERIODS

TEXT BOOKS:

1. V.N. Mittle “Basic Electrical Engineering”, Tata McGraw Hill Edition, New Delhi, 1990.
2. V.K.Mehta “Principles of Power System”, S.Chand & Company Ltd, New Delhi, 2001.
3. R.S.Sedha,”Applied electronics”S.Chand&Co.,2006.

REFERENCES:

1. Muthusubramanian R, Salivahanan S and Muraleedharan K A, “Basic Electrical, Electronics and Computer Engineering”, Tata McGraw Hill, Second Edition, (2006).
2. Nagsarkar T K and Sukhija M S, “Basics of Electrical Engineering”, Oxford press (2005).
3. Chakrabarti A, Soni M.L, Gupta P.V, Bhatnagar U.S , “ A Text book on Power System Engineering,” Dhanpat Rai & Co, New Delhi,2010.
4. Muthusubramanian R, Salivahanan S and Muraleedharan K A, “Basc Electrical Electronics and Computer engineering”,Tata McGraw Hill, Second edition(2006).
5. Nagsarkar T K and Sukhija M S, “Basics of Electrical Engineering”, Oxford Press(2005).
6. Mehta V K, “Principles of Electronics”,S.Chand&Company Ltd(1994).
7. Mahmood Nahvi and Joseph A. Edminister, “Electric Circuits”, Schaum’ Outline Series McGraw Hill,(2002).
8. Premkumar N, “Basic Electrical Engineering”, Anuradha Publishers,(2003)

BE1102 **BASIC ENGINEERING – II** **3 1 0 4**

(Basic Mechanical and Civil Engineering)

Aim:

To introduce students to the profession of Mechanical and Civil Engineering and involve them in small-scale projects which would allow them to develop teamwork skills.

Objective:

- To understand the basic knowledge about the Mechanical components used in various application
- To be aware of the different fields of Civil Engineering, such as Surveying, Structural and Transportation Engineering.

Unit I – IC Engine and Boilers **9**

IC Engines: Working and comparison of two stroke and four stroke petrol and diesel engines - general description of various systems using block diagrams – air system, fuel system and ignition system. A brief description of CRDI, MPFI, GDI and Hybrid Vehicles.

Steam boilers: Classification – Cochran boiler, Babcock and Wilcox boiler, High pressure Boilers - Lamont, Benson boiler

Unit II – Compressor, Blower, Pumps, Power plants, Refrigeration and Air Conditioning **9**

Principles and fields of application of compressors - reciprocating and centrifugal, blower principle, pumps- reciprocating, and centrifugal pumps steam

Elementary ideas of hydroelectric, thermal and nuclear power plants

Refrigeration & Air Conditioning: Refrigerants, Vapor compression system, Vapor absorbtion system window air conditioning unit -types (general description only).

Unit III – Manufacturing Processes **9**

Basic Principles of Manufacturing processes – casting, metal forming - forging, rolling, Metal joining - soldering, Welding Machining processes- Lathe construction, operation - turning, taper turning, thread cutting

UNIT - IV Civil Engineering and Materials **9**

Introduction: Civil Engineering, branches of Civil Engineering, contribution to society, Scope,

Civil Engineering Materials: Bricks – stones – sand – cement – concrete – steel sections, glass, wood, FRP

Surveying: Objects – types – classification – principles – measurements of distances – angles – leveling – determination of areas – illustrative examples.

Sub Structure: Types, Bearing capacity – Requirement of good foundations.

Superstructure: Brick masonry – stone masonry – beams – columns – lintels – roofing – flooring – plastering– Types of Bridges and Dams

UNIT- V Civil Engineering structures

Building planning **9**

Residential, Institutional and industrial – functional requirements. – Basics of Interior Design and Landscaping.

Roads- benefits- classifications- traffic signs

Bridges-components od bridges-Dam-Purpose of reservoir.

Environmental Engineering: Protected water supply, water treatment methods-sewage treatment- Pollution-Types-causes-remedial measures

L: 45 + T: 15, TOTAL: 60 PERIODS

TEXT BOOKS

1) Dr. B.C. Punmia, Ashok Kumar Jain, Arun Kr. Jain, "Basic Civil Engineering", Laxmi Pulications,
2) Roy and Choudhary, "*Elements of Mechanical Engineering*"
3) J Benjamin, "*Basic Mechanical Engineering*"

References

1. K.Venugopal and v prabu raja "*Basic Mechanical Engineering*" Anuradha Agencies
2. Shanmugam G and Palanichamy M.S "*Basic Mechanical Engineering*" Tata MC Graw Hill.
3. Shanmugam G and Palanichamy M S, "Basic Civil and Mechanical Engineering",Tata McGraw Hill Publishing Co., New Delhi, (1996).
4. Ramamrutham. S, "Basic Civil Engineering", Dhanpat Rai Publishing Co. (P) Ltd. (1999).
5. Seetharaman S. "Basic Civil Engineering", Anuradha Agencies, (2005).

CS1172 COMPUTER PRACTICE LAB – II 0 1 2 2

Prerequisite: None

List of Experiments

1. Unix Commands **15**

Study of Unix OS - Basic Shell Commands - Unix Editor

2. Shell Programming **15**

Simple Shell program - Conditional Statements - Testing and Loops

3. C Programming on Unix **15**

Dynamic Storage Allocation-Pointers-Functions-File Handling

TOTAL: 45 PERIODS

Hardware / software requirements for a batch of 30 students

Hardware

1 UNIX Clone Server
33 Nodes (thin client or PCs)
Printer– 3 Nos.

Software

OS– UNIX Clone (33 user license or License free Linux)
Compiler- C

PH1172 PHYSICS LAB - II 0 0 2 1

LIST OF EXPERIMENTS

(Any five experiments)

1. Determination of focal length of convex lens- Newtons Rings
2. Determination of wavelength of mercury spectrum- Spectrometer grating
3. Determination of Viscosity of a liquid- Poiseuille's method.
4. Determination of hysteresis loss in a ferromagnetic material.
5. Determination of dielectric constant of a material at room temperature.
6. Determination of band gap of a semiconducting material.
7. Determination of Young's modulus- Uniform bending.

REFERENCE: Physics lab manual- Department of Physics

CH1172 CHEMISTRY LAB- II 0 0 2 1

LIST OF EXPERIMENTS

1. Determination of concentration of ferrous ion by potentiometry.
2. Conductometric titration of mixture of acids.
3. Estimation of copper in brass by EDTA method.
4. Determination of chloride content in water sample by argentometry.
5. Determination of acidity by titrimetry.
6. Determination of iron content in a solution by spectrophotometric method.
7. Determination of amount of water of crystallization in hydrated barium chloride.
8. Percentage purity of limestone (permanganometry)

Minimum five experiments shall be offered.

TOTAL: 45 PERIODS

REFERENCES:

1. J. Bassette, R. B. Deanen & G. H. Jeffery & J. Mendham, Text book of Vogel Quantitative Inorganic Analysis, ELBS, England.

BE1171 **BASIC ENGINEERING LAB – I** **0 0 4 2**

(Basic Electrical and Electronics Engineering Lab)

I. Electrical Engineering Lab

1. Study of Symbols, Cables and Earthing.
2. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
3. Fluorescent lamp wiring.
4. Stair case wiring / Lamp control from three different places/ Doctor Room control/ Go down control
5. Measurement of electrical quantities – voltage, current, power & computation of power factor in RLC circuit.
6. Measurement of energy using single phase energy meter.
7. Fan Wiring.

II. Electronics Engineering Lab

1. Study of Electronic components and equipments – Resistor, colour coding, Measurement of AC signal parameter (peak-peak, rms period, frequency) using CRO.
2. Study of logic gates AND, OR, EX-OR and NOT, NAND and NOR.
3. Generation of Clock Signal.
4. Soldering practice – Components, Devices and Circuits – Using general purpose PCB.
5. Measurement of ripple factor of HWR and FWR.
6. Characteristics of PN Junction diode
7. Characteristics of Zener diode
8. Voltage Regulator using Zener diode

TOTAL: 45 PERIODS

BE1172 **BASIC ENGINEERING LAB – II** **0 0 4 2**

(Basic Mechanical and Civil Engineering Lab)

OBJECTIVE:

Introduction to different materials in engineering practices with respect to their workability, formability & machinability with hand tools & power tools and to develop skills through hands on experience.

I. Mechanical Engineering Lab

1. Welding - Metal arc welding tools and equipment, exercises.
2. Fitting - Tools, operations, exercises, types of joints. (*Term work to include one job involving fitting to size, male-female fitting with drilling and tapping*.)

3. Foundry- Tools, preparation of moulding sand, patterns, cores, foundry exercises.
4. Carpentry- Tools, carpentry process, carpentry exercises, types of joints.
5. Assembly and Inspection.(*Assembly and Disassembly of some products, tools used. Videos of advancement in manufacturing technology. Inspection of various components using different measuring instruments.*)
6. Machine Tools I - Demonstration of drilling machine.
7. Machine Tools II - Demonstration of Lathe.
8. Study of Automobile and Power Transmission.
9. Wood working - Demonstration of wood working machinery and furniture manufacturing.(*Term work includes one job involving joint and woodturning*)

II. Civil Engineering Lab

Buildings:

(a) Study of plumbing and carpentry components of residential and industrial buildings. Safety aspects.

Plumbing Works:

(a) Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, elbows in household fittings.

(b) Study of pipe connections requirements for pumps and turbines.

(c) Preparation of plumbing line sketches for water supply and sewage works.

(d) Hands-on-exercise:

Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.

(e) Demonstration of plumbing requirements of high-rise buildings.

Carpentry using Power Tools only:

(a) Study of the joints in roofs, doors, windows and furniture.

(b) Hands-on-exercise: Wood work, joints by sawing, planing and cutting.

(c) Demonstration of elementary surveying techniques

TOTAL: 45 PERIODS

List of equipment and components
(For a Batch of 30 Students)

1. Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, couplings, unions, elbows, plugs and other fittings. **15 Sets.**
2. Carpentry vice (fitted to work bench) **15 Nos.**
3. Standard woodworking tools **15 Sets.**
4. Models of industrial trusses, door joints, furniture joints **5 each**
5. Power Tools:

(a) Rotary Hammer	**2 Nos**
(b) Demolition Hammer	**2 Nos**
(c) Circular Saw	**2 Nos**
(d) Planer	**2 Nos**
(e) Hand Drilling Machine	**2 Nos**
(f) Jigsaw	**2 Nos**

6. Surveying equipment for Demonstration

NOORUL ISLAM CENTRE FOR HIGHER EDUCATION

NOORUL ISLAM UNIVERSITY, KUMARACOIL

B.E COMPUTER SCIENCE AND ENGINEERING

CURRICULUM & SYLLABUS

SEMESTER III

Sl. No	Course Code	Course Title	L	T	P	C
THEORY						
1	MA1201	Engineering Mathematics III	3	1	0	4
2	IT1201	Computer Architecture	3	0	0	3
3	EC1218	Digital Principles and Design	3	1	0	4
4	CS1201	Object Oriented Programming	3	1	0	4
5	CS1202	Data Structures and Algorithms	3	1	0	4
6	CS1203	Software Engineering	3	1	0	4
PRACTICAL						
7	CS1271	Object Oriented Programming Lab	0	1	2	2
8	CS1272	Data Structures Lab	0	1	2	2
TOTAL			18	7	4	27

MA1201 ENGINEERING MATHEMATICS - III 3 1 0 4

AIM:

To impart the fundamental knowledge of Engineering Mathematics to the students in order to achieve a well founded knowledge about the principles of Mathematics.

OBJECTIVE:

To develop the skill of the students in the areas of boundary value problems and Transform techniques. This will be necessary for their effective studies in a large number of Engineering subjects like heat conduction, communication systems, electro-optics and electromagnetic theory. This course will also serve as a prerequisite for post graduate and specialized studies and research.

UNIT I PARTIAL DIFFERENTIAL EQUATIONS 9

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solutions of standard types of first order partial differential equations – Lagrange's linear equation –Homogeneous linear partial differential equations of second and higher order with constant coefficients.

UNIT II FOURIER SERIES 9

Dirichlet's conditions – Fourier series – Change of interval - Odd and Even functions – Half range sine and cosine series – Parseval's identity – Harmonic Analysis.

UNIT III BOUNDARY VALUE PROBLEMS 9

Classification of second order linear partial differential equations – One dimensional wave and heat equations – Assumptions – Fourier series solution – Steady state solution of two dimensional heat equation (insulated edges excluded) – Fourier series solution in Cartesian co-ordinates.

UNIT IV FOURIER TRANSFORMS 9

Fourier integral theorem(without proof) – Fourier transform – Sine and Cosine transforms – Properties - Inverse Fourier transform – Inverse sine and cosine transforms – Properties - Transforms of simple functions – Convolution theorem – Parseval's identity

UNIT V Z-TRANSFORMS 9

Z- transform – Elementary properties – convolution theorem-Inverse Z-transform –Partial fraction Method, Inversion integral method and Convolution – Initial and Final value theorems –Formation of difference equations – Solution of difference equations using Z-transform

T: 15 + L: 45 = TOTAL: 60 PERIODS

TEXT BOOK:

Grewal B.S., "Higher Engineering Mathematics" – 40th Edition , Khanna Publishers, Delhi 2011.

REFERENCES:

1. Kandasamy P, Thilagavathy K, and Gunavathy K., "Engineering Mathematics Volume III",First Edition, S.Chand & Company Ltd., New Delhi, 1996
2. Veerarajan T., "Engineering Mathematics(for Semester III), Third Edition, Tata McGraw – Hill Publishing Company Limited, New Delhi 2007.
3. Bali, N.P. and Manish Goyal, A Text Book of Engineering Mathematics, Seventh Edition, Lakshmi Publications Pvt. Ltd., New Delhi, 2009.

IT1201 COMPUTER ARCHITECTURE 3 0 0 3

AIM

To discuss the basic structure of a digital computer and to study in detail the organization of the arithmetic unit, processing unit, memory unit, multiprocessors and multicomputers.

OBJECTIVES

- To have a through understanding of the basic structure and operation of a digital computer, architecture of mainframe computer and cloud computing.
- To discuss in detail the operation of the arithmetic unit including the algorithm and implementation for integer and floating point operations.
- To study in detail the different types of control and the concept of pipelining.
- To study the hierarchical memory system including cache and virtual memories.
- To study the concepts of parallel organization including multiprocessors and multi computers.

UNIT I BASIC STRUCTURE OF COMPUTERS 10

Computer Components - Computer Function - Instruction Fetch and Execute – Interrupts - I/O Function - Interconnection Structures - Bus Interconnection - Bus Structure - Multiple-Bus Hierarchies - Elements of Bus Design – PCI – Mainframe computers – Cloud computing architecture.

UNIT II ARITHMETIC UNIT 8

Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers - Signed operand multiplication and fast multiplication – Integer division – Floating point numbers and operations.

UNIT III BASIC PROCESSING UNIT 9

Fundamental concepts – Execution of a complete instruction – Hardwired control – Microprogrammed control - Pipelining – Basic concepts – Data hazards – Instruction hazards – Influence on Instruction sets – Data path and control consideration – Superscalar operation.

UNIT IV MEMORY SYSTEM 9

Basic concepts – Semiconductor RAMs - ROMs – Speed - size and cost – Cache

memories - Performance consideration – Virtual memory- Memory Management requirements – Secondary storage.

UNIT V PARALLEL ORGANIZATION 9

Multiple Processor Organizations - Types of Parallel Processor Systems - Parallel Organizations - Symmetric Multiprocessors – Organization - Multiprocessor Operating System Design Considerations - A Mainframe SMP - Multicore Organization.

TOTAL: 45 PERIODS

TEXT BOOKS

1. William Stallings, "Computer Organization and Architecture – Designing for Performance", 8th Edition, Pearson Education, 2010.
2. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, 5th Edition "Computer Organization", McGraw-Hill, 2002

REFERENCES

1. David A.Patterson and John L.Hennessy, "Computer Organization and Design: The hardware / software interface", 5th Edition, Morgan Kaufmann, 2014.
2. John P.Hayes, "Computer Architecture and Organization", 3rd Edition, McGraw-Hill, 2012.
3. B. Govindarajalu, "Computer Architecture and Organization", 2nd Edition, Tata McGraw Hill Education, 2011.

EC1218 DIGITAL PRINCIPLES AND DESIGN 3 1 0 4

AIM

To provide an in-depth knowledge of the design of digital circuits and the use of Hardware Description Language in digital system design.

OBJECTIVES

- To understand different methods used for the simplification of Boolean functions
- To design and implement combinational circuits
- To design and implement synchronous sequential circuits
- To design and implement asynchronous sequential circuits
- To study the fundamentals of VHDL

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES 9

Review of binary number systems - Binary arithmetic – Binary codes – Boolean algebra and theorems - Boolean functions – Simplifications of Boolean functions using Karnaugh map and tabulation methods – Logic gates

UNIT II COMBINATIONAL LOGIC 9

Combinational circuits – Analysis and design procedures - Circuits for arithmetic operations - Code conversion – Introduction to Hardware Description Language (HDL)

UNIT III DESIGN WITH MSI DEVICES 9

Decoders and encoders - Multiplexers and De multiplexers - Memory and programmable logic - HDL for combinational circuits

UNIT IV SYNCHRONOUS SEQUENTIAL LOGIC 9

Sequential circuits – Flip flops – Analysis and design procedures - State reduction and state assignment - Shift registers – Counters - HDL for sequential logic circuits, Shift registers and counters.

UNIT V ASYNCHRONOUS SEQUENTIAL LOGIC 9

Analysis and design of asynchronous sequential circuits - Reduction of state and flow tables – Race-free state assignment – Hazards.

T: 15 + L: 45 = TOTAL: 60 PERIODS

TEXT BOOKS

1. M.Morris Mano, "Digital Design", 3rd edition, Pearson Education, 2002.

REFERENCES

1. Charles H.Roth, Jr. "Fundamentals of Logic Design", 4th Edition, Jaico Publishing House, 2000.
2. Donald D.Givone, "Digital Principles and Design", Tata McGraw-Hill, 2003.

CS1201 OBJECT ORIENTED PROGRAMMING 3 1 0 4

AIM

To understand the concepts of object-oriented programming and master using C++ and Java.

OBJECTIVES:

- To learn object oriented concepts
- To learn C++ and Java languages.

Unit I OOP BASICS 7

Object oriented programming concepts – Objects-Classes- Methods and Messages, Abstraction and Encapsulation - Inheritance- Abstract classes - Polymorphism. Introduction to C++ - Objects – Classes - Constructors and Destructors.

Unit II Polymorphism 12

Operator Overloading - Friend Functions - Type Conversions - Templates - Inheritance – Virtual functions - Runtime polymorphism-Dynamic Binding.

Unit III I/O Basics **8**

Exception handling - Streams and Formatted I/O – String I/O – Character I/O – Object I/O- File Handling – Namespaces – String Objects - standard template library.

Unit IV Java Basics **8**

Introduction to JAVA , bytecode, virtual machines – objects – classes -constructors– Methods Overloading-static members- overriding methods- Final variables, methods, classes- visibility control - Javadoc – packages – Arrays – Strings.

Unit V Reusability **10**

Inheritance – Multiple inheritance -Interfaces and Inner classes - Exception handling – Multithreaded Programming -lifecycle – Thread Exceptions-Streams and I/O - Applets

T: 15 + L: 45 = TOTAL: 60 PERIODS

TEXT BOOKS

1. B. Trivedi, “Programming with ANSI C++”, Oxford University Press, 2007.
2. Cay S. Horstmann, Gary Cornell, “Core JAVA volume 1”, Eighth Edition, Pearson Education, 2008.

REFERENCES

1. ISRD Group, “Introduction to Object-oriented Programming and C++”, Tata McGraw-Hill Publishing Company Ltd., 2007.
2. ISRD Group, “Introduction to Object-oriented programming through Java”, Tata McGraw-Hill Publishing Company Ltd., 2007.
3. S. B. Lippman, Josee Lajoie, Barbara E. Moo, “C++ Premier”, Fourth Edition, Pearson Education, 2005.
4. D. S. Malik, “C++ Programming: From Problem Analysis to Program Design”, Third Edition, Thomson Course Technology, 2007.
5. K. Arnold and J. Gosling, “The JAVA programming language”, Third edition, Pearson Education, 2000.
6. C. Thomas Wu, “An introduction to Object-oriented programming with Java”, Fourth Edition, Tata McGraw-Hill Publishing Company Ltd., 2006.

CS1202 DATA STRUCTURES AND ALGORITHMS 3 1 0 4

AIM

The aim of this course is to provide an introduction to computer algorithms and data structures, with an emphasis on foundational material.

OBJECTIVES

At the end of the course students should

- Have a good understanding of how several fundamental algorithms work, particularly those concerned with sorting, searching and graph manipulation
- Be able to analyze the space and time efficiency of most algorithms

UNIT I INTRODUCTION AND BASIC DATA STRUCTURES 9

Problem solving Techniques and Examples - Abstract Data Type (ADT) - The List ADT - Arrays - Stacks and Queues: Implementation and Applications.

UNIT II ADVANCED DATA STRUCTURES 9

Trees: Preliminaries - Binary Tree – Implementation - Tree Traversals - Binary Search Trees - Implementation- AVL Trees - Implementation.

UNIT III SORTING AND HASHING 9

Sorting by Selection - Sorting by Insertion - Sorting by Exchange - Sorting by Diminishing Increment - Heap Sort - Heaps - Maintaining the Heap Property - Building a Heap - Heap Sort Algorithm - Quick Sort - Description - Performance of quick sort - Analysis of Quick Sort. Hashing - General Idea - Hash Functions - Separate Chaining - Open Addressing - Rehashing - Extendible Hashing.

UNIT IV ALGORITHM DESIGN TECHNIQUES 9

The role of Algorithms in computing - Getting Started - Growth of functions. Divide and Conquer - Dynamic Programming - Greedy Algorithm - Backtracking - Branch and Bound - Randomized Algorithms

UNIT V GRAPHS ALGORITHMS 9

Elementary Graph Algorithms - Minimum Spanning Trees - Single-source Shortest Paths - All Pairs Shortest Paths – Dijikstra's Algorithms - Prim's Algorithms- Kruskal's Algorithms.

T: 15 + L: 45 = TOTAL: 60 PERIODS

TEXT BOOKS:

1. M A Weiss, "Data Structures & Algorithm Analysis in C++", 3rd Edt, Pearson Education, 2007.
2. Thomas H Cormen, Charles E Leiserson and Ronald L Rivest, "Introduction to Algorithms", 2nd Edition, Prentice Hall of India, 2002.

REFERENCES:

1. R G Dromey, "How to Solve it by Computers", Pearson Education Asia, 2005.
2. Robert L Kruse, Alex Ryba, "Data Structures and Program Design in C++", 1st Edition, Amazon.
3. Jean Paul Trembley, Paul G Sorenson, "An Introduction to Data Structures with Applications", 2nd Edition, Tata McGraw Hill, 2007.

CS1203 SOFTWARE ENGINEERING 3 1 0 4

AIM

This course in Software Engineering provides an in-depth understanding of the Software Engineering principles and methodologies.

OBJECTIVES:

To know about

- Analysis modeling and specification
- Architectural and detailed design methods
- Implementation and testing strategies
- Verification and validation techniques
- Project planning and management
- Use of CASE tools

UNIT I SOFTWARE PROJECT MANAGEMENT 9

Software project planning : Importance of software – Introduction – Defining the problem – Developing a solution strategy – Planning and development process – Other planning activities. Software cost estimation : Introduction – Software cost factors – Software cost estimation techniques – Staffing level estimation – Estimating software maintenance costs.

UNIT II SOFTWARE REQUIREMENTS ANALYSIS 9

Introduction – The software requirement specifications – Formal specification techniques – Languages and processors for requirements specification : SDAT, SSA, GIST, PSL/PSA, REL/REVS- Software prototyping – rapid prototyping techniques- user interface prototyping- Analysis & modelling – data, functional & behavioural models – Structured analysis & data dictionary.

UNIT III SOFTWARE DESIGN CONCEPTS 9

Abstraction – Modularity – Software architecture – Cohesion, coupling – Various design concepts and notations – Real time and distributed system – Design – Documentation – Data flow oriented design – Jackson system development – Design for reuse – Programming standards.User interface Design- principles- SCM- Need for SCM- Version control – Introduction to SCM process –software configuration items

UNIT IV IMPLEMENTATION AND TESTING 9

Implementation Issues : Introduction – Structured coding techniques – Coding style – Standards and guidelines – Documentation guidelines-Modern Programming Languages Features : The translation process – PL characteristics. Software testing – levels – test activities – types of s/w test – black box testing – testing boundary conditions – structural testing – test coverage criteria based on data flow mechanisms – regression testing – testing in

the large. S/W testing strategies – strategic approach and issues - unit testing – integration testing – validation testing – system testing and debugging

UNIT V SOFTWARE MAINTENANCE & RELIABILITY ISSUES 9

Introduction – Quality assurance – Walk through and inspections – Static analysis – Symbolic execution- Software Maintenance: Introduction – Enhancing maintainability during development – Managerial aspects of software maintenance – Configuration management – Source code metrics – Other maintenance tools and techniques. Software reliability – issues- Software reliability Vs Hardware reliability – Failures and Faults – Classification of Failures – Components and Operational Models

T: 15 + L: 45 = TOTAL: 60 PERIODS

TEXT BOOKS

1. Ian Sommerville, *Software engineering*, Pearson education Asia, 6th edition, 2000.
2. Pankaj Jalote- *An Integrated Approach to Software Engineering*, Springer Verlag, 1997.

REFERENCE BOOKS

1. Richard Fairley, "*Software Engineering Concepts*", McGraw Hill, 1985.
2. Roger S.Pressman, *Software engineering- A practitioner's Approach*, McGraw-Hill International Edition, 5th edition, 2001.
3. Shooman, *Software Engineering*, McGraw Hill, 1983.
4. John D. Musa, " *Software Reliability*", McGrawHill, 1985
5. David Gustafson, "*Software Engineering*", Schaum's outlines,Tata McGraw-Hill,2003.

ONLINE REFERENCES:

1. http://www.rspa.com/spi
2. http://www.comp.lancs.ac.uk/computing/resources/IanS/SE6/Slides/index.html
3. http://www.softwareqatest.com/qatlnks1.html

CS1271 OBJECT ORIENTED PROGRAMMING LAB 0 1 2 2

AIM:

To develop object-oriented programming skills using C++ and Java

LIST OF EXPERIMENTS:

1. Function overloading, default arguments in C++
2. Simple class design in C++, namespaces, objects creations
3. Class design in C++ using dynamic memory allocation, destructor, copy constructor

4. Operator overloading, friend functions
5. Overloading assignment operator, type conversions
6. Inheritance, run-time polymorphism
7. Template design in C++
8. I/O, Throwing and Catching exceptions
9. Program development using STL
10. Simple class designs in Java with Javadoc
11. Designing Packages with Javadoc comments
12. Interfaces and Inheritance in Java
13. Exceptions handling in Java
14. Java I/O
15. Design of multi-threaded programs in Java

TOTAL: 45 PERIODS

CS1272 DATA STRUCTURES LAB 0 1 2 2

AIM

To teach the principles of good programming practice and to give a practical training in writing efficient programs in C++.

LIST OF EXERCISES:

1. Array implementation of List Abstract Data Type (ADT)
2. Linked list implementation of List ADT
3. Cursor implementation of List ADT
4. Array implementations of Stack ADT
5. Linked list implementations of Stack ADT
6. Implement the application for checking ‘Balanced Parenthesis’ using array implementation of Stack ADT
7. Implement the application for checking ‘Balanced Parenthesis’ using linked list implementation of Stack ADT

8. Implement the application for ‘Evaluating Postfix Expressions’ using array and linked list implementations of Stack ADT
9. Queue ADT
10. Search Tree ADT - Binary Search Tree
11. Heap Sort
12. Quick Sort

TOTAL: 45 PERIODS

NOORUL ISLAM CENTRE FOR HIGHER EDUCATION

NOORUL ISLAM UNIVERSITY, KUMARACOIL

B.E. COMPUTER SCIENCE AND ENGINEERING

CURRICULUM & SYLLABUS

SEMESTER IV

Sl. No	Course Code	Course Title	L	T	P	C
THEORY						
1	MS1201	Environmental Science	3	0	0	3
2	MA1205	Probability Queuing Theory	3	1	0	4
3	EE1215	Electrical Engineering and Control Systems	3	1	0	4
4	CS1204	Data Base Management System	3	1	0	4
5	CS1205	Operating System Principles	3	1	0	4
6	CS1206	Computer Networks	3	1	0	4
PRACTICAL						
7	CS1273	DBMS Lab	0	1	2	2
8	CS1274	Networking Lab	0	1	2	2
9	CS1275	Operating System Lab	0	1	2	2
TOTAL			18	8	6	29

MS1201 ENVIRONMENTAL SCIENCE 3 0 0 3

OBJECTIVES

- To provide the students about general aspirants of environment and ecology, the environment pollution and the current social issues.

UNIT I: NATURE OF ENVIRONMENT STUDIES AND NATURAL RESOURCES 9

Environment studies- definition- multi disciplinary nature – scope and importance- need for public awareness- Natural resources- Forest resources- energy resources- food Resources- water resources – land resources - mineral resources.

UNIT II: ECO SYSTEMS AND BIO-DIVERSITY 9

Concept and component of eco systems- producer, consumer, decomposer- structure and function of eco system- food chain and food web- energy flow model- aquatic eco system- forest eco system- desert eco system- pyramid of biomass- ocean eco system- grass land eco system- Bio diversity in India- value of bio diversity- biodiversity threatens- biodiversity protection- In-situ and Ex-situ conservation.

UNIT III: ENVIRONMENTAL POLLUTION 9

Meaning of environmental pollution- air pollution- acid rain – global warming- water pollution- water pollution control- soil pollution- urban waste and soil pollution- marine pollution- noise pollution- thermal pollution- solid and hazardous waste management- waste disposal methods- solid waste and India- natural disaster and disaster management. Low carbon perspectives, Energy savings, Safety and Security

UNIT IV: SOCIAL ISSUES AND THE ENVIRONMENT 9

Unsustainable to sustainable development- sustainable development in India- water conservation, watershed management and water harvesting- environmental ethics- role of engineer in environmental protection- economic aspects of environment.

UNIT V: HUMAN POPULATION AND ENVIRONMENT 9

Population growth- distribution of population- factors affecting variation in population- theories of population- future of human population- family welfare programme- HIV and AIDS- environment and human health- human rights- value education- women and child welfare.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Cunnigham & saigo: 'Environmental science :A global concern' 4th Ed.W.c. Brown Publishers. USA. 1997
2. Chauhan A.S, 'Environmental studies' 2nd revised ed.2004, Jain Brother publishers, New Delhi

REFERENCE BOOKS

1. Benny Joseph : 'Environmental Science and Engineering', 2006, Tata McGraw- Hill Publication.
2. Siddique K.A. : Elements of Ecology and Environmental Pollution, 1st Ed. 2002, Kushal Publication, Varanasi.

MA1205 PROBABILITY AND QUEUEING THEORY 3 1 0 4

AIM:

The probabilistic models are employed in countless applications in all areas of Science and Engineering. Queuing theory provides models for a number of situations that arise in real life. The course aim at providing necessary mathematical support and confidence to tackle real life problems

OBJECTIVE:

To have the fundamental knowledge of basic probability concepts, the standard distributions and random variables which can describe real life phenomena. To acquire skills in the basic characteristic features of queuing system and in analyzing queuing models.

UNIT I PROBABILITY AND RANDOM VARIABLE 9

Axioms of probability - Conditional probability – Independent Events - Total probability – Baye's theorem- Random variable - Probability mass functions - Probability density functions -Distribution functions- Properties – Expectation – Moments - Moment generating function and its properties.

UNIT II STANDARD DISTRIBUTIONS 9

Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull and Normal distributions and their properties (Problems only)– Central Limit Theorem.(without proof)

UNIT III TWO DIMENSIONAL RANDOM VARIABLES 9

Joint distributions - Marginal and Conditional distributions – Covariance – Correlation and Regression .

UNIT IV RANDOM PROCESSES AND MARKOV CHAINS 9

Classification - Stationary process - Markov process - Poisson process – Renewal process and Renewal equations - Markov chains - Transition probabilities - Limiting distributions.

UNIT V QUEUING THEORY 9

Birth and Death process - Markovian queuing models – Little's formulae - M/M/1, M/M/C , finite and infinite capacity - M/G/1 queue (steady state solutions only) – Pollaczek – Khintchine formula.

T: 15 + L: 45 = TOTAL: 60 PERIODS

TEXT BOOK:

1. Veerarajan., T., "Probability, Statistics and Random Processes", Second Edition, Tata McGraw-Hill, New Delhi, 2007.

REFERENCES:

1. Ross, S., "A first course in Probability", Sixth Edition, Pearson Education, Delhi, 2011.
2. Allen., A.O., "Probability, Statistics and Queuing Theory", Second Edition, Academic Press, New Delhi, 2010.
3. Medhi J., "Stochastic Processes", New Age Publishers, Second Edition, New Delhi, 2006 (Chapters 2 to 4)
4. Taha, H. A., "Operations Research-An Introduction", Seventh Edition, Pearson Education Edition. Asia, Delhi, 2002 (Chapter 17)

EE1215 ELECTRICAL ENGINEERING AND CONTROL SYSTEMS 3 1 0 4

AIM

To expose the students to the basic concept of circuits, machines and control systems.

OBJECTIVES

- To study the phasor representation, complex power and three phase circuits and do simple problems.
- To study the concepts of resonance & magnetic circuits and to do simple problems.
- To study qualitatively the construction details and principle of operation of special machines.
- To study control problem, control system dynamics and feedback principles.
- To study time response of first and second order systems and basic state variable analysis and to do simple problems.
- To study the concept of stability and criteria for stability and to do simple problems.
- To study the different type of control system components

UNIT I CIRCUIT ANALYSIS 9

Network, Graph, Tree, Co-tree, Cut set, Tie set – RC, RL and RLC circuits – simple series and parallel circuits – source transformation – star - delta transformation – three phase power measurement using two wattmeters method.

UNIT II RESONANCE, MAGNETIC CIRCUITS AND SPECIAL MACHINES 9

Resonance in series and parallel circuits, Q factor, half-power frequencies and bandwidth of resonant circuits – Coupled circuits: mutual inductance, coefficient of coupling, dot conventions, analysis of simple coupled circuits – principle of operation of servo motor, stepper motor.

UNIT III CONTROL SYSTEMS 9

The control problem – differential equation of physical systems – mathematical modeling of control systems – transfer function – block diagram reduction – signal flow graphs - regenerative feedback.

UNIT IV TIME RESPONSE ANALYSIS 9

Time response of first and second order system – steady state errors – error constants – Design specifications of second order systems – simple problems.

UNIT V STABILITY AND FREQUENCY RESPONSE 9

Concept of stability – stability conditions and criteria – Hurwitz and Routh criterian – relative Stability analysis - Correlation between time and frequency response – Frequency response plots: polar plots, Bode plots – simple problems.

L: 45 + T: 15 = TOTAL: 60 PERIODS

TEXT BOOK

1. I.J.Nagrath and M.Gopal "Control system engineering" New Age International Publishing Company Ltd, third edition 2003.
2. D.P.Kothari and I.J. Nagrath "Basic Electrical Engineering", Tata McGraw Hill Ltd, second edition, 2002.

REFERENCES

1. M.Gopal "Control Systems – Principle and Design", McGraw Hill Publishing Company Ltd, second edition, 2003.
2. Joseph J.Distafeno et-al "Shaums outline series – theory and Problems of Feedback control systems, Tata McGraw Hill publishing company Ltd, 2003.
3. Stephen J.Chapman "Electrical Machinery Fundamentals", McGraw Hill Publishing Company Ltd, third edition, 1999.
4. K.Murugesh Kumar, "Electric Machines", Vikas Publishing House (P) Ltd, 2002.

CS1204 DATA BASE MANAGEMENT SYSTEM 3 1 0 4

AIM

To provide a strong foundation in database technology and an introduction to the current trends in this field.

OBJECTIVES

- To learn the fundamentals of data models and to conceptualize and depict a database system using ER diagram.
- To make a study of SQL and relational database design.

- To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
- To know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.
- To have an introductory knowledge about the emerging trends in the area of distributed DB- OODB- Data mining and Data Warehousing and XML

UNIT I INTRODUCTION AND CONCEPTUAL MODELING 9

Introduction to File and Database systems- Database system structure – Data Models – Introduction to Network and Hierarchical Models – ER model – Relational Model – Relational Algebra and Calculus.

UNIT II RELATIONAL MODEL 9

SQL – Data definition- Queries in SQL- Updates- Views – Integrity and Security – Relational Database design – Functional dependences and Normalization for Relational Databases (up to BCNF).

UNIT III DATA STORAGE AND QUERY PROCESSING 9

Record storage and Primary file organization- Secondary storage Devices- Operations on Files- Heap File- Sorted Files- Hashing Techniques – Index Structure for files –Different types of Indexes- B-Tree - B+Tree – Query Processing.

UNIT IV TRANSACTION MANAGEMENT 9

Transaction Processing – Introduction- Need for Concurrency control- Desirable properties of Transaction- Schedule and Recoverability- Serializability and Schedules – Concurrency Control – Types of Locks- Two Phases locking- Deadlock- Time stamp based concurrency control – Recovery Techniques – Concepts- Immediate Update- Deferred Update - Shadow Paging.

UNIT V CURRENT TRENDS 9

Object Oriented Databases – Need for Complex Data types- OO data Model- Nested relations- Complex Types- Inheritance Reference Types - Distributed databases- Homogenous and Heterogenous- Distributed data Storage – XML – Structure of XML- Data- XML Document- Schema- Querying and Transformation. – Data Mining and Data Warehousing.

T: 15 + L: 45 = TOTAL: 60 PERIODS

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan- “Database System Concepts”, Fourth Edition, McGraw-Hill, 2002.

REFERENCES

1. Ramez Elmasri and Shamkant B. Navathe, “Fundamental Database Systems”, Third Edition, Pearson Education, 2003.

2. Raghu Ramakrishnan, “Database Management System”, Tata McGraw-Hill Publishing Company, 2003.
3. Hector Garcia–Molina, Jeffrey D.Ullman and Jennifer Widom- “Database System Implementation”- Pearson Education- 2000.
4. Peter Rob and Corlos Coronel- “Database System, Design, Implementation and Management”, Thompson Learning Course Technology- Fifth edition, 2003.

CS1205 OPERATING SYSTEM PRINCIPLES 3 1 0 4

AIM

To have a thorough knowledge of processes, scheduling concepts, memory management, I/O and file systems in an operating system.

OBJECTIVES

- To have an overview of different types of operating systems
- To know the components of an operating system.
- To have a thorough knowledge of process management
- To have a thorough knowledge of storage management
- To know the concepts of I/O and file systems.

UNIT I INTRODUCTION 9

Introduction - Mainframe systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time Systems – Handheld Systems - Hardware Protection - System Components – Operating System Services – System Calls – System Programs - Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes – Inter-process Communication.

UNIT II THREAD & SCHEDULING 9

Threads – Overview – Threading issues - CPU Scheduling – Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple-Processor Scheduling – Real Time Scheduling - The Critical-Section Problem – Synchronization Hardware – Semaphores – Classic problems of Synchronization – Critical regions – Monitors.

UNIT III DEADLOCK 9

System Model – Deadlock Characterization – Methods for handling Deadlocks -Deadlock Prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlocks - Storage Management – Swapping – Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging.

UNIT IV VIRTUAL MEMORY 9

Virtual Memory – Demand Paging – Process creation – Page Replacement – Allocation of

frames – Thrashing - File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection

UNIT V FILE SYSTEM 9

File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free-space Management. Kernel I/O Subsystems - Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management. Case Study: The Linux System, Windows

T: 15 + L: 45 = TOTAL: 60 PERIODS

TEXT BOOK

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", Sixth Edition, John Wiley & Sons (ASIA) Pvt. Ltd, 2003.

REFERENCES

1. Harvey M. Deitel, "Operating Systems", Second Edition, Pearson Education Pvt. Ltd, 2002.
2. Andrew S. Tanenbaum, "Modern Operating Systems", Prentice Hall of India Pvt. Ltd, 2003.
3. William Stallings, "Operating System", Prentice Hall of India, 4th Edition, 2003.
4. Pramod Chandra P. Bhatt – "An Introduction to Operating Systems, Concepts and Practice", PHI, 2003.

CS1206 COMPUTER NETWORKS 3 1 0 4

AIM

To introduce the concepts, terminologies and technologies used in modern days data communication and computer networking

OBJECTIVES

- To understand the concepts of data communications.
- To study the functions of different layers.
- To introduce IEEE standards employed in computer networking.
- To make the students to get familiarized with different protocols and network components.

UNIT I DATA COMMUNICATIONS 9

Components – Direction of Data flow networks – Components and Categories – Types of Connections – Topologies –Protocols and Standards – ISO / OSI model – Transmission Media – Coaxial Cable – Fiber Optics – Line Coding – Modems – RS232 Interfacing sequences.

UNIT II DATA LINK LAYER 9

Error detection and correction – Parity – LRC – CRC – Hamming code – low Control and Error control - stop and wait – go back-N ARQ – selective repeat ARQ- sliding window –

HDLC. - LAN - Ethernet IEEE 802.3 - IEEE 802.4 - IEEE 802.5 - IEEE 802.11 – FDDI - SONET – Bridges.

UNIT III NETWORK LAYER **9**

Internet works – Packet Switching and Datagram approach – IP addressing methods – Subnetting – Routing – Distance Vector Routing – Link State Routing – Routers.

UNIT IV TRANSPORT LAYER **9**

Duties of transport layer – Multiplexing – De Multiplexing – Sockets – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Congestion Control – Quality of services (QOS) – Integrated Services.

UNIT V APPLICATION LAYER **9**

Domain Name Space (DNS) – SMTP – FTP – HTTP - WWW – Security – Cryptography.

T: 15 + L: 45 = TOTAL: 60 PERIODS

TEXT BOOKS

1. Behrouz A. Forouzan, “Data communication and Networking”, Tata McGraw-Hill, 2004.

REFERENCES

1. James F. Kurose and Keith W. Ross, “Computer Networking: A Top-Down Approach Featuring the Internet”, Pearson Education, 2003.
2. Larry L.Peterson and Peter S. Davie, “Computer Networks”, Harcourt Asia Pvt. Ltd., Second Edition.
3. Andrew S. Tanenbaum, “Computer Networks”, PHI, Fourth Edition, 2003.
4. William Stallings, “Data and Computer Communication”, Sixth Edition, Pearson Education, 2000.

CS1273 DBMS LAB 0 1 2 2

Aim: To understand and implement the various phases of DBMS product development.

LIST OF EXPERIMENTS

1. Data Definition Language (DDL) commands in RDBMS.
2. Data Manipulation Language (DML) and Data Control Language (DCL) commands in RDBMS.
3. High-level language extension with Cursors.
4. High level language extension with Triggers
5. Procedures and Functions.

6. Embedded SQL.
7. Database design using E-R model and Normalization.
8. Design and implementation of Payroll Processing System.
9. Design and implementation of Banking System.
10. Design and implementation of Library Information System.

TOTAL: 45 PERIODS

CS1274 NETWORKING LAB 0 1 2 2

Aim: To understand the functionalities of Networking Principles

List of Experiments:

(All the programs are to be written using C)

1. Simulation of ARP / RARP.
2. Write a program that takes a binary file as input and performs bit stuffing and CRC Computation.
3. Develop an application for transferring files over RS232.
4. Simulation of Sliding-Window protocol.
5. Simulation of BGP / OSPF routing protocol.
6. Develop a Client – Server application for chat.
7. Develop a Client that contacts a given DNS Server to resolve a given host name.
8. Write a Client to download a file from a HTTP Server.

9 &10 Study of Network Simulators like NS2/Glomosim / OPNET.

TOTAL: 45 PERIODS

CS1275 OPERATING SYSTEM LAB 0 1 2 2

Aim: To understand the functionalities of Operating System concepts

(Implement the following on LINUX platform. Use C for high level language implementation)

List of Experiments:

1. Shell programming
   - Command syntax

- write simple functions
- Basic tests

2. Shell programming
   - loops
   - Patterns
   - Expansions
   - Substitutions
3. Write programs using the following system calls of UNIX operating system:
   Fork, exec, getpid, exit, wait, close, stat, opendir, readdir
4. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)
5. Write C programs to simulate UNIX commands like ls, grep, etc.
6. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time
7. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time
8. Implement the Producer – Consumer problem using semaphores.
9. Implement some memory management schemes – I
10. Implement some memory management schemes – II

TOTAL: 45 PERIODS

Example for expt 9 & 10:

Free space is maintained as a linked list of nodes with each node having the starting byte address and the ending byte address of a free block. Each memory request consists of the process-id and the amount of storage space required in bytes. Allocated memory space is again maintained as a linked list of nodes with each node having the process-id, starting byte address and the ending byte address of the allocated space.

When a process finishes (taken as input) the appropriate node from the allocated list should be deleted and this free disk space should be added to the free space list. [Care should be taken to merge contiguous free blocks into one single block. This results in deleting more than one node from the free space list and changing the start and end address in the appropriate node]. For allocation use first fit, worst fit and best fit.

NOORUL ISLAM CENTRE FOR HIGHER EDUCATION

NOORUL ISLAM UNIVERSITY, KUMARACOIL

B.E COMPUTER SCIENCE AND ENGINEERING

CURRICULUM & SYLLABUS

SEMESTER V

Sl. No	Course Code	Course Title	L	T	P	C
THEORY						
1	MS1202	Professional and Business Ethics	3	0	0	3
2	MA1207	Discrete Mathematics	3	1	0	4
3	CS1207	System Software	3	1	0	4
4	CS1208	Object Oriented Analysis and Design	3	1	0	4
5	CS1209	Microprocessors & Microcontrollers	3	1	0	4
6	CS1210	Client/Server Computing	3	0	0	3
PRACTICAL						
7	CS1276	Microprocessors & Microcontroller Laboratory	0	1	2	2
8	CS1277	System Software Laboratory	0	1	2	2
9	CS12P1	Mini Project – I	0	0	4	2
TOTAL			18	6	8	28

MS1202 PROFESSIONAL AND BUSINESS ETHICS 3 0 0 3

OBJECTIVES

• To create an awareness on Engineering Ethics and Human Values.
• To instill Moral and Social Values and Loyalty
• To appreciate the rights of Others.

UNIT I: HUMAN VALUES 9

Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Character – Spirituality.

UNIT II: ENGINEERING ETHICS 9

Senses of 'Engineering Ethics' - variety of moral issues - types of inquiry - moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory - consensus and controversy – Models of Professional Roles - theories about right action - Self-interest - customs and religion - uses of ethical theories.

UNIT III: ENGINEERING AS SOCIAL EXPERIMENTATION 9

Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study

UNIT IV: SAFETY, RESPONSIBILITIES AND RIGHTS 9

Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk - the Three Mile Island and chernobyl case studies. 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 9

Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors - oral leadership-sample code of Ethics like ASME, ASCE, IEEE, Institution of Engineers (India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers (IETE), India, etc.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Mike Martin and Roland Schinzinger, “Ethics in Engineering”, McGraw-Hill, New York.1996.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, “Engineering Ethics”, Prentice Hall of India, New Delhi, 2004.

REFERENCES

1. Charles D. Fleddermann, “Engineering Ethics”, Pearson Education / Prentice Hall, New Jersey, 2004 (Indian Reprint now available).

2. Charles E Harris, Michael S. Protchard and Michael J Rabins, “Engineering Ethics – Concepts and Cases”, Wadsworth Thompson Leatning, United States, 2000 (Indian Reprint now available)
3. John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, New Delhi,2003.
4. Edmund G Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers”, Oxford University Press, Oxford, 2001.

MA1207 DISCRETE MATHEMATICS 3 1 0 4

AIM:

To have a fundamental knowledge of the concepts needed to test the logic of a program, the applications in database and graphical structures.

Objective:

This course introduces most of the basic terminologies used in computer science and applications of computation and graph theory.

UNIT I LOGIC 9

Propositional logic – Logical connectives – Truth tables – Normal forms –Consistency – Predicate Logic – Universal and Existential quantifiers – Proof techniques – direct and indirect methods.

UNIT II LATTICES AND BOOLEAN ALGEBRA 9

Poset-Lattices and their properties- Hasse diagram -Sub lattices-Boolean algebra-Homomorphism.

UNIT III GRAPH THEORY 9

Basic definitions and examples – Graph terminology –Sub graphs – Operations on Graphs-Graph Isomorphism – Connectivity- Eulerian and Hamiltonian graphs - Matrix Representation of graphs-Incidence matrix, Adjacency matix and Circuit matrix.

UNIT IV GROUPS 9

Definition and Examples – subgroups – Homomorphism – Fundamental theorem of Homomorphism- Cosets and Lagrange’s theorem – Normal subgroups – Group Codes

UNIT V RINGS AND FIELDS 9

Basic definition and concepts – Rings – Fields – Examples- Polynomial Rings – Integral Domain

T: 15 + L: 45 = TOTAL: 60 PERIODS

TEXT BOOK:

1. Veerarajan T., “Discrete Mathematics with Graph Theory and Combinations” First Edition, Tata McGraw-Hill Pub. Co. Ltd., New Delhi,2012

REFERENCES:

1. J.P. Trembley and R.Manohar, "Discrete Mathematical Structure with Applications to computer science", First Edition,Tata McGraw-Hill Pub. Co. Ltd., New Delhi, 2012.
2. Kenneth H. Rosen, "Discrete Mathematics and its Applications"Seventh Edition, Tata McGraw-Hill Pub. Co. Ltd., New Delhi,2011.
3. M.K. Venkataraman, N. Sridharan and N.Chandarasekaran," Discrete Mathematics" First Edition, The National publishing company,2012
4. Narsingh Deo,"Graph Theory with applications to Engineering and Computer Science" , First Edition, Prentice Hall of India – New Delhi 2005.

CS1207 SYSTEM SOFTWARE 3 1 0 4

AIM

To have an understanding in foundations of design of assemblers, loaders, linkers, and macro processors.

OBJECTIVES

- To understand the relationship between system software and machine architecture.
- To know the design and implementation of assemblers
- To know the design and implementation of linkers and loaders.
- To have an understanding of macro processors.
- To have an understanding of system software tools.

UNIT I INTRODUCTION 9

System software and machine architecture – The Simplified Instructional Computer (SIC) - Machine architecture - Data and instruction formats - addressing modes - instruction sets - I/O and programming.

UNIT II ASSEMBLERS 9

Basic assembler functions - A simple SIC assembler – Assembler algorithm and data structures - Machine dependent assembler features - Instruction formats and addressing modes – Program relocation - Machine independent assembler features - Literals – Symbol-defining statements – Expressions - One pass assemblers and Multi pass assemblers - Implementation example - MASM assembler.

UNIT III LOADERS AND LINKERS 9

Basic loader functions - Design of an Absolute Loader – A Simple Bootstrap Loader - Machine dependent loader features - Relocation – Program Linking – Algorithm and Data Structures for Linking Loader - Machine-independent loader features - Automatic Library Search – Loader Options - Loader design options - Linkage Editors – Dynamic Linking – Bootstrap Loaders - Implementation example – MS DOS linker.

UNIT IV MACRO PROCESSORS 9

Basic macro processor functions - Macro Definition and Expansion – Macro Processor Algorithm and data structures - Machine-independent macro processor features - Concatenation of Macro Parameters – Generation of Unique Labels – Conditional Macro Expansion – Keyword Macro Parameters-Macro within Macro-Implementation example - MASM Macro Processor – ANSI C Macro language.

UNIT V SYSTEM SOFTWARE TOOLS 9

Text editors - Overview of the Editing Process - User Interface – Editor Structure. - Interactive debugging systems - Debugging functions and capabilities – Relationship with other parts of the system – User-Interface Criteria- Introduction to compiler-Phases of compiler-Introduction to Operating Systems-Evolution of Operating Systems functions-Distributed Operating Systems.

T: 15 + L: 45 = TOTAL: 60 PERIODS

TEXT BOOK

1. Leland L. Beck, "System Software – An Introduction to Systems Programming", 3rd Edition, Pearson Education Asia, 2000.

REFERENCES

1. D. M. Dhamdhere, "Systems Programming and Operating Systems", Second Revised Edition, Tata McGraw-Hill, 1999.
2. John J. Donovan "Systems Programming", Tata McGraw-Hill Edition, 1972.

CS1208 OBJECT ORIENTED ANALYSIS AND DESIGN 3 1 0 4

AIM:

To explain OOAD concepts and related programming.

OBJECTIVES:

- To learn about the basic OO analysis and Design skills through an elaborate case study.
- To Use the UML design Diagrams.
- To apply the appropriate design patterns.

UNIT I UML DIAGRAMS 9

Introduction to OOAD – Unified Process - UML diagrams – Use Case – Class Diagrams– Interaction Diagrams – State Diagrams – Activity Diagrams – Package, component and Deployment Diagrams.

UNIT II DESIGN PATTERNS 9

GRASP: Designing objects with responsibilities – Creator – Information expert – Low

Coupling – High Cohesion – Controller - Design Patterns – creational - factory method - structural – Bridge – Adapter - behavioral – Strategy – observer.

UNIT III CASE STUDY 9

Case study – the Next Gen POS system, Inception -Use case Modeling - Relating Use cases – include, extend and generalization - Elaboration - Domain Models - Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class Hierarchies - Aggregation and Composition.

UNIT IV APPLYING DESIGN PATTERNS 9

System sequence diagrams - Relationship between sequence diagrams and use cases Logical architecture and UML package diagram – Logical architecture refinement - UML class diagrams - UML interaction diagrams - Applying GoF design patterns.

UNIT V CODING AND TESTING 9

Mapping design to code – Testing: Issues in OO Testing – Class Testing – OO Integration Testing – GUI Testing – OO System Testing.

T: 15 + L: 45 = TOTAL: 60 PERIODS

TEXT BOOK:

1. Craig Larman, "Applying UML and Patterns: An introduction to object –oriented analysis and Design and iterative development", Third Edition, Pearson Education, 2005

REFERENCES:

1. Simon Bennett, Steve Mc Robb and Ray Farmer, "Object Oriented Systems Analysis and Design Using UML", Fourth Edition, Mc-Graw Hill Education, 2010.
2. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, **"**Design patterns: Elements of Reusable Object-Oriented Software", Addison-Wesley, 1995.
3. Martin Fowler, "UML Distilled: A Brief Guide to the Standard Object Modeling Language", Third edition, Addison Wesley, 2003.
4. Paul C. Jorgensen, "Software Testing: A Craftsman's Approach", Third Edition, Auerbach Publications, Taylor and Francis Group, 2008.
5. Mike O'ODecherty,"Object Oriented Analysis and Design:Introduction System development with UML2.0",John Wiley and Sons,2005.
6. James W-Cooper,Addission-wesley,"Java Design Patterns-A Tutorial",2009.
7. Micheal Blaha,James Rambaugh,"Object Oriented Modeling and Design with UML",Second Edition,Prentice Hall of India Private Limited,2007.

CS1209 MICROPROCESSORS AND MICROCONTROLLER 3 1 0 4

AIM

To learn the architecture programming and interfacing of microprocessors and microcontroller.

OBJECTIVES

- To introduce the architecture and programming of 8085 microprocessor.
- To introduce the interfacing of peripheral devices with 8085 microprocessor.
- To introduce the architecture and programming of 8086 microprocessor.
- To introduce the architecture, programming and interfacing of 8051 micro controller.

UNIT I 8-BIT MICROPROCESSOR 9

8085 Architecture – Instruction set – Addressing modes – Timing diagrams – Assembly language programming – Counters – Time Delays – Interrupts – Memory interfacing – Interfacing I/O devices.

UNIT II 16-BIT MICROPROCESSOR *9*

Intel 8086 Internal Architecture – 8086 Addressing modes- Instruction set- 8086 Assembly language Programming–Interrupts.

UNIT III PERIPHERALS INTERFACING 9

Interfacing Serial I/O (8251)-parallel I/O (8255) –Keyboard and Display controller (8279) – ADC/DAC interfacing – Inter Integrated Circuits interfacing (I^2C Standard)- Bus: RS232C-RS485-GPIB

UNIT IV 8-BIT MICROCONTROLLER 9

8051 Micro controller hardware- I/O pins, ports and circuits – External memory – Instruction set – Addressing modes– Interrupts – Interrupt programming – Assembly language programming.

UNIT V INTERFACING MICROCONTROLLER 9

Serial Data I/O – I/O port programming - Timers and counters - Timer and counter programming – Serial Communication — Interfacing to external memory and 8255 - 8051 Interfacing: LCD, ADC, Sensors, Stepper Motors, Keyboard and DAC.

T: 15 + L: 45 = TOTAL: 60 PERIODS

TEXT BOOKS

1. Ramesh S Gaonkar, Microprocessor Architecture, Programming and application with 8085, 4th Edition, Penram International Publishing, New Delhi, 2000. (Unit I, III)
2. John Uffenbeck, The 80x86 Family, Design, Programming and Interfacing, Third Edition. Pearson Education, 2002. (Unit II)
3. Mohammed Ali Mazidi and Janice Gillispie Mazidi, The 8051 Microcontroller and Embedded Systems, Pearson Education Asia, New Delhi, 2003. (Unit IV, V)

REFERENCES

1. A.K. Ray and K.M.Burchandi, Intel Microprocessors Architecture Programming and Interfacing, McGraw Hill International Edition, 2000
2. Kenneth J Ayala, 8051 Microcontroller Architecture Programming and Application, 2nd Edition, Penram International Publishers (India), New Delhi, 1996.
3. M. Rafi Quazzaman, Microprocessors Theory and Applications: Intel and Motorola prentice Hall of India, Pvt. Ltd., New Delhi, 2003.

CS1210 CLIENT / SERVER COMPUTING 3 0 0 3

AIM

The aim of the course is to make students aware of computing in Client/Server systems.

UNIT I INTRODUCTION 9

Client-Server Computing-Benefits-Evolution of client-server computing; Hardware Trends-Software Trends-Network Trends- Client/Server Applications: Components-Classes-Categories-Open Systems and standards – Factors for success

UNIT II CLIENT HARDWARE AND SOFTWARE 9

Client Components-Client Operating Systems- X window GUIs-Windowing GUIs-Database Access-GUI Environments-Client Requirements: GUI Design Standards-Open GUI Standards-Interface Independence-Testing Interfaces-Client technology-Thin Client-Thick Client.

UNIT III SERVER HARDWARE 9

Categories of servers-Features of Server Machines-Classes of Server Machines-Server Operating Systems-Server Requirements: Platform Independence-Transaction Processing-Connectivity-Stored Procedures-Triggers-Testing & Diagnostic Tools-Reliability-Data Management Software: SYBASE SQL Server-Microsoft SQL Server-SQL Base-Netware SQL-Database Gateways: EDA/SQL – DB Gateway – SQL Bridge.

UNIT IV NETWORKING 9

Layers, Interfaces & protocols – Standard Architectures; OSI-TCP/IP-SNA model-Network characteristics-Network Management Standards: SNMP – CMIP-SMP-LAN characteristics.

LAN HARDWARE & SOFTWARE: LAN Hardware-Repeaters-Bridges-Routers-Network Hardware Gateways-Backbone Networks-Network Operating Systems: Netware – LAN manager – OS/2 LAN server – Vines

UNIT V APPLICATION DEVELOPMENT ENVIRONMENTS 9

EASEL workbench-Ellipse-SQL Windows-Power Builder-Distributed Transaction Management: Tuxedo – TOP END- Encina-Retix -Integrating Multivendor Environments-Systems Management-Network Management.

TOTAL = 45 PERIODS

TEXT BOOK:

1. Client/Server Computing-Dawna Travis, Dewire – Tata McGraw-Hill Edition-2003.

REFERENCE BOOK:

1. Client/Server Computing-Patrick Smith & Steve Guengerich – Prentice Hall – 2002-2nd edition

CS1276 MICROPROCESSORS & MICROCONTROLLER LABORATORY

0 1 2 2

LIST OF EXPERIMENTS

1. Programs for 8/16 bit Arithmetic operations (Using 8085, 8086).
2. Programs for Sorting and Searching (Using 8085, 8086).
3. Programs for String manipulation operations (Using 8086).
4. Programs for Digital clock and Stop watch (Using 8086).
5. Interfacing ADC and DAC.
6. Parallel Communication between two MP Kits using Mode 1 and Mode 2 of 8255.
7. Interfacing and Programming 8279, 8259, and 8253.
8. Serial Communication between two MP Kits using 8251.
9. Interfacing and Programming of Stepper Motor and DC Motor Speed control.
10. Programming using Arithmetic, Logical and Bit Manipulation instructions of 8051microcontroller.
11. Programming and verifying Timer, Interrupts and UART operations in 8031 microcontroller.
12. Communication between 8051 Microcontroller kit and PC.

TOTAL: 45 PERIODS

CS1277 SYSTEM SOFTWARE LABORATORY 0 1 2 2

Aim: On successful completion of the System Software Lab students will be able to describe the various phases of the compiling process, including algorithms and data structures for their implementation in recursive high-level imperative programming languages.

Objectives

In particular, students will be able to:

Describe the behavior of the various compiling phases

Devise and implement algorithms and data structures for the various phases

(Using C or C++)

1. Implement a symbol table with functions to create, insert, modify, search, and display.
2. Implement pass one of a two pass assembler.
3. Implement pass two of a two pass assembler.
4. Implement a single pass assembler.
5. Implement a macro processor.
6. Implement an absolute loader.
7. Implement a relocating loader.
8. Implement pass one of a direct-linking loader.
9. Implement pass two of a direct-linking loader.
10. Implement a simple text editor with features like insertion / deletion of a character, word, sentence.

(For loader exercises, output the snap shot of the main memory as it would be, after the loading has taken place)

TOTAL = 45 PERIODS

CS12P1 MINI PROJECT - I 0 0 4 2

AIM

To give practical knowledge in OOAD

OBJECTIVE:

To develop a mini-project using OOAD.

Suggested domains for Mini-project.

1. Passport automation system.
2. Book bank
3. Exam Registration
4. Stock maintenance system.
5. Online course reservation system
6. E-ticketing
7. Software personnel management system

8. Credit card processing
9. e-book management system
10. Recruitment system
11. Foreign trading system
12. Conference Management System
13. BPO Management System
14. Library Management System
15. Student Information System

Suggested SoftwareTools

ArgoUML, Eclipse IDE, Visual Paradigm, Visual case, and Rational Suite.

TOTAL = 45 PERIODS

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NOORUL ISLAM UNIVERSITY, KUMARACOIL

B.E. COMPUTER SCIENCE AND ENGINEERING

CURRICULUM & SYLLABUS

SEMESTER VI

Sl. No	Course Code	Course Title	L	T	P	C
THEORY						
1	IT1212	Cyber Security	3	0	0	3
2	CS1211	Compiler Design	3	1	0	4
3	CS1212	Computer Graphics	3	1	0	4
4	CS1213	Visual Programming	3	1	0	4
5	xxExx1	Elective I	3	0	0	3
6	xxExx2	Elective II	3	0	0	3
PRACTICAL						
7	CS1278	Computer Graphics Laboratory	0	1	2	2
8	CS1279	Visual Programming Laboratory	0	1	2	2
9	CS12P2	Mini Project – II	0	0	4	2
TOTAL			18	5	6	27

IT1212 CYBER SECURITY 3 0 0 3

AIM

The Course curriculum aims at imparting the fundamentals of cyber crime investigation, the tools used for the investigation, in addition to giving an exposure to the various kinds of cyber security threats and their impact on connected systems/resources.

OBJECTIVES

- The course also gives an exposure to the different types of mechanisms to sanitize the cyber space by adopting standardized operating procedures while transacting business/commerce online, and also to ensure security of information handled over the net.
- Introduction to the Cyber Laws and the IPC/Cr.PC equips the students with sufficient legal knowledge about deterrence in preventing cyber crimes.

UNIT I COMPUTER ORGANIZATION& ARCHITECTURE AND OPERATINGSYSTEMS 6

Computer Organization, Architecture, Operating Systems, Process Management, CPU Scheduling, I/O Memory Management, file systems and deadlocks. LAN, MAN, WAN, ISO/OSI seven layer architecture.

UNIT II INFORMATION SECURITY FUNDAMENTALS 6

Background, Importance, statistics, national and international scenarios. Identification and authentication, confidentiality, privacy, integrity, non-repudiation. Goals of security: prevention, detection and recovery. E-commerce security. Critical Infrastructure Protection.

UNIT III SECURITY THREATS AND VULNERABILITIES 9

Overview of security threats, various kinds of threats; Authentication-weak passwords. Insecure internet connection- internet cookies, viruses and other infections. Security of hard drives, security of laptops; sniffers, backdoors and Trojans. Buffer overflow and other programming bugs. Common attacks- DoS, man-in-the-middle, brute force attacks

UNIT IV OVERVIEW OF SECURITY PRINCIPLES 15

Security policies and procedures, International standards, Security consideration of OS- OS hardening - Internet protocols and security: SSL/TLS, IP Security, Application layer security - Access Control: Physical, Logical and Biometric - Tools and Techniques: Firewalls, Antivirus, IDS, Log analysis, Cryptography, steganography - Security Infrastructure: PKI, VPN, Digital signature - Network scanners, vulnerability scanners - Device Security - Cloud computing security, Database security.

UNIT V CYBER CRIMES. 9

Cyber crimes, Cyber crime Investigation, and Cyber forensic tools. Cyber Laws. Information Technology Act, Cyber laws and cyber crime investigation. Social networks and analysis.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Thomas Calabres and Tom Calabrese, “Information Security Intelligence: Cryptographic Principles & Application”, Thomson Delmar Learning, 2004.
2. Bernadette H Schell, Clemens Martin, “Cyber Crime”, ABC-CLIO Inc, California, 2004.
3. Swiderski, Frank and Syndex, “Threat Modeling”, Microsoft Press, 2004.
4. William Stallings and Lawrie Brown, “Computer Security: Principles and Practice”, Prentice Hall, 2008.

REFERENCES

1. Silberschatz A, Galvin P, Gagne G, "Operating Systems Concepts", John Wiley & Sons, Singapore, 2006.
2. Principles and Practices of Information Security by Michael.E. Whiteman and Herbert .J. Mattord.
3. Cyber Laws by Aparna Viswanathan.
4. Joseph M Kizza, “Computer Network Security”, Springer Verlag, 2005.

CS1211 COMPILER DESIGN 3 1 0 4

AIM

At the end of the course the student will be able to design and implement a simple compiler.

OBJECTIVE

- To understand, design and implement a lexical analyzer.
- To understand, design and implement a parser.
- To understand, design code generation schemes.
- To understand optimization of codes and runtime environment.

1. INTRODUCTION 9

Basic concepts - Grammar - Language - Parts of a compiler – Grouping of phases - Compiler construction tools.

2. LEXICAL ANALYZER 9

Role of a lexical analyzer – Input buffering - Specification and recognition of tokens - Finite automata - Regular expression to finite automation – Optimization of DFA-based pattern matchers-Use of a tool for generating lexical analyzer.

3. SYNTAX ANALYZER 9

Role of a parser - Context-free grammars - Top-down parsing - Bottom-up parsing - Use of a tool to generate parsers.

4. INTERMEDIATE CODE GENERATION 9

Intermediate languages - Declaration - Assignment statements - Boolean expressions - Flow control statements –Back patching.

5. CODE GENERATION 9

Introduction to optimization techniques - Issues in the design of a code generator - Run-time storage management - Design of a simple code generator.

T: 15 + L: 45 = TOTAL: 60 PERIODS

REFERENCE BOOKS:

1. A.V. Aho, Ravi Sethi, J.D. Ullman, Compilers - Principles, Techniques and Tools, Addison- Wesley, 1988.
2. Fischer Leblanc, Crafting Compiler, Benjamin Cummings, Menlo Park, 1988.
3. Kennath C.Louden, Compiler Construction Principles and Practice, Vikas publishing House, 2003.
4. Allen I. Holub, Compiler Design in C, Prentice Hall of India, 2001.

CS1212 COMPUTER GRAPHICS 3 1 0 4

AIM

To impart the fundamental concepts of Computer Graphics.

OBJECTIVES

- To gain knowledge about graphics hardware devices and software used.
- To understand the two dimensional graphics and their transformations.
- To understand the three dimensional graphics and their transformations.
- To study illumination and color models.

UNIT I INTRODUCTION 9

Survey of computer graphics, Overview of graphics systems – Video display devices, Raster scan systems, Random scan systems, Graphics monitors and Workstations, Input devices, Hard copy Devices, Graphics Software; Output primitives – points and lines, line drawing algorithms, loading the frame buffer, line function; circle and ellipse generating algorithms; Pixel addressing and object geometry, filled area primitives.

UNIT II TWO DIMENSIONAL GRAPHICS 9

Two dimensional geometric transformations – Matrix representations and homogeneous coordinates, composite transformations; Two dimensional viewing – viewing pipeline, viewing coordinate reference frame; widow-to-viewport coordinate transformation, Two dimensional viewing functions; clipping operations – point, line, and polygon clipping algorithms.

UNIT III THREE DIMENSIONAL GRAPHICS 10

THREE DIMENSIONAL CONCEPTS: Three dimensional object representations – Polygon surfaces- Polygon tables- Plane equations - Polygon meshes; Curved Lines and

surfaces, Quadratic surfaces; Blobby objects; Spline representations – Bezier curves and surfaces -B-Spline curves and surfaces.

TRANSFORMATION AND VIEWING: Three dimensional geometric and modeling transformations – Translation, Rotation, Scaling, composite transformations; Three dimensional viewing – viewing pipeline, viewing coordinates, Projections, Clipping; Visible surface detection methods.

UNIT IV ILLUMINATION AND COLOUR MODELS 7

Light sources - basic illumination models – halftone patterns and dithering techniques; Properties of light - Standard primaries and chromaticity diagram; Intuitive colour concepts - RGB colour model - YIQ colour model - CMY colour model - HSV colour model - HLS colour model; Colour selection.

UNIT V ANIMATIONS & REALISM 10

ANIMATION GRAPHICS: Design of Animation sequences – animation function – raster animation – key frame systems – motion specification –morphing – tweening.

COMPUTER GRAPHICS REALISM: Tiling the plane – Recursively defined curves – Koch curves – C curves – Dragons – space filling curves – fractals – Grammar based models – fractals – turtle graphics – ray tracing.

T: 15 + L: 45 = TOTAL: 60 PERIODS

TEXT BOOKS:

1. John F. Hughes, Andries Van Dam, Morgan Mc Guire ,David F. Sklar , James D. Foley, Steven K. Feiner and Kurt Akeley ,"Computer Graphics: Principles and Practice", 3rd Edition, Addison- Wesley Professional,2013. (UNIT I, II, III, IV).
2. Donald Hearn and Pauline Baker M, "Computer Graphics", Prentice Hall, New Delhi, 2007 (UNIT V).

REFERENCES:

1. Donald Hearn and M. Pauline Baker, Warren Carithers,"Computer Graphics With Open GL", 4th Edition, Pearson Education, 2010.
2. Jeffrey McConnell, "Computer Graphics: Theory into Practice", Jones and Bartlett Publishers, 2006.
3. Hill F S Jr., "Computer Graphics", Maxwell Macmillan" , 1990.
4. Peter Shirley, Michael Ashikhmin, Michael Gleicher, Stephen R Marschner, Erik Reinhard, Kelvin Sung, and AK Peters, Fundamental of Computer Graphics, CRC Press, 2010.
5. William M. Newman and Robert F.Sproull, "Principles of Interactive Computer Graphics", Mc Graw Hill 1978.

CS1213 VISUAL PROGRAMMING 3 1 0 4

AIM

Goal:

To enable the students to learn the basic VB.NET and concepts of arrays

Objectives:

To understand VB.net programming

Unit I

Software Development and VB.NET – VB.NET and the .NET Framework – The VB.NET Development Environment – Modules and Namespaces – data Types – Assignments and Operators-Types, Structures and Enumeration – Control Structures – Control Flow – Error Handling: Basics, Classes

Unit II

Object Oriented Programming – Class Fundamentals: Fields, Methods, Properties, Contructors, Events, Shared Members – Inheritance: Basics, Overriding, Sealed and Virtual Classes – Interfaces Delegates – Attributes – Lists, Collections, and Other Data Structures.

Unit III

Files and Directories: Directory and File Classes, DirectoryInfo and FileInfo Classes, Path Class – Streams: Stream class, stream operations, stream readers and writers, reading and writing text files, reading and writing binary files, reading – object serialization – regular expression

Threading: Fundamentals, Thread Synchronization – Components and Assemblies – Reflection – Windows Forms: Basics – Windows Forms- Controls: Text Boxes, Labels, Buttons, Checkboxes, Radio Buttons, List Boxes, Combo Boxes

Unit IV

Picture Boxes, Scroll Bars, Timers, Menus, Built-in Dialog Boxes, Tree and List Views, Tool bars, Status bars, Progress bars – Web Forms: HTML Server Controls, Web Forms Controls, Validation Controls

Unit V

Data Access with ADO.NET – Binding controls to database- Handling Database in Code- XML and ADO.NET – Windows services: Creation and Installation, Service Controller Component – ASP.NET Applications- Web services: Introduction and Creation of web services - .NET Remoting.

T: 15 + L: 45 = TOTAL: 60 PERIODS

TEXT BOOKS

1. The Complete Reference – Visual Basic .NET, Jefrey R.Shapiro, Tata McGraw-Hill, 2002

2. Visual Basic .Net Programming Black Book, Stevem Holzner, Dreamtech Press, Reprint 2011
3. Programming Microsoft Visual Basic .NET, Francesco Balena , Microsoft press 2003
4. www.spoken-tutorial.org

CS1278 COMPUTER GRAPHICS LABORATORY 0 1 2 2

1. To implement Bresenham's algorithms for line, circle and ellipse drawing
2. To perform 2D Transformations such as translation, rotation, scaling, reflection and sharing.
3. To implement Cohen-Sutherland 2D clipping and window-viewport mapping
4. To perform 3D Transformations such as translation, rotation and scaling.
5. To visualize projections of 3D images.
6. To create 3D scenes.
7. To convert between color models.
8. To perform animation using any Animation software
9. To perform basic operations on image using any image editing software

TOTAL: 45 PERIODS

CS1279 VISUAL PROGRAMMING LABORATORY 0 1 2 2

LIST OF EXPERIMENTS

1. Create & validate Login form.
2. Program to design an 'Account' class.
3. Program to demonstrate Inheritence, Polymorphism & Interface.
4. Advance Controls.
5. Common Dialog Controls.
6. ADO.NET Code to show records in DataGridView Control.
7. ADO.NET to perform insert, delete, update & select operations.
8. Crystal Reports.
9. Web application using validation controls.
10. Web application with ADO.NET to perform insert, delete, update & select operations.

TOTAL: 45 PERIODS

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B.E. COMPUTER SCIENCE AND ENGINEERING

LIST OF ELECTIVES

SL. No.	Course Code	Course Title	L	T	P	C
ELECTIVES						
1.	CS12A1	UNIX Internals	3	0	0	3
2.	CS12A2	High Performance Microprocessors	3	0	0	3
3.	CS12A3	High Speed Networks	3	0	0	3
4.	CS12A4	User Interface Design	3	0	0	3
5.	CS12A5	Embedded Systems	3	0	0	3
6.	CS12A6	Cryptography and Network Security	3	0	0	3
7.	CS12A7	Operating System Design	3	0	0	3
8.	CS12A8	Real Time System Concepts	3	0	0	3

CS12A1 UNIX INTERNALS 3 0 0 3

AIM

To understand the kernel, I/O & files, process control, scheduling and memory management policies in unix.

OBJECTIVES

- To get thorough understanding of the kernel..
- To understand the file organization and management.
- To know the various system calls.
- To have a knowledge of process architecture, process control & scheduling and memory management.

UNIT I GENERAL OVERVIEW OF THE SYSTEM 9

History – System structure – User perspective – Operating system services – Assumptions about hardware. Introduction to the Kernel : Architecture of the UNIX operating system – Introduction to system concepts – Kernel data structures – System administration – Summary and Preview.

UNIT II BUFFER CACHE 9

Buffer headers – Structure of the buffer pool – Advantages and disadvantages of the buffer cache. Internal representation of files : Inodes – Structure of a regular file – Directories – Conversion of a path name to an Inode – Super block – Other file types.

UNIT III SYSTEM CALLS FOR FILE SYSTEM 9

Open – Read – Write – File and record locking – Adjusting the position of file I/O –LSEEK – Close – File creation – Creation of special files – Pipes – Dup – Mounting and un mounting file systems

UNIT IV THE STRUCTURE OF PROCESSES 9

Process states and transitions – Layout of system memory – The context of a process – Saving the context of a process. Process Control: Process creation – Signals – Process termination – Awaiting process termination – Invoking other programs – The shell – System boot and the INIT process.

UNIT V PROCESS SCHEDULING AND MEMORY MANAGEMENT POLICIES 9

Process Scheduling – Memory Management Policies: Swapping – A hybrid system with swapping and demand paging. The I/O Subsystem: Driver Interfaces– Disk Drivers-Terminal Drivers.

TOTAL: 45 PERIODS

TEXT BOOK

1. Maurice J. Bach, “The Design of the Unix Operating System”, Prentice Hall of India, 2004.

REFERENCE

1. Vahalia, “Unix Internals: The New Frontiers”, Pearson Education Inc, 2003.

CS12A2 HIGH PERFORMANCE MICROPROCESSORS 3 0 0 3

AIM

To do a detailed study of CISC and RISC principles, study the architecture & special features of the Pentium processors and typical RISC processors and to study the architecture of special purpose processors.

OBJECTIVES

- To study the principles of CISC
- To study the Pentium processor family
- To study the principles of RISC
- To study the architecture & special features of typical RISC processors.
- To study the architecture & function of special purpose processors.

UNIT I CISC PRINCIPLES 9

Classic CISC microprocessors, Intel x86 Family: Architecture - register set - Data formats - Addressing modes - Instruction set - Assembler directives – Interrupts - Segmentation, Paging, Real and Virtual mode execution – Protection mechanism, Task management 80186, 286, 386 and 486 architectures.

UNIT II PENTIUM PROCESSORS 9

Introduction to Pentium microprocessor – Special Pentium Registers – Pentium Memory Management – New Pentium instructions – Introduction to Pentium Pro and its special features – Architecture of Pentium-II, Pentium-III and Pentium IV microprocessors.

UNIT III RISC PRINCIPLES 9

RISC Vs CISC – RISC properties and evaluation – On chip register File Vs Cache evaluation – Study of a typical RISC processor – The PowerPC – Architecture & special features – Power PC 601 – IBM RS/6000, Sun SPARC Family – Architecture – Super SPARC.

UNIT IV RISC PROCESSOR 9

MIPS Rx000 family – Architecture – Special features – MIPS R4000 and R4400 – Motorola 88000 Family – Architecture – MC 88110 – MC 88100 and MC 88200.

UNIT V SPECIAL PURPOSE PROCESSORS 9

EPIC Architecture – ASIPs – Network Processors – DSPs – Graphics / Image Processors.

TOTAL: 45 PERIODS

TEXT BOOK

1. Daniel Tabak, “Advanced Microprocessors”, Tata McGraw-Hill, 1995, 2nd Edition.

REFERENCES

1. www.intel.com/products/server/processors/server/itanium2 (Unit V:EPIC)
2. www.hpl.hp.com/techreports/1999/HPL-1999-111.html (Unit V: Network Processor)

3. www.intel.com/design/network/products/npfamily (Unit V: Network Processor)
4. www.national.com/appinfo/imaging/processors.html(Unit V: Image Processor)
5. Barry B.Brey, "The Intel Microprocessors, 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, PentiumPro Processor, PentiumII, PentiumIII, PentiumIV, Architecture, Programming & Interfacing", 6th Edition, Pearson Education/PHI, 2002.

CS12A3 HIGH SPEED NETWORKS 3 0 0 3

AIM

To highlight the features of different technologies involved in High Speed Networking and their performance.

OBJECTIVES

- Students will get an introduction about ATM and Frame relay.
- Students will be provided with an up-to-date survey of developments in High Speed Networks.
- Enable the students to know techniques involved to support real-time traffic and congestion control.
- Students will be provided with different levels of quality of service (Q.S) to different applications.

UNIT I HIGH SPEED NETWORKS 9

Frame Relay Networks – Asynchronous Transfer Mode – ATM Protocol Architecture, ATM logical Connection, ATM Cell – ATM Service Categories – AAL. High Speed LAN's: Fast Ethernet, Gigabit Ethernet, Fibre Channel – Wireless LAN's: applications, requirements – Architecture of 802.11

UNIT II CONGESTION AND TRAFFIC MANAGEMENT 9

Queuing Analysis- Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

UNIT III TCP AND ATM CONGESTION CONTROL 9

TCP Flow control – TCP Congestion Control – Retransmission – Timer Management – Exponential RTO backoff – KARN's Algorithm – Window Management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats, ABR Capacity allocations – GFR traffic management.

UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES 9

Integrated Services Architecture – Approach, Components, Services- Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ – Random Early Detection, Differentiated Services

UNIT V PROTOCOLS FOR QOS SUPPORT 9

RSVP – Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms –

Multiprotocol Label Switching – Operations, Label Stacking, Protocol details – RTP – Protocol Architecture, Data Transfer Protocol, RTCP.

TOTAL: 45 PERIODS

TEXTBOOK

1. William Stallings, "HIGH SPEED NETWORKS AND INTERNET", Pearson Education, Second Edition, 2002. [Chapter – 4-6, 8, 10, 12, 13, 17,18]

REFERENCES

1. Warland & Pravin Varaiya, "HIGH PERFORMANCE COMMUNICATION NETWORKS", Jean Harcourt Asia Pvt. Ltd., II Edition, 2001.
2. Irvan Pepelnjk, Jim Guichard and Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003

CS12A4 USER INTERFACE DESIGN 3 0 0 3

AIM:

Upon completion of the course, the student will be able to build effective, flexible, and robust user interfaces. They will also develop paradigms of programming environments used to build user interfaces, translate system requirements into appropriate human/computer interaction sequences and model human/computer dialogues into transaction networks in order to capture and to respond to changes of state in the system.

OBJECTIVE:

- To provide skills necessary to choose mode, media, and device for input/output instantiation appropriate for the user population, the application requirements, and the processing capabilities of the system.
- To provide an introductory experience in designing and building user interfaces

UNIT I 9

Importance of Good Screen Design – Characteristics of Graphical User Interface Design – Principles of Graphical User Interface Design – Human Characteristics in Design – User's Tasks and Jobs.

UNIT II 9

Business Functions –Requirement Analysis – Direct – Indirect Methods – Basic Business Functions – Design Standards – System Timings – Human Consideration In Screen Design – Structures of Menus – Functions Of Menus – Contents of Menu – Formatting – Phrasing The Menu – Selecting Menu Choice – Navigating Menus – Graphical Menus.

UNIT III 9

The variety of Interactive Systems – Concerns of Interactive Systems – Skills of the Interactive system designer – Human Capabilities – Contexts – Technologies – Human Centered Interactive System Design.

UNIT IV **9**

Cognitive Psychology and Human Information Processing – Seven stage model activity – visual perception – depth perception – mental models – Virtual reality – VR Input and Output devices – Embodied Interaction.

UNIT V **9**

Activities and Contexts of Interactive System Design – participative design and requirements – Exploring Design Concepts – Evaluating Interactive system design – usability evaluation – Effective messages – Test and retest.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Wilbent. O. Galitz ,"The Essential Guide To User Interface Design", John Wiley& Sons, 2001.
2. David Benyon, Phil Turner and Susan Turner "Designing Interactive Systems: People, Activities, Context, Technologies. Addison Wesley, 2005.

REFERENCE BOOKS

1. Dix, Alan, Finlay, Janet, Abowd, Grwgory D. and Beale Russel, Human Computer Interaction, 3rd Edition, Pearson Prentice Hall, 2004.
2. Ben Sheiderman, "Design The User Interface", Pearson Education, 1998.
3. Alan Cooper, "The Essential Of User Interface Design", Wiley – Dream Tech Ltd., 2002.

CS12A5 EMBEDDED SYSTEMS 3 1 0 4

AIM

To give sufficient background for undertaking embedded systems design.

UNIT I INTRODUCTION TO EMBEDDED SYSTEMS 9

Definition and Classification – Overview of Processors and hardware units in an embedded system – Software embedded into the system – Exemplary Embedded Systems – Embedded Systems on a Chip (SoC) and the use of VLSI designed circuits

UNIT II DEVICES AND BUSES FOR DEVICES NETWORK 9

I/O Devices - Device I/O Types and Examples – Synchronous - Iso-synchronous and Asynchronous Communications from Serial Devices - Examples of Internal Serial-Communication Devices - UART and HDLC - Parallel Port Devices - Sophisticated interfacing features in Devices/Ports- Timer and Counting Devices - '12C', 'USB', 'CAN' and advanced I/O Serial high speed buses- ISA, PCI, PCI-X, cPCI and advanced buses.

UNIT III PROGRAMMING CONCEPTS AND EMBEDDED PROGRAMMING IN C, C++ 9

Programming in assembly language (ALP) vs. High Level Language - C Program Elements, Macros and functions -Use of Pointers - NULL Pointers - Use of Function Calls – Multiple function calls in a Cyclic Order in the Main Function Pointers – Function Queues and

Interrupt Service Routines Queues Pointers – Concepts of EMBEDDED PROGRAMMING in C++ - Objected Oriented Programming – Embedded Programming in C++, 'C' Program compilers – Cross compiler – Optimization of memory codes.

UNIT IV REAL TIME OPERATING SYSTEMS – PART - 1 9

Definitions of process, tasks and threads – Clear cut distinction between functions – ISRs and tasks by their characteristics – Operating System Services- Goals – Structures- Kernel - Process Management – Memory Management – Device Management – File System Organization and Implementation – I/O Subsystems – Interrupt Routines Handling in RTOS, REAL TIME OPERATING SYSTEMS : RTOS Task scheduling models - Handling of task scheduling and latency and deadlines as performance metrics – Co-operative Round Robin Scheduling – Cyclic Scheduling with Time Slicing (Rate Monotonics Co-operative Scheduling) – Preemptive Scheduling Model strategy by a Scheduler – Critical Section Service by a Preemptive Scheduler – Fixed (Static) Real time scheduling of tasks - INTER PROCESS COMMUNICATION AND SYNCHRONISATION – Shared data problem – Use of Semaphore(s) – Priority Inversion Problem and Deadlock Situations – Inter Process Communications using Signals – Semaphore Flag or mutex as Resource key – Message Queues – Mailboxes – Pipes – Virtual (Logical) Sockets – Remote Procedure Calls (RPCs).

UNIT V REAL TIME OPERATING SYSTEMS – PART - 2 9

Study of Micro C/OS-II or Vx Works or Any other popular RTOS – RTOS System Level Functions – Task Service Functions – Time Delay Functions – Memory Allocation Related Functions – Semaphore Related Functions – Mailbox Related Functions – Queue Related Functions – Case Studies of Programming with RTOS – Understanding Case Definition – Multiple Tasks and their functions – Creating a list of tasks – Functions and IPCs – Exemplary Coding Steps.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw-Hill, First reprint Oct. 2003

REFERENCES

1. Steve Heath, Embedded Systems Design, Second Edition-2003, Newness,
2. David E.Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.
3. Wayne Wolf, Computers as Components; Principles of Embedded Computing System Design – Harcourt India, Morgan Kaufman Publishers, First Indian Reprint 2001
4. Frank Vahid and Tony Givargis, Embedded Systems Design – A unified Hardware / Software Introduction, John Wiley, 2002.

CS12A6 CRYPTOGRAPHY AND NETWORK SECURITY 3 0 0 3

AIM

To understand the principles of encryption algorithms; conventional and public key cryptography. To have a detailed knowledge about authentication, hash functions and application level security mechanisms.

OBJECTIVES

- To know the methods of conventional encryption.
- To understand the concepts of public key encryption and number theory
- To understand authentication and Hash functions.
- To know the network security tools and applications.
- To understand the system level security used.

UNIT I INTRODUCTION 9

OSI Security Architecture - Classical Encryption techniques – Cipher Principles – Data Encryption Standard – Block Cipher Design Principles and Modes of Operation - Evaluation criteria for AES – AES Cipher – Triple DES – Placement of Encryption Function – Traffic Confidentiality

UNIT II PUBLIC KEY CRYPTOGRAPHY 9

Key Management - Diffie-Hellman key Exchange – Elliptic Curve Architecture and Cryptography - Introduction to Number Theory – Confidentiality using Symmetric Encryption – Public Key Cryptography and RSA.

UNIT III AUTHENTICATION AND HASH FUNCTION 9

Authentication requirements – Authentication functions – Message Authentication Codes – Hash Functions – Security of Hash Functions and MACs – MD5 message Digest algorithm - Secure Hash Algorithm – RIPEMD – HMAC Digital Signatures – Authentication Protocols – Digital Signature Standard

UNIT IV NETWORK SECURITY 9

Authentication Applications: Kerberos – X.509 Authentication Service – Electronic Mail Security – PGP – S/MIME - IP Security – Web Security.

UNIT V SYSTEM LEVEL SECURITY 9

Intrusion detection – password management – Viruses and related Threats – Virus Counter measures – Firewall Design Principles – Trusted Systems.

TOTAL: 45 PERIODS

TEXT BOOK

1. William Stallings, “Cryptography And Network Security – Principles and Practices”, Prentice Hall of India, Third Edition, 2003.

REFERENCES

1. Atul Kahate, “Cryptography and Network Security”, Tata McGraw-Hill, 2003.

2. Bruce Schneier, “Applied Cryptography”, John Wiley & Sons Inc, 2001.
3. Charles B. Pfleeger, Shari Lawrence Pfleeger, “Security in Computing”, Third Edition, Pearson Education, 2003.

CS12A7 OPERATING SYSTEM DESIGN 3 0 0 3

AIM

To understand the principles in the design of modern operating systems, distributed and multiprocessor operating systems

UNIT I 9

Architectures of Distributed Systems - System Architecture types - issues in distributed operating systems - communication networks – communication primitives. Theoretical Foundations - inherent limitations of a distributed system – lamp ports logical clocks – vector clocks – casual ordering of messages – global state – cuts of a distributed computation – termination detection. Distributed Mutual Exclusion – introduction – the classification of mutual exclusion and associated algorithms – a comparative performance analysis.

UNIT II 9

Distributed Deadlock Detection -Introduction - deadlock handling strategies in distributed systems – issues in deadlock detection and resolution – control organizations for distributed deadlock detection – centralized and distributed deadlock detection algorithms –hierarchical deadlock detection algorithms. Agreement protocols – introduction-the system model, a classification of agreement problems, solutions to the Byzantine agreement problem, applications of agreement algorithms. Distributed resource management: introduction-architecture – mechanism for building distributed file systems – design issues – log structured file systems.

UNIT III 9

Distributed shared memory-Architecture– algorithms for implementing DSM – memory coherence and protocols – design issues. Distributed Scheduling – introduction – issues in load distributing – components of a load distributing algorithm – stability – load distributing algorithm – performance comparison – selecting a suitable load sharing algorithm – requirements for load distributing -task migration and associated issues. Failure Recovery and Fault tolerance: introduction– basic concepts – classification of failures – backward and forward error recovery, backward error recovery- recovery in concurrent systems – consistent set of check points – synchronous and asynchronous check pointing and recovery – check pointing for distributed database systems- recovery in replicated distributed databases.

UNIT IV 9

Protection and security -preliminaries, the access matrix model and its implementations.-safety in matrix model- advanced models of protection. Data security – cryptography: Model of cryptography, conventional cryptography- modern cryptography, private key cryptography, data encryption standard- public key cryptography – multiple encryption – authentication in distributed systems.

UNIT-V **9**

Multiprocessor operating systems - basic multiprocessor system architectures – inter connection networks for multiprocessor systems – caching – hypercube architecture. Multiprocessor Operating System - structures of multiprocessor operating system, operating system design issues- threads- process synchronization and scheduling.

Database Operating systems :Introduction- requirements of a database operating system Concurrency control : theoretical aspects – introduction, database systems – a concurrency control model of database systems- the problem of concurrency control – serializability theory- distributed database systems, concurrency control algorithms – introduction, basic synchronization primitives, lock based algorithms-timestamp based algorithms, optimistic algorithms – concurrency control algorithms, data replication.

TOTAL: 45 PERIODS

TEXT BOOK

1. Mukesh Singhal, Niranjan G.Shivaratri, "Advanced concepts in operating systems: Distributed, Database and multiprocessor operating systems", TMH, 2001

REFERENCES

1. Andrew S.Tanenbaum, "Modern operating system", PHI, 2003
2. Pradeep K.Sinha, "Distributed operating system-Concepts and design", PHI, 2003.
3. Andrew S.Tanenbaum, "Distributed operating system", Pearson education, 2003

CS12A8 REAL TIME SYSTEM CONCEPTS 3 0 0 3

AIM

To understand the basic concepts, design and integration of Real Time Systems.

OBJECTIVES

- To know about the specification and design techniques of a Real Time System.
- To understand about real time task communication and synchronization
- To have a vast knowledge of queuing models and Real Time System integration.

UNIT I BASIC REAL TIME CONCEPTS 9

Basic computer architecture – some terminology - real time design issues – example real time systems – input and output – other devices – language features.

UNIT II REAL TIME SPECIFICATION AND DESIGN TECHNIQUES 9

Natural languages – mathematical specification – flow charts – structured charts – pseudocode and programming design languages – finite state automata – data flow diagrams – petri nets – Warnier Orr notation – state charts – polled loop systems – phase state driven code – co-routines – interrupt – driven systems – foreground/background system – full featured real time operating systems

UNIT III INTERTASK COMMUNICATION AND SYNCHRONIZATION 9

Buffering data – mailboxes – critical regions – semaphores – deadlock – process stack management – dynamic allocation – static schemes – response time calculation – interrupt latency – scheduling is NP complete – reducing response times and time loading – analysis of memory requirements – reducing memory loading – I/O performance

UNIT IV QUEUING MODELS 9

Probability functions – discrete- basic buffering calculation – classical queuing theory – little's law – erlong's formula – faults, failures, bugs and effects – reliability-testing – fault tolerance – distributing systems – Non Von Neuman architecture

UNIT V HARDWARE/SOFTWARE INTEGRATION 9

Goals of real time system integration – tools - methodology -software Heinsberg uncertainity principle – real time applications

TOTAL: 45 PERIODS

TEXT BOOK

1. Philip A.Laplante, “Real time system design and analysis – an engineer's handbook

REFERENCES

1. C.M.Krishna and Kang G Shin, "Real time systems", TMH, 1997
2. Stuart Bennelt, "Real time computer control – and introduction", Pearson education, 2003.
3. Allen Burns, Andy Wellings, “Real Time Systems and Programming Languages”, Pearson Education, 2003.