

1701MA101

**ENGINEERING MATHEMATICS I**  
(Common to all B.E / B.Tech Degree Programmes)

L	T	P	C
3	2	0	4

**COURSE OBJECTIVES:**

1. To educate Matrix Algebra Technique and curvature Theory
2. To impart knowledge of Techniques in solving Ordinary Differential Equations and to apply in solving Modern Engineering Problems
3. To acquaint the students about functions of several variables and also to familiarize the students in infinite series and their convergence

**UNIT I EIGEN VALUE PROBLEMS 9 Hours**

Characteristic equation - Eigen values and Eigen vectors of a real matrix – Properties - Cayley– Hamilton theorem- Diagonalization of Matrices - Reduction of a quadratic form to a canonical form by orthogonal transformation – Application of Matrices in Structural Engineering and image processing

**UNIT II ORDINARY DIFFERENTIAL EQUATIONS 9 Hours**

Higher order linear differential equations with constant coefficients – Cauchy’s and Legendre’s linear equations – Method of variation of parameters in solution of ordinary differential equations.

**UNIT III DIFFERENTIATION AND GEOMETRICAL APPLICATIONS 9 Hours**

Derivative of special functions (Trigonometry, Exponential, Logarithmic), Derivative by rule (Product, Quotient, Chain rule), Curvature in Cartesian co-ordinates – Centre and radius of curvature – Circle of curvature- Evolutes and involutes.

**UNIT IV MULTIVARIABLE CALCULUS 9 Hours**

Functions of two variables and solutions (Partial derivatives and Euler’s theorem)– Taylor’s series - Maxima and Minima – Application of Partial Derivatives to find the optimum requirement using Lagrangian multipliers.

**UNIT V SEQUENCES AND SERIES 9 Hours**

Sequences: Definition and examples – Series: Types and Convergence – Series of positive terms – Tests of convergence: Comparison test, Integral test and D’Alembert’s ratio test – Alternating series – Leibnitz’s test – Application of Sequences in real life.

**TOTAL: 45 + 15 HOURS**

**FURTHER READING:**

1. Modeling and solutions using Newton’s Law of Cooling of Bodies
2. Differentiation of implicit Functions, Jacobians and Properties

**COURSE OUTCOMES:**

On the Successful completion of the course, Students will be able to

- Skill development*
- CO1: Analyze the characteristics of a linear system with Eigen value and Eigen Vectors
  - CO2: Recognize and solve Higher order Ordinary Differential Equations
  - CO3: Solve Derivative of special functions and apply it in solving Geometrical problems
  - CO4: Apply Partial Derivatives in finding Maxima and Minima of a function
  - CO5: Test the convergence of any series

**REFERENCES:**

1. Veerarajan R., “Engineering Mathematics”, updated second edition for semester I and II, (2017)
2. Grewal. B.S, “Higher Engineering Mathematics”, 44th Edition, Khanna Publications, Delhi, (2014).
3. Bali N. P and Manish Goyal, “Text book of Engineering Mathematics”, Sixth edition, Laxmi Publications(p) Ltd., (2014).
4. Glyn James, “Advanced Modern Engineering Mathematics”, 3<sup>rd</sup> Edition, Pearson Education, (2012).
5. P.Kandasamy, K. Gunavathy and K. Thilagavathy, Engineering Mathematics, Volume II, S. Chand & Co., New Delhi, (2009)
6. Erwin Kreyszig, Advanced Engineering Mathematics, 9<sup>th</sup> Edition, Wiley International edition, (2006)
7. Ramana B.V, “Higher Engineering Mathematics”, Tata McGrawHill Publishing, New Delhi, (2007).
8. M K Venkataraman, Engineering mathematics, Volume I, 2<sup>nd</sup> ed., National Publishing Co. (2003)
9. nptel.ac.in/courses/111105035, www.nptelvideos.in/2012/11/Mathematics.html
10. www.learnerstv.com/Free-maths-video lectures - ltv348-page1.htm

**ATTESTED**  
  
**Dr. S. RAMABALAN, M.E., Ph.D.,**  
**PRINCIPAL**  
E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.



1701PH101

**APPLIED PHYSICS FOR ENGINEERS**  
(Common to all B.E. / B.Tech Degree Programmes)

L	T	P	C
3	0	0	3

**COURSE OBJECTIVES:**

1. To impart knowledge in properties of matter, crystallography and ultrasonics.
2. To understand the applications of lasers and fiber optics.
3. To implement the principles of quantum physics in the respective engineering fields.

**UNIT I PROPERTIES OF MATTER**

9 Hours

Elasticity: elastic and plastic materials – Hooke's law – elastic behavior of a material – stress – strain diagram – factors affecting elasticity. Three moduli of elasticity – Poisson's ratio – torsional pendulum – twisting couple on a cylinder. Young's modulus – uniform bending – non-uniform bending. Viscosity: coefficient of viscosity – streamline and turbulent flow – experimental determination of viscosity of a liquid – Poiseuille's method.

**UNIT II APPLIED OPTICS**

9 Hours

Interference: air wedge – theory – uses – testing of flat surfaces – thickness of a thin wire. Laser: introduction – principle of laser – characteristics of laser light – types: CO<sub>2</sub> laser – semiconductor laser (homojunction). Fiber optics: principle of light transmission through fiber – expression for acceptance angle and numerical aperture – types of optical fibers (refractive index profile and modes) – fiber optic communication system (block diagram & description).

**UNIT III ULTRASONICS**

9 Hours

Ultrasonics: introduction – properties of ultrasonic waves – generation of ultrasonic waves – magnetostriction – piezo electric methods – detection of ultrasonic waves – Determination of velocity of ultrasonic waves (acoustic grating). Applications of ultrasonic waves: pulse echo method, SONAR – measurement of velocity of blood flow – modes of operation (A scan, B Scan & C Scan).

**UNIT IV SOLID STATE PHYSICS**

9 Hours

Crystal Physics: lattice – unit cell – crystal systems – Bravais lattices – Miller indices – 'd' spacing in cubic lattice – calculation of number of atoms per unit cell, atomic radius, coordination number and determination of packing density for SC, BCC, FCC and HCP structures – X-ray diffraction: Laue's method – powder crystal method.

**UNIT V QUANTUM MECHANICS**

9 Hours

Quantum Physics: development of quantum theory – de Broglie wavelength – Schrodinger's wave equation – time dependent and time independent wave equations – physical significance. Application: particle in a box (1D) – degenerate and non-degenerate states. Electron Microscopy-SEM, TEM – principle and working – problem solving.

**TOTAL: 45 HOURS**

**FURTHER READING:**

Neutrino's – expanding universe

**COURSE OUTCOMES:**

**SKILL DEVELOPMENT**

On the successful completion of the course, students will be able to

- CO1: Realize the concept of properties of matter and apply the same for practical applications.
- CO2: Identify the suitable laser source for fiber optic communication applications.
- CO3: Determine the velocity of ultrasonic waves and apply the same for day today applications.
- CO4: Classify the different types of crystal structures and analyze their properties.
- CO5: Comprehend the efficacy of quantum equations in modern areas.

**REFERENCES:**

1. D.S.Mathur, Elements of Properties of matter, 5th edition, S.Chand & Company Ltd., New Delhi, 2012.
2. Charles Kittel, Introduction to Solid State Physics, 8th edition, Wiley India Pvt. Ltd., New Delhi, 2012
3. Arthur Beiser, Shobhit Mahajan and S. Rai Choudhury, Concepts of Modern Physics, 6th edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2010.
4. B.K. Pandey and S. Chaturvedi, Engineering Physics, 1st edition, Cengage Learning India Pvt. Ltd., New Delhi, 2012.
5. Halliday and Resnick, Fundamentals of Physics, John Wiley and Sons, Inc, 2011.
6. Ian Morison, Introduction to Astronomy and Cosmology, John Wiley and Sons, Ltd, 2013.
7. <http://nptel.ac.in/>

ATTESTED

  
Dr. S. RAMABALAN, M.E., Ph.D.,  
PRINCIPAL  
E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.



1701EN101

**TECHNICAL ENGLISH**  
(Common to all B.E / B.Tech Degree Programmes)

L	T	P	C
3	0	0	3

**COURSE OBJECTIVES:**

1. To develop the ability to read and comprehend technical texts in the field of Engineering
2. To develop vocabulary building through the study of word construction
3. To develop ability to write formal definitions of technical terms and expression.
4. To recognize various grammatical structures that will aid the student improve his/her theoretical knowledge.

**UNIT I**

9 Hours

Articles-Preposition-Subject-Verb-Object-Adjective-Adverb-Conjunction-Nouns- Usages of Have, has, had- Simple Present-Simple Past-Simple Future-Self introduction-Framing Questions

**UNIT II**

9 Hours

Present Continuous-Past Continuous-Future Continuous-Describing a place, person or thing-Framing negative questions-Gerund-Listening to Articles, speeches and audios

**UNIT III**

9 Hours

Present perfect-past perfect-future perfect-writing short paragraph-sentence pattern- Infinitive-Tag questions- Reading newspaper cutting

**UNIT IV**

9 Hours

Present perfect continuous -Past perfect continuous-Future perfect continuous-writing an Essay in 100 words-Types of sentences-Prefix-suffix-word formation-Dialogue writing.

**UNIT V**

9 Hours

Active voice-passive voice-impersonal passive voice -Synonyms and Antonyms-phrasal verbs- Punctuation- Common Errors-Letter writing.

**TOTAL: 45 HOURS**

**FURTHER READING:**

*Letters from a Father to His Daughter*- Jawaharlal Nehru

**COURSE OUTCOMES:** *Skill Development*

On the successful completion of the course, Students will be able to

CO1: Read and comprehend technical texts in the field of Engineering

CO2: Acquire vocabulary building and write effectively in technical writing

CO3: Write formal definitions of technical terms and expression in both verbal and written form.

CO4: Understand grammatical structures and use flawless English in the professional documents

**REFERENCES:**

1. Meenakshi Raman, Sangeetha Sharma, "Technical Communication : English Skills for Engineers" Oxford University Press: New Delhi, 2016.
2. Rizvi Ashrav.M, "Effective Technical Communication" Tata McGraw Hill: New Delhi, 2017
3. Herbert, A.J, "Structure of Technical English", London English Language Society. <https://archive.org/details/in.ernet.dli.2015.136456>
4. J.D. O'Connor, Better *English Pronunciation* Paperback, 2nd edition, 162 pages, Published September 16th 2013 by Cambridge University Press, October 23rd 1967
5. Nehru, Jawaharlal. *Letters from a Father to His Daughter*, Puffin Books, 2004
6. *Technical English* by faculty of English -published by EGS Pillay press 2017

ATTESTED



Dr. S. RAMABALAN, M.E., Ph.D.,  
PRINCIPAL

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.



1701CH101

**APPLIED CHEMISTRY IN INFORMATICS**  
(Common to B.E. CSE & B.Tech. IT Programmes)

L	T	P	C
3	0	0	3

**COURSE OBJECTIVES:**

1. Recall the terminologies of electrochemistry and explain the function of batteries and fuel cells.
2. Choose appropriate instrumentation technique for interpreting analytical data.
3. Understand the fundamentals of corrosion, its types and polymers with its applications with its electrochemical reactions.

**UNIT I ELECTROCHEMISTRY**

9 Hours

Cell terminology-Electrochemical cells- Electrolytic cells- Cell reactions- Daniel cell-Difference between electrolytic cells and electrochemical cells. Reversible cells and irreversible cells -types- EMF series and its applications - Nernst equation (derivation and problems).Single electrode potential - Hydrogen electrode - Calomel electrode - Glass electrode - pH measurement using glass electrode.

**UNIT II CORROSION AND ITS CONTROL**

9 Hours

Corrosion – types-chemical, electrochemical corrosion (galvanic, differential aeration) - factors influencing corrosion -corrosion control – material selection and design aspects - electrochemical protection – sacrificial anode method and impressed current cathodic method. protective coatings: electroplating of gold and electroless plating of nickel. paints - constituents and functions.

**UNIT III NONCONVENTIONAL ENERGY RESOURCES AND STORAGE DEVICES**

9 Hours

Introduction- nuclear energy- nuclear fission, nuclear fusion- nuclear chain reactions- breeder reactor- Nuclear Reactor-solar energy conversion- solar cells- wind energy. Batteries and fuel cells: Types of batteries- alkaline battery- lead storage battery nickel- cadmium battery- lithium battery- fuel cell H<sub>2</sub> -O<sub>2</sub> fuel cell- applications

**UNIT IV POLYMER AND ITS APPLICATION**

9 Hours

Introduction: Classification of polymers – Natural and synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerization. Addition (Free Radical Mechanism) condensation and copolymerization. Fabrication of Plastics. Application –Conducting polymer.

**UNIT V CHEM-INFORMATICS**

9 Hours

Definition – coordinate – Bonds - Bond length - Bond angles - Torsional angles -Polypeptide conformation and representation by Ramachandran map – Chemical structure – Conformation –Representation of structural information – Linear format - SMILEYS notation – MOL format – PDB format – Storage of structural data in a data base –Canonical structure – Similarity search – Sub structure search - Structural keys – Finger print - molecular data base-Cambridge structural database (protein data bank)-noting data bank- Application of chem-informatics in drugs designing.

**TOTAL: 45 HOURS**

**FURTHER READING:**

1. Alloys-ferrous and nonferrous alloys
2. Cambridge structural database (protein data bank)-noting data bank
3. Unique properties of nano material- introduction to quantum materials, quantum dots, supramolecular materials and molecular crystal engineering – molecular machines and devices- Logic gate using electronics material for molecular electronic

**COURSE OUTCOMES: Skill Development**

On the successful completion of the course, students will be able to

- CO1: Construct an electrochemical cell and measure its potential
- CO2: Identify the components and processes in batteries and infer the selection criteria for commercial battery systems with respect to different applications
- CO3: Utilize electrochemical data to formulate an electrochemical half-cell and cell reactions for corrosion control processes
- CO4: Differentiate the polymers used in day to day life based on its source, properties and applications
- CO5: Identify the applications of analytical methods for the estimation of elements in aqueous media

**REFERENCES:**

1. Ashima Srivastava and Janhavi N N., "Concepts of Engineering Chemistry", ACME Learning Private Limited., New Delhi, 2010.
2. Ravikrishnan A., "Engineering Chemistry", Sri Krishna Hi-tech Publishing Company Pvt. Ltd. Chennai, 2016.
3. RenuBapna and Renu Gupta., "Engineering Chemistry", Macmillan India Publisher Pvt Ltd, 2010.
4. Willard Merritt and Dean Settle, Instrumental methods of analysis, CBS publishers, Seventh edition, 2012.
5. Dara S.S, Umare S.S."Engineering Chemistry", S. Chand & Company Ltd, New Delhi., 2010.
6. <https://www.ccdc.cam.ac.uk/solutions/csd-system/components/>

Dr. S. RenuBapna, M.E.,  
PRINCIPAL  
E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.



7. [https://link.springer.com/chapter/10.1007/978-3-642-28030-6\\_2](https://link.springer.com/chapter/10.1007/978-3-642-28030-6_2)
8. [www.santarosa.edu/~yataiia/4D/QuantumDotsMk2.ppt](http://www.santarosa.edu/~yataiia/4D/QuantumDotsMk2.ppt)
9. [onlinelibrary.wiley.com/doi/10.1002/9780470661345.smc107/pods](http://onlinelibrary.wiley.com/doi/10.1002/9780470661345.smc107/pods)
10. [https://en.wikipedia.org/wiki/Molecular\\_electronics](https://en.wikipedia.org/wiki/Molecular_electronics).
11. Jain and Jain, "Engineering Chemistry", Sixteenth edition, Dhanpatrai publications, 2012.

1701GEX01	<b>BASIC ELECTRICAL AND ELECTRONICS ENGINEERING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	(Common to B.E. / B.Tech. – CSE, IT, CIVIL & MECH)	3	0	0	3

**COURSE OBJECTIVES:**

1. To introduce basic electrical terminologies and laws
2. To impart knowledge on solving series and parallel circuits
3. To introduce about the three phase system
4. To explain the working principle of dc and ac machines, power plants
5. To familiarize about basic electronic components, circuits, transducers, digital logic and communication systems

**UNIT I DC AND AC CIRCUIT FUNDAMENTALS** **9 Hours**  
 Definition of terms - voltage, current, power, energy, active and passive elements; Ohm's law and Kirchoff's laws; Series and parallel circuits; source transformation; equivalent resistance; star/delta conversion; Concepts of AC circuits - RMS and average values, form and peak factors, real and reactive power, power factor.

**UNIT II THREE PHASE SYSTEM** **9 Hours**  
 Introduction to three phase circuits; balanced and unbalanced system; phase and line parameters - relations; power measurement - voltmeter and ammeter method, two and three watt meter methods; Components of AC transmission and distributions systems (single line diagram approach).

**UNIT III ELECTRICAL MACHINES AND POWER PLANTS** **9 Hours**  
 Operating principle, classification and applications of DC generator, DC motor, transformer and induction motor (single phase); Power plants - Thermal power plant, hydroelectric power plant and nuclear power plant (Block diagram approach only).

**UNIT IV SEMICONDUCTOR DEVICES AND TRANSDUCERS** **9 Hours**  
 Characteristics of PN junction diode and zener diode; Rectifiers- Half wave and full wave rectifiers (qualitative treatment only); BJT – configurations; Amplifiers & Oscillators - definition, classification and applications; Transducers – classification, resistance temperature detector (RTD), linear variable differential transformer (LVDT).

**UNIT V DIGITAL ELECTRONICS AND COMMUNICATION SYSTEMS** **9 Hours**  
 Boolean algebra - Reduction of Boolean expressions; De-Morgan's theorem; Logic gates - Implementation of Boolean expressions; Model of communication system - Analog and digital, Wired and wireless channel; Block diagram of various communication systems - Microwave, satellite, optical fiber and cellular mobile system.

**TOTAL: 45 HOURS**

**FURTHER READING:**

1. Working principle and operation of Fax and ISDN
2. LED lightings

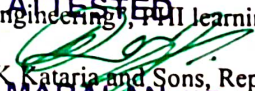
**COURSE OUTCOMES:** *skill development*

On the successful completion of the course, students will be able to

- CO1: Remember the basic laws and fundamental concepts related to electrical, electronics and communication engineering
- CO2: Apply basic concepts to solve problems in DC and AC circuits
- CO3: Recall the principle of operation of DC & AC machines and power plants
- CO4: Summarize the Boolean algebra and digital logic gates
- CO5: Elucidate the characteristics of diode, BJT and applications of amplifiers and oscillators
- CO6: Explain the operation of functional blocks of various communication systems

**REFERENCES:**

1. Smarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", 2<sup>nd</sup> Edition, PHI Learning, 2010.
2. R.Muthusubramaniam, S.Salaivahanan and K.A.Mureleedharan, "Basic Electrical Electronics and Computer Engineering", Tata McGraw Hill, 2004.
3. D.P.Kothari and I.J.Nagrath, "Theory and Problems of Basic Electrical Engineering", PHI Learning, New Delhi, 2004.
4. J.B. Gupta, "Fundamentals of Electrical Engineering and Electronics" S.K. Kataria and Sons, Reprint 2012 Edition.
5. R.L.Boylestad and L.Nashelsky, "Electronic Devices and Circuit Theory", Pearson, 1<sup>st</sup> Edition, 2013.

**ATTESTED**  
  
**DR. S. RAMABALAN, M.E., Ph.D.**  
**PRINCIPAL**  
 E.G.S. Pillay Engineering College,  
 Thethi, Nagore - 611 002.  
 Nagapattinam (Dt) Tamil Nadu.



6. George Kennedy and Bernard Davis, "Kennedy's Electronic communication Systems", McGraw Hill Education, 5<sup>th</sup> Edition, 2011.
7. Donald P. Leach, Albert Paul Malvino and Goutam Saha, "Digital Principles and Applications", McGraw-Hill Education, 8<sup>th</sup> Edition, 2014.
8. <http://nptel.ac.in/>

1701GEX02

**ENGINEERING GRAPHICS**  
 (Common to all B.E. / B.Tech Degree Programmes)

L	T	P	C
2	2	0	3

**COURSE OBJECTIVES:**

1. To develop in students, graphic skills for communication of concepts, ideas and design of Engineering products.
2. To expose them to existing national standards related to technical drawings.

**CONCEPTS AND CONVENTIONS (Not for Examination)**

**2 Hours**

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

**UNIT I PLANE CURVES AND FREE HAND SKETCHING**

**10 Hours**

Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves, Scales: Construction of Diagonal and Vernier scales.

Visualization concepts and Free Hand sketching: Visualization principles –Representation of Three Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of Objects

**UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES**

**10 Hours**

Orthographic projection- principles-Principal planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and traces Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

**UNIT III PROJECTION OF SOLIDS**

**10 Hours**

Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method and auxiliary plane method.

**UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES**

**10 Hours**

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones. Development of lateral surfaces of solids with cut-outs and holes.

**UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS**

**10 Hours**

Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions and miscellaneous problems. Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method.

**COMPUTER AIDED DRAFTING (Demonstration Only)**

**8 Hours**

Basics commands of AutoCAD- two dimensional drawing, editing, layering and dimensioning - coordinate Systems-Drawing practice - orthographic views of simple solids using AutoCAD.

**FURTHER READING:**

Applications of engineering graphics in students' discipline

**COURSE OUTCOMES: Skill Development**

**TOTAL: 60 HOURS**

On the successful completion of the course, students will be able to

CO1: Perform free hand sketching of basic geometrical constructions and multiple views of objects.

CO2: Do orthographic projection of lines and plane surfaces.


CO3: Draw projections and solids and development of surfaces.

CO4: Prepare isometric and perspective sections of simple solids.

CO5: Demonstrate computer aided drafting.

**REFERENCES:**

1. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subba Rao, Bangalore, 2007.
2. Luzzader, Warren.J. and Duff, John M., "Fundamentals of Engineering Drawing", an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Education Co. Pvt. Ltd, New Delhi, 2005.

**ATTESTED**  
  
**PRINCIPAL**  
 E.G.S. Pillay Engineering College  
 Thethi, Nagore - 614 007  
 Nagapattinam (Dt) Tamil Nadu.



3. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson, 2nd Edition, 2009.
4. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2008.
5. Natrajan K.V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2009.
6. Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
7. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 50<sup>th</sup> Edition, 2010.

**PUBLICATION OF BUREAU OF INDIAN STANDARDS:**

1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing sheets.
2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation – Lettering.
3. IS 10714 (Part 20) – 2001 & SP 46 – 2003: Lines for technical drawings.
4. IS 11669 – 1986 & SP 46 – 2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

**SPECIAL POINTS APPLICABLE TO UNIVERSITY EXAMINATIONS ON ENGINEERING GRAPHICS:**

1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.

1701GEX03

**PROGRAMMING IN C**  
 (Common to all B.E. / B.Tech Degree Programmes)

L	T	P	C
3	0	0	3

**COURSE OBJECTIVES:**

1. To prepare students to comprehend the fundamental concepts
2. To demonstrate fine grained operations in number system
3. To gain exposure in programming language using C
4. To develop programming skills using the fundamentals and basics of C Language

<b>UNIT I</b>	<b>BASIC CONCEPTS</b>	<b>8 Hours</b>
Organization and Classifications of Computer- Generations of Computers- Number System- Problem Solving Techniques – Algorithm Design– Flowchart–Pseudocode		
<b>UNIT II</b>	<b>INTRODUCTION TO C LANGUAGE</b>	<b>10 Hours</b>
Overview of C - Constants, Variables and Data Types- Compilation and Linking - Operators and Expressions- Decision Making and Branching – Looping statements		
<b>UNIT III</b>	<b>ARRAYS AND STRINGS</b>	<b>9 Hours</b>
Arrays-One Dimensional Array- Declaration and Initialization-Two Dimensional Array-Declaration and Initialization- Programs using Arrays- Strings- String Handling Functions, Programs using Strings- Managing I/O Operations		
<b>UNIT IV</b>	<b>FUNCTIONS &amp; STRUCTURES</b>	<b>10 Hours</b>
Functions-Function Prototypes-Declaring, Defining and Calling Functions-Call by value and Call by Reference-Recursive Functions-Structures- Declaration and Definition -Accessing Structure Members-Arrays of Structures-Unions- Programs using Structures and Unions		
<b>UNIT V</b>	<b>POINTERS &amp; FILES</b>	<b>8 Hours</b>
Pointers-Dynamic Memory Allocation-Arithmetic Operations using Pointers, Files – File Manipulation-I/O Operations, Preprocessor Directives, Storage Classes		
		<b>TOTAL: 45 HOURS</b>

**FURTHER READING:**

Object Oriented Programming Approach.

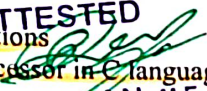
**COURSE OUTCOMES:** *Employability*

On the successful completion of the course, students will be able to

- CO1: Describe basic concepts of computers
- CO2: Paraphrase the operations of number system
- CO3: Describe about basic concepts of C-Language
- CO4: Understand the code reusability with the help of user defined functions
- CO5: Analyze the structure concept, union, file management and preprocessor in C language.

**REFERENCES:**

1. E. Balagurusamy, "Programming in ANSI C", McGraw Hill Education India Private Limited; Seventh Edition, 2017.

**ATTESTED**  
  
**DR. S. RAMABALAN, M.E., Ph.D.,**  
 Principal,  
 E.G.S. Pillay Engineering College,  
 Thethi, Nagore - 611 002.  
 Nagapattinam (Dt) Tamil Nadu.

2. Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2013.
3. Ashok N. Kamthane, "Programming in C", Pearson Education India, 3<sup>rd</sup> Edition, 2015.
4. Yashavant P. Kanetkar, "Let Us C", BPB Publications, 15<sup>th</sup> Revised and Updated Edition, 2016.
5. <http://nptel.ac.in/>

1701HS151

**PHYSICS AND CHEMISTRY LABORATORY-I**  
(Common to all B.E. / B.Tech Degree Programmes)

L	T	P	C
0	0	2	1

**COURSE OBJECTIVES:**

1. The Objective of this course is to make the students gain practical knowledge to co-relate with the theoretical studies
2. To achieve perfectness in experimental skills
3. To bring confidence and ability to develop and fabricate engineering and technical equipments.
4. To train the students to analyses the water sample
5. To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis

**PHYSICS**

**LIST OF EXPERIMENTS:**

1. Determine the moment of inertia of the disc and calculate the rigidity modulus of a given wire using torsion pendulum (symmetrical masses method).
2. Find the elevation of the given wooden beam at the midpoint by loading at the ends and hence calculate the Young's modulus of the material by uniform bending.
3. Determine the coefficient of viscosity of the given liquid by Poiseuille's method.
4. From the interference fringes from the air wedge setup and calculate the thickness of the given wire.
5. By applying the principle of diffraction, determine the wavelength of given laser light and the average particle size of lycopodium powder using laser source.
6. Determine the
  - (i) Wavelength of ultrasonic in a liquid medium
  - (ii) Velocity of ultrasonic waves in the given liquid
  - (iii) Compressibility of the given liquid using ultrasonic interferometer.

**CHEMISTRY**

**LIST OF EXPERIMENTS:**

1. Determination of total, temporary & permanent hardness of water by EDTA method
2. Determination of strength of given hydrochloric acid using pH meter
3. Estimation of iron content of the given solution using potentiometer
4. Estimation of sodium present in water using flame photometer
5. Corrosion experiment – weight loss method
6. Determination of molecular weight of a polymer by viscometry method
7. Conductometric titration of strong acid Vs strong Base

**TOTAL: 45 HOURS**

**COURSE OUTCOMES:**

On the successful completion of the course, students will be able to

CO1: Realize the concept of properties of matter and apply the same for practical applications.

CO2: Identify the suitable laser source for fiber optic communication applications.

CO3: Determine the velocity of ultrasonic waves and apply the same for day today applications.

CO4: Classify the different types of crystal structures and analyze their properties.

CO5: Comprehend the efficacy of quantum equations in modern areas.

CO6: Identify the pH of the solution.

CO7: Find the iron content of the water sample using potentiometer.

CO8: Explain and demonstrate the conductance of the solution.

CO9: Interpret the hardness and metal ions present in the water.

**REFERENCES:**

1. D.S.Mathur, Elements of Properties of matter, 5th edition, S.Chand & Company Ltd., New Delhi, 2012.
2. Charles Kittel, Introduction to Solid State Physics, 8th edition, Wiley India Pvt. Ltd., New Delhi, 2012.
3. Arthur Beiser, Shobhit Mahajan and S. Rai Choudhury, Concepts of Modern Physics, 6th edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2010.
4. B.K. Pandey and S. Chaturvedi, Engineering Physics, 1st edition, Cengage Learning India Pvt. Ltd., New Delhi, 2012.
5. Halliday and Resnick, Fundamentals of Physics, John Wiley and Sons, Inc, 2011.

**Dr. S. RAMABALAN, M.E., Ph.D.**  
**PRINCIPAL**  
E.G.S. Pillay Engineering College,  
Thethi. Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.



6. Ian Morison, Introduction to Astronomy and Cosmology, John Wiley and Sons, Ltd, 2013.
7. Daniel R. Palleros, "Experimental organic chemistry" John Wiley & Sons, Inc., New York (2001).
8. Furniss B.S. Hannaford A.J, Smith P.W.G and Tatchel A.R., "Vogel's Textbook of practical organic chemistry", LBS Singapore (1994).
9. Jeffery G.H., Bassett J., Mendham J and Denny Vogel's R.C, "Text book of quantitative analysis chemical analysis", ELBS 5th Edn. Longman, Singapore publishers, Singapore, 1996.
10. Kolthoff I.M., Sandell E.B. et al. "Quantitative chemical analysis", Mcmillan, Madras 1980.

1701GEX51

**PROGRAMMING IN C LABORATORY**  
(Common to all B.E. / B.Tech. Degree Programmes)

L	T	P	C
0	0	2	1

**COURSE OBJECTIVES:**

1. To prepare students to comprehend the fundamental concepts
2. To demonstrate fine grained operations in number system
3. To gain exposure in programming language using C
4. To develop programming skills using the fundamentals and basics of C Language.

**LIST OF EXPERIMENTS:**

1. Working with word and style sheets
2. Write a C program to implement basic concepts
3. Write a C program to implement Decision Making and Branching statements
4. Write a C program to implement looping statements
5. Write a C program to implement Arrays
6. Write a C program to implement Strings
7. Write a C program to implement pointers
8. Write a C program to implement Structures
9. Write a C program to work with files in C

**TOTAL: 30 HOURS**

**ADDITIONAL EXPERIMENTS:**

1. Write a c program to remove the occurrence of "the" word from entered string.
2. Create two files test1.txt and test2.txt and write a C program to read the file text1.txt character by character on the screen and paste it at the end of test2.txt

**COURSE OUTCOMES:**

On the successful completion of the course, students will be able to

CO1: Understand basic concepts of computers

CO2: Implement basic concepts of c-language

CO3: Implement arrays, strings and pointers.

CO4: Implement the basics of structures, unions, file management and preprocessor in C language.

*Skill Development*

*Employability*

**REFERENCES:**

1. E. Balagurusamy, "Programming in ANSI C", McGraw Hill Education India Private Limited; Seventh Edition, 2017.
2. Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2013.
3. Ashok N. Kamthane, "Programming in C", Pearson Education India, 3<sup>rd</sup> Edition, 2015.
4. Yashavant P. Kanetkar, "Let Us C", BPB Publications, 15<sup>th</sup> Revised and Updated Edition, 2016.
5. <http://nptel.ac.in/>

- ATTESTED

  
Dr. S. RAMABALAN, M.E., Ph.D.,  
PRINCIPAL

E.G.S. Pillay Engineering College,  
Thethi. Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.

1701GEX52

**COMMUNICATION SKILLS LAB**  
(Common to all B.E. / B.Tech Degree Programmes)

L	T	P	C
0	0	2	1

**COURSE OBJECTIVES:**

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

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

**LIST OF EXPERIMENTS:** The following course content to conduct the activities is prescribed for the Communication Skills Lab:

1. **Activities on Fundamentals of Inter-personal Communication and Building Vocabulary** - Starting a conversation - responding appropriately and relevantly - using the right body language - Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.
2. **Activities on Reading Comprehension** - General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
3. **Activities on Writing Skills** - Structure and presentation of different types of writing - letter writing/ Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing - planning for writing - improving one's writing.
4. **Activities on Presentation Skills** - Oral presentations (individual and group) through JAM sessions / seminars / PPTs and written presentations through posters/ projects/ reports/ e-mails/ assignments etc.
5. **Activities on Group Discussion and Interview Skills** - Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conferencing and Mock Interviews.

**TOTAL: 30 HOURS**

**ADDITIONAL EXPERIMENTS:**

Phonetics

**COURSE OUTCOMES:**

*Skill Development*

On the successful completion of the course, students will be able to

- CO1: Accomplishment of sound vocabulary and its proper use contextually.
- CO2: Flair in Writing and felicity in written expression
- CO3: Enhanced job prospects.
- CO4: Effective Speaking Abilities.

**REFERENCES:**

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009
2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
3. Technical Communication by Paul V. Anderson, 2007. Cengage Learning pvt. Ltd. New Delhi
4. English Vocabulary in Use series, Cambridge University Press 2008.
5. Management Shapers Series by Universities Press (India) Pvt Ltd., Himayatnagar, Hyderabad 2008.
6. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw Hill 2009.
7. Books on TOFEL/ GRE/ GMAT/ CAT/ IELTS by Barron's/ DELTA/ Cambridge University Press.

**ATTESTED**

  
**Dr. S. RAMABALAN, M.E., Ph.D.,**  
**PRINCIPAL**

E.G.S. Pillay Engineering College,  
Thethi. Nagore - 611 002.  
Agapattinam (Dt) Tamil Nadu.



1701MA201

**ENGINEERING MATHEMATICS II**  
(Common to all B.E / B.Tech Degree Programmes )

L T P C  
3 2 0 4

**COURSE OBJECTIVES:**

1. To develop an understanding of the standard techniques of Complex variable theory to apply in areas such as heat conduction, elasticity, fluid Dynamics and flow of electric current
2. To train the students with the concepts of Vector calculus needed for problems in all Engineering Disciplines
3. To make the Students apply Laplace Transform to create a new domain in which it is easier to handle the problem that is being investigated

**UNIT I ANALYTIC FUNCTIONS**

9 Hours

Analytic functions – Cauchy Riemann Equations – Properties – Determination of Analytic function using Milne Thomson's method, Conformal Mappings – Mappings of  $w = z + a$ ,  $az$ ,  $1/z$  – Bilinear Transformation – Application of Analytic Functions.

**UNIT II COMPLEX INTEGRATION**

9 Hours

Cauchy's fundamental theorem (statement only) – Application of Cauchy's Integral formula – Laurent's series – Classification of singularities – Cauchy's Residue theorem (statement only) – Contour integration.

**UNIT III MULTIPLE INTEGRAL**

9 Hours

Double integration – Cartesian and polar coordinates – Change the order of Integration – Applications: Area of a curved surface using double integral – Triple integration in Cartesian co-ordinates – Volume as triple integral.

**UNIT IV VECTOR CALCULUS**

9 Hours

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) – Applications of the above theorems to find surface area of a closed region and volume of cube and parallel piped.

**UNIT V LAPLACE TRANSFORM**

9 Hours

Laplace Transform – Conditions for existence – Transform of Elementary Functions – Basic Properties – Transform of Unit step function and Impulse function – Transform of Periodic function – Inverse Laplace Transform – Convolution Theorem (excluding Proof) – Initial and Final value Theorems – Solution of Linear ODE of Second order with constant coefficient using Laplace Transform techniques.

**TOTAL: 45 + 15 HOURS**

**FURTHER READING:**

1. Volume of Cylindrical and spherical polar co ordinates.
2. Application of Integral theorems in finding Volume/Area of Hemispheres, cylinders etc.

**COURSE OUTCOMES: Skill Development**

On the Successful completion of the course, Students will be able to

CO1: Construct Analytic functions and trace the image of a region using transformation.

CO2: Solve complex integrals.

CO3: Apply multiple integral technique to find area and volume.

CO4: Compute surface and volume integral in vector field.

CO5: Apply Laplace Transform in solving Boundary value problems of second order ODE.

**REFERENCES:**

1. Veerarajan R., "Engineering Mathematics", updated second edition for Semester I and II, 2017.
2. Grewal. B.S, "Higher Engineering Mathematics", 44th Edition, Khanna Publications, Delhi, 2014.
3. Bali N. P and Manish Goyal, "Text book of Engineering Mathematics", Sixth edition, Laxmi Publications Pvt. Ltd., 2014.
4. Glyn James, "Advanced Modern Engineering Mathematics", 3rd Edition, Pearson Education, 2012.
5. P.Kandasamy, K. Gunavathy and K. Thilagavathy, Engineering Mathematics, Volume II, S. Chand & Co., New Delhi, 2009.
6. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing, New Delhi, 2007.
7. Veerarajan R., "Engineering Mathematics", fifth Edition, Tata Mc Graw Hill Publishing Company, New Delhi, 2006.
8. M K Venkataraman, Engineering mathematics, Volume I, 2nd ed., National Publishing Co. 2003.
9. nptel.ac.in/courses/111105035, www.nptelvideos.in/2012/11/Mathematics.html
10. www.learnerstv.com/Free-maths-video lectures - ltv348

ATTESTED

Dr. S. RAMABALAN, M.E., Ph.D.  
PRINCIPAL

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002  
Nagapattinam (Dt) Tamil Nadu.



1701PH201

**PHYSICS OF ENGINEERING MATERIALS**  
(Common to B.E. CSE & B.Tech. IT Programmes)

L	T	P	C
3	0	0	3

**COURSE OBJECTIVES:**

1. To understand the physical properties of conductors, semiconductors and superconductors.
2. To recognize the basic principle of interaction of light with matter and working of optical devices.
3. To classify the types of dielectric, magnetic materials and polarization mechanisms with their properties.

**UNIT I CONDUCTING AND SUPERCONDUCTING MATERIALS** **9 Hours**  
Electrical and thermal conductivity of metals – Wiedemann Franz law – band theory of metals – density of states. Superconductors: properties – types – High Tc superconductors – applications.

**UNIT II SEMICONDUCTORS** **9 Hours**  
Elemental and compound semiconductors – intrinsic semiconductors: carrier concentration – electrical conductivity – band gap. Extrinsic semiconductors: carrier concentration – variation of Fermi level. Hall effect: theory and experimental determination – applications: Solar cells.

**UNIT III DIELECTRIC MATERIALS** **9 Hours**  
Types of polarization: electronic, ionic, orientation and space charge polarization mechanisms – Langevin – Debye equation – frequency and temperature effects on polarization – dielectric strength and loss – dielectric breakdown mechanisms – active dielectric materials: piezo, pyro and ferroelectricity – applications.

**UNIT IV OPTICAL MATERIALS** **9 Hours**  
Interaction of light with materials – optical absorption – transmission – Luminescence in solids – Fluorescence and Phosphorescence – Optical band gap – LED, LCD.

**UNIT V MAGNETIC MATERIALS** **9 Hours**  
Classification and properties – domain theory – hard and soft magnetic materials – anti-ferro and ferri magnetic materials – applications: magnetic recording and memories.

**TOTAL: 45 HOURS**

**FURTHER READING:**

1. Photonic crystals - LIFI

**COURSE OUTCOMES:** Skill Development

On the Successful completion of the course, Students will be able to

- CO1: Exemplify the physical properties of conductors, superconductors and semiconductors with applications.
- CO2: Identify the suitable semiconducting material for solar cell applications.
- CO3: Select the suitable materials for insulating and dielectric applications.
- CO4: Compare the optical properties of display devices.
- CO5: Analyze the properties of magnetic materials for practical applications.

**REFERENCES:**

1. Saxena, Gupta, Mandal, Solid State Physics, Pragati Prakashan Educational Publishers, 13<sup>th</sup> revised edition, Meerut, India, 2013.
2. M.N. Avadhanulu and P.G.Kshirsagar, A Text Book of Engineering Physics, S.Chand & Company Ltd, New Delhi, 2011.
3. S.O.Pillai, Solid State Physics, New Age International Publications, New Delhi, 2010.
4. M.A. Wahab, N.K. Mehta, Solid State physics – structure and properties of materials, Narosa publishing house Pvt. Ltd, 6<sup>th</sup> edition, 2010.
5. Semiconductor Physics and Devices, Donald A. Neamen, Mc Graw-Hill, 2011.
6. P.K. Palanisamy, Materials Science, Scitech Publications India Pvt.Ltd, 2014.

ATTESTED

  
**Dr. S. RAMABALAN, M.E., Ph.D.,**  
PRINCIPAL

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.



1701CH201

**ENVIRONMENTAL STUDIES**  
 (Common to all B.E. / B.Tech Degree Programmes)

L	T	P	C
3	0	0	3

**COURSE OBJECTIVES:**

1. Realize the interdisciplinary and holistic nature of the environment.
2. Understand how natural resources and environment affect the quality of life and stimulate the quest for sustainable development.
3. Recognize the socio-economic, political and ethical issues in environmental science.

**UNIT I**

**ECOSYSTEMS AND BIODIVERSITY**

**10 Hours**

Concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – Oxygen cycle and Nitrogen cycle – energy flow in the ecosystem – ecological succession processes – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – hot – spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man – wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Documentation of the medicinal plants in your native place.

**UNIT II**

**NATURAL RESOURCES**

**10 Hours**

Forest resources: Use and over – exploitation, deforestation, case studies – timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and overutilization of surface and ground water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer – pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources. Energy Conversion processes – Biogas – production and uses, anaerobic digestion; case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Documentation of the effect of modern Agriculture in your nearby Village.

**UNIT III ENVIRONMENTAL POLLUTION**

**9 Hours**

Definition – Source, causes, effects and control measures of: (a) Air pollution – Mitigation procedures – Control of particulate and gaseous emission, Control of SO<sub>x</sub>, NO<sub>x</sub>, CO and HC) – Technology for capturing CO<sub>2</sub> (metallo- organic frame works) (b) Water pollution – Waste water treatment processes. (c) Soil pollution – soil waste management: causes, effects and control measures of municipal solid wastes – (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – role of an individual in prevention of pollution – pollution case studies. Documentation study of local polluted site – Urban / Rural / Industrial / Agricultural.

**UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT**

**8 Hours**

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – environmental ethics: Issues and possible solutions – 12 Principles of green chemistry – consumerism and waste products – environment protection act – Air act – Water act – Wildlife protection act – Forest conservation act – The Biomedical Waste (Management and Handling) Rules; 1998 and amendments – scheme of labeling of environmentally friendly products (Ecomark) central and state pollution control boards – disaster management: floods, earthquake – Public awareness. Analyze the recent steps taken by government of India to prevent pollution (Green India and Clean India).

**UNIT V HUMAN POPULATION AND THE ENVIRONMENT**

**8 Hours**

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – Environmental impact analysis (EIA) – GIS – remote sensing – role of information technology in environment and human health – Case studies. Documentation study of the Human health and the environment in nearby Hospital (Statistical report).

**TOTAL: 45 HOURS**

**FURTHER READING:**

Human rights: E – waste and biomedical waste – Identification of adulterants in food materials



**COURSE OUTCOMES:** *Employability*

On the Successful completion of the course, Students will be able to

- CO1: Describe the importance of ecosystem and its conservation.
- CO2: Differentiate various natural resources and the urgent need to conserve the natural resources.
- CO3: Explain the different types of pollution and its effects.
- CO4: Describe the various environmental protection acts.
- CO5: Explain the major diseases, women, child development and the impacts of population explosion.

**REFERENCES:**

1. Trivedi. R.K., "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol. I and II, Enviro Media, 3<sup>rd</sup> edition, BPB publications, 2010.
2. Cunningham, W.P.Cooper, T.H. Gorhani, "Environmental Encyclopedia", Jaico Publishing House, Mumbai, 2001.
3. Dharmendra S. Sengar, "Environmental law", Prentice hall of India PVT LTD, New Delhi, 2007.
4. Rajagopalan. R, "Environmental Studies-From Crisis to Cure", Oxford University Press, 2005.
5. Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, 2006.
6. [https://en.wikipedia.org/wiki/Carbon\\_capture\\_and\\_storage](https://en.wikipedia.org/wiki/Carbon_capture_and_storage)
7. Ravikrishnan. A., "Environmental Science and Engineering", Sri Krishna Hi-tech Publishing Company Pvt. Ltd.

**ATTESTED**



**Dr. S. RAMABALAN, M.E., Ph.D.,  
PRINCIPAL**

E.G.S. Pillay Engineering College  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.

1701GE201	<b>BASIC CIVIL AND MECHANICAL ENGINEERING</b> (Common to B.E. / B.Tech. – CSE, ECE & IT)	<b>L</b> 3	<b>T</b> 0	<b>P</b> 0	<b>C</b> 3
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**COURSE OBJECTIVES:**

1. To impart basic knowledge on Civil and Mechanical Engineering.
2. To explain the materials used for the construction of civilized structures.
3. To understand the fundamentals of construction of structure.
4. To explain the component of power plant units and detailed explanation to IC engines their working principles.
5. To explain the R & AC system.

**A – CIVIL ENGINEERING**

**UNIT I SURVEYING AND CIVIL ENGINEERING MATERIALS** 9 Hours

Surveying: Objects – types – classification – principles.

Civil Engineering Materials: Bricks – stones – sand – cement – concrete – steel sections

**UNIT II BUILDING COMPONENTS AND STRUCTURES** 9 Hours

Foundations: Types, Bearing capacity – Requirement of good foundations.

Superstructure: Brick masonry – stone masonry – beams – columns – lintels – roofing – flooring – plastering – Mechanics – Internal and external forces – stress – strain – elasticity.

**B – MECHANICAL ENGINEERING**

**UNIT III POWER PLANT ENGINEERING AND PUMPS** 9 Hours

Introduction, Classification of Power Plants – Working principle of steam, Gas, Diesel, Hydro-electric and Nuclear Power plants – Merits and Demerits – Pumps and turbines – working principle of Reciprocating pumps (single acting and double acting) – Centrifugal Pump.

**UNIT IV IC ENGINES** 9 Hours

Internal combustion engines as automobile power plant – Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Boiler as a power plant.

**UNIT V REFRIGERATION AND AIR CONDITIONING SYSTEM** 9 Hours

Terminology of Refrigeration and Air Conditioning. Principle of vapour compression and absorption system – Layout of typical domestic refrigerator – Window and Split type room Air conditioner.

**FURTHER READING:**

1. Mechanics of solids.
2. Structural Design.
3. Thermal Engineering, Fluid mechanics, Heat and mass transfer.

**COURSE OUTCOMES: Employability**

On the successful completion of the course, students will be able to

**CO1: Explain the survey and usage of construction material and proper selection of construction materials.**

**CO2: Know about the building structures.**

**CO3: Identify the components of power plant.**

**CO4: Demonstrate working principles of petrol and diesel engine.**

**CO5: Explain the components of refrigeration and air conditioning.**

**REFERENCES:**

1. Ramamrutham S., "Basic Civil Engineering", Dhanpat Rai Publishing Co. (P) Ltd., New Delhi, 1999.
2. Seetharaman S., "Basic Civil Engineering", Anuradha Agencies, 2005.
3. Venugopal K. and Prahuraja V., "Basic Mechanical Engineering", Anuradha Publishers, Kumbakonam, 2000.
4. Shantha Kumar S R J., "Basic Mechanical Engineering", Hi-tech Publications, Mayiladuthurai, 2000.
5. Shanmugam G and Palanichamy M S, "Basic Civil and Mechanical Engineering", Tata McGraw Hill Publishing Co., New Delhi, 1996.

**ATTESTED**

  
**Dr. S. RAMABALAN, M.E., Ph.D.,**  
**PRINCIPAL**

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.



1702CS201

**PROGRAMMING IN C++**  
(Common to B.E. CSE & B.Tech. IT Programmes)

L	T	P	C
3	0	0	3

**COURSE OBJECTIVES:**

1. To understand the concepts of Object Oriented Programming.
2. To execute the Object oriented concepts to solve problems using C++
3. To develop programs using files and templates.

**UNIT I BASIC CONCEPTS**

Object Oriented Paradigm – Elements of Object Oriented Programming – Merits and Demerits of Object oriented Methodology – C++ fundamentals – Data types, Operators and Expressions, Control flow, Arrays – Implementing ADT in the base language. **8 Hours**

**UNIT II CLASS AND OBJECTS**

**Classes and Objects** – Passing objects as arguments – returning objects – Friend functions – Static data and member functions – Constructors – Parameterized Constructor – Destructor – Copy constructor – Array of objects – pointer to object members. **10 Hours**

**UNIT III POLYMORPHISM AND INHERITANCE**

Polymorphism – Function overloading – Unary operator overloading – Binary operator overloading – Data conversion – Overloading with Friend Functions. **Inheritance** – Derived Class – Abstract Classes – **Types of Inheritance** – Iterators and Containers. **9 Hours**

**UNIT IV VIRTUAL FUNCTIONS AND TEMPLATES**

Virtual functions – Pure virtual functions – Virtual Destructors – RTTI – Typeid – Dynamic casting – Cross casting – Down casting – Template – Class template, Function Template, Generic programming, Standard Template Library. **10 Hours**

**UNIT V FILES AND EXCEPTION HANDLING**

C++ streams – console streams – console stream classes – formatted and unformatted console I/O operations – Manipulators File streams classes – File modes – File pointers and Manipulations – File I/O – **Exception Handling** – Try-Catch-Throw Paradigm – Exception specifications – Terminate and unexpected functions – Uncaught Exception. **8 Hours**

**FURTHER READING:**

**TOTAL: 45 HOURS**

**Object Oriented Approach in Java Programming**

**COURSE OUTCOMES: Employability -**

On the Successful completion of the course, Students will be able to

CO1: Explore the concept of classes and objects.

CO2: Develop programs using arrays and strings.

CO3: Implement the various types of inheritance.


CO4: Exemplify the concepts of functions and streams.

CO5: Develop programs using files, templates and exception handling.

**REFERENCES:**

1. K.R.Venugopal, Rajkumar Buyya, and T.Ravishankar, "Mastering C++", McGraw Hill Education, 2<sup>nd</sup> Edition, 2017.
2. Bjarne Stroustrup, "The C++ programming language", Addison Wesley, fourth edition, 2013
3. E.Balagurusamy, "Object Oriented Programming with C++", McGraw Hill Education, 5<sup>th</sup> Edition, 2017.
4. Robert Lafore, "Object Oriented Programming in C++", Galgotia Publications Pvt. Ltd., Third Edition, 1999.
5. Ira Pohl, "Object oriented programming using C++", 2nd Edition, Pearson Education, Reprint 2004.
6. <http://nptel.ac.in/>

ATTESTED

  
Dr. S. RAMABALAN, M.E., Ph.D.  
PRINCIPAL  
E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.

1701GEX53

**WORKSHOP PRACTICE**  
(Common to all B.E. / B.Tech Degree Programmes)

L	T	P	C
0	0	2	1

**COURSE OBJECTIVES:**

1. To provide hands on training for fabrication of components using sheet metal and welding equipment / tools.
2. To develop skill for using carpentry and fitting tools to make simple components and metal joints.
3. To provide hands on training for preparing the green sand mould using foundry tools.
4. To provide training for making simple house hold electrical & pipe line connections using suitable tools.
5. To develop the skill to make / operate/utilize the simple engineering components.

**LIST OF EXPERIMENTS**

- |   |         |
|---|---------|
| 1. Forming of simple object in sheet metal using suitable tools (Example: Dust Pan / Soap Box) (or) making simple object using Metal Spinning Machine. (Example: Aluminum Cup).   | 4 Hours |
| 2. Prepare V (or) Half round (or) Square (or) Dovetail joint from the given mild Steel flat.  | 4 Hours |
| 3. Fabrication of a simple component using thin and thick plates. (Example: Book rack)  | 2 Hours |
| 4. Making a simple component using carpentry power tools. (Example: Electrical switch Box/Tool box/ Letter box.   | 2 Hours |
| 5. Construct a household pipe line connections using pipes, Tee joint, Four way joint, elbow, union, bend, Gate way and Taps (or) Construct a pipe connections of house application centrifugal pump using pipes, bend, gate valve, flanges and foot valve. | 4 Hours |
| 6. Prepare a green sand mould using solid pattern/split pattern.  | 4 Hours |
| 7. Study of gas welding equipment and its demonstration   | 2 Hours |
| 8. Soldering Practice for simple printed circuit board.   | 4 Hours |
| 9. Construct a domestic electrical wire connections using indicator, one way switch with calling bell, two way switch with lamp, one way switch with fan regulator and one way switch with socket.  | 4 Hours |

**COURSE OUTCOMES:**

**TOTAL: 30 HOURS**

- On the successful completion of the course, students will be able to
- CO1: Fabricate simple components using sheet metal & welding equipment/tools.
  - CO2: Make simple components / joints using carpentry and fitting tools. *Skill Development*
  - CO3: Prepare green sand mould using suitable tools. *Employability*
  - CO4: Make simple house hold electrical & pipe line connections using suitable tools. *Entrepreneur*
  - CO5: Make / operate / utilize the simple engineering components.

**ATTESTED**

*[Signature]*  
**Dr. S. RAMABALAN, M.E., Ph.D.,**  
**PRINCIPAL**  
E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.



1701HS251

**PHYSICS AND CHEMISTRY LABORATORY-II**  
(Common to all B.E. / B.Tech Degree Programmes)

L	T	P	C
0	0	2	1

**COURSE OBJECTIVES:**

1. The Objective of this course is to make the students gain practical knowledge to co-relate with the theoretical studies.
2. To achieve perfectness in experimental skills.
3. To bring confidence and ability to develop and fabricate engineering and technical equipments.
4. To make the student acquire practical skills in the wet chemical and instrumental methods for quantitative estimation of hardness, alkalinity, metal ion content, corrosion in metals and cement analysis.

**LIST OF EXPERIMENTS:**

**PHYSICS**

1. Using lees disc apparatus, determine the coefficient of thermal conductivity of a bad conductor.
2. Find the band gap value of the given semiconductor diode. Based on the band gap value, identify the given semiconductor.
3. With the aid of spectrometer, find the angle of Prism and refractive index of the medium.
4. Determine the wavelengths of polychromatic source in the visible region using spectrometer grating.
5. Find the depression at the midpoint of the given wooden beam subjected to non-uniform bending and determines the Young's modulus of the material of the beam.
6. Find the given unknown resistance using Carey-Foster's Bridge.

**LIST OF EXPERIMENTS:**

**CHEMISTRY**

1. Conductometric Precipitation titration of  $\text{BaCl}_2$  Vs  $\text{Na}_2\text{SO}_4$
  2. Estimation of dissolved oxygen in a water sample/sewage by Winklers method.
  3. Estimation of chloride content in water by argentometric method.
  4. Conductometric titration of mixture of acids.
  5. Comparison of alkalinities of the given water samples.
- Additional Experiments:**
1. Estimation of heavy metals in the given solution by EDTA method.
  2. Determination of concentration of unknown colored solution using spectrophotometer.

**COURSE OUTCOMES:**

TOTAL: 30 HOURS

On the successful completion of the course, students will be able to

- CO1 : Realize the concept of properties of matter and apply the same for practical applications.
- CO2 : Identify the suitable laser source for fiber optic communication applications.
- CO3 : Determine the velocity of ultrasonic waves and apply the same for day today applications.
- CO4 : Classify the different types of crystal structures and analyze their properties.
- CO5 : Comprehend the efficacy of quantum equations in modern areas.
- CO6 : Illustrate the EMF of the Redox reaction.
- CO7 : Compare the Alkalinity of given water Sample with their standards.
- CO8 : Identify the Concentration of metal ion present in water sample.
- CO9 : Outline the precipitation titration using Conductivity meter.
- CO10: Interpret the dissolved oxygen present in the water.

Employability

Skill Development

**REFERENCES:**

1. D.S.Mathur, Elements of Properties of matter, 5th edition, S.Chand & Company Ltd., New Delhi, 2012.
2. Charles Kittel, Introduction to Solid State Physics, 8th edition, Wiley India Pvt. Ltd., New Delhi, 2012.
3. Arthur Beiser, Shobhit Mahajan and S. Rai Choudhury, Concepts of Modern Physics, 6th edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2010.
4. B.K. Pandey and S. Chaturvedi, Engineering Physics, 1st edition, Cengage Learning India Pvt. Ltd., New Delhi, 2012.
5. Halliday and Resnick, Fundamentals of Physics, John Wiley and Sons, Inc, 2011.
6. Ian Morison, Introduction to Astronomy and Cosmology, John Wiley and Sons, Ltd, 2013.
7. Laboratory Manual on Engineering Chemistry, S.K. Bhasin, S. Rani, Dhanpat Rai Publishing Company, New Delhi, 2011.
8. Daniel R. Palleros, "Experimental organic chemistry" John Wiley & Sons, New York (2001).
9. Furniss B.S. Hannaford A.J, Smith P.W.G and Tatchel A.R., "Vogel's Textbook of practical organic chemistry", LBS Singapore (1994).
10. Jeffery G.H., Bassett J., Mendham J. and Denny vogel "Textbook of quantitative analysis chemical analysis", ELBS 5th Edn. Longman, Singapore publishers, Singapore.
11. Kolthoff I.M., Sandell E.B. et al. "Quantitative chemical analysis", McGraw-Hill, New York.

DR. S. RAMARAJAN, M.E., Ph.D.  
PRINCIPAL  
E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.

1702CS251

**PROGRAMMING IN C++ LAB**  
(Common to B.E. CSE & B.Tech. IT Programmes)

L	T	P	C
0	0	2	1

**COURSE OBJECTIVES:**

1. To understand the concepts of Object Oriented Programming.
2. To execute the Object oriented concepts to solve problems using C++
3. To develop programs using files and templates.

**LIST OF EXPERIMENTS:**

1. Write a C++ program to implement operator overloading with class and objects.
2. Write a C++ program to implement types of Inheritance.
3. Write a C++ program to implement two different classes for adding a private data member using friend function.
4. Write a C++ program to implement operator and function overloading.
5. Write a C++ program to implement file handling operations.
6. Write a C++ program to implement Class templates and Function templates.
7. Write a C++ program to implement exception handling.

**Additional Experiments:**

1. Write a C ++ program to perform complex number subtraction by overloading an operator using friend function.
2. Write a C ++ program to perform quick sort using function template.

**TOTAL: 30 HOURS**

**COURSE OUTCOMES:**

On the successful completion of the course, students will be able to

**CO1 :** Implement the concept of classes and objects.

**CO2 :** Develop programs using arrays and strings. *Employability*

**CO3 :** Implement the various types of inheritance.

**CO4 :** Exemplify the concepts of functions and streams. *skill development*

**REFERENCES:**

1. K.R.Venugopal, Rajkumar Buyya, and T.Ravishankar, "Mastering C++", McGraw Hill Education, 2<sup>nd</sup> Edition, 2017.
2. Bjarne Stroustrup, "The C++ programming language", Addison Wesley, fourth edition, 2013
3. E.Balagurusamy, "Object Oriented Programming with C++", McGraw Hill Education, 5<sup>th</sup> Edition, 2017.
4. Robert Lafore, "Object Oriented Programming in C++", Galgotia Publications Pvt. Ltd., Third Edition, 1999.
5. Ira Pohl, "Object oriented programming using C++", 2nd Edition, Pearson Education, Reprint 2004.
6. <http://nptel.ac.in/>

**ATTESTED**

  
**Dr. S. RAMABALAN. M.E., Ph.D.,**  
**PRINCIPAL**

**E.G.S. Pillay Engineering College,**  
**Thethi, Nagore - 611 002.**  
**Nagapattinam (Dt) Tamil Nadu.**



**OBJECTIVES:**

To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems.

To acquaint the student with Fourier transform techniques used in wide variety of situations.

To introduce the effective mathematical tools for the solutions of partial differential equations that model several physical processes and to develop Z transform techniques for discrete time systems.

**UNIT I PARTIAL DIFFERENTIAL EQUATIONS 9+3** Formation of partial differential equations – Singular integrals -- Solutions of standard types of first order partial differential equations - Lagrange's linear equation -- Linear partial differential equations of second and higher order with constant coefficients of both homogeneous and non-homogeneous types.

**UNIT II FOURIER SERIES**

9+3

Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series – Half range cosine series – Complex form of Fourier series – Parseval's identity – **Harmonic analysis.**

**UNIT III APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS**

9+3

Classification of PDE – Method of separation of variables - **Solutions of one dimensional wave equation** – One dimensional equation of heat conduction – Steady state solution of two dimensional equation of heat conduction (excluding insulated edges).

**UNIT IV FOURIER TRANSFORMS**

9+3

Statement of Fourier integral theorem – Fourier transform pair – Fourier sine and cosine transforms – Properties – Transforms of simple functions – **Convolution theorem** – Parseval's identity.

**UNIT V Z - TRANSFORMS AND DIFFERENCE EQUATIONS**

9+3

Z- transforms - Elementary properties – Inverse Z - transform (using partial fraction and residues) – Convolution theorem - Formation of difference equations – Solution of difference equations using Z - transform.

**TOTAL (L:45+T:15): 60 PERIODS**



**OUTCOMES:***Skill Development*

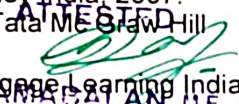
The understanding of the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.

**TEXT BOOKS:**

- Veerarajan. T., "Transforms and Partial Differential Equations", Second reprint, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2012.  
 Grewal. B.S., "Higher Engineering Mathematics", 42<sup>nd</sup> Edition, Khanna Publishers, Delhi, 2012.  
 Narayanan.S., Manicavachagom Pillay.T.K and Ramanaiah.G "Advanced Mathematics for Engineering Students" Vol. II & III, S.Viswanathan Publishers Pvt Ltd. 1998.

**REFERENCES:**

- Bali.N.P and Manish Goyal, "A Textbook of Engineering Mathematics", 7<sup>th</sup> Edition, Laxmi Publications Pvt Ltd , 2007.  
 Ramana.B.V., "Higher Engineering Mathematics", Tata Mc-GrawHill Publishing Company Limited, New Delhi, 2008.  
 Glyn James, "Advanced Modern Engineering Mathematics", 3<sup>rd</sup> Edition, Pearson Education, 2007.  
 Erwin Kreyszig, "Advanced Engineering Mathematics", 8<sup>th</sup> Edition, Wiley India, 2007.  
 Ray Wylie. C and Barrett.L.C, "Advanced Engineering Mathematics" Tata McGraw Hill Education Pvt Ltd, Sixth Edition, New Delhi, 2012.  
 Datta.K.B., "Mathematical Methods of Science and Engineering" Cengage Learning India Pvt Ltd, Delhi, 2013.

ATTESTED  
  
 DR. S. RAMA PRALAN, M.E., Ph.D.,  
 PRINCIPAL  
 E.G.S. Pillay Engineering College,  
 Thethi, Nagore - 611 002.  
 Nagapattinam (Dt) Tamil Nadu.

CS6301

PROGRAMMING AND DATA STRUCTURES II

L T P C

3 0 0 3

**OBJECTIVES:**

- Be familiar with the C++ concepts of abstraction, encapsulation, constructor, polymorphism, overloading and Inheritance.
- Learn advanced nonlinear data structures.
- Be exposed to graph algorithms
- Learn to apply Tree and Graph structures

**UNIT I OBJECT ORIENTED PROGRAMMING FUNDAMENTALS**

9

C++ Programming features - Data Abstraction - Encapsulation - class - object - constructors - static members - constant members - member functions - pointers - references - Role of this pointer - Storage classes - function as arguments.

## UNIT II OBJECT ORIENTED PROGRAMMING CONCEPTS

9

String Handling – Copy Constructor - Polymorphism – compile time and run time polymorphisms – function overloading – operators overloading – dynamic memory allocation - Nested classes - Inheritance – virtual functions.

## UNIT III C++ PROGRAMMING ADVANCED FEATURES

9

Abstract class – Exception handling - Standard libraries - Generic Programming - templates – class template - function template – STL – containers – iterators – function adaptors – allocators - Parameterizing the class - File handling concepts.

## UNIT IV ADVANCED NON-LINEAR DATA STRUCTURES

9

AVL trees – B-Trees – Red-Black trees – Splay trees - Binomial Heaps – Fibonacci Heaps – Disjoint Sets – Amortized Analysis – accounting method – potential method – aggregate analysis.

## UNIT V GRAPHS

9

Representation of Graphs – Breadth-first search – Depth-first search – Topological sort – Minimum Spanning Trees – Kruskal and Prim algorithm – Shortest path algorithm – Dijkstra's algorithm – Bellman-Ford algorithm – Floyd-Warshall algorithm.

**TOTAL: 45 PERIODS**

### OUTCOMES:

*Employability*

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

Design problem solutions using Object Oriented Techniques.

Apply the concepts of data abstraction, encapsulation and inheritance for problem solutions.

Use the control structures of C++ appropriately.

Critically analyse the various algorithms.

Apply the different data structures to problem solutions.

### TEXT BOOKS:

Bjarne Stroustrup, "The C++ Programming Language", 3<sup>rd</sup> Edition, Pearson Education, 2007.  
Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", 2<sup>nd</sup> Edition, Pearson Education, 2005.

### REFERENCES:

Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Second Edition, Mc Graw Hill, 2002.  
Michael T Goodrich, Roberto Tamassia, David Mount, "Data Structures and Algorithms in C++", 7<sup>th</sup> Edition, Wiley Publishers, 2004.

**ATTESTED**

*[Signature]*  
**Dr. S. RAMABALAN**, M.E., Ph.D.,

**PRINCIPAL**,  
E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.

CS6302

**DATABASE MANAGEMENT SYSTEMS**

**L T P C**  
**3 0 0 3**

### OBJECTIVES:

To expose the students to the fundamentals of Database Management Systems.

To make the students understand the relational model.

To familiarize the students with ER diagrams.

To expose the students to SQL.

To make the students to understand the fundamentals of Transaction Processing and Query Processing.

To familiarize the students with the different types of databases.

To make the students understand the Security Issues in Databases.



**UNIT I INTRODUCTION TO DBMS**

10

File Systems Organization - Sequential, Pointer, Indexed, Direct - Purpose of Database System- Database System Terminologies-Database characteristics- Data models – Types of data models – Components of DBMS- Relational Algebra. LOGICAL DATABASE DESIGN: Relational DBMS - Codd's Rule - Entity-Relationship model - Extended ER Normalization – Functional Dependencies, Anomaly- 1NF to 5NF- Domain Key Normal Form – Denormalization.

**UNIT II SQL & QUERY OPTIMIZATION**

8

SQL Standards - Data types - Database Objects- DDL-DML-DCL-TCL-Embedded SQL-Static Vs Dynamic SQL - QUERY OPTIMIZATION: Query Processing and Optimization - Heuristics and Cost Estimates in Query Optimization.

**UNIT III TRANSACTION PROCESSING AND CONCURRENCY CONTROL**

8

Introduction-Properties of Transaction- Serializability- Concurrency Control – Locking Mechanisms- Two Phase Commit Protocol-Dead lock.

**UNIT IV TRENDS IN DATABASE TECHNOLOGY**

10

Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary storage – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing - Introduction to Distributed Databases- Client server technology- Multidimensional and Parallel databases- Spatial and multimedia databases- Mobile and web databases- Data Warehouse-Mining- Data marts.

**UNIT V ADVANCED TOPICS**

9

DATABASE SECURITY: Data Classification-Threats and risks – Database access Control – Types of Privileges –Cryptography- Statistical Databases.- Distributed Databases-Architecture-Transaction Processing-Data Warehousing and Mining-Classification-Association rules-Clustering-Information Retrieval- Relevance ranking-Crawling and Indexing the Web- Object Oriented Databases-XML Databases.

**TOTAL: 45 PERIODS**

**OUTCOMES:**

*Employability*

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

- Design Databases for applications.
- Use the Relational model, ER diagrams.
- Apply concurrency control and recovery mechanisms for practical problems.
- Design the Query Processor and Transaction Processor.
- Apply security concepts to databases.

**TEXT BOOK:**

- Ramez Elmasri and Shamkant B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education, 2008.

**REFERENCES:**

- Abraham Silberschatz, Henry F. Korth and S. Sudharshan, "Database System Concepts", Sixth Edition, Tata McGraw Hill, 2011.
- C.J.Date, A.Kannan and S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.
- Atul Kahate, "Introduction to Database Management Systems", Pearson Education, New Delhi, 2006.
- Alexis Leon and Mathews Leon, "Database Management Systems", Vikas Publishing House Private Limited, New Delhi, 2003.

**ATTESTED**

  
**Dr. S. RAMABALAN, M.E., Ph.D.,**  
**PRINCIPAL**

**E.G.S. Pillay Engineering College,**  
**Thethi, Nagore - 611 002.**  
**Nagapattinam (Dt) Tamil Nadu.**

Raghu Ramakrishnan, "Database Management Systems", Fourth Edition, Tata McGraw Hill, 2010.

G.K.Gupta, "Database Management Systems", Tata McGraw Hill, 2011.

Rob Cornell, "Database Systems Design and Implementation", Cengage Learning, 2011.

CS6303

COMPUTER ARCHITECTURE

L T P C  
3 0 0 3

**OBJECTIVES:**

To make students understand the basic structure and operation of digital computer.

To understand the hardware-software interface.

To familiarize the students with arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations.

To expose the students to the concept of pipelining.

To familiarize the students with hierarchical memory system including cache memories and virtual memory.

To expose the students with different ways of communicating with I/O devices and standard I/O interfaces.

**UNIT I OVERVIEW & INSTRUCTIONS**

9

Eight ideas – Components of a computer system – Technology – Performance – Power wall – Uniprocessors to multiprocessors; Instructions – operations and operands – representing instructions – Logical operations – control operations – Addressing and addressing modes.

**UNIT II ARITHMETIC OPERATIONS**

7

ALU - Addition and subtraction – Multiplication – Division – Floating Point operations – Subword parallelism.

**UNIT III PROCESSOR AND CONTROL UNIT**

11

Basic MIPS implementation – Building datapath – Control Implementation scheme – Pipelining – Pipelined datapath and control – Handling Data hazards & Control hazards – Exceptions.

**UNIT IV PARALLELISM**

9

Instruction-level-parallelism – Parallel processing challenges – Flynn's classification – Hardware multithreading – Multicore processors

**UNIT VMEMORY AND I/O SYSTEMS**

9

Memory hierarchy - Memory technologies – Cache basics – Measuring and improving cache performance - Virtual memory, TLBs - Input/output system, programmed I/O, DMA and interrupts, I/O processors.

**TOTAL: 45 PERIODS**

**OUTCOMES:**

*Skill Development*

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

Design arithmetic and logic unit.

Design and analyse pipelined control units

Evaluate performance of memory systems.

Understand parallel processing architectures.

**TEXT BOOK:**

David A. Patterson and John L. Hennessey, "Computer organization and design", Morgan auffman / Isevier, Fifth edition, 2014.

35

**ATTESTED**

  
**Dr. S. RAMABALAN, M.E., Ph.D.,**  
**PRINCIPAL**  
E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nandapattinam (Dt) Tamil Nadu.



## REFERENCES:

- V. Carl Hamacher, Zvonko G. Varanescic and Safat G. Zaky, "Computer Organisation", VI edition, McGraw-Hill Inc, 2012.
- William Stallings "Computer Organization and Architecture", Seventh Edition, Pearson Education, 2006.
- Vincent P. Heuring, Harry F. Jordan, "Computer System Architecture", Second Edition, Pearson Education, 2005.
- Govindarajalu, "Computer Architecture and Organization, Design Principles and Applications", first edition, Tata McGraw Hill, New Delhi, 2005.
- John P. Hayes, "Computer Architecture and Organization", Third Edition, Tata McGraw Hill, 1998.
- <http://nptel.ac.in/>.

CS6304

ANALOG AND DIGITAL COMMUNICATION

L T P C  
3 0 0 3

## OBJECTIVES:

The student should be made to:

- Understand analog and digital communication techniques.
- Learn data and pulse communication techniques.
- Be familiarized with source and Error control coding.
- Gain knowledge on multi-user radio communication.

### UNIT I ANALOG COMMUNICATION

9

Noise: Source of Noise - External Noise- Internal Noise- Noise Calculation. Introduction to Communication Systems: Modulation – Types - Need for Modulation. Theory of Amplitude Modulation Evolution and Description of SSB Techniques - Theory of Frequency and Phase Modulation – Comparison of various Analog Communication System (AM – FM – PM).

### UNIT II DIGITAL COMMUNICATION

9

Amplitude Shift Keying (ASK) – Frequency Shift Keying (FSK) Minimum Shift Keying (MSK) –Phase Shift Keying (PSK) – BPSK – QPSK – 8 PSK – 16 PSK - Quadrature Amplitude Modulation (QAM) – 8 QAM – 16 QAM – Bandwidth Efficiency– Comparison of various Digital Communication System (ASK – FSK – PSK – QAM).

### UNIT III DATA AND PULSE COMMUNICATION

9

Data Communication: History of Data Communication - Standards Organizations for Data Communication- Data Communication Circuits - Data Communication Codes - Error Detection and Correction Techniques - Data communication Hardware - serial and parallel interfaces.  
Pulse Communication: Pulse Amplitude Modulation (PAM) – Pulse Time Modulation (PTM) – Pulse code Modulation (PCM) - Comparison of various Pulse Communication System (PAM – PTM – PCM).

### UNIT IV SOURCE AND ERROR CONTROL CODING

9

Entropy, Source encoding theorem, Shannon fano coding, Huffman coding, mutual information, channel capacity, channel coding theorem, Error Control Coding, linear block codes, cyclic codes, convolution codes, viterbi decoding algorithm.

## UNIT V MULTI-USER RADIO COMMUNICATION

9

Advanced Mobile Phone System (AMPS) - Global System for Mobile Communications (GSM) - Code division multiple access (CDMA) - Cellular Concept and Frequency Reuse - Channel Assignment and Hand off - Overview of Multiple Access Schemes - Satellite Communication - Bluetooth.

TOTAL: 45 PERIODS

OUTCOMES: Skill Development

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

- Apply analog and digital communication techniques.
- Use data and pulse communication techniques.
- Analyze Source and Error control coding.
- Utilize multi-user radio communication.

### TEXT BOOK:

Wayne Tomasi, "Advanced Electronic Communication Systems", 6<sup>th</sup> Edition, Pearson Education, 2009.

### REFERENCES:

- Simon Haykin, "Communication Systems", 4<sup>th</sup> Edition, John Wiley & Sons, 2004
- Rappaport T.S, "Wireless Communications: Principles and Practice", 2<sup>nd</sup> Edition, Pearson Education, 2007
- H.Taub, D L Schilling and G Saha, "Principles of Communication", 3<sup>rd</sup> Edition, Pearson Education, 2007.
- B. P.Lathi, "Modern Analog and Digital Communication Systems", 3<sup>rd</sup> Edition, Oxford University Press, 2007.
- Blake, "Electronic Communication Systems", Thomson Delmar Publications, 2002.
- 6. Martin S.Roden, "Analog and Digital Communication System", 3<sup>rd</sup> Edition, Prentice Hall of India, 2002.
- B.Sklar, "Digital Communication Fundamentals and Applications" 2<sup>nd</sup> Edition Pearson Education 2007.

ATTESTED

  
Dr. S. RAMABALAN. M.E., Ph.D..  
PRINCIPAL

E.G.S. Pillay Engineering College,

Agore - 611 002. L T P C  
Nagapattinam (Dt) Tamil Nadu 3 0 0 3

GE6351

ENVIRONMENTAL SCIENCE AND ENGINEERING

### OBJECTIVES:

To the study of nature and the facts about environment:

- To finding and implementing scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth's interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.



<b>UNIT I</b>	<b>ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY</b>	<b>12</b>
<p>Definition, scope and importance of Risk and hazards; Chemical hazards, Physical hazards, Biological hazards in the environment – concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers-Oxygen cycle and Nitrogen cycle – energy flow in the ecosystem – ecological succession processes – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Field study of common plants, insects, birds Field study of simple ecosystems – pond, river, hill slopes, etc.</p>		
<b>UNIT II</b>	<b>ENVIRONMENTAL POLLUTION</b>	<b>10</b>
<p>Definition – causes, effects and control measures of: (a) Air pollution (Atmospheric chemistry-Chemical composition of the atmosphere; Chemical and photochemical reactions in the atmosphere - formation of smog, PAN, acid rain, oxygen and ozone chemistry;- Mitigation procedures- Control of particulate and gaseous emission, Control of SO<sub>2</sub>, NO<sub>x</sub>, CO and HC) (b) Water pollution : Physical and chemical properties of terrestrial and marine water and their environmental significance; Water quality parameters – physical, chemical and biological; absorption of heavy metals - Water treatment processes. (c) Soil pollution - soil waste management: causes, effects and control measures of municipal solid wastes – (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards–role of an individual in prevention of pollution – pollution case studies – Field study of local polluted site – Urban / Rural / Industrial / Agricultural.</p>		
<b>UNIT III</b>	<b>NATURAL RESOURCES</b>	<b>10</b>
<p>Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and overutilization of surface and ground water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Energy Conversion processes – Biogas – production and uses, anaerobic digestion; case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Introduction to Environmental Biochemistry: Proteins –Biochemical degradation of pollutants, Bioconversion of pollutants. Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.</p>		
<b>UNIT IV</b>	<b>SOCIAL ISSUES AND THE ENVIRONMENT</b>	<b>7</b>
<p>From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization-environmental ethics: Issues and possible solutions – 12 Principles of green chemistry- nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act – Air act – Water act – Wildlife protection act – Forest conservation act – The Biomedical Waste (Management and Handling) Rules; 1998 and amendments- scheme of labeling of environmentally friendly products (Ecomark). enforcement machinery involved in environmental legislation- central and state pollution control boards- disaster management: floods, earthquake, cyclone and landslides. Public awareness.</p>		

## UNIT V HUMAN POPULATION AND THE ENVIRONMENT

6

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – Environmental impact analysis (EIA) – GIS-remote sensing-role of information technology in environment and human health – Case studies.

TOTAL: 45 PERIODS

### OUTCOMES:

*Employability*

Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.

Public awareness of environmental is at infant stage.

Ignorance and incomplete knowledge has lead to misconceptions.

Development and improvement in std. of living has lead to serious environmental disasters.

### TEXT BOOKS:

Gilbert M.Masters, „Introduction to Environmental Engineering and Science“, 2<sup>nd</sup> Edition, Pearson Education 2004.

Benny Joseph, „Environmental Science and Engineering“, Tata McGraw-Hill, New Delhi, 2006.

### REFERENCES:

R.K. Trivedi, „Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards“, Vol. I and II, Enviro Media.

Cunningham, W.P. Cooper, T.H. Gorhani, “Environmental Encyclopedia”, Jaico Publ., House, Mumbai, 2001.

Dharmendra S. Sengar, „Environmental law“, Prentice hall of India PVT LTD, New Delhi, 2007.

Rajagopalan, R, „Environmental Studies-From Crisis to Cure“, Oxford University Press 2005.

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Dr. S. RAMABALAN, M.E., Ph.D.,  
PRINCIPAL

IT6311

PROGRAMMING AND DATA STRUCTURE  
LABORATORY II

E.S.S. Pillay Engineering College  
Thetri, Nagore - 611 002. LT P C  
Nagapattinam. (Dt) Tamil Nadu. 0032

### OBJECTIVES:

The student should be made to:

- Be familiarized with good programming design methods, particularly Top- Down design.
- Getting exposure in implementing the different data structures using C++
- Appreciate recursive algorithms.

### LIST OF EXPERIMENTS:

#### IMPLEMENTATION IN THE FOLLOWING TOPICS:

- Constructors & Destructors, Copy Constructor.
- Friend Function & Friend Class.
- Inheritance.
- Polymorphism & Function Overloading.
- Virtual Functions.
- Overload Unary & Binary Operators Both as Member Function & Non Member Function.
- Class Templates & Function Templates.
- Exception Handling Mechanism.
- Standard Template Library concept.



File Stream classes.  
Applications of Stack and Queue  
Binary Search Tree  
Tree traversal Techniques  
Minimum Spanning Trees  
Shortest Path Algorithms

TOTAL: 45 PERIODS

**REFERENCE:**

[spoken-tutorial.org](http://spoken-tutorial.org).

**OUTCOMES:**

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

Design and implement C++ programs for manipulating stacks, queues, linked lists, trees, and graphs. *Skill Development*  
Apply good programming design methods for program development. *Employability*  
Apply the different data structures for implementing solutions to practical problems  
Develop recursive programs using trees and graphs.

**LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:**

Standalone desktops with C++ compiler 30 Nos.

(or)

Server with C++ compiler supporting 30 terminals or more.

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**PRINCIPAL**

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 062.  
Nagapattinam (Dt) Tamil Nadu.

IT6312

**DATABASE MANAGEMENT SYSTEMS LABORATORY**

**L T P C**  
**0 0 3 2**

**OBJECTIVES:**

The student should be made to:

- Learn to create and use a database
- Be familiarized with a query language
- Have hands on experience on DDL Commands
- Have a good understanding of DML Commands and DCL commands
- Familiarize advanced SQL queries.
- Be Exposed to different applications

**LIST OF EXPERIMENTS:**

- Creation of a database and writing SQL queries to retrieve information from the database.
- Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions.
- Creation of Views, Synonyms, Sequence, Indexes, Save point.
- Creating an Employee database to set various constraints.
- Creating relationship between the databases.
- Study of PL/SQL block.
- Write a PL/SQL block to satisfy some conditions by accepting input from the user.
- Write a PL/SQL block that handles all types of exceptions.
- Creation of Procedures.
- Creation of database triggers and functions
- Mini project (Application Development using Oracle/ Mysql )  
Inventory Control System.

Material Requirement Processing.  
Hospital Management System.  
Railway Reservation System.  
Personal Information System.  
Web Based User Identification System.  
Timetable Management System.  
Hotel Management System

**REFERENCE:**

spoken-tutorial.org

**TOTAL: 45 PERIODS**

**OUTCOMES:**

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

- Design and implement a database schema for a given problem-domain *Skill Development*
- Populate and query a database
- Create and maintain tables using PL/SQL. *Employability*
- Prepare reports.

**LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS**

**HARDWARE:**

Standalone desktops 30 Nos.  
(or)


Server supporting 30 terminals or more.

**SOFTWARE:**

Front end: VB/VC ++/JAVA or Equivalent

Back end: Oracle / SQL / MySQL/ PostGress / DB2 or Equivalent

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**Dr. S. RAMABALAN, M.E., Ph.D.,**  
**PRINCIPAL**  
E.G.S. Pillay Engineering College,  
Thethi, Nagere - 611 002.  
Nagapattinam (Dt) Tamil Nadu.

IT6313

**DIGITAL COMMUNICATION LABORATORY**

**L T P C**  
**0 0 3 2**

**OBJECTIVES:**

The purpose of this lab is to explore digital communications with a software radio to understand how each component works together. The lab will cover, analog to digital conversion, modulation, pulse shaping, and noise analysis.

**LIST OF EXPERIMENTS**

**EXPERIMENTS IN THE FOLLOWING TOPICS:**

- Signal Sampling and reconstruction
- Amplitude modulation and demodulation
- Frequency modulation and demodulation
- Pulse code modulation and demodulation.
- Delta modulation, adaptive delta Modulation
- Line Coding Schemes
- BFSK modulation and Demodulation (Hardware(Kit based) & Simulation using MATLAB / SCILAB / Equivalent)
- BPSK modulation and Demodulation (Hardware& Simulation using MATLAB/SCILAB/ Equivalent)
- FSK, PSK and DPSK schemes (Simulation)
- Error control coding schemes (Simulation)



Spread spectrum communication (Simulation)  
Communication link simulation  
TDM and FDM

TOTAL: 45 PERIODS

**OUTCOME:** *Employability, Skill Development*

To develop necessary skill in designing, analyzing and constructing digital electronic circuits.

LAB REQUIREMENT FOR A BATCH OF 30 STUDENTS, 3 STUDENTS / EXPERIMENT:

- Kits for Signal Sampling, TDM, AM, FM, PCM, DM and Line Coding Schemes
- ii) Software Defined Radio platform for link simulation studies
- MATLAB / SCILAB for simulation experiments
- PCs - 10 Nos
- Signal generator / Function generators / Power Supply / CRO / Bread Board each -15 nos

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**Dr. S. RAMABALAN, M.E., Ph.D.**  
PRINCIPAL  
E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.

MA6453

PROBABILITY AND QUEUEING THEORY

L T P C  
3 1 0 4

**OBJECTIVES:**

To provide the required mathematical support in real life problems and develop probabilistic models which can be used in several areas of science and engineering.

**UNIT I RANDOM VARIABLES**

9+3

Discrete and continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma and Normal distributions.

**UNIT IITWO - DIMENSIONAL RANDOM VARIABLES**

9+3

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables.

**UNIT III RANDOM PROCESSES**

9+3

Classification – Stationary process – Markov process - Poisson process – Discrete parameter Markov chain – Chapman Kolmogorov equations – Limiting distributions.

**UNIT IVQUEUEING MODELS**

9+3

Markovian queues – Birth and Death processes – Single and multiple server queueing models – Little"s formula - Queues with finite waiting rooms – Queues with impatient customers: Balking and reneqing.

**UNIT V ADVANCED QUEUEING MODELS**

9+3

Finite source models - M/G/1 queue – Pollaczek Khinchin formula - M/D/1 and M/E<sub>k</sub>/1 as special cases – Series queues – Open Jackson networks.

TOTAL (L:45+T:15): 60 PERIODS

**OUTCOMES:** *Skill Development*

The students will have a fundamental knowledge of the probability concepts.

Acquire skills in analyzing queueing models.

It also helps to understand and characterize phenomenon which evolve with respect to time in a probabilistic manner.

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**Dr. S. RAMABALAN, M.E., Ph.D.**  
PRINCIPAL  
E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002  
Nagapattinam (Dt) Tamil Nadu.

### TEXT BOOKS:

- Ibe. O.C., "Fundamentals of Applied Probability and Random Processes", Elsevier, 1st Indian Reprint, 2007.  
Gross. D. and Harris. C.M., "Fundamentals of Queueing Theory", Wiley Student edition, 2004.

### REFERENCES:

- Robertazzi, "Computer Networks and Systems: Queueing Theory and Performance Evaluation", , 3<sup>rd</sup> Edition, Springer, 2006.  
Taha. H.A., "Operations Research", 8<sup>th</sup> Edition, Pearson Education, Asia, 2007.  
Trivedi.K.S., "Probability and Statistics with Reliability, Queueing and Computer Science Applications", 2<sup>nd</sup> Edition, John Wiley and Sons, 2002.  
Hwei Hsu, "Schaum's Outline of Theory and Problems of Probability, Random Variables and Random Processes", Tata McGraw Hill Edition, New Delhi, 2004.  
Yates. R.D. and Goodman. D. J., "Probability and Stochastic Processes", 2<sup>nd</sup> Edition, Wiley India Pvt. Ltd., Bangalore, 2012.

EC6504

MICROPROCESSOR AND MICROCONTROLLER

L T P C  
3 0 0 3

### OBJECTIVES:

The student should be made to:

- Study the Architecture of 8086 microprocessor.
- Learn the design aspects of I/O and Memory Interfacing circuits.
- Study about communication and bus interfacing.
- Study the Architecture of 8051 microcontroller.

#### UNIT I THE 8086 MICROPROCESSOR

9

Introduction to 8086 – Microprocessor architecture – Addressing modes - Instruction set and assembler directives – Assembly language programming – Modular Programming - Linking and Relocation - Stacks - Procedures – Macros – Interrupts and interrupt service routines – Byte and String Manipulation.

#### UNIT II 8086 SYSTEM BUS STRUCTURE

9

8086 signals – Basic configurations – System bus timing –System design using 8086 – IO programming – Introduction to Multiprogramming – System Bus Structure - Multiprocessor configurations – Coprocessor, Closely coupled and loosely Coupled configurations – Introduction to advanced processors.

#### UNIT III I/O INTERFACING

9

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications Case studies: Traffic Light control, LED display , LCD display, Keyboard display interface and Alarm Controller.

#### UNIT IV MICROCONTROLLER

9

Architecture of 8051 – Special Function Registers(SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming.



**UNIT V INTERFACING MICROCONTROLLER**

9

Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation.

TOTAL: 45 PERIODS

**OUTCOMES:**

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

- Design and implement programs on 8086 microprocessor. } Skill Development
- Design I/O circuits.
- Design Memory Interfacing circuits.
- Design and implement 8051 microcontroller based systems. } Employability

**TEXT BOOKS:**

- Yu-Cheng Liu, Glenn A.Gibson, "Microcomputer Systems: The 8086 / 8088 Family - Architecture, Programming and Design", Second Edition, Prentice Hall of India, 2007.
- Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, "The 8051 Microcontroller and Embedded Systems: Using Assembly and C", Second Edition, Pearson Education, 2011.

**REFERENCE:**

- Doughlas V.Hall, "Microprocessors and Interfacing, Programming and Hardware", TMH,2012

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Dr. S. RAMABALAN, M.E., Ph.D.

PRINCIPAL

E.G.S. Pillay Engineering College, L T P C  
Thethi, Nagore - 611 002. 3 0 0 3  
Nagapattinam (Dt) Tamil Nadu.

CS6402

DESIGN AND ANALYSIS OF ALGORITHMS

**OBJECTIVES:**

The student should be made to:

- Learn the algorithm analysis techniques.
- Become familiar with the different algorithm design techniques.
- Understand the limitations of Algorithm power.

**UNIT I INTRODUCTION**

9

Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithm Efficiency – Analysis Framework – Asymptotic Notations and its properties – Mathematical analysis for Recursive and Non-recursive algorithms.

**UNIT II BRUTE FORCE AND DIVIDE-AND-CONQUER**

9

Brute Force - Closest-Pair and Convex-Hull Problems-Exhaustive Search - Traveling Salesman Problem - Knapsack Problem - Assignment problem.  
Divide and conquer methodology – Merge sort – Quick sort – Binary search – Multiplication of Large Integers – Strassen's Matrix Multiplication-Closest-Pair and Convex-Hull Problems.

**UNIT III DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE**

9

Computing a Binomial Coefficient – Warshall's and Floyd" algorithm – Optimal Binary Search Trees – Knapsack Problem and Memory functions. Greedy Technique– Prim's algorithm- Kruskal's Algorithm- Dijkstra's Algorithm-Huffman Trees.

**UNIT IV ITERATIVE IMPROVEMENT**

9

The Simplex Method-The Maximum-Flow Problem – Maximum Matching in Bipartite Graphs- The Stable marriage Problem.

**UNIT V COPING WITH THE LIMITATIONS OF ALGORITHM POWER**

9

Limitations of Algorithm Power-Lower-Bound Arguments-Decision Trees-P, NP and NP-Complete Problems--Coping with the Limitations - Backtracking - n-Queens problem - Hamiltonian Circuit Problem - Subset Sum Problem-Branch and Bound - Assignment problem - Knapsack Problem - Traveling Salesman Problem- Approximation Algorithms for NP - Hard Problems - Traveling Salesman problem - Knapsack problem.

TOTAL: 45 PERIODS

**OUTCOMES:** Employability

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

- Design algorithms for various computing problems.
- Analyze the time and space complexity of algorithms.
- Critically analyze the different algorithm design techniques for a given problem.
- Modify existing algorithms to improve efficiency.

**TEXT BOOK:**

Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson Education, 2012.

**REFERENCES:**

- Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.
- Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, Reprint 2006.
- Donald E. Knuth, "The Art of Computer Programming", Volumes 1& 3 Pearson Education, 2009. Steven S. Skiena, "The Algorithm Design Manual", Second Edition, Springer, 2008.
- <http://nptel.ac.in/>

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**Dr. S. RAMABALAN, M.E., Ph.D.,**  
PRINCIPAL

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.

Nagapattinam (Dt) Tamil Nadu

CS6401

OPERATING SYSTEMS

L T P C  
3 0 0 3

**OBJECTIVES:**

The student should be made to:

- Study the basic concepts and functions of operating systems.
- Understand the structure and functions of OS.
- Learn about Processes, Threads and Scheduling algorithms.
- Understand the principles of concurrency and Deadlocks.
- Learn various memory management schemes.
- Study I/O management and File systems.
- Learn the basics of Linux system and perform administrative tasks on Linux Servers.

**UNIT I OPERATING SYSTEMS OVERVIEW**

9

Computer System Overview-Basic Elements, Instruction Execution, Interrupts, Memory Hierarchy, Cache Memory, Direct Memory Access, Multiprocessor and Multicore Organization. Operating system overview-objectives and functions, Evolution of Operating System.- Computer System Organization- Operating System Structure and Operations- System Calls, System Programs, OS Generation and System Boot.



## UNIT II PROCESS MANAGEMENT

9

Processes-Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication; Threads- Overview, Multicore Programming, Multithreading Models; Windows 7 - Thread and SMP Management. Process Synchronization - Critical Section Problem, Mutex Locks, Semaphores, Monitors, CPU Scheduling and Deadlocks.

## UNIT III STORAGE MANAGEMENT

9

Main Memory-Contiguous Memory Allocation, Segmentation, Paging, 32 and 64 bit architecture Examples; Virtual Memory- Demand Paging, Page Replacement, Allocation, Thrashing; Allocating Kernel Memory, OS Examples.

## UNIT IV I/O SYSTEMS

9

Mass Storage Structure- Overview, Disk Scheduling and Management; File System Storage-File Concepts, Directory and Disk Structure, Sharing and Protection; File System Implementation- File System Structure, Directory Structure, Allocation Methods, Free Space Management; I/O Systems.

## UNIT V CASE STUDY

9

Linux System- Basic Concepts; System Administration-Requirements for Linux System Administrator, Setting up a LINUX Multifunction Server, Domain Name System, Setting Up Local Network Services; Virtualization- Basic Concepts, Setting Up Xen, VMware on Linux Host and Adding Guest OS.

TOTAL: 45 PERIODS

## OUTCOMES: *Employability*

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

- Design various Scheduling algorithms.
- Apply the principles of concurrency.
- Design deadlock, prevention and avoidance algorithms.
- Compare and contrast various memory management schemes.
- Design and Implement a prototype file systems.
- Perform administrative tasks on Linux Servers.

## TEXT BOOK:

Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 9<sup>th</sup> Edition, John Wiley and Sons Inc., 2012.

## REFERENCES:

- William Stallings, "Operating Systems – Internals and Design Principles", 7<sup>th</sup> Edition, Prentice Hall, 2011.
- Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Addison Wesley, 2001.
- Charles Crowley, "Operating Systems: A Design-Oriented Approach", Tata McGraw Hill Education", 1996.
- D M Dhamdhare, "Operating Systems: A Concept-Based Approach", Second Edition, Tata McGraw-Hill Education, 2007.
- <http://nptel.ac.in/>.

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Dr. S. RAMABALAN, M.E., Ph.D.,  
PRINCIPAL  
E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.

**OBJECTIVES:**

The student should be made to:

- Understand the phases in a software project
- Understand fundamental concepts of requirements engineering and Analysis Modelling.
- Understand the major considerations for enterprise integration and deployment.
- Learn various testing and maintenance measures

**UNIT I SOFTWARE PROCESS AND PROJECT MANAGEMENT** 9

Introduction to Software Engineering, Software Process, Perspective and Specialized Process Models – Software Project Management: Estimation – LOC and FP Based Estimation, COCOMO Model – Project Scheduling – Scheduling, Earned Value Analysis - Risk Management.

**UNIT II REQUIREMENTS ANALYSIS AND SPECIFICATION** 9

Software Requirements: Functional and Non-Functional, User requirements, System requirements, Software Requirements Document – Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis, requirements validation, requirements management-Classical analysis: Structured system Analysis, Petri Nets- Data Dictionary.

**UNIT III SOFTWARE DESIGN** 9

Design process – Design Concepts-Design Model– Design Heuristic – Architectural Design – Architectural styles, Architectural Design, Architectural Mapping using Data Flow- User Interface Design: Interface analysis, Interface Design –Component level Design: Designing Class based components, traditional Components.

**UNIT IV TESTING AND IMPLEMENTATION** 9

Software testing fundamentals-Internal and external views of Testing-white box testing - basis path testing-control structure testing-black box testing- Regression Testing – Unit Testing – Integration Testing – Validation Testing – System Testing And Debugging – Software Implementation Techniques: Coding practices-Refactoring.

**UNIT V PROJECT MANAGEMENT** 9

Estimation – FP Based, LOC Based, Make/Buy Decision, COCOMO II - Planning – Project Plan, Planning Process, RFP Risk Management – Identification, Projection, RMMM - Scheduling and Tracking –Relationship between people and effort, Task Set & Network, Scheduling, EVA - Process and Project Metrics.

**TOTAL: 45 PERIODS****OUTCOMES: Employability**

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

- Identify the key activities in managing a software project.
- Compare different process models.
- Concepts of requirements engineering and Analysis Modeling.
- Apply systematic procedure for software design and deployment.
- Compare and contrast the various testing and maintenance

**TEXT BOOKS:**

Roger S. Pressman, "Software Engineering – A Practitioner's Approach", Seventh Edition, Mc Graw-Hill International Edition, 2010.



**REFERENCES:**

- Ian Sommerville, "Software Engineering", 9<sup>th</sup> Edition, Pearson Education Asia, 2011.
- Rajib Mall, "Fundamentals of Software Engineering", Third Edition, PHI Learning Private Limited, 2009.
- Pankaj Jalote, "Software Engineering, A Precise Approach", Wiley India, 2010.
- Kelkar S.A., "Software Engineering", Prentice Hall of India Pvt Ltd, 2007.
- Stephen R.Schach, "Software Engineering", Tata McGraw-Hill Publishing Company Limited, 2007.
- <http://nptel.ac.in/>.

IT6411                      MICROPROCESSOR AND MICROCONTROLLER LABORATORY

L T P C  
0 0 3 2

**OBJECTIVES:**

The student should be made to:

- Introduce ALP concepts and features
- Write ALP for arithmetic and logical operations in 8086 and 8051
- Differentiate Serial and Parallel Interface
- Interface different I/Os with Microprocessors
- Be familiar with MASM

**LIST OF EXPERIMENTS:**

**8086 Programs using kits and MASM**

- Basic arithmetic and Logical operations
- Move a data block without overlap
- Code conversion, decimal arithmetic and Matrix operations.
- Floating point operations, string manipulations, sorting and searching
- Password checking, Print RAM size and system date
- Counters and Time Delay

**Peripherals and Interfacing Experiments**

- Traffic light control
- Stepper motor control
- Digital clock
- Key board and Display
- Printer status
- Serial interface and Parallel interface
- A/D and D/A interface and Waveform Generation

**8051 Experiments using kits and MASM**

- Basic arithmetic and Logical operations
- Square and Cube program, Find 2's complement of a number
- Unpacked BCD to ASCII

TOTAL: 45 PERIODS

**OUTCOMES:**

*Employability Skill Development*

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

- Write ALP Programmes for fixed and Floating Point and Arithmetic
- Interface different I/Os with processor
- Generate waveforms using Microprocessors
- Execute Programs in 8051
- Explain the difference between simulator and Emulator

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Dr. S. RAMABALAN, M.E., Ph.D.,  
PRINCIPAL  
E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.

**LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:**

**HARDWARE:**

8086 development kits - 30 nos  
Interfacing Units - Each 10 nos  
Microcontroller - 30 nos

**SOFTWARE:**

Intel Desktop Systems with MASM - 30 nos  
8086 Assembler  
8051 Cross Assembler

IT6412

OPERATING SYSTEMS LABORATORY

L T P C  
0 0 3 2

**OBJECTIVES:**

The student should be made to:

- Learn shell programming and the use of filters in the UNIX environment.
- Be exposed to programming in C using system calls.
- Learn to use the file system related system calls.
- Be exposed to process creation and inter process communication.
- Be familiar with implementation of CPU Scheduling Algorithms, page replacement algorithms and Deadlock avoidance

**LIST OF EXPERIMENTS:**

- Basics of UNIX commands.
- Shell Programming.
- Implement the following CPU scheduling algorithms  
Round Robin b) SJF c) FCFS d) Priority
- Implement all file allocation strategies  
Sequential b) Indexed c) Linked
- Implement Semaphores
- Implement all File Organization Techniques  
Single level directory b) Two level c) Hierarchical d) DAG
- Implement Bankers Algorithm for Dead Lock Avoidance
- Implement an Algorithm for Dead Lock Detection
- Implement all page replacement algorithms  
FIFO b) LRU c) LFU
- Implement Shared memory and IPC
- Implement Paging Technique of memory management.
- Implement Threading & Synchronization Applications

TOTAL: 45 PERIODS

**REFERENCE:**

[spoken-tutorial.org](http://spoken-tutorial.org)

**OUTCOMES:**

*Employability, Skill Development*

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

- Implement deadlock avoidance, and Detection Algorithms
- Compare the performance of various CPU Scheduling Algorithm
- Critically analyze the performance of the various page replacement algorithms
- Create processes and implement IPC

49

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*[Signature]*  
Dr. S. RAMABALAN, M.E., Ph.D.,  
PRINCIPAL  
E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002,  
Nagapattinam (Dt) Tamil Nadu.



**LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:**

Standalone desktops with C / C++ / Java / Equivalent compiler 30 Nos.

(or)

Server with C / C++ / Java / Equivalent compiler supporting 30 terminals or more.

IT6413

**SOFTWARE ENGINEERING LABORATORY**

L T P C  
0 0 3 2

**OBJECTIVES:**

- To understand the software engineering methodologies for project development.
- To gain knowledge about open source tools for Computer Aided Software Engineering.
- To develop an efficient software using case tools.

**SOFTWARE REQUIRED:**

Open source Tools: StarUML / UMLGraph / Topcased  
Prepare the following documents for each experiment and develop the software using software engineering methodology.

**Problem Analysis and Project Planning** -Thorough study of the problem – Identify Project scope, Objectives and Infrastructure.

**Software Requirement Analysis** - Describe the individual Phases/modules of the project and Identify deliverables.

**Data Modelling** - Use work products – data dictionary, use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.

**Software Development and Debugging** – implement the design by coding

**Software Testing** - Prepare test plan, perform validation testing, coverage analysis, memory leaks, develop test case hierarchy, Site check and site monitor.

**Sample Experiments:**

**Academic domain**

- Course Registration System
- Student marks analysing system

**Railway domain**

- Online ticket reservation system
- Platform assignment system for the trains in a railway station

**Medicine domain**

- Expert system to prescribe the medicines for the given symptoms
- Remote computer monitoring

**Finance domain**

- ATM system
- Stock maintenance

**Human Resource management**

- Quiz System
- E-mail Client system.

**TOTAL: 45 PERIODS**

**OUTCOMES:** *Employability, Skill Development*

Upon Completion of the course, the students should be able to:

Use open source case tools to develop software.

Analyze and design software requirements in efficient manner.

**LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:**

**SOFTWARE:**

Argo UML / StarUML / UMLGraph / Topcased or Equivalent.

**HARDWARE:**

Standalone desktops

30 Nos

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**Dr. S. RAMABALAN, M.E., Ph.D.,**  
PRINCIPAL

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu

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**OBJECTIVES:**

The student should be made to:

- Understand the division of network functionalities into layers.
- Be familiar with the components required to build different types of networks
- Be exposed to the required functionality at each layer
- Learn the flow control and congestion control algorithms

**UNIT I FUNDAMENTALS & LINK LAYER**

9

Building a network – Requirements - Layering and protocols - Internet Architecture – Network software – Performance ; Link layer Services - Framing - Error Detection - Flow control

**UNIT II MEDIA ACCESS & INTERNETWORKING**

9

Media access control - Ethernet (802.3) - Wireless LANs – 802.11 – Bluetooth - Switching and bridging – Basic Internetworking (IP, CIDR, ARP, DHCP, ICMP )

**UNIT III ROUTING**

9

Routing (RIP, OSPF, metrics) – Switch basics – Global Internet (Areas, BGP, IPv6), Multicast – addresses – multicast routing (DVMRP, PIM)

**UNIT IV TRANSPORT LAYER**

9

Overview of Transport layer - UDP - Reliable byte stream (TCP) - Connection management - Flow control - Retransmission – TCP Congestion control - Congestion avoidance (DECbit, RED) – QoS – Application requirements

**UNIT V APPLICATION LAYER**

9

Traditional applications -Electronic Mail (SMTP, POP3, IMAP, MIME) – HTTP – Web Services – DNS - SNMP

**TOTAL: 45 PERIODS****OUTCOMES:**

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

Identify the components required to build different types of networks

Choose the required functionality at each layer for given application

Identify solution for each functionality at each layer

Trace the flow of information from one node to another node in the network

*Entrepreneurship*  
*Employability*

**ATTESTED**

*[Signature]*  
**Dr. S. RAMABALAN, M.E., Ph.D.,**  
**PRINCIPAL**  
E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.

**TEXT BOOK:**

Larry L. Peterson, Bruce S. Davie, "Computer Networks: A systems approach", Fifth Edition, Morgan Kaufmann Publishers, 2011.

**REFERENCES:**

- James F. Kurose, Keith W. Ross, "Computer Networking - A Top-Down Approach Featuring the Internet", Fifth Edition, Pearson Education, 2009.  
Nader. F. Mir, "Computer and Communication Networks", Pearson Prentice Hall Publishers, 2010.  
Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, "Computer Networks: An Open Source Approach", Mc Graw Hill Publisher, 2011.  
Behrouz A. Forouzan, "Data communication and Networking", Fourth Edition, Tata McGraw – Hill, 2011

IT6501

GRAPHICS AND MULTIMEDIA

L T P C  
3 0 0 3

**OBJECTIVES:**

The student should be made to:

Develop an understanding and awareness of how issues such as content, information architecture, motion, sound, design, and technology merge to form effective and compelling interactive experiences for a wide range of audiences and end users.

Be familiar with various software programs used in the creation and implementation of multimedia (interactive, motion/animation, presentation, etc.).

Be aware of current issues relative between new emerging electronic technologies and graphic design (i.e. social, cultural, cognitive, etc).

understand the relationship between critical analysis and the practical application of design.

Appreciate the importance of technical ability and creativity within design practice.

**UNIT I OUTPUT PRIMITIVES 9** Basic – Line – Curve and ellipse drawing algorithms – Examples – Applications - Attributes – Two- Dimensional geometric transformations – Two-Dimensional clipping and viewing – Input techniques.

**UNIT II THREE-DIMENSIONAL CONCEPTS 9**  
Three-Dimensional object representations – Three-Dimensional geometric and modeling transformations – Three-Dimensional viewing – Hidden surface elimination  
Color models – Virtual reality - Animation.

**UNIT III MULTIMEDIA SYSTEMS DESIGN 9**  
Multimedia basics – Multimedia applications – Multimedia system architecture – Evolving technologies for multimedia – Defining objects for multimedia systems – Multimedia data interface standards – Multimedia databases.

**UNIT IV MULTIMEDIA FILE HANDLING 9**  
Compression and decompression – Data and file format standards – Multimedia I/O technologies – Digital voice and audio – Video image and animation – Full motion video – Storage and retrieval technologies.



**UNIT V      HYPERMEDIA**

9

Multimedia authoring and user interface - Hypermedia messaging - Mobile messaging - Hypermedia message component - Creating hypermedia message - Integrated multimedia message standards - Integrated document management - Distributed multimedia systems.

TOTAL: 45 PERIODS

**OUTCOMES: Entrepreneurship**

Upon completion of the course, the student should be able to:

- Effectively and creatively solve a wide range of graphic design problems
- Form effective and compelling interactive experiences for a wide range of audiences.
- Use various software programs used in the creation and implementation of multi-media (interactive, motion/animation, presentation, etc.).
- Discuss issues related to emerging electronic technologies and graphic design

**TEXT BOOKS:**

Donald Hearn and M. Pauline Baker, "Computer Graphics C Version", Pearson Education, 2003.

Andleigh, P. K and Kiran Thakrar, "Multimedia Systems and Design", PHI, 2003.

**REFERENCES:**

Judith Jeffcoate, "Multimedia in practice: Technology and Applications", PHI, 1998.

Foley, Vandam, Feiner and Huges, "Computer Graphics: Principles and Applications, 2<sup>nd</sup> Edition, Pearson Education, 2003.

  
**Dr. S. RAMABALAN, M.E., Ph.D.,**  
**PRINCIPAL**

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.

CS6502

**OBJECT ORIENTED ANALYSIS AND DESIGN** (Dt) Tamil Nadu.

**L T P C**  
**3 0 0 3**

**OBJECTIVES:**

The student should be made to:

- Learn the basics of OO analysis and design skills
- Learn the UML design diagrams
- Learn to map design to code
- Be exposed to the various testing techniques.

**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

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

**TOTAL: 45 PERIODS**

**OUTCOMES:**

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

Design and implement projects using OO concepts

Use the UML analysis and design diagrams

*Entrepreneurship*

Apply appropriate design patterns

Create code from design

Compare and contrast various testing techniques

*Employability*

**TEXT BOOK:**

Craig Larman, "Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development", Third Edition, Pearson Education, 2005.

**REFERENCES:**

Simon Bennett, Steve Mc Robb and Ray Farmer, "Object Oriented Systems Analysis and Design Using UML", Fourth Edition, Mc-Graw Hill Education, 2010.

Erich Gamma, and Richard Helm, Ralph Johnson, John Vlissides, "Design patterns: Elements of Reusable Object-Oriented Software", Addison-Wesley, 1995.

Martin Fowler, "UML Distilled: A Brief Guide to the Standard Object Modeling Language", Third edition, Addison Wesley, 2003.

Paul C. Jorgensen, "Software Testing:- A Craftsman's Approach", Third Edition, Auerbach Publications, Taylor and Francis Group, 2008.

**ATTESTED**

**Dr. S. RAMABALAN, M.E., Ph.D.,  
PRINCIPAL**

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002. **L T P C**  
Nagapattinam (Dt) Tamil Nadu. **3 1 0 4**

IT6502

**DIGITAL SIGNAL PROCESSING**

**OBJECTIVES:**

To introduce discrete Fourier transform and its applications.

To teach the design of infinite and finite impulse response filters for filtering undesired signals.

To introduce signal processing concepts in systems having more than one sampling frequency.

**UNIT I SIGNALS AND SYSTEMS**

9

Basic elements of DSP – concepts of frequency in Analog and Digital Signals – sampling theorem – Discrete – time signals, systems – Analysis of discrete time LTI systems – Z transform – Convolution – Correlation.

**UNIT II FREQUENCY TRANSFORMATIONS**

9

Introduction to DFT – Properties of DFT – Circular Convolution - Filtering methods based on DFT – FFT Algorithms - Decimation – in – time Algorithms, Decimation – in – frequency Algorithms – Use of FFT in Linear Filtering – DCT – Use and Application of DCT.



**UNIT III IIR FILTER DESIGN** 9  
Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (LPF, HPF, BPF, BRF) filter design using frequency translation.

**UNIT IV FIR FILTER DESIGN** 9  
Structures of FIR – Linear phase FIR filter – Fourier Series - Filter design using windowing techniques (Rectangular Window, Hamming Window, Hanning Window), Frequency sampling techniques


**UNIT V FINITE WORD LENGTH EFFECTS IN DIGITAL FILTERS** 9  
Binary fixed point and floating point number representations – Comparison - Quantization noise – truncation and rounding – quantization noise power- input quantization error- coefficient quantization error – limit cycle oscillations-dead band- Overflow error-signal scaling.

**TOTAL (L:45+T:15): 60 PERIODS**

**OUTCOMES: Employability**  
Upon completion of the course, students will be able to  
Perform frequency transforms for the signals.  
Design IIR and FIR filters.  
Finite word length effects in digital filters

**TEXT BOOK:**  
John G. Proakis and Dimitris G. Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", Fourth Edition, Pearson Education, Prentice Hall, 2007.

**REFERENCES:**  
Emmanuel C. Ifeachor, and Barrie.W. Jervis, "Digital Signal Processing", Second Edition, Pearson Education, Prentice Hall, 2002.  
Sanjit K. Mitra, "Digital Signal Processing – A Computer Based Approach", Third Edition, Tata Mc Graw Hill, 2007.  
A.V. Oppenheim, R.W. Schafer and J.R. Buck, Discrete-Time Signal Processing, 8<sup>th</sup> Indian Reprint, Pearson, 2004.  
Andreas Antoniou, "Digital Signal Processing", Tata McGraw Hill, 2006.

**ATTESTED**  
  
**Dr. S. RAMABALAN, M.E., Ph.D.,**  
**PRINCIPAL**  
E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinani (Dt) Tamil Nadu  
**IT P C**  
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IT6503

**WEB PROGRAMMING**

**OBJECTIVES:**  
The student should be made to:  
Understand the technologies used in Web Programming.  
Know the importance of object oriented aspects of Scripting.  
Understand creating database connectivity using JDBC.  
Learn the concepts of web based application using sockets.

**UNIT I SCRIPTING** 9  
Web page Designing using HTML, Scripting basics- Client side and server side scripting. Java Script- Object, names, literals, operators and expressions- statements and features- events - windows - documents - frames - data types - built-in functions- Browser object model - Verifying forms.-HTML5- CSS3- HTML 5 canvas - Web site creation using tools.

**UNIT II JAVA**

9

Introduction to object oriented programming-Features of Java – Data types, variables and arrays – Operators – Control statements – Classes and Methods – Inheritance. Packages and Interfaces – Exception Handling – Multithreaded Programming – Input/Output – Files – Utility Classes – String Handling.

**UNIT III JDBC**

9

JDBC Overview – JDBC implementation – Connection class – Statements - Catching Database Results, handling database Queries. Networking– InetAddress class – URL class- TCP sockets - UDP sockets, Java Beans –RMI.

**UNIT IV APPLET**

9

Java applets- Life cycle of an applet – Adding images to an applet – Adding sound to an applet. Passing parameters to an applet. Event Handling. Introducing AWT: Working with Windows Graphics and Text. Using AWT Controls, Layout Managers and Menus. Servlet – life cycle of a servlet. The Servlet API, Handling HTTP Request and Response, using Cookies, Session Tracking. Introduction to JSP.

**UNIT V XML AND WEB SERVICES**

9

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

**TOTAL (L:45+T:15): 60 PERIODS**

**OUTCOMES: Employability**

Upon Completion of the course, the students will be able to

- Design web pages.
- Use technologies of Web Programming.
- Apply object oriented aspects to Scripting.
- Create databases with connectivity using JDBC.
- Build web based application using sockets.

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**Dr. S. RAMABALAN, M.E., Ph.D.,  
PRINCIPAL**

**E.G.S. Pillay Engineering College,  
Thethi Nagore - 611 002.**

**TEXT BOOKS:**

- Harvey Deitel, Abbey Deitel, Internet and World Wide Web: How To Program, 5<sup>th</sup> Edition, Jdu.
- Herbert Schildt, Java - The Complete Reference, 7<sup>th</sup> Edition. Tata McGraw- Hill Edition.
- Michael Morrison XML Unleashed Tech media SAMS.

**REFERENCES:**

- John Pollock, Javascript - A Beginners Guide, 3<sup>rd</sup> Edition — Tata McGraw-Hill Edition.
- Keyur Shah, Gateway to Java Programmer Sun Certification, Tata McGraw Hill, 2002.

EC6801

**WIRELESS COMMUNICATION**

**L T P C  
3 0 0 3**

**OBJECTIVES:**

The student should be made to:

- Know the characteristic of wireless channel
- Learn the various cellular architectures
- Understand the concepts behind various digital signaling schemes for fading channels
- Be familiar the various multipath mitigation techniques
- Understand the various multiple antenna systems



<b>UNIT I WIRELESS CHANNELS</b>	<b>9</b>
Large scale path loss – Path loss models: Free Space and Two-Ray models -Link Budget design – Small scale fading- Parameters of mobile multipath channels – Time dispersion parameters- Coherence bandwidth – Doppler spread & Coherence time, Fading due to Multipath time delay spread – flat fading – frequency selective fading – Fading due to Doppler spread – fast fading – slow fading.	
<b>UNIT II CELLULAR ARCHITECTURE</b>	<b>9</b>
Multiple Access techniques - FDMA, TDMA, CDMA – Capacity calculations–Cellular concept- Frequency reuse - channel assignment- hand off- interference & system capacity- trunking & grade of service – Coverage and capacity improvement.	
<b>UNIT III DIGITAL SIGNALING FOR FADING CHANNELS</b>	<b>9</b>
Structure of a wireless communication link, Principles of Offset-QPSK, p/4-DQPSK, Minimum Shift Keying, Gaussian Minimum Shift Keying, Error performance in fading channels, OFDM principle – Cyclic prefix, Windowing, PAPR.	
<b>UNIT IV MULTIPATH MITIGATION TECHNIQUES</b>	<b>9</b>
Equalisation – Adaptive equalization, Linear and Non-Linear equalization, Zero forcing and LMS Algorithms. Diversity – Micro and Macrodiversity, Diversity combining techniques, Error probability in fading channels with diversity reception, Rake receiver,	
<b>UNIT V MULTIPLE ANTENNA TECHNIQUES</b>	<b>9</b>
MIMO systems – spatial multiplexing -System model -Pre-coding - Beam forming - transmitter diversity, receiver diversity- Channel state information-capacity in fading and non-fading channels.	
<b>TOTAL : 45 PERIODS</b>	

**OUTCOMES: Employability**

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

- Characterize wireless channels
- Design and implement various signaling schemes for fading channels
- Design a cellular system
- Compare multipath mitigation techniques and analyze their performance
- Design and implement systems with transmit/receive diversity and MIMO systems and analyze their performance

**TEXTBOOKS:**

- Rappaport, T.S., "Wireless communications", Second Edition, Pearson Education, 2010.
- Andreas.F. Molisch, "Wireless Communications", John Wiley – India, 2006.

**REFERENCES:**

- David Tse and Pramod Viswanath, "Fundamentals of Wireless Communication", Cambridge University Press, 2005.
- Upena Dalal, "Wireless Communication", Oxford University Press, 2009.
- Van Nee, R. and Ramji Prasad, "OFDM for wireless multimedia communications", Artech House, 2000.

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Dr. S. RAMABALAN, M.E., Ph.D.  
PRINCIPAL

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002,  
Nagapattinam (Dt) Tamil Nadu.

IT6511

NETWORKS LABORATORY

L T P C  
0 0 3 2

**OBJECTIVES:**

The student should be made to:

- Learn socket programming.
- Be familiar with simulation tools.
- Have hands on experience on various networking protocols.

**LIST OF EXPERIMENTS:**

- Implementation of Stop and Wait Protocol and Sliding Window Protocol.
- Study of Socket Programming and Client – Server model
- Write a code simulating ARP /RARP protocols.
- Write a code simulating PING and TRACEROUTE commands
- Create a socket for HTTP for web page upload and download.
- Write a program to implement RPC (Remote Procedure Call)
- Implementation of Subnetting .
- Applications using TCP Sockets like
  - Echo client and echo server
  - Chat
  - File Transfer
- Applications using TCP and UDP Sockets like
  - DNS
  - SNMP
  - File Transfer
- Study of Network simulator (NS).and Simulation of Congestion Control Algorithms using NS
- Perform a case study about the different routing algorithms to select the network path with its optimum and economical during data transfer.
  - Link State routing
  - Flooding
  - Distance vector

**TOTAL: 45 PERIODS**

**REFERENCE:**

[spoken-tutorial.org](http://spoken-tutorial.org)

**OUTCOMES:**

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

- Use simulation tools
- Implement the various protocols. *Employability*
- Analyze the performance of the protocols in different layers.
- Analyze various routing algorithms *skill Development*


**LIST OF EQUIPMENTS FOR A BATCH OF 30 STUDENTS**

**SOFTWARE**

- C / C++ / Java / Equivalent Compiler 30
- Network simulator like NS2/Glomosim/OPNET/  
Equivalent

**HARDWARE**

Standalone desktops 30 Nos

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**Dr. S. RAMABALAN, M.E., Ph.D.,**  
**PRINCIPAL**  
E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.



**LAB EXERCISES**  
(For IT branch)**OBJECTIVES:****The student should be made to:**

- Be familiar with Web page design using HTML / DHTML and style sheets
- Be exposed to creation of user interfaces using Java frames and applets.
- Learn to create dynamic web pages using server side scripting.
- Learn to write PHP database functions.
- Learn .Net frame work and RMI

**LIST OF EXPERIMENTS:**

- Write a html program for Creation of web site with forms, frames, links, tables etc
- Design a web site using HTML and DHTML. Use Basic text Formatting, Images,
- Create a script that asks the user for a name, then greets the user with "Hello" and the user name on the page
- Create a script that collects numbers from a page and then adds them up and prints them to a blank field on the page.
- Create a script that prompts the user for a number and then counts from 1 to that number displaying only the odd numbers.
- Create a script that will check the field in Assignment 1 for data and alert the user if it is blank. This script should run from a button.
- Using CSS for creating web sites
- Creating simple application to access data base using JDBC Formatting HTML with CSS.
- Program for manipulating Databases and SQL.
- Program using PHP database functions.
- Write a web application that functions as a simple hand calculator, but also keeps a "paper trail" of all your previous work
- Install Tomcat and use JSP and link it with any of the assignments above
- Reading and Writing the files using .Net
- Write a program to implement web service for calculator application
- Implement RMI concept for building any remote method of your choice.

**TOTAL: 45 PERIODS****OUTCOMES:****At the end of the course, the student should be able to**

- Design Web pages using HTML/DHTML and style sheets *Skill Development*
- Design and Implement database applications. *Employability*
- Create dynamic web pages using server side scripting.
- Write Client Server applications.

**LAB REQUIREMENTS FOR A BATCH OF 30 STUDENTS:****SOFTWARE:**

Java, Dream Weaver or Equivalent, MySQL or Equivalent, Apache Server

**HARDWARE:**

Standalone desktops 30 Nos

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**PRINCIPAL**E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.

**OBJECTIVES:****The student should be made to:**

- Learn the basics of OO analysis and design skills.
- Be exposed to the UML design diagrams.
- Learn to map design to code.
- Be familiar with the various testing techniques

**LIST OF EXPERIMENTS:****To develop a mini-project by following the 9 exercises listed below.**

- To develop a problem statement.
- Identify Use Cases and develop the Use Case model.
- Identify the conceptual classes and develop a domain model with UML Class diagram.
- Using the identified scenarios, find the interaction between objects and represent them using UML Sequence diagrams.
- Draw relevant state charts and activity diagrams.
- Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
- Develop and test the Technical services layer.
- Develop and test the Domain objects layer.
- Develop and test the User interface layer.

**Suggested domains for Mini-Project:**

- Passport automation system.
- Book bank
- Exam Registration
- Stock maintenance system.
- Online course reservation system
- E-ticketing
- Software personnel management system
- Credit card processing
- e-book management system
- Recruitment system
- Foreign trading system
- Conference Management System
- BPO Management System
- Library Management System
- Student Information System

**TOTAL: 45 PERIODS****OUTCOMES:****At the end of the course, the student should be able to**

- Design and implement projects using OO concepts.
- Use the UML analysis and design diagrams. *Skill Development*
- Apply appropriate design patterns. *Employability*
- Create code from design. *Entrepreneurship*
- Compare and contrast various testing techniques

**LAB EQUIPMENTS FOR A BATCH OF 30 STUDENTS:****SUGGESTED SOFTWARE TOOLS:**

Rational Suite (or) Argo UML (or) equivalent, Eclipse IDE and Junit

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PRINCIPAL****E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.**



**SOFTWARE TOOLS** 30 user License  
 Rational Suite  
 Open Source Alternatives: ArgoUML, Visual Paradigm  
 Eclipse IDE and JUnit  
 PCs 30

**CS6601 DISTRIBUTED SYSTEMS L T P C**  
**3 0 0 3**

**OBJECTIVES:**

The student should be made to:

- Understand foundations of Distributed Systems
- Introduce the idea of peer to peer services and file system
- Understand in detail the system level and support required for distributed system
- Understand the issues involved in studying process and resource management

**UNIT I INTRODUCTION 7**  
 Introduction – Examples of Distributed Systems–Trends in Distributed Systems – Focus on resource sharing – Challenges. **Case study:** World Wide Web.

**UNIT II COMMUNICATION IN DISTRIBUTED SYSTEM 10**  
 System Model – Inter process Communication - the API for internet protocols – External data representation and Multicast communication. **Network virtualization:** Overlay networks. **Case study:** MPI **Remote Method Invocation And Objects:** Remote Invocation – Introduction - Request-reply protocols - Remote procedure call - Remote method invocation. **Case study:** Java RMI - Group communication - Publish-subscribe systems - Message queues - Shared memory approaches - Distributed objects - Case study: Enterprise Java Beans -from objects to components

**UNIT III PEER TO PEER SERVICES AND FILE SYSTEM 10**  
 Peer-to-peer Systems – Introduction - Napster and its legacy - Peer-to-peer – Middleware - Routing overlays. **Overlay case studies:** Pastry, Tapestry- Distributed File Systems –Introduction - File service architecture – Andrew File system. **File System:** Features-File model -File accessing models  
 File sharing semantics **Naming:** Identifiers, Addresses, Name Resolution – Name Space  
 Implementation – Name Caches – LDAP.

**UNIT IV SYNCHRONIZATION AND REPLICATION 9**  
 Introduction - Clocks, events and process states - Synchronizing physical clocks- Logical time and logical clocks - Global states – Coordination and Agreement – Introduction - Distributed mutual exclusion – Elections – Transactions and Concurrency Control– Transactions -Nested transactions – Locks – Optimistic concurrency control - Timestamp ordering – Atomic Commit protocols -Distributed deadlocks – Replication – Case study – Coda.

**UNIT V PROCESS & RESOURCE MANAGEMENT 9**  
**Process Management:** Process Migration: Features, Mechanism - Threads: Models, Issues, Implementation. **Resource Management:** Introduction- Features of Scheduling Algorithms –Task Assignment Approach – Load Balancing Approach – Load Sharing Approach.

**TOTAL: 45 PERIODS**

**OUTCOMES:** *Employability*

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

- Discuss trends in Distributed Systems.
- Apply network virtualization.
- Apply remote method invocation and objects.
- Design process and resource management systems.

**TEXT BOOK:**

George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", Fifth Edition, Pearson Education, 2012.

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**Dr. S. RAMABALAN, M.E., Ph.D.**  
**PRINCIPAL**

**REFERENCES:**

- Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, 2007.
- Tanenbaum A.S., Van Steen M., "Distributed Systems: Principles and Paradigms", Pearson Education, 2007.
- Liu M.L., "Distributed Computing, Principles and Applications", Pearson Education, 2004.
- Nancy A Lynch, "Distributed Algorithms", Morgan Kaufman Publishers, USA, 2003.

IT6601

**MOBILE COMPUTING**

**L T P C**  
**3 0 0 3**

**OBJECTIVES:**

The student should be made to:

- Understand the basic concepts of mobile computing.
- Be familiar with the network protocol stack.
- Learn the basics of mobile telecommunication system.
- Be exposed to Ad-Hoc networks.
- Gain knowledge about different mobile platforms and application development .

**UNIT I INTRODUCTION**

Mobile Computing – Mobile Computing Vs wireless Networking – Mobile Computing Applications – Characteristics of Mobile computing – Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Issues – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes. 9

**UNIT II MOBILE INTERNET PROTOCOL AND TRANSPORT LAYER**

Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of TCP/IP – Architecture of TCP/IP- Adaptation of TCP Window – Improvement in TCP Performance. 9

**UNIT III MOBILE TELECOMMUNICATION SYSTEM**

Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunication System (UMTS). 9

**UNIT IV MOBILE AD-HOC NETWORKS**

Ad-Hoc Basic Concepts – Characteristics – Applications – Design Issues – Routing – Essential of Traditional Routing Protocols – Popular Routing Protocols – Vehicular Ad Hoc networks (VANET) – MANET Vs VANET – Security . 9



## UNIT V MOBILE PLATFORMS AND APPLICATIONS

9

Mobile Device Operating Systems – Special Constrains & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone – M-Commerce – Structure – Pros & Cons – Mobile Payment System – Security Issues.

TOTAL: 45 PERIODS

OUTCOMES: *Employability*

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

- Explain the basics of mobile telecommunication system
- Choose the required functionality at each layer for given application
- Identify solution for each functionality at each layer
- Use simulator tools and design Ad hoc networks
- Develop a mobile application.

### TEXT BOOK:

Prasant Kumar Pattnaik, Rajib Mall, "Fundamentals of Mobile Computing", PHI Learning Pvt. Ltd, New Delhi – 2012.

### REFERENCES:

Jochen H. Schller, "Mobile Communications", Second Edition, Pearson Education, New Delhi, 2007.

Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.

3. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, 2003.

William.C.Y.Lee, "Mobile Cellular Telecommunications-Analog and Digital Systems", Second Edition, Tata Mc Graw Hill Edition, 2006.

C.K.Toth, "AdHoc Mobile Wireless Networks", First Edition, Pearson Education, 2002.

Android Developers : <http://developer.android.com/index.html>

Apple Developer : <https://developer.apple.com/>

Windows Phone Dev Center : <http://developer.windowsphone.com>

BlackBerry Developer : <http://developer.blackberry.com/>

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Dr. S. RAMABALAN, M.E., Ph.D.  
PRINCIPAL

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.

Nagapattinam (Dt) Tamil Nadu.

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CS6659

ARTIFICIAL INTELLIGENCE

### OBJECTIVES:

The student should be made to:

- Study the concepts of Artificial Intelligence.
- Learn the methods of solving problems using Artificial Intelligence.
- Introduce the concepts of Expert Systems and machine learning.

## UNIT I INTRODUCTION TO AI AND PRODUCTION SYSTEMS

9

Introduction to AI-Problem formulation, Problem Definition -Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics -Specialized production system- Problem solving methods - Problem graphs, Matching, Indexing and Heuristic functions -Hill Climbing-Depth first and Breath first, Constraints satisfaction - Related algorithms, Measure of performance and analysis of search algorithms.

<b>UNIT II REPRESENTATION OF KNOWLEDGE</b>	<b>9</b>
Game playing - Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic-Structured representation of knowledge.	
<b>UNIT III KNOWLEDGE INFERENCE</b>	<b>9</b>
Knowledge representation -Production based system, Frame based system. Inference - Backward chaining, Forward chaining, Rule value approach, Fuzzy reasoning - Certainty factors, Bayesian Theory-Bayesian Network-Dempster - Shafer theory.	
<b>UNIT IV PLANNING AND MACHINE LEARNING</b>	<b>9</b>
Basic plan generation systems - Strips -Advanced plan generation systems – K strips -Strategic explanations -Why, Why not and how explanations. Learning- Machine learning, adaptive Learning.	
<b>UNIT V EXPERT SYSTEMS</b>	<b>9</b>
Expert systems - Architecture of expert systems, Roles of expert systems - Knowledge Acquisition – Meta knowledge, Heuristics. Typical expert systems - MYCIN, DART, XOON, Expert systems shells.	

**TOTAL: 45 PERIODS**

**OUTCOMES:** *Employability*

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

Identify problems that are amenable to solution by AI methods.

Identify appropriate AI methods to solve a given problem.

Formalise a given problem in the language/framework of different AI methods.

Implement basic AI algorithms.

Design and carry out an empirical evaluation of different algorithms on a problem formalisation, and state the conclusions that the evaluation supports.

**TEXT BOOKS:**

Kevin Night and Elaine Rich, Nair B., "Artificial Intelligence (SIE)", McGraw Hill- 2008. (Unit- 1,2,4,5).

Dan W. Patterson, "Introduction to AI and ES", Pearson Education, 2007. (Unit-III)

**REFERENCES:**

Peter Jackson, "Introduction to Expert Systems", 3<sup>rd</sup> Edition, Pearson Education, 2007.

Stuart Russel and Peter Norvig "AI – A Modern Approach", 2<sup>nd</sup> Edition, Pearson Education, 2007.

Deepak Khemani "Artificial Intelligence", Tata Mc Graw Hill Education 2013

<http://nptel.ac.in/>

**ATTESTED**  
*[Signature]*  
**Dr. S. RAMABALAN, M.E., Ph.D.,**  
**PRINCIPAL**

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.

**CS6660**

**COMPILER DESIGN**

**L T P C**  
**3 0 0 3**

**OBJECTIVES:**

**The student should be made to:**

Learn the design principles of a Compiler.

Learn the various parsing techniques and different levels of translation.

Learn how to optimize and effectively generate machine codes.



<b>UNIT I INTRODUCTION TO COMPILERS</b>	<b>5</b>
Translators-Compilation and Interpretation-Language processors -The Phases of Compiler-Errors Encountered in Different Phases-The Grouping of Phases-Compiler Construction Tools - Programming Language basics.	
<b>UNIT II LEXICAL ANALYSIS</b>	<b>9</b>
Need and Role of Lexical Analyzer-Lexical Errors-Expressing Tokens by Regular Expressions- Converting Regular Expression to DFA- Minimization of DFA-Language for Specifying Lexical Analyzers-LEX-Design of Lexical Analyzer for a sample Language.	
<b>UNIT III SYNTAX ANALYSIS</b>	<b>10</b>
Need and Role of the Parser-Context Free Grammars -Top Down Parsing -General Strategies- Recursive Descent Parser Predictive Parser-LL(1) Parser-Shift Reduce Parser-LR Parser-LR (0)Item- Construction of SLR Parsing Table -Introduction to LALR Parser - Error Handling and Recovery in Syntax Analyzer-YACC-Design of a syntax Analyzer for a Sample Language .	
<b>UNIT IV SYNTAX DIRECTED TRANSLATION &amp; RUN TIME ENVIRONMENT</b>	<b>12</b>
Syntax directed Definitions-Construction of Syntax Tree-Bottom-up Evaluation of S-Attribute Definitions- Design of predictive translator - Type Systems-Specification of a simple type checker- Equivalence of Type Expressions-Type Conversions.	
<b>RUN-TIME ENVIRONMENT:</b> Source Language Issues-Storage Organization-Storage Allocation-Parameter Passing-Symbol Tables-Dynamic Storage Allocation-Storage Allocation in FORTAN.	
<b>UNIT V CODE OPTIMIZATION AND CODE GENERATION</b>	<b>9</b>
Principal Sources of Optimization-DAG- Optimization of Basic Blocks-Global Data Flow Analysis- Efficient Data Flow Algorithms-Issues in Design of a Code Generator - A Simple Code Generator Algorithm.	
<b>TOTAL: 45 PERIODS</b>	

**OUTCOMES:** *Skill Development*  
**At the end of the course, the student should be able to:**  
 Design and implement a prototype compiler.  
 Apply the various optimization techniques.  
 Use the different compiler construction tools.

**TEXTBOOK:**  
 Alfred V Aho, Monica S. Lam, Ravi Sethi and Jeffrey D Ullman, "Compilers – Principles, Techniques and Tools", 2<sup>nd</sup> Edition, Pearson Education, 2007.

**REFERENCES:**  
 Randy Allen, Ken Kennedy, "Optimizing Compilers for Modern Architectures: A Dependence-based Approach", Morgan Kaufmann Publishers, 2002.  
 Steven S. Muchnick, "Advanced Compiler Design and Implementation", Morgan Kaufmann Publishers - Elsevier Science, India, Indian Reprint 2003.  
 Keith D Cooper and Linda Torczon, "Engineering a Compiler", Morgan Kaufmann Publishers Elsevier Science, 2004.  
 4. Charles N. Fischer, Richard. J. LeBlanc, "Crafting a Compiler with C", Pearson Education, 2008.

**ATTESTED**  
  
**Dr. S. RAMABALAN, M.E., Ph.D.,**  
**PRINCIPAL**  
 E.G.S. Pillay Engineering College,  
 Thethi, Nagore - 611 002.  
 Nagapattinam (Dt) Tamil Nadu.

**OBJECTIVES:**

- Understand software architectural requirements and drivers
- Be exposed to architectural styles and views
- Be familiar with architectures for emerging technologies

<b>UNIT I INTRODUCTION AND ARCHITECTURAL DRIVERS</b>	<b>9</b>
Introduction – What is software architecture? – Standard Definitions – Architectural structures – Influence of software architecture on organization-both business and technical – Architecture Business Cycle- Introduction – Functional requirements – Technical constraints – Quality Attributes.	
<b>UNIT II QUALITY ATTRIBUTE WORKSHOP</b>	<b>9</b>
Quality Attribute Workshop – Documenting Quality Attributes – Six part scenarios – Case studies.	
<b>UNIT III ARCHITECTURAL VIEWS</b>	<b>9</b>
Introduction – Standard Definitions for views – Structures and views - Representing views-available notations – Standard views – 4+1 view of RUP, Siemens 4 views, SEI's perspectives and views – Case studies	
<b>UNIT IV ARCHITECTURAL STYLES</b>	<b>9</b>
Introduction – Data flow styles – Call-return styles – Shared Information styles - Event styles – Case studies for each style.	
<b>UNIT V DOCUMENTING THE ARCHITECTURE</b>	<b>9</b>
Good practices – Documenting the Views using UML – Merits and Demerits of using visual languages – Need for formal languages - Architectural Description Languages – ACME – Case studies. Special topics: SOA and Web services – Cloud Computing – Adaptive structures	

**OUTCOMES:**

Upon Completion of the course, the students will be able to

- Explain influence of software architecture on business and technical activities *Employability*
- Identify key architectural structures
- Use styles and views to specify architecture *Entrepreneurship*
- Design document for a given architecture

**TEXT BOOKS:**

- Len Bass, Paul Clements, and Rick Kazman, "Software Architectures Principles and Practices", 2<sup>nd</sup> Edition, Addison-Wesley, 2003.
- Anthony J Lattanze, "Architecting Software Intensive System. A Practitioner's Guide", Auerbach Publications, 2010.

**REFERENCES:**

- Paul Clements, Felix Bachmann, Len Bass, David Garlan, James Ivers, Reed Little, Paulo Merson, Robert Nord, and Judith Stafford, "Documenting Software Architectures. Views and Beyond", 2<sup>nd</sup> Edition, Addison-Wesley, 2010.
- Paul Clements, Rick Kazman, and Mark Klein, "Evaluating software architectures: Methods and case studies. Addison-Wesley, 2001.
- Rajkumar Buyya, James Broberg, and Andrzej Goscinski, "Cloud Computing. Principles and Paradigms", John Wiley & Sons, 2011
- Mark Hansen, "SOA Using Java Web Services", Prentice Hall, 2007

**ATTESTED**  
  
**Dr. S. RAMABALAN, M.E., Ph.D.,**  
**PRINCIPAL**  
**E.G.S. Pillay Engineering College,**  
**Thethi, Nagore - 611 002,**  
**Nagapattinam (Dt) Tamil Nadu.**



GE6757

**TOTAL QUALITY MANAGEMENT**

**L T P C**  
**3 0 0 3**

**OBJECTIVES :**

To facilitate the understanding of Quality Management principles and process.

**UNIT I INTRODUCTION**

**9**

Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Contributions of Deming, Juran and Crosby - Barriers to TQM - Quality statements - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Costs of quality.

**UNIT II TQM PRINCIPLES**

**9**

Leadership - Strategic quality planning, Quality Councils - Employee involvement - Motivation, Empowerment, Team and Teamwork, Quality circles Recognition and Reward, Performance appraisal  
Continuous process improvement - PDCA cycle, 5S, Kaizen - Supplier partnership - Partnering, Supplier selection, Supplier Rating.

**UNIT III TQM TOOLS AND TECHNIQUES I**

**9**

The seven traditional tools of quality - New management tools - Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types.

**UNIT IV TQM TOOLS AND TECHNIQUES II**

**9**

Control Charts - Process Capability - Concepts of Six Sigma - Quality Function Development (QFD) - Taguchi quality loss function - TPM - Concepts, improvement needs - Performance measures.

**UNIT V** **QUALITY SYSTEMS**

9

Need for ISO 9000 - ISO 9001-2008 Quality System - Elements, Documentation, Quality Auditing - QS 9000 - ISO 14000 - Concepts, Requirements and Benefits - TQM Implementation in manufacturing and service sectors..

**OUTCOMES:** *Skill Development, Employability Entrepreneurship* **TOTAL: 45 PERIODS**

The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

**TEXTBOOK:**

Dale H. Besterfield, et al., "Total quality Management", Pearson Education Asia, Third Edition, Indian Reprint 2006.

**REFERENCES:**

James R. Evans and William M. Lindsay, "The Management and Control of Quality", 8<sup>th</sup> Edition, First Indian Edition, Cengage Learning, 2012.  
Suganthi.L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd., 2006.  
Janakiraman. B and Gopal .R.K., "Total Quality Management - Text and Cases", Prentice Hall (India) Pvt. Ltd., 2006.

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**Dr. S. RAMABALAN, M.E., Ph.D.,**  
**PRINCIPAL**

**E.G.S. Pillay Engineering College,**  
**Thathi Nagore - 611 002**

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David Garlan, Bradley Schmerl, and Shang-Wen Cheng, "Software Architecture-Based Self-Adaptation," 31-56. Mieso K Denko, Laurence Tianruo Yang, and Yan Zang (eds.), "Autonomic Computing and Networking". Springer Verlag, 2009

IT6611

**MOBILE APPLICATION DEVELOPMENT LABORATORY**

L T P C  
0 0 3 2

**OBJECTIVES:**

The student should be made to:

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

**LIST OF EXPERIMENTS**

- Develop an application that uses GUI components, Font and Colours
- Develop an application that uses Layout Managers and event listeners.
- Develop a native calculator application.
- Write an application that draws basic graphical primitives on the screen.
- Develop an application that makes use of database.
- Develop an application that makes use of RSS Feed.
- Implement an application that implements Multi threading
- Develop a native application that uses GPS location information.
- Implement an application that writes data to the SD card.
- Implement an application that creates an alert upon receiving a message.
- Write a mobile application that creates alarm clock

TOTAL: 45 PERIODS

**OUTCOMES:** *Skill Development, Employability, Entrepreneurship*

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

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

**LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS**

- Standalone desktops with Windows or Android or iOS or Equivalent Mobile Application Development Tools with appropriate emulators and debuggers - 30 Nos.

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Dr. S. RAMABALAN, M.E., Ph.D.,  
PRINCIPAL

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu C

IT6612

**COMPILER LABORATORY**

0 0 3 2

**OBJECTIVES:**

The student should be made to:

- Be exposed to compiler writing tools.
- Learn to implement the different Phases of compiler
- Be familiar with control flow and data flow analysis
- Learn simple optimization techniques

### LIST OF EXPERIMENTS:

- Implementation of Symbol Table
- Develop a lexical analyzer to recognize a few patterns in C. (Ex. identifiers, constants, comments, operators etc.)
- Implementation of Lexical Analyzer using Lex Tool
- Generate YACC specification for a few syntactic categories.
  - Program to recognize a valid arithmetic expression that uses operator +, -, \* and /.
  - Program to recognize a valid variable which starts with a letter followed by any number of letters or digits.
- d) Implementation of Calculator using LEX and YACC
- Convert the BNF rules into Yacc form and write code to generate Abstract Syntax Tree.
- Implement type checking
- Implement control flow analysis and Data flow Analysis
- Implement any one storage allocation strategies (Heap, Stack, Static)
- Construction of DAG
- Implement the back end of the compiler which takes the three address code and produces the 8086 assembly language instructions that can be assembled and run using a 8086 assembler. The target assembly instructions can be simple move, add, sub, jump. Also simple addressing modes are used.
- Implementation of Simple Code Optimization Techniques (Constant Folding., etc.)

TOTAL: 45 PERIODS

### OUTCOMES:

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

- Implement the different Phases of compiler using tools *Skill Development*
- Analyze the control flow and data flow of a typical program *Employability*
- Optimize a given program
- Generate an assembly language program equivalent to a source language program

### LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

Standalone desktops with C / C++ compiler and Compiler writing tools 30 Nos.  
(or)

Server with C / C++ compiler and Compiler writing tools supporting 30 terminals or

more. LEX and YACC

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*[Signature]*  
**Dr. S. RAMABALAN, M.E., Ph.D.,**  
PRINCIPAL

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.

Nagapattinam (Dt) Tamil Nadu.

GE6674

COMMUNICATION AND SOFT SKILLS - LABORATORY BASED

LTPC  
0042

### OBJECTIVES:

- To enable learners to develop their communicative competence.
- To facilitate them to hone their soft skills.
- To equip them with employability skills to enhance their prospect of placements.

### UNIT I LISTENING AND SPEAKING SKILLS

12

Conversational skills (formal and informal) – group discussion and interview skills – making presentations.

Listening to lectures, discussions, talk shows, news programmes, dialogues from TV/radio/Ted talk/Podcast – watching videos on interesting events on You tube.



**UNIT II READING AND WRITING SKILLS 12**

Reading different genres of texts ranging from newspapers to philosophical treatises – reading strategies such as graphic organizers, summarizing and interpretation.

Writing job applications – cover letter – resume – emails – letters – memos – reports – blogs – writing for publications.

**UNIT III ENGLISH FOR NATIONAL AND INTERNATIONAL EXAMINATIONS AND PLACEMENTS 12** International English Language Testing System (IELTS) – Test of English as a Foreign Language (TOEFL) – Graduate Record Examination (GRE) – Civil Service (Language related) – Verbal ability.

**UNIT IV SOFT SKILLS (1) 12**  
Motivation – self image – goal setting – managing changes – time management – stress management – leadership traits – team work – career and life planning.

**UNIT V SOFT SKILLS (2) 12**  
Multiple intelligences – emotional intelligence – spiritual quotient (ethics) – intercultural communication – creative and critical thinking – learning styles and strategies.

**TOTAL: 60 PERIODS**

**TEACHING METHODS:**

1. To be totally learner-centric with minimum teacher intervention as the course revolves around practice.  
Suitable audio/video samples from Podcast/YouTube to be used for illustrative purposes.  
Portfolio approach for writing to be followed. Learners are to be encouraged to blog, tweet, text and email employing appropriate language.  
GD/Interview/Role Play/Debate could be conducted off the laboratory (in a regular classroom) but learners are to be exposed to telephonic interview and video conferencing.  
Learners are to be assigned to read/write/listen/view materials outside the classroom as well for gaining proficiency and better participation in the class.

**LAB INFRASTRUCTURE:**

S. No.	Description of Equipment (minimum configuration)	Qty Required
1	<b>Server</b>	1 No.
	• PIV System	
	• 1 GB RAM / 40 GB HDD	
	• OS: Win 2000 server	
	• Audio card with headphones	
• JRE 1.3		
2	<b>Client Systems</b>	60 Nos.
	• PIII System	
	• 256 or 512 MB RAM / 40 GB HDD	
	• OS: Win 2000	
	• Audio card with headphones	
• JRE 1.3		
3	Handicam	1 No.
4	Television 46"	1 No.
5	Collar mike	1 No.
6	Cordless mike	1 No.
7	Audio Mixer	1 No.
8	DVD recorder/player	1 No.
9	LCD Projector with MP3/CD/DVD provision for Audio/video facility	1 No.

## EVALUATION:

### INTERNAL: 20 MARKS

Record maintenance: Students should write a report on a regular basis on the activities conducted, focusing on the details such as the description of the activity, ideas emerged, learning outcomes and so on. At the end of the semester records can be evaluated out of 20 marks.

### EXTERNAL: 80 MARKS

Online Test	- 35 marks
Interview	- 15 marks
Presentation	- 15 marks
Group Discussion	- 15 marks

### NOTE ON INTERNAL AND EXTERNAL EVALUATION:

Interview – mock interview can be conducted on one-on-one basis.

Speaking – example for role play:

Marketing engineer convincing a customer to buy his product.

Telephonic conversation- fixing an official appointment / placing an order / enquiring and so on.

Presentation – should be extempore on simple topics.

Discussion – topics of different kinds; general topics, case studies and abstract concept.

### OUTCOMES: Skill Development

At the end of the course, learners should be able to

Take international examination such as IELTS and TOEFL

Make presentations and Participate in Group Discussions.

Successfully answer questions in interviews.

### REFERENCES:

Business English Certificate Materials, Cambridge University Press.

Graded Examinations in Spoken English and Spoken English for Work downloadable materials from Trinity College, London.

International English Language Testing System Practice Tests, Cambridge University Press.

Interactive Multimedia Programs on Managing Time and Stress.

Personality Development (CD-ROM), Times Multimedia, Mumbai.

Robert M Sherfield and et al. "Developing Soft Skills" 4th edition, New Delhi: Pearson Education, 2009.

### WEB SOURCES:

<http://www.slideshare.net/rohitjsh/presentation-on-group-discussion>

[http://www.washington.edu/doi/TeamN/present\\_tips.html](http://www.washington.edu/doi/TeamN/present_tips.html)

<http://www.oxforddictionaries.com/words/writing-job-applications>

<http://www.kent.ac.uk/careers/cv/coveringletters.htm>

[http://www.mindtools.com/pages/article/newCDV\\_34.htm](http://www.mindtools.com/pages/article/newCDV_34.htm)

ATTESTED

Dr. S. RAMABALAN, M.E., Ph.D.,  
PRINCIPAL

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.



**OBJECTIVES:**

- To expose students with the basics of managing the information
- To explore the various aspects of database design and modelling,
- To examine the basic issues in information governance and information integration
- To understand the overview of information architecture.

<b>UNIT I</b>	<b>DATABASE MODELLING, MANAGEMENT AND DEVELOPMENT</b>	<b>9</b>
Database design and modelling - Business Rules and Relationship; Java database Connectivity (JDBC), Database connection Manager, Stored Procedures. Trends in Big Data systems including NoSQL - Hadoop HDFS, MapReduce, Hive, and enhancements.		
<b>UNIT II</b>	<b>DATA SECURITY AND PRIVACY</b>	<b>9</b>
Program Security, Malicious code and controls against threats; OS level protection; Security – Firewalls, Network Security Intrusion detection systems. Data Privacy principles. Data Privacy Laws and compliance.		
<b>UNIT III</b>	<b>INFORMATION GOVERNANCE</b>	<b>9</b>
Master Data Management (MDM) – Overview, Need for MDM, Privacy, regulatory requirements and compliance. Data Governance – Synchronization and data quality management.		
<b>UNIT IV</b>	<b>INFORMATION ARCHITECTURE</b>	<b>9</b>
Principles of Information architecture and framework, Organizing information, Navigation systems and Labelling systems, Conceptual design, Granularity of Content.		
<b>UNIT V</b>	<b>INFORMATION LIFECYCLE MANAGEMENT</b>	<b>9</b>
Data retention policies; Confidential and Sensitive data handling, lifecycle management costs. Archive data using Hadoop; Testing and delivering big data applications for performance and functionality; Challenges with data administration;		
		<b>TOTAL: 45 PERIODS</b>

**OUTCOMES:** *Employability*

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

Cover core relational database topics including logical and physical design and modeling

Design and implement a complex information system that meets regulatory requirements; define and manage an organization's key master data entities

Design, Create and maintain data warehouses.

Learn recent advances in NOSQL , Big Data and related tools.

**TEXT BOOKS:**

Alex Berson, Larry Dubov MASTER DATA MANAGEMENT AND DATA GOVERNANCE, 2/E,  
Tata McGraw Hill, 2011

Security in Computing, 4/E, Charles P. Pfleeger, Shari Lawrence Pfleeger, Prentice Hall; 2006

Information Architecture for the World Wide Web; Peter Morville, Louis Rosenfeld ; O'Reilly Media;  
1998

**REFERENCES:**

Jeffrey A. Hoffer, Heikki Topi, V Ramesh - MODERN DATABASE MANAGEMENT, 10 Edition,  
PEARSON, 2012

<http://nosql-database.org/> Next Gen databases that are distributed, open source and scalable.

<http://ibm.com/big-data> - Four dimensions of big data and other ebooks on Big Data Analytics

Inside Cyber Warfare: Mapping the Cyber Underworld- Jeffrey Carr, O'Reilly Media; Second  
Edition 2011

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*[Signature]*  
**Dr. S. RAMABALAN, M.E., Ph.D.,**  
**PRINCIPAL**

**E.G.S. Pillay Engineering College,**  
**Thethi, Nagore - 611 002.**  
**Nagapattinam (Dt) Tamil Nadu.**

**OBJECTIVES:**

The student should be made to:

- Understand OSI security architecture and classical encryption techniques.
- Acquire fundamental knowledge on the concepts of finite fields and number theory.
- Understand various block cipher and stream cipher models.
- Describe the principles of public key cryptosystems, hash functions and digital signature.

**UNIT I INTRODUCTION & NUMBER THEORY**

10

Services, Mechanisms and attacks-the OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography).FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields-Modular arithmetic-Euclid's algorithm-Finite fields- Polynomial Arithmetic -Prime numbers-Fermat's and Euler's theorem-Testing for primality -The Chinese remainder theorem- Discrete logarithms.

**UNIT II BLOCK CIPHERS & PUBLIC KEY CRYPTOGRAPHY**

10

Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES-Blowfish-RC5 algorithm. **Public key cryptography:** Principles of public key cryptosystems-The RSA algorithm-Key management - Diffie Hellman Key exchange-Elliptic curve arithmetic-Elliptic curve cryptography.

**UNIT III HASH FUNCTIONS AND DIGITAL SIGNATURES**

8

Authentication requirement - Authentication function - MAC - Hash function - Security of hash function and MAC -MD5 - SHA - HMAC - CMAC - Digital signature and authentication protocols - DSS - El Gamal - Schnorr.

**UNIT IV SECURITY PRACTICE & SYSTEM SECURITY**

8

Authentication applications - Kerberos - X.509 Authentication services - Internet Firewalls for Trusted System: Roles of Firewalls - Firewall related terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions. Intruder - Intrusion detection system - Virus and related threats - Countermeasures - Firewalls design principles - Trusted systems - Practical implementation of cryptography and security.

**UNIT VE-MAIL, IP & WEB SECURITY**

9

**E-mail Security:** Security Services for E-mail-attacks possible through E-mail - establishing keys privacy-authentication of the source-Message Integrity-Non-repudiation-Pretty Good Privacy-S/MIME. **IP Security:** Overview of IPSec - IP and IPv6-Authentication Header-Encapsulation Security Payload (ESP)-Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding). **Web Security:** SSL/TLS Basic Protocol-computing the keys- client authentication-PKI as deployed by SSL Attacks fixed in v3-Exportability-Encoding-Secure Electronic Transaction (SET).

TOTAL: 45 PERIODS

**OUTCOMES: Employability**

Upon Completion of the course, the students should be able to:

- Compare various Cryptographic Techniques
- Design Secure applications
- Inject secure coding in the developed applications

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Dr. S. RAMABALAN, M.E., Ph.D.,  
PRINCIPAL

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.





**UNIT V CLUSTERING AND TRENDS IN DATA MINING**

9

Cluster Analysis - Types of Data – Categorization of Major Clustering Methods – K-means– Partitioning Methods – Hierarchical Methods - Density-Based Methods –Grid Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data - Constraint – Based Cluster Analysis – Outlier Analysis – Data Mining Applications.

TOTAL: 45 PERIODS

**OUTCOMES:** *Employability*

After completing this course, the student will be able to:

- Apply data mining techniques and methods to large data sets.
- Use data mining tools.
- Compare and contrast the various classifiers.

**TEXT BOOKS:**

- Alex Berson and Stephen J.Smith, "Data Warehousing, Data Mining and OLAP", Tata McGraw – Hill Edition, Thirteenth Reprint 2008.
- Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Third Edition, Elsevier, 2012.

**REFERENCES:**

- Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to Data Mining", Person Education, 2007.
- K.P. Soman, Shyam Diwakar and V. Aja, "Insight into Data Mining Theory and Practice", Eastern Economy Edition, Prentice Hall of India, 2006.
- G. K. Gupta, "Introduction to Data Mining with Case Studies", Eastern Economy Edition, Prentice Hall of India, 2006.
- Daniel T.Larose, "Data Mining Methods and Models", Wiley-Interscience, 2006.

ATTESTED

*[Signature]*  
**Dr. S. RAMABALAN, M.E., Ph.D.,**  
PRINCIPAL

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.

CS6703

GRID AND CLOUD COMPUTING

L T P C  
3 0 0 3

**OBJECTIVES:**

The student should be made to:

- Understand how Grid computing helps in solving large scale scientific problems.
- Gain knowledge on the concept of virtualization that is fundamental to cloud computing.
- Learn how to program the grid and the cloud.
- Understand the security issues in the grid and the cloud environment.

**UNIT I INTRODUCTION**

9

Evolution of Distributed computing: Scalable computing over the Internet – Technologies for network based systems – clusters of cooperative computers - Grid computing Infrastructures – cloud computing - service oriented architecture – Introduction to Grid Architecture and standards – Elements of Grid – Overview of Grid Architecture.

**UNIT II GRID SERVICES**

9

Introduction to Open Grid Services Architecture (OGSA) – Motivation – Functionality Requirements – Practical & Detailed view of OGSA/OGSI – Data intensive grid service models – OGSA services.



### UNIT III VIRTUALIZATION

Cloud deployment models: public, private, hybrid, community – Categories of cloud computing: Everything as a service: Infrastructure, platform, software – Pros and Cons of cloud computing – Implementation levels of virtualization – virtualization structure – virtualization of CPU, Memory and I/O devices – virtual clusters and Resource Management – Virtualization for data center automation.

### UNIT IV PROGRAMMING MODEL

Open source grid middleware packages – Globus Toolkit (GT4) Architecture, Configuration – Usage of Globus – Main components and Programming model - Introduction to Hadoop Framework - Mapreduce, Input splitting, map and reduce functions, specifying input and output parameters, configuring and running a job – Design of Hadoop file system, HDFS concepts, command line and java interface, dataflow of File read & File write.

### UNIT V SECURITY

Trust models for Grid security environment – Authentication and Authorization methods – Grid security infrastructure – Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud, Key privacy issues in the cloud.

TOTAL: 45 PERIODS

### OUTCOMES: Entrepreneurship

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

- Apply grid computing techniques to solve large scale scientific problems
- Apply the concept of virtualization
- Use the grid and cloud tool kits
- Apply the security models in the grid and the cloud environment


### TEXT BOOK:

Kai Hwang, Geoffery C. Fox and Jack J. Dongarra, "Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet", First Edition, Morgan Kaufman Publisher, an Imprint of Elsevier, 2012.

### REFERENCES:

- Jason Venner, "Pro Hadoop- Build Scalable, Distributed Applications in the Cloud", A Press, 2009
- Tom White, "Hadoop The Definitive Guide", First Edition, O'Reilly, 2009.
- Bart Jacob (Editor), "Introduction to Grid Computing", IBM Red Books, Vervante, 2005
- Ian Foster, Carl Kesselman, "The Grid: Blueprint for a New Computing Infrastructure", 2<sup>nd</sup> Edition, Morgan Kaufmann.
- Frederic Magoules and Jie Pan, "Introduction to Grid Computing" CRC Press, 2009.
- Daniel Minoli, "A Networking Approach to Grid Computing", John Wiley Publication, 2005.
- Barry Wilkinson, "Grid Computing: Techniques and Applications", Chapman and Hall, CRC, Taylor and Francis Group, 2010.

ATTESTED

  
Dr. S. RAMABALAN, M.E., Ph.D.  
PRINCIPAL  
E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam, (Dt) Tamil Nadu.

**OBJECTIVES:****The student should be made to:**

- Expose the criteria for test cases.
- Learn the design of test cases.
- Be familiar with test management and test automation techniques.
- Be exposed to test metrics and measurements.

**UNIT I INTRODUCTION**

Testing as an Engineering Activity – Testing as a Process – Testing axioms – Basic definitions – Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Cost of defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support of Developing a Defect Repository – Defect Prevention strategies.

9

**UNIT II TEST CASE DESIGN**

Test case Design Strategies – Using Black Box Approach to Test Case Design – Random Testing – Requirements based testing – Boundary Value Analysis – Equivalence Class Partitioning – State-based testing – Cause-effect graphing – Compatibility testing – user documentation testing – domain testing – Using White Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing – Coverage and Control Flow Graphs – Covering Code Logic – Paths – code complexity testing – Evaluating Test Adequacy Criteria.

9

**UNIT III LEVELS OF TESTING**

The need for Levers of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – Scenario testing – Defect bash elimination System Testing – Acceptance testing – Performance testing – Regression Testing – Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – Testing OO systems – Usability and Accessibility testing – Configuration testing – Compatibility testing – Testing the documentation – Website testing.

9

**UNIT IV TEST AMANAGEMENT**

People and organizational issues in testing – Organization structures for testing teams – testing services – Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process – Reporting Test Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group.

9

**UNIT V TEST AUTOMATION** 9 Software test automation – skill needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation – Test metrics and measurements – project, progress and productivity metrics.

**TOTAL: 45 PERIODS****OUTCOMES: Employability****At the end of the course the students will be able to**

- Design test cases suitable for a software development for different domains.
- Identify suitable tests to be carried out.
- Prepare test planning based on the document.
- Document test plans and test cases designed.
- Use of automatic testing tools.
- Develop and validate a test plan.

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**Dr. S. RAMABALAN, M.E., Ph.D.,**  
**PRINCIPAL**

E.G.S. Pillay Engineering College,  
 Thethi, Nagore - 611 002.  
 Nagapattinam (Dt) Tamil Nadu.



IT6711

DATA MINING LABORATORY

L T P C  
0 0 3 2

**OBJECTIVES:**

The student should be made to:

- Be familiar with the algorithms of data mining,
- Be acquainted with the tools and techniques used for Knowledge Discovery in Databases.
- Be exposed to web mining and text mining

**LIST OF EXPERIMENTS:**

- Creation of a Data Warehouse.
- Apriori Algorithm.
- FP-Growth Algorithm.
- K-means clustering.
- One Hierarchical clustering algorithm.
- Bayesian Classification.
- Decision Tree.
- Support Vector Machines.
- Applications of classification for web mining.
- Case Study on Text Mining or any commercial application.

TOTAL : 45 PERIODS

**OUTCOMES:**

After completing this course, the student will be able to:

Apply data mining techniques and methods to large data sets.

Use data mining tools. *skill Development*

Compare and contrast the various classifiers. *Employability*

**LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:**


**SOFTWARE:**

WEKA, RapidMiner, DB Miner or Equivalent

**HARDWARE**

Standalone desktops 30 Nos

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Dr. S. RAMABALAN, M.E., Ph.D.,  
PRINCIPAL  
E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.

IT6712

SECURITY LABORATORY

L T P C  
0 0 3 2

**OBJECTIVES:**

The student should be made to:

- Be exposed to the different cipher techniques
- Learn to implement the algorithms DES, RSA, MD5, SHA-1
- Learn to use tools like GnuPG, KF sensor, Net Strumbler

**LIST OF EXPERIMENTS**

Implement the following SUBSTITUTION & TRANSPOSITION TECHNIQUES concepts:

- Caesar Cipher
- Playfair Cipher
- Hill Cipher
- Vigenere Cipher
- Rail fence – row & Column Transformation

Implement the following algorithms

DES  
RSA Algorithm  
Diffie-Hellman  
MD5  
SHA-1

3 Implement the SIGNATURE SCHEME - Digital Signature Standard

Demonstrate how to provide secure data storage, secure data transmission and for creating digital signatures (GnuPG).

Setup a honey pot and monitor the honeypot on network (KF Sensor)

Installation of rootkits and study about the variety of options

Perform wireless audit on an access point or a router and decrypt WEP and WPA.( Net Stumbler)

Demonstrate intrusion detection system (ids) using any tool (snort or any other s/w)

TOTAL: 45 PERIODS

**OUTCOMES:**

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

Implement the cipher techniques

Develop the various security algorithms *Skill Development*

Use different open source tools for network security and analysis *Employability*

**LAB EQUIPMENTS FOR A BATCH OF 30 STUDENTS:**

**SOFTWARE:**

C / C++ / Java or equivalent compiler

GnuPG, KF Sensor or Equivalent, Snort, Net Stumbler or Equivalent

**HARDWARE:**

Standalone desktops -30 Nos.

(or)

Server supporting 30 terminals or more.

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Dr. S. RAMABALAN, M.E., Ph.D.,  
PRINCIPAL

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002  
Nagapattinam (Dt) Tamil Nadu.

IT6713

GRID AND CLOUD COMPUTING LABORATORY

L T P C  
0 0 3 2

**OBJECTIVES:**

The student should be made to:

Be exposed to tool kits for grid and cloud environment.

Be familiar with developing web services/Applications in grid framework

Learn to run virtual machines of different configuration.

Learn to use Hadoop

**LIST OF EXPERIMENTS:**

**GRID COMPUTING LAB:**

Use Globus Toolkit or equivalent and do the following:

Develop a new Web Service for Calculator.

Develop new OGSA-compliant Web Service.

Using Apache Axis develop a Grid Service.



Develop applications using Java or C/C++ Grid APIs  
 Develop secured applications using basic security mechanisms available in Globus Toolkit.  
 Develop a Grid portal, where user can submit a job and get the result. Implement it with and without GRAM concept.

**CLOUD COMPUTING LAB:**

Use Eucalyptus or Open Nebula or equivalent to set up the cloud and demonstrate.  
 Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time.  
 Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.  
 Install a C compiler in the virtual machine and execute a sample program.  
 Show the virtual machine migration based on the certain condition from one node to the other.  
 Find procedure to install storage controller and interact with it.  
 Find procedure to set up the one node Hadoop cluster.  
 Mount the one node Hadoop cluster using FUSE.  
 Write a program to use the API's of Hadoop to interact with it.  
 Write a word count program to demonstrate the use of Map and Reduce tasks.

**TOTAL: 45 PERIODS**

**OUTCOMES:**

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

- Use the grid and cloud tool kits. *Skill Development*
- Design and implement applications on the Grid.
- Design and Implement applications on the Cloud. *Employability*

**LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:**

**SOFTWARE:**

Globus Toolkit or equivalent  
 Eucalyptus or Open Nebula or equivalent to

**HARDWARE**

Standalone desktops 30 Nos

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**Dr. S. RAMABALAN, M.E., Ph.D.,**  
**PRINCIPAL**  
 E.G.S. Pillay Engineering College,  
 Thethi, Nagore - 611 002.  
 Nagapattinam (Dt) Tamil Nadu.

IT6801

**SERVICE ORIENTED ARCHITECTURE**

**L T P C**  
**3 0 0 3**

**OBJECTIVES:**

**The student should be made to:**

- Learn XML fundamentals.
- Be exposed to build applications based on XML.
- Understand the key principles behind SOA.
- Be familiar with the web services technology elements for realizing SOA.
- Learn the various web service standards.

**UNIT I**

**INTRODUCTION TO XML**

XML document structure – Well formed and valid documents – Namespaces – DTD – XML Schema – X-Files.

<b>UNIT II</b>	<b>BUILDING XML- BASED APPLICATIONS</b>	<b>9</b>
Parsing XML – using DOM, SAX – XML Transformation and XSL – XSL Formatting – Modeling Databases in XML.		
<b>UNIT III</b>	<b>SERVICE ORIENTED ARCHITECTURE</b>	<b>9</b>
Characteristics of SOA, Comparing SOA with Client-Server and Distributed architectures – Benefits of SOA -- Principles of Service orientation – Service layers.		
<b>UNIT IV</b>	<b>WEB SERVICES</b>	<b>9</b>
Service descriptions – WSDL – Messaging with SOAP – Service discovery – UDDI – Message Exchange Patterns – Orchestration – Choreography –WS Transactions.		
<b>UNIT V</b>	<b>BUILDING SOA-BASED APPLICATIONS</b>	<b>9</b>
Service Oriented Analysis and Design – Service Modeling – Design standards and guidelines -- Composition – WS-BPEL – WS-Coordination – WS-Policy – WS-Security – SOA support in J2EE.		

**TOTAL: 45 PERIODS**

**OUTCOMES:** *Employability*

Upon successful completion of this course, students will be able to:

- Build applications based on XML.
- Develop web services using technology elements.
- Build SOA-based applications for intra-enterprise and inter-enterprise applications.

**TEXTBOOKS:**

- Ron Schmelzer et al. " XML and Web Services", Pearson Education, 2002
- Thomas Erl, "Service Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2005.

**REFERENCES:**

- Frank P.Coyle, "XML, Web Services and the Data Revolution", Pearson Education, 2002.
- 2. Eric Newcomer, Greg Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.
- Sandeep Chatterjee and James Webber, "Developing Enterprise Web Services: An Architect's Guide", Prentice Hall, 20044.
- James McGovern, Sameer Tyagi, Michael E.Stevens, Sunil Mathew, "Java Web Services Architecture", Morgan Kaufmann Publishers, 2003.

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**Dr. S. RAMABALAN**, M.E., Ph.D.,  
PRINCIPAL

E.G.S. Pillay Engineering College,  
Thethi, Nagore - 611 002.  
Nagapattinam (Dt) Tamil Nadu.

IT6811

**PROJECT WORK**

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**0012 6**

**OBJECTIVES:**

To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same. To train the students in preparing project reports and to face reviews and viva voce examination.

The students in a group of 3 to 4 works on a topic approved by the head of the department under the guidance of a faculty member and prepares a comprehensive project report after completing the work to the satisfaction of the supervisor. The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department.

**TOTAL: 180 PERIODS**



## OBJECTIVES:

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

<b>UNIT I</b>	<b>HUMAN VALUES</b>	10
Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.		
<b>UNIT II</b>	<b>ENGINEERING ETHICS</b>	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		
<b>UNIT III</b>	<b>ENGINEERING AS SOCIAL EXPERIMENTATION</b>	9
Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.		
<b>UNIT IV</b>	<b>SAFETY, RESPONSIBILITIES AND RIGHTS</b>	9
Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination		
<b>UNIT V</b>	<b>GLOBAL ISSUES</b>	8
Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Code of Conduct – Corporate Social Responsibility		
<b>OUTCOMES :</b>	<b>Skill Development</b>	<b>TOTAL: 45 PERIODS</b>
Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society		
<b>TEXTBOOKS:</b>		
Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delhi, 2003.		
Govindarajan Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.		
<b>REFERENCES:</b>		
Charles B. Fleishman, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.		
Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009		
John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003		
Edmund G Sasse and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001		
Laura P. Hartman and Joe Desjardins, "Business Ethics: Decision Making for Personal Integrity and Social Responsibility" Mc Graw Hill education, India Pvt. Ltd., New Delhi 2013.		
World Community Service Centre, " Value Education", Vethathiri publications, Erode, 2011		

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Dr. S. RAMABALAN, M.E., Ph.D.,  
PRINCIPAL

E.G.S. Pillay Engineering College,

Thethi, Nagore - 611 002.

Nagapattinam (Dt) Tamil Nadu.

**OBJECTIVES:**

The student should be made to:

- Learn the security issues network layer and transport layer.
- Be exposed to security issues of the application layer.
- Learn computer forensics.
- Be familiar with forensics tools.
- Learn to analyze and validate forensics data.

**UNIT I NETWORK LAYER SECURITY & TRANSPORT LAYER SECURITY 9**

IPSec Protocol - IP Authentication Header - IP ESP - Key Management Protocol for IPSec. Transport layer Security: SSL protocol, Cryptographic Computations – TLS Protocol.

**UNIT II E-MAIL SECURITY & FIREWALLS 9**

PGP - S/MIME - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions.

**UNIT III INTRODUCTION TO COMPUTER FORENSICS 9**

Introduction to Traditional Computer Crime, Traditional problems associated with Computer Crime. Introduction to Identity Theft & Identity Fraud. Types of CF techniques - Incident and incident response methodology - Forensic duplication and investigation. Preparation for IR: Creating response tool kit and IR team. - Forensics Technology and Systems - Understanding Computer Investigation – Data Acquisition.

**UNIT IV EVIDENCE COLLECTION AND FORENSICS TOOLS 9**

Processing Crime and Incident Scenes – Working with Windows and DOS Systems. Current Computer Forensics Tools: Software/ Hardware Tools.

**UNIT V ANALYSIS AND VALIDATION 9**

Validating Forensics Data – Data Hiding Techniques – Performing Remote Acquisition – Network Forensics – Email Investigations – Cell Phone and Mobile Devices Forensics.

**TOTAL: 45 PERIODS****OUTCOMES: Employability**

Upon completion of the course, the student should be able to:


- Discuss the security issues network layer and transport layer.
- Apply security principles in the application layer.
- Explain computer forensics.
- Use forensics tools.
- Analyze and validate forensics data.

**TEXT BOOKS:**

- Man Young Rhee, "Internet Security: Cryptographic Principles", Wiley Publications, 2003.
- Nelson, Phillips, Enfinger, Steuart, "Computer Forensics and Investigations", Cengage Learning, India Edition, 2008.

**REFERENCES:**

- John R. Vacca, "Computer Forensics", Cengage Learning, 2005
- Richard E. Smith, "Internet Cryptography", 3<sup>rd</sup> Edition Pearson Education, 2008.
- Marjie T. Britz, "Computer Forensics and Cyber Crime": An Introduction", 3<sup>rd</sup> Edition, Prentice Hall, 2013.

**ATTESTED**  
  
**Dr. S. RAMABALAN, M.E., Ph.D.**  
**PRINCIPAL**  
 E.G.S. Pillay Engineering College,  
 Thethi, Nagore - 611 002,  
 Nagapattinam (Dt) Tamil Nadu.



**OBJECTIVES:**

- To outline the need for Software Project Management
- To highlight different techniques for software cost estimation and activity planning.

**UNIT I PROJECT EVALUATION AND PROJECT PLANNING** 9

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

**UNIT II PROJECT LIFE CYCLE AND EFFORT ESTIMATION** 9

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

**UNIT III ACTIVITY PLANNING AND RISK MANAGEMENT** 9

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

**UNIT IV PROJECT MANAGEMENT AND CONTROL** 9

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

**UNIT V STAFFING IN SOFTWARE PROJECTS** 9

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

**TOTAL: 45 PERIODS****OUTCOMES: Entrepreneurship**

At the end of the course the students will be able to practice Project Management principles while developing a software.

**TEXTBOOK:**

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

**REFERENCES:**

Robert K. Wysocki "Effective Software Project Management" – Wiley Publication, 2011.

Walker Royce: "Software Project Management"- Addison-Wesley, 1998.

Gopalswamy Ramesh, "Managing Global Software Projects" – McGraw Hill Education (India), Fourteenth Reprint 2013.