E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai Accredited by NAAC with 'A' Grade | Accredited by NBA (CSE, EEE, MECH)

NAGAPATTINAM - 611 002



B.E ELECTRONICS AND COMMUNICATION ENGINEERING

First Year – First Semester

Course Code	Course Name	L	T	P	C	Man	ximum	Marks
						CA	ES	Total
Theory Cours	e							
1901MA104	Engineering Mathematics –I (Linear Algebra, Calculus and Partial differentiation)	3	1	0	4	40	60	100
1901CH102	Chemistry for Electronic Engineers	3	0	0	3	40	60	100
1901GEX03	Programming for Problem Solving	3	0	0	3	40	60	100
1901ENX01	English for Engineers	2	0	0	2	100		
Laboratory Co	ourse			0	1 4	100		100
1901GEX52	Computer Programming Lab	0	0	2	1	70		
1901GEX51	Engineering Intelligence I	0		2	1	50	50	100
1901CHX51	Engineering Chemistry Lab	-	0	2	1	50	50	100
1901HS151	Communication Skills	0	0	2	1	50	50	100
		0	0	2	1	100	0	100
	Total	11	1	8	16	470	330	800

1901MA104

MATHEMATICS -I (LINEAR ALGEBRA,

 \mathbf{L} T 3 1

CALCULUS AND PARTIAL DIFFERENTIATION) (Common for ECE, MECH & BME Programme)

MODULE I **MATRICES**

9 Hours

Inverse and rank of a matrix - rank-nullity theorem - System of linear equations - Symmetric-skew-symmetric and orthogonal matrices - Determinants - Eigen values and Eigen vectors-Diagonalization of matrices-Cayley-Hamilton Theorem - Orthogonal transformation.

MODULE II DIFFERENTIAL CALCULUS

Curvature in Cartesian co-ordinates - Centre and radius of curvature - Circle of curvature- Evaluates and involutes.

MODULE III INTEGRAL CALCULUS

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.

MODULE IV SEQUENCES AND SERIES

9 Hours

Convergence of sequence and series-Tests for convergence - Power series - Taylor's series, Series for exponential - trigonometric and logarithm functions.

PARTIAL DIFFERENTIATION

9 Hours

Partial derivatives, total derivative; Maxima, minima and saddle points; Method of Lagrange multipliers.

REFERENCES:

TOTAL: 45 HOURS

- 1. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2018.
- 2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
- 3. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
- 4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
- 5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
- 6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint,
- 7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010

1901CH102

CHEMISTRY FOR ELECTRONIC ENGINEERS

3

MODULE I

(Common for ECE & EEE Programme) Employability Enteneurshi

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

MODULE II

Semiconductors- Conductors, insulators, semiconductors, - Band theory semiconductors - Junction devices -Super conductivity - Ionic conductivity - defects in stoichiometric and Non stoichiometric crystals. Optical properties of solids - Lasers and phosphors - Photovoltaic effect- Solar energy storage and conversion

MODULE III

Materials for communications - crystalline semiconductors; metalized film conductors; dielectric films; solders; ceramics and polymers. Electronic materials, Semiconductor crystals - Silicon, III-V compounds, Photoresist films, Packaging materials, Photonic materials, Crystalline materials - Epitaxial layers, Optical switching, Optical transmission-NLO and OLED Materials.

MODULE IV

9 Hours

Biosensors- biosensors -types of biosensors- magnetic biosensors, thermal biosensors- piezoelectric biosensorsoptical biosensors - applications of biosensor. introduction: classification of polymers - natural and synthetic; thermoplastic and thermosetting. conducting polymers, electron conducting polymers- polyaniline (pan), polypyrroles (ppy), polythiophenes (pt) and polyphenylene vinylenes (ppv) - light emitting diodes , photo-induced doping.

MODULE V

Nanotechnology - Basics - distinction between molecules, nanoparticles and bulk materials; size-dependent properties. Nanoparticles: nano cluster, nano rod, nanotube (CNT) and nanowire. Synthesis: precipitation, thermolysis, hydrothermal, solvothermal, electrodeposition, chemical vapour deposition, laser ablation; Properties and applications.

TOTAL: 45 HOURS

REFERENCES:

- 1. Dara S.S, Umare S.S, "Engineering Chemistry", S. Chand & Company Ltd., New Delhi 2010.
- 2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company, Ltd., New delhi
- 3. Gowariker V.R., Viswanathan N.V. and Jayadev Sreedhar, "Polymer Science", New Age .
- 4. Ozin G. A. and Arsenault A. C., "Nanochemistry: A Chemical Approach to Nanomaterials", RSC
- 5. Biosensors: An Introductory Textbook by C. S. Pundir and Jagriti Narang,2017
- 6. J.O.M.Bockris & A.K.N.Reddy, "Modern Electrochemistry -Vol. I & II", Plenum Press, New York,
- 7. Peter Atkins and Julio de Paula, "Physical Chemistry", VII Edition, Oxford University Press, New
- 8. A.J. Bard and L.R. Faulkner, "Electrochemical Methods Fundamentals and applications" 3 rd edition John Wiley & Sons Inc, 2001.

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PROGRAMMING FOR PROBLEM SOLVING L T \mathbf{C} (Common for all B.E./B.Tech Programme) 3 3

1901GEX03

MODULE I INTODUCTION TO PROGRAMM

9 Hours

Components of Computers and its Classifications- Problem Solving Techniques - Algorithm- Flowchart-Pseudo code - Program-Compilation - Execution

MODULE II BASICS OF C PROGRAMMING

Structure of C program - C programming: Data Types - Storage classes - Constants - Enumeration Constants -Keywords - Operators: Precedence and Associativity - Expressions - Input/output statements - Decision making statements - Switch statement - Looping statements - Pre-processor directives.

MODULE III ARRAYS AND STRINGS

9 Hours

Introduction to Arrays: Declaration, Initialization - One dimensional array - Two dimensional arrays - Example Program: Matrix Operations - String operations

MODULE IV FUNCTIONS AND POINTERS

9 Hours

Introduction to functions: Function prototype, function definition, function call, Built-in functions - Recursion -Example Program - Pointers - Pointer operators - Pointer arithmetic - Arrays and pointers - Array of pointers -Example Program: Sorting of names - Parameter passing: Pass by value, Pass by reference - Example Program: Swapping of two numbers and changing the value of a variable using pass by reference

MODULE V STRUCTURES & FILE PROCESSING

Structure - Nested structures - Pointer and Structures - Array of structures - Example Program using structures and pointers - Dynamic memory allocation -Files - Types - File processing: Sequential access, Random access -Command line arguments

TOTAL: 45 HOURS

REFERENCES:

- 1. Paul Deitel and Harvey Deitel, —C How to Programl, Seventh edition, Pearson Publication
- 2. Juneja, B. L and Anita Seth, —Programming in Cl, CENGAGE Learning India pvt. Ltd., 2011
- 3. Pradip Dey, Manas Ghosh, -Fundamentals of Computing and Programming in CI, First Edition, Oxford University Press, 2009.
- 4. Anita Goel and Ajay Mittal, —Computer Fundamentals and Programming in Cl, Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
- 5. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw-Hill Education, 1996.

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1901ENX01

ENGLISH FOR ENGINEERS

C

(Common for all B.E./B.Tech. Programme)

3

(Kill Developmen FOCUS ON LANGUAGE (Vocabulary and Grammar) MODULE I

9 Hours

Vocabulary -The Concept of Word Formation - prefixes- suffixes- Synonyms ✓ Antonyms - Grammar -Articles-Preposition- Adjective-Adverb-connectives -Tenses (present, past & future) - Sentence pattern- types of sentences -Active voice -passive voice and Impersonal passive voice - Wh- Questions.

MODULE II LISTENING SKILLS

9 Hours

Listening- listening intently-arousing and sustaining interest-listening to short or longer texts- formal and informal conversations- telephonic etiquettes- narratives from different sources. -listening and Note takingcorrelative verbal and nonverbal communication-listening to TOEFL & IELTS programs-listening to presentation- listening to technical seminar and conferences. Project

MODULE III SPEAKING SKILLS

9 Hours

Speaking - stress and intonation -persuasive speaking -Describing person, place and thing - sharing information — greetings —taking leave -Individual and Group Presentation-impromptu personal Presentation-public speaking-Group Discussion- project planning-facing viva voce and delivering project.

MODULE IV READING SKILLS

9 Hours

Reading- comprehending general and technical articles -cloze reading - inductive reading- short narrative and descriptions from newspapers - Skimming and scanning-reading and interpretation-critical reading interpreting and transferring graphical information- sequencing of sentences-analytical reading on various Projects.

MODULE V WRITING SKILLS

9 Hours

Writing- Precise writing -Summarizing- interpreting visual texts (pie chart, bar chart, picture advertisements etc., - Proposal writing (launching new units or department in a institution or industry & to get loan from bank) -report writing (accident, progress, project, survey, Industrial visit)- job applicatione-mail drafting- letter writing (permission, accepting and decaling)-instructions recommendations -checklist

TOTAL: 45 HOURS

REFERENCES:

- 1. Raman, Meenakshi and Sangeetha Sharma, "Technical Communication: Principles and Practice", Oxford University Press, New Delhi, 2011.
- 2. Rizvi and Ashraf M., "Effective Technical Communication", Tata McGraw-Hill, New Delhi, 2005.
- 3. G. Radhakrishna Pillai, "English for Success", Central Institute of English and Foreign Languages", Emerald Publishers ,Hyderabad, 2003
- 4. Jones, D, "The Pronunciation of English", CUP, . Cambridge, 2002.

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1901GNX51

ENGINEERING INTELLIGENCE I (Common for all B.E./B.Tech. Programme)

 \mathbf{L} \mathbf{C} 0 1

BEHAVIORAL CHANGES - TRANSITION OF MODULE I SCHOOL TO 6 Hours COLLEGE

Vocabulary -The Concept of Word Formation - prefixes- suffixes- Synonyms - Antonyms - Grammar -Articles-Preposition- Adjective-Adverb-connectives -Tenses (present, past & future) - Sentence patterntypes of sentences -Active voice -passive voice and Impersonal passive voice - Wh- Questions.

MODULE II EXPOSURE TO INDIVIDUAL COMPETANCE

6 Hours

Listening- listening intently-arousing and sustaining interest-listening to short or longer texts- formal and informal conversations- telephonic etiquettes- narratives from different sources. -listening and Note taking- correlative verbal and nonverbal communication-listening to TOEFL & IELTS programs-listening to Project presentation-listening to technical seminar and conferences.

MODULE III CAREER PLANNING

6 Hours

Speaking - stress and intonation -persuasive speaking -Describing person, place and thing - sharing personal information — greetings leave -Individual and Group Presentation-impromptu -taking Presentation-public speaking-Group Discussion- project planning-facing viva voce and delivering project.

MODULE IV INTRODUCTION TO COMMUNICATION SKILLS

Reading- comprehending general and technical articles -cloze reading - inductive reading- short narrative and descriptions from newspapers - Skimming and scanning-reading and interpretation-critical reading interpreting and transferring graphical information- sequencing of sentences-analytical reading on various Projects.

MODULE V COMMUNICATION EXERCISE-1

6 Hours

Writing- Precise writing -Summarizing- interpreting visual texts (pie chart, bar chart, picture advertisements etc., - Proposal writing (launching new units or department in a institution or industry & to get loan from bank) -report writing (accident, progress, project, survey, Industrial visit)- job application-e-mail drafting- letter writing (permission, accepting and decaling)-instructions recommendations -checklist

TOTAL: 30 HOURS

REFERENCES:

- Dr.P.Prasad(2012) "The Functional Aspects of COMMUNICATION SKILLS"; fifth Edition; S.K Kataria & Sons Publication
- Kalyana; (2015) "Soft Skill for Managers"; First Edition; Wiley Publishing Ltd. 2.
- Aruna Koneru (2008) "Professional Communication"; Second edition; Tata McGraw-Hill 3. Publishing Ltd.

1901HS151

COMMUNICATION SKILLSLAB (Common for all B.E./B.Tech. Programme)

List of Experiments:

1. Activities on Fundamentals of Inter-personal Communication

Starting a conversation - responding appropriately and relevantly - using the right body language - Role Play in different situations & Discourse Skills- using visuals.

2. Activities on Reading Comprehension

General Vs Local comprehension, reading for facts, guessing meanings from context, Scanning, skimming, and inferring meaning, critical reading & effective googling.

3. Activities on Writing Skills

Structure and presentation of different types of writing - letter writing/ Resume writing/ecorrespondence/ Proposal writing/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.- creative thinking.

5. Activities on Soft 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, preinterview planning, opening strategies, answering strategies, interview through tele-conference & video-conferencing and Mock Interviews-Timemanagement-stress management -paralinguistic features- Multiple intelligences - emotionalintelligence - spiritual quotient (ethics) - intercultural communication - creative and critical.

> Total: 45 Hours

- 1. Raman, Meenakshi and Sangeetha Sharma, "Technical Communication: Principles and Practice", Oxford University Press, New Delhi, 2011.
- 2. Sudha Rani, D, "Advanced Communication Skills Laboratory Manual", Pearson Education 2011.
- 3. Paul V. Anderson, "Technical Communication", Cengage Learning pvt. Ltd. New Delhi, 2007.
- 4. "English Vocabulary in Use series", Cambridge University Press 2008.
- 5. "Management Shapers Series", Universities Press (India) Pvt Ltd., Himayatnagar, Hyderabad
- 6. Rizvi and Ashraf M., "Effective Technical Communication", Tata McGrawHill, New Delhi, 2005.
- 7. Jones, D, "The Pronunciation of English", CUP, . Cambridge, 2002.

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NAGAPATTINAM - 611 002



B.E ELECTRONICS AND COMMUNICATION ENGINEERING

First Year - Second Semester

Course Code	Course Name	L	T	P	c	Max	kimum	Marks
				1		CA	ES	Total
Theory Cours	se							
1901MA204	Engineering Mathematics –II (Calculus, Ordinary Differential Equations and Complex Variable)	3	2	0	4	40	60	100
1901PH202	Semiconductor Physics and Optoelectronics	3	0	0	3	40	60	100
1901GEX01	Basic Electrical and Electronics Engineering	3	0	0	3	40	60	100
1901GEX02	Engineering Graphics	2	2	0	-	50	7 0	
1901GE201	Engineering Exploration	2	0		3	50	50	100
Laboratory Co	ourse		U	0	2	40	60	100
1901GE254	Computer Hardware and IT Essentials Lab	0	0	2	1	50	50	100
1901GE252	Engineering Intelligence - II	0	0	2	1	100		
1901GEX51	CAD Lab	0	0		1	100	0	100
1901GEX53	Basic Electrical and	0	-	2	1	50	50	100
W. Carrier	Electronics Engineering Lab	0	0	2	1	50	50	100
1901PHX51	Engineering Physics Lab	0	0	2	1	50	50	100

1901CHX51 ENGINEERING CHEMISTRY LAB P \mathbf{C} (Common for all B.E./B.Tech. Programme) 2 1

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 viscometer method
- 7. Conductometric titration of strong acid Vs strong Base
- 8. Estimation of dissolved oxygen in a water sample/sewage by Winkler's method.
- 9. Comparison of alkalinities of the given water samples
- 10. Determination of concentration of unknown colored solution using spectrophotometer
- 11. Determination of percentage of copper in alloy
- 12. Determination of ferrous iron in cement by spectrophotometry method
- 13. Adsorption of acetic acid on charcoal
- 14. Determination the flash point and fire point of a given oil using pen skyMartine closed cup apparatus
- 15. Determination the calorific value of solid fuels
- 16. Determination the structural of the compound using chemo software.

References:

1. Furniss B.S. Hannaford A.J, Smith P.W.G and Tatchel A.R., "Vogel"s Textbook of practical organic chemistry", LBS Singapore (1994).

Total:

45 Hours

2. 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.

3. Daniel R. Palleros, "Experimental organic chemistry" John Wiley & Sons, Inc., New Yor (2001).

4. Kolthoff I.M., Sandell E.B. et al. "Quantitative chemical analysis", Mcmillan, Madras 1980.

1901MA204

ENGINEERING MATHEMATICS – II

(Calculus, Ordinary Differential Equations and Complex Variable)

MODULE I

LAPLACE TRANSFORM SKII DEVELOPMEN enew S 12 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.

MODULE II **VECTOR CALCULUS**

12 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.

MODULE III ORDINARY DIFFERENTIAL EQUATIONS

12Hours

Second order linear differential equations with variable coefficients, method of variation of parameters.

COMPLEX VARIABLE - DIFFERENTIATION MODULE IV

12Hours

Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; Conformal mappings, Mobius transformations.

MODULE V COMPLEX VARIABLE-INTEGRATION

12 Hours

Contour integrals, Cauchy Integral formula (without proof), Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals using the Bromwich contour.

TOTAL: 60 HOURS

REFERENCES:

- 1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
- 2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
- 3. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.
- 4. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
- 5. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., McGraw Hill, 2004.
- 6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
- 7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

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SEMICONDUCTOR PHYSICS AND OPTOELECTRONICS L \mathbf{T} \mathbf{C} 1901PH202 3 3

MODULE I ELECTRONIC MATERIALS

9 Hours

Free electron theory, Density of states and energy band diagrams, Energy bands in solids, E-k diagram, Direct and indirect bandgaps, Types of electronic materials: metals, semiconductors and insulators, Occupation probability, Fermi level.

MODULE II SEMICONDUCTORS Entreplements hif 9 Hours
Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier- concentration and temperature (equilibrium carrier statistics), Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction, Metal- semiconductor junction (Ohmic and Schottky). Entrepreneurship

MODULE III SEMICONDUCTOR LASERS

Optical transitions in bulk semiconductors: absorption, spontaneous emission, and stimulated emission; Density of states for photons, Transition rates (Fermi's golden rule), Optical loss and gain. Semiconductor laser (GaAs): materials, device characteristics, figures of merit and Vertical-Cavity Surface-Emitting Lasers (VECSEL), Tunable semiconductor lasers.

MODULE IV SEMICONDUCTOR PHOTODETECTORS

Types of semiconductor photodetectors -p-n junction, PIN, and Avalanche and their structure, working principle, and characteristics, Noise limits on performance; Solar cells.

MODULE V NANO- OPTOELECTRONIC DEVICES

9 Hours

Digital systems: Boolean algebra - Reduction of Boolean expressions - De-Morgan"s theorem - Logic gates -Implementation of Boolean expressions.

TOTAL: 45 HOURS

REFERENCES:

- 1. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Inc. (1995).
- 2. B. E. A. Saleh and M. C. Teich, Fundamentals of Photonics, John Wiley & Sons, Inc., (2007).
- 3. S. M. Sze, Semiconductor Devices: Physics and Technology, Wiley (2008).
- 4. A. Yariv and P. Yeh, Photonics: Optical Electronics in Modern Communications, Oxford University Press, New York (2007).
- 5. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).
- 6. Online course: "Semiconductor Optoelectronics" by M R Shenoy on NPTEL
- 7. Online course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Gupta on NPTEL

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1901GEX01 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING L T P C

3 0 0 3

MODULE I INTRODUCTION TO DC AND AC CIRCUITS

7 Hours

Introduction to DC and AC circuits: Ohms law - Kirchhoff's laws - Mesh analysis - Nodal analysis - Generation of AC waveforms - Analysis of R-L, R-C, R-L-C circuits - Introduction to three phase systems - Types of connections.

MODULEII ELECTRICAL MACHINES

6 Hours

Electrical Machines: DC Generator, DC Motor, Transformer, Induction Motor: Working principle, construction and applications.

MODULEIII MEASURING INSTRUMENTS

6 Hours

Measuring instruments: Classification of instruments; Voltmeter, Ammeter, Wattmeter, Energy meter, Multimeter, CRO: Principles and operation.

MODULEIV SEMICONDUCTOR DEVICES

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7 Hours

Semiconductor devices: V-I characteristics of PN junction diode and Zener diode; Rectifiers - Half wave and full wave rectifiers; BJT - configurations; Amplifiers & Oscillators: classification, operation and applications; SCR: Construction and V-I characteristics; Basic power converters (Block diagram approach only).

MODULEV DIGITAL SYSTEMS

6 Hours

Digital systems: Boolean algebra - Reduction of Boolean expressions - De-Morgan's theorem - Logic gates - Implementation of Boolean expressions.

MODULEVI COMMUNICATION SYSTEMS

6 Hours

Communication Systems: 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.

MODULEVII ELECTRICAL SAFETY AND WIRING

7 Hours

Electrical safety and wiring: Safety measures in electrical system - Safety devices - types of wiring - Wiring accessories- staircase, fluorescent lamps and corridor wiring - Basic principles of earthing - Types of earthing - layout of generation, transmission and distribution of power (Single line diagram).

TOTAL: 45 HOURS

REFERENCES:

- 1. Smarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", 2nd Edition, PHI Learning, 2010.
- 2. R. Muthusubramaniam, S. Salaivahanan and K.A. Mureleedharan, "Basic Electrical Electronics and Computer Engineering", Tata McGraw Hill, 2004.
- 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, 11th Edition, 2013.
- 6. George Kennedy and Bernard Davis, "Kennedy"s Electronic communication Systems", McGraw Hill Education, 5th Edition, 2011.

7. Donald P. Leach, Albert Paul Malvino and Goutam Saha, "Digital Principles and Applications", McGraw-Hill Education, 8th Edition, 2014.

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Page I A

1901GEX02

ENGINEERING GRAPHICS

L T P C 2 2 0 3

MODULE I CONCEPTS AND CONVENTIONS (Not for Examination)

5 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.

MODULEII PLANE CURVES AND FREE HAND SKETCHING

9 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.

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.

MODULEIII PROJECTION OF POINTS, LINES AND PLANE SURFACES

9 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.

MODULEIV PROJECTION OF SOLIDS

9 Hours

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

MODULE V PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF 9 Hours SURFACES

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.

MODULE VI ISOMETRIC AND PERSPECTIVE PROJECTIONS

9 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.

TOTAL: 45+5 HOURS

REFERENCES:

- 1. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Stores, Bangalore, 2016.
- 2. Luzzader, Warren.J. and Duff, John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
- 3. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson, 2nd Edition, 2015.
- 4. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2017.
- 5. Natrajan K.V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2015.
- 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, 50th Edition, 2016.

1901GE201

ENGINEERING EXPLORATION

L T P C 2 0 0 2

What is Engineering: Engineering Requirement, Knowledge within Engineering disciplines, Engineering advancements

Engineering Design: Problem definition, idea generation through brainstorming and researching, solution creation through evaluating and communicating, text/analysis, final solution and design improvement.

Defining problems and Brainstorming: Researching design, sketching problem solving.

Communicating solution: Dimensioning orthographic drawing, perspective drawing.

Modeling and Testing final output: Product evaluation, reverse engineering, final project report.

Civil Engineering: Structural forces structural analysis, bridge design components, structural design.

Mechanical Engineering: Types of motion, mechanical power system, mechanical power formula, mechanical design.

Electrical Engineering: Reading analog multimeter, measuring current, voltage and resistance, electricity from chemicals, solar cells, magnets, Ohms law and watts law, circuit identification and circuit calculation, resistor color code, continuity.

Computer Engineering: Logic gates, algorithms, computer architecture, binary code.

TOTAL: 30 HOURS

REFERENCES:

- 1. Ryan A.Brown, Joshua W.Brown and Michael Berkihiser: "Engineering Fundamentals: Design, Principles, and Careers", Goodheart-Willcox Publisher, Second Edition, 2014.
- 2. Saeed Moaveni, "Engineering Fundamentals: An Introduction to Engineering", Cengage learning, Fourth Edition, 2011.

1901GE254 COMPUTER HARDWARE AND IT ESSENTIALS LAB L T P C 0 0 2 1

List of Experiments:

- 1. Study of hardware components (such as storage devices, I/O devices, CPU, Motherboard, other peripherals).
- 2. Installation of operating systems (Windows and Linux).
- 3. Other software installation.
- 4. Study of network components.
- 5. Network establishment(configuring IP address, Domain name system)
- 6. Study of Internet.
- 7. Introduction to Web.
- 8. Usage of internet services- Email, File Sharing, Social Media etc.
- 9. Study of firewalls and Antivirus.
- 10. Troubleshooting various problems.

Skill Development

TOTAL: 30 HOURS

REFERENCES:

- 1. Craig Zacker& John Rourke, "The complete reference:PC hardware", Tata McGrawHill, New Delhi, 2001.
- 2. Mike Meyers, "Introduction to PC Hardware and Troubleshooting", Tata McGrawHill, New Delhi, 2003.
- 3. B.Govindarajulu, "IBM PC and Clones hardware trouble shooting and maintenance".
- 4. Tata McGraw-Hill, New Delhi, 2002
- 5. R. Kelly Rainer, Casey G. Cegielski, Brad Prince, Introduction to Information Systems, Fifth Edition, Wiley Publication, 2014.
- 6. James F. Kurose, —Computer networking: A Top-Down Approach!, Sixth Edition, Pearson, 2012.
- 7. R. Kelly Rainer, Casey G. Cegielski, Brad Prince, Introduction to Information Systems, Fifth Edition, Wiley Publication, 2014
- 8. Craig Zacker& John Rourke, "The complete reference:PC hardware", Tata McGrawHill, New Delhi, 2001.

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ENGINEERING INTELLIGENCE II

L T P C 0 0 2 1

Skill Development

MODULE I VOCABULARY BULIDING

6 Hours

Parts of Grammar-SVA-Art of Writing-word building activities

MODULEII COMMUNICATION WORKSHOP

6 Hours

Story Telling- Newspaper Reading-Extempore.

MODULEIII INTERPERSONAL SKILLS

6 Hours

Personality Development - Creativity and innovation - Critical Thinking and Problem Solving - Work Ethics-Technical Skill Vs Interpersonal Skills

MODULEIV LEADERSHIP& EMPLOYABILITY SKILLS

6 Hours

Levels of Leadership-Making of leader-Types of leadership-Transactions Vs Transformational Leadership – Exercises - Industry Expectations & Career Opportunities- Recruitment patterns.

MODULE V RESUME BUILDING

6 Hours

Importance of Resume-Resume Preparation - introducing onself

TOTAL: 30 HOURS

REFERENCES:

- 1. Barun K. Mitra; (2011), "Personality Development & Soft Skills", First Edition; Oxfor Publishers.
- 2. Raymond Murphy, Essential English Grammar in Use, Cambridge University press, New Delhi, Third Edition, 2007.
- 3. Arun Sharma and Meenakshi Upadhyav, How to Prepare for Verbal Ability and Reading Comprehension for CAT, McGrawHill Publication, Seventh Edition 2017.

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1901GEX51

CAD (COMPUTER AIDED DRAFTING) LAB

L T P C 0 0 2 1

List of Experiments:

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

- 1. Study of capabilities of software for Drafting and Modeling Coordinate systems (absolute, relative, polar, etc.) Creation of simple figures like polygon and general multi-line figures.
- 2. Drawing of a Title Block with necessary text and projection symbol.
- 3. Drawing of curves like parabola, spiral, involute using B-spline or cubic spline.
- 4. Drawing of front view and top view of simple solids like prism, pyramid, cylinder, cone, etc, and dimensioning.
- 5. Drawing front view, top view and side view of objects from the given pictorial views (eg. V-block, Base of a mixie, Simple stool, Objects with hole and curves).
- 6. Drawing sectional views of prism, pyramid, cylinder, cone, etc,
- 7. Drawing isometric projection of simple objects.
- 8. Creation of 3-D models of simple objects and obtaining 2-D multi-view drawings from 3-D model.

TOTAL: 30 HOURS

- 1. N.D. Bhatt, Machine Drawing, Charotar Publishing House Pvt. Ltd., 2014.
- 2. P.S. Gill, A Textbook of Machine Drawing, Katson books, 2013.
- 3. R.K. Dhawan, A Textbook of Machine Drawing, S. Chand, 2012.
- 4. K.C. John, Textbook of Machine Drawing, PHI Learning Pvt. Ltd., 2009.

1901GEX53 BASIC ELECTRICAL AND ELECTRONICS L T P C ENGINEERING LABORATORY 0 0 2 1

List of Experiments:

- 1. Experiments related to verification of Ohm's law and Kirchhoff's laws
- 2. Experiments involving logic gates
- 3. Fan and light control using regulators
- 4. Design of 6V regulated power supply
- 5. Energy conservation demonstration experiment using energy meter
- 6. Waveform generation and calculation of RMS and average values
- 7. IC 555 and IC 741 based experiments
- 8. Experiments in earthing
- 9. Staircase wiring and residential building wiring
- 10. Speed control of DC shunt motor

Total: 30 Hours

- 1. Edward Hughes, "Electrical Technology,", Pearson Education
- 2. D.P. Kothari and Nagrath" Basic Electronics", MH Education 2013.
- 3. Paul Scherz and Simon Monk "Practical Electronics for inventors" Mc Graw Hill Publications 2013.

1901PHX51

ENGINEERING PHYSICS LAB

L T P C 0 0 2 1

List of Experiments:

- 1. Determination of wavelength of various colours of mercury spectrum using Laser grating
- 2. Determination of velocity of liquids using ultrasonic interferometer
- 3. Determine the dispersive power of a prism using spectrometer
- 4. Determine the unknown resistance of the given wire using Carey-Foster"s Bridge
- 5. Determine the band gap of the given semiconductor
- 6. Determine the acceptance angle and particle size using Laser
- 7. Torsional pendulum Rigidity modulus of a steel wire
- 8. Thickness of a thin wire Air Wedge
- 9. Measurement of Young"s modulus Uniform and Non-uniform bending
- 10. Thermal conductivity -Lee"s Disc method

Total: 45 Hours

- 1. "Practical Physics", R.K. Shukla, Anchal Srivastava, New age international (2011)
- 2. "B.Sc. Practical Physics", C.L Arora, S. Chand &Co. (2012)

E.G.S. PILLAY ENGINEERING COLLEGE(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai |

Accredited by NAAC with "A"Grade | Accredited by NBA (CIVIL, CSE, ECE, EEE, IT, MECH)

NAGAPATTINAM – 611 002



B.E. ELECTRONICS AND COMMUNICATION ENGINEERING <u>FullTimeCurriculum And Syllabus</u>

Second Year - Third Semester

Course Code	Course Name	L	T	P		M	aximum	Marks
Theory C	ourse					CA	ES	Total
1901MA301	Engineering Mathematics III (Linear Algebra and Vector Calculus)	3	1		4	10		
1902EC301	Electronic Devices	1 2	+			40	60	100
902EC302	Circuits and Networks	3	0	0	3	40	60	100
902EC303	Digital Electronics	2	1	0	3	40	60	100
901EC304	Biology for Engineers	2	1	0	3	40	60	100
902CS306	Object Oriented Programming and Data	3	0	0	3	40	60	100
- 1	Structures	3	0	0	3	40	(0)	
Laborator						1 40	60	100
902EC351	Devices and Circuits Laboratory	0	0	-				
902EC352	Digital Electronics Laboratory	0	0	2	1	50	50	100
002CS354	Object Oriented Programming and Dat	0	0	2	1	50	50	100
	Structures Laboratory	0	0	2	1	50	50	100
004GE351	Life Skills: Verbal Ability	0	0	2	1	100		
111.0	Total	18	3			100	0	100
Audit Cour	se	10	3	6	23	590	510	1100
UTMCX02	Constitution of India	2	0	0	0	0 1		
		-	U	U	0	0	- 1	0

 $L-Lecture |T-Tutorial| P-Practical| C-Credit |CA-Continuous Assessment| \ ES-End Semester$

1901MA301

ENGINEERING MATHEMATICS III (LINEAR ALGEBRA AND VECTOR CALCULUS)

P C

3

MODULE I VECTOR SPACES

12 Hours

Vector spaces - Subspaces - Linear combinations and system of Linear equations - Linear independence and Linear dependence - Bases and Dimensions

MODULE II LINEAR TRANSFORMATIONS

Entrepreneurspip Linear combination system of linear equation – algebra of transformation – Linear transformation of matrices – Linear

12 Hours

MODULE III FOURIER SERIES

Dirichlet's conditions - General Fourier series - Odd and even functions - Half range sine series - Half range cosine series -12 Hours Entreaceneurofia

MODULE IV FOURIER TRANSFORMS

Statement of Fourier integral theorem - Fourier transform pair - Fourier sine and cosine transforms - Properties - Transforms of simple functions - Convolution theorem - Parseval"s identity

MODULEV Z – TRANSFORMS AND DIFFERENCE EQUATIONS

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:

60 HOURS

REFERENCES:

- Friedberg, A.H., Insel, A.J. and Spence, L., —Linear Algebral, Prentice Hall of India, New Delhi, 2004.
- Veerarajan. T., "Transforms and Partial Differential Equations", Second reprint, Tata McGraw Hill Education Pvt. Ltd.,
- Kumaresan, S., —Linear Algebra A geometric approach!, Prentice Hall of India, New Delhi, Reprint, 2010. 3.
- Grewal. B.S., "Higher Engineering Mathematics", 42nd Edition, Khanna Publishers, Delhi, 2012.
- Bali.N.P and Manish Goyal, "A Textbook of Engineering Mathematics", 7th Edition, Laxmi Publications Pvt Ltd , 2007 5.
- Ramana.B.V., "Higher Engineering Mathematics", Tata Mc-GrawHill Publishing Company Limited, New Delhi, 2008.
- Narayanan.S.,ManicavachagomPillay.T.K and Ramanaiah.G "Advanced Mathematics for Engineering Students" Vol. II 7. www.nptelvideos.in/2012/11/mathematics-iii.html

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ELECTRON DEVICES

 \mathbf{C} 3 3

MODULE I SEMICONDUCTOR DIODE

PN junction diode, Current equations, Diffusion and drift current densities, forward and reverse bias characteristics, MODULE II

BIPOLAR JUNCTION TRANSISTOR

NPN - PNP - Junctions - Early effect - Current equations - Input and Output characteristics of CE, CB, CC - Hybrid - π model - h-parameter model, Ebers Moll Model- Gummel Poon-model, Multi Emitter transistor. MODULE III FIELD EFFECT TRANSISTORS Employactivity

JFETs - Drain and Transfer characteristics - Current equations - Pinch off voltage and its significance - MOSFET -Characteristics - Threshold voltage - Channel length modulation, D-MOSFET, E-MOSFET- Current equation - Equivalent circuit model and its parameters, FINFET, DUAL GATE MOSFET. MODULE IV

SPECIAL SEMICONDUCTOR DEVICES,

9 Hours

Metal-Semiconductor Junction- MESFET, Schottky barrier diode - Zener diode - Varactor diode Tunnel diode- Gallium Arsenide device, LASER diode, LDR.

POWER DEVICES AND DISPLAY DEVICES

UJT, SCR, Diac, Triac, Power BJT, LED, Photo diode, Photo transistor, Opto Coupler, Solar cell, LCD, CCD.

MODULE V RECTIFIERS & POWER SUPPLIES

Full-wave: Centre tapped and bridge rectifiers with resistive load -Analysis for V_{dc} and ripple voltage with C, C-L, L-C and C-L-C filters. Clippers and clampers. Zener diode regulator - Transistor voltage regulators: Series and shunt regulators -

Total:

45 Hours

TEXT BOOKS: 1. Salivahanan .S and Sureshkumar .N, —Electronic Devices & Circuits, 3rd Edition, Tata McGraw-Hill, New Delhi, 2011,

References:

- 1. Jacob Millman, Christos C. Halkias—Electronic Devices and Circuits, 3rdEdition, McGraw Hill Education (India) Private Limited, 2010, ISBN :9780070700215
- 2.Allen Mottershead, —Electronic Devices and Circuits-An Introduction , 1stEdition, PHI, New Delhi, 1990, ISBN: 9788120301245.
- 3. Electronic Devices and Circuits Theory, Boylsted, Prentice Hall Publications.
- 4. https://www.youtube.com/watch?v=oqOG6XErAl8
- 5. https://www.youtube.com/watch?v=Kp-jS6NHsB8&list=PLF178600D851B098F

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CIRCUITS AND NETWORKS

 \mathbf{L} C 2 1 3

MODULE I BASIC ELECTRIC CIRCUITS

Basic of electric circuits, Ohms law- Thevenintheorem-Norton theorem-Maximum power transfer theorem- KCL and KVL, Nodal analysis and Mesh analysis with dependant and independent Current & Voltage Sources, Analysis of ladder and lattice networks - Tuned circuits

MODULE II **RLC CIRCUITS**

9+3=12 Hours

Voltage current relationship of Capacitor- Inductor- Resistor, First order RL,RC circuits- Laplace transformation-S domain-Source free and step response of RL-RC-Tank Circuit, Second order RLC- Source free and step response of RLC serial &

MODULE III AC POWER ANALYSIS

Sinusoidal waves- Phasor-Impedance and Admittance in AC-Phasor based circuit analysis-Power and Energy calculation, Self-inductance - Mutual Inductance- Ideal transformers, Frequency response and resonance

MODULE IV TWO PORT NETWORK

9+3=12 Hours

Network functions - Poles and Zeros of network functions - Complex frequency - Two port parameters Z,Y,H and ABCD -Scaling network functions - Interrelationships between the parameters-T and π equivalent circuits- Bridged networks-Coupled circuits as two port network

MODULE V NETWORKS AND GRAPHS

Entrepreneuship

9+3=12Hours

Loop Impedance and Node Admittance Matrices, Duality in Electrical Networks, Network graph-Tie set-Cut set-

Total:

45+15 =60 Hours

References:

- 1. David A Bell "Electric Circuits, (7thEdition, 2011)". Oxford press.
- 2. Franklin F.Kuo, "Network Analysis and Synthesis (5th Edition ,2012)" Wiley International;2010
- 3. A.V.Bakshi, U.A.Bakshi "Circuit Theory" (First edition, 2009), Technical Publications
- 4. A Nagoorkani "Circuit theory" (Third Edition 2016) Mcgraw hill education
- 5. S. Salivahanan, N.Suresh Kumar, Electronic devices and ciruits (Second edition, 2011), Mcgraw hill Education

6. M.E.VanValkenberg, "Introduction to Modern Network Synthesis", Wiley Eastern.

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Page 4 of 12

DIGITAL ELECTRONICS

L 2 1 0 3

BOOLEAN ALGEBRAANDLOGICGATES

(6+2) 8 Hours

Boolean Algebra: Boolean expression - Minimization of Boolean expressions - Minterm - Maxterm - Sum of Products (SOP) -ProductofSums (POS)- Karnaugh map Minimization(2,3,4,5 Variables) -Quine- McCluskeymethod of minimization.

MODULE II **COMBINATIONAL LOGICS**

(9+3) 12 Hours

Introduction - Designprocedure- Adders &subtractor (Halfadder, Full Adder, Half subtractor, Full subtractor FastAdders, SerialAdder/Subtractor,BCDadder)—BinaryMultiplier/Divider-Multiplexer/Demultiplexer-decoder/encoderparitygenerators/checker-codeconverters -MagnitudeComparator

MODULE III SEQUENTIAL LOGICS

(12+4) 16 Hours

Latches, Flipflops,

SR,JK,D,T,Edgetriggering,LevelTriggering-Design

Synchronouscounters, Synchronous Up/Downcounters, Programmable counters, Modulo-ncounter-Registers, Universalshift registers-AsynchronousRippleorserial counter, Asynchronous Up/Downcounter ProblemsinAsynchronousCircuits -StateMachines-

MODULE IV PROGRAMMABLE LOGIC DEVICES

(9+3) 12Hours

Classificationofmemories(RAM,ROM,PROM,EPROM,EPROM)-ProgrammableLogicDevices

(PLA,PAL,FPGA)-

Implementation of combinational logiccircuits using ROM, PLA, PAL

MODULE V 8085 MICROPROCESSOR

(9+3) 12 Hours

Evolution Of Microprocessors - 8-Bit Processor - 8085 Architecture, Register Organization, Instruction Sets, Timing Diagram, Addressing Modes, Interrupts, Interrupt Service Routines- Assembly Language Programming Using 8085.

Total:

(45+15) 60 Hours

References:

- 1. Ronald J. Tocci, Neal S. Widmer & Gregory L. Moss, "Digital Systems: Principles and Applications", 10th Edition, Pearson Prentice Hall, 2007
- $2. \quad M. Morris Mano, "Digital Design", 4 \\ ^{th} Edition, Prentice Hall of India Pvt. Ltd., 2008 / Pearson$ (Singapore)Pvt.Ltd., NewDelhi,2003

Education

- 3. Ramesh Gaonkar "Microprocessor Architecture, Programming, and Applications with the 8085"- 5th edition Penram International Publishing-2000.
- 4. John F. Wakerly, "Digital Design", Fourth Edition, Pearson/PHI, 2008
- 5. John.MYarbrough, "Digital Logic Applications and Design", Thomson Learning, 2006

E-References

- 1. https://www.coursera.org/learn/digital-systems (Digital Systems: From Logic Gates to Processors from barcelona autonomous university)
- 2. Electronics-Digital Circuit Design-Udemy
- https://nptel.ac.in/courses/117106086/ (Digital Circuits and Systems by IITM)

BIOLOGY FOR ENGINEERS

L T 3

MODULE I Life (Introduction to cells)

Biomolecules: Carbohydrates, Proteins, Nucleic Acids, Lipids, Enzymes. Cell structure and composition; The central dogma in molecular biology; Darwinian evolution; Molecular perspective and classification; Phylogenetic trees; Study of inter-and intra-species relationships; Microorganisms and Infectious Diseases

MODULE II Life Processes (Functioning of Human Systems)

7 Hours

Muscular System; Nervous System; Special Senses; Sensory organs (eye, ear, smell, taste, touch); Cardiovascular System; Respiratory System; Renal System; Immune System; Endocrine System; Cancer and Life style diseases; Stem cells

MODULE III Biochips

10 Hours

Biochips -Introduction to Biochips, Its features, types and components. Advantages and Disadvantages, Applications of Biochips.Human-organs-on-chips; Applications; Challenges; Future scopes

MODULE IV Bioelectronics

Overview of bioelectronics - Electron Transfer through proteins - Electrochemical DNA Sensors - Interfacing Biological molecules with Group IV Semiconductors for Bioelectronics sensing - DNA Templated Electronics - Neuron semiconductor Interface - Medical applications of bioelectronics: ECG, EEG, etc.

MODULE V Bio-Sensors

Introduction - Basic Principle of Biosensor - Components of Biosensor: Bioreceptors : Enzyme bioreceptors, Antibody bioreceptors, Nucleic acid bioreceptors, Aptasensors, Microbial biosensors - Classification of biosensors based on transducers - Piezoelectric biosensors - Non-invasive biosensors - Electrochemical Biosensors - Biosensor electrode fabrication technique - Biomedical Applications

Total:

45 Hours

Further Reading:

Bio medical Instrumentation

- 1. Biology for Engineers, Rajiv Singal, CBS Publishers and Distributors Pvt Ltd; First Edition edition (4 June
- 2. Biology for Engineers, Wiley Editorial, Wiley (2018).
- 3. Biosensors: An Introductory Textbook, Jagriti Narang, C.S. Pundir, Jenny Stanford Publishing; 1 edition (11
- 4. Biochips: Technology and Applications, Wan-Li Xing, Jing Cheng, Springer; 2003 edition (11 July 2003)
- 5. Biosensors and Bioelectronics, Chandran Karunakaran Kalpana Bhargava Robson Benjamin, Elsevier publications book series

1902CS306

OBJECT ORIENTED PROGRAMMING AND DATA STRUCTURES

C 3 0 3

MODULE I OBJECT ORIENTED PROGRAMMING

9Hours

Evolution of Programming methodologies- Introduction to OOP -Basic Concepts - Structure of C++ Program-Compiling and Executing C++ Program - Data types - Operators - Expressions - Control statements & Iteration statements in C++ - Arrays-Structures-Pointers

MODULE II FUNCTIONS& CONSTRUCTORS

Functions - Passing Data to Functions - Scope and Visibility of variables in Functions - Dynamic Binding - data members 9Hours - member functions - this Pointer - Friend Functions - Friend Classes - Constructors and Destructors.

MODULE III LINEAR DATA STRUCTURES

9 Hours

Abstract Data Types (ADTs) - List ADT - array-based implementation - linked list implementation - singly linked lists -Polynomial Manipulation - Stack ADT - Queue ADT - Evaluating arithmetic expressions

MODULE IV NON-LINEAR DATA STRUCTURES

Trees - Binary Tree-Binary search trees - Tree traversal - Expression manipulation - Symbol table construction - AVL trees: 9 Hours Rotation, Insertion, Deletion,-Red black tree - Graph and its representations - Graph Traversals - Representation of Graphs Breadth-first search - Depth-first search - Connected components.

MODULE V SORTING AND SEARCHING

9 Hours

Sorting Techniques-Selection, Bubble, Insertion, Merge, Heap, Quick, and Radix sort-Address calculation -Linear search -Binary search -Hash table methods.

Total:

45 Hours

- 1. Deitel and Deitel, "C++, How To Program", Seventh Edition, Pearson Education, 2013.
- 2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Fourth Edition, Addison-Wesley, 2013.
- 3. Bhushan Trivedi, "Programming with ANSI C++, A Step-By-Step approach", Oxford University Press, 2010.
- 4. Goodrich, Michael T., Roberto Tamassia, David Mount, "Data Structures and Algorithms in C++", 7th Edition,
- 5. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, Mc Graw Hill, 2009.
- Bjarne Stroustrup, "The C++ Programming Language", 3rd Edition, Pearson Education, 2007.
- 7. Ellis Horowitz, Sartaj Sahni and Dinesh Mehta, "Fundamentals of Data Structures in C++", Galgotia Publications,

1902EC351	DEVICES AND CIRCUITS LABORATORY	L	T	Р	
Link CD	Still Development	0	0	2	1 1
List of Experiments:	Shan Bevery ment	-			
2. Characteristics of P.	N Junction Diode and Zener diode Entrepreneur	11 9 0			
3.Characteristics of D.	ctifiers, clippers and clampers	Ship 1	Emp	loyo	211
4. Characteristics of JF	T (common emitter configuration) and determination of h parameter and MOSFET	ers		J	
5.Characteristics of SC		013			
6.Characteristics of TF	CK and Oll				
7. Verification of Ohm	s Law and Kirchoff, s Laws.				
3. Verification of They	enin,,s and Norton,,s Theorem.				
Verification of Super	position Theorem.	- +			
0.Simulation of Trans	position Theorem, Maximum Power Transfer Theorem				
Mini Project	ient Response of RL and RC circuits using PSPICE	_			
Design of Power	er sumly				
Design of Regular	lators using zener diode.				
- Joseph of Regu	idiois using zener diode.		15		-
	T	otal:	4	Iours	

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Nagapattinam (Dt) Tamil Nadu.

DIGITAL ELECTRONICS LABORATORY

 \mathbf{L} T \mathbf{C} 1

List of Experiments:

- Study and Verification of Boolean Theorems using basic gates
- Design, Simulate and implementation of 4 bit code converters using logic gates
- Design, Simulate and implementation of 4 bit binary Adder/ Subtractor and BCD adder
- Design, Simulate and implementation of 4:1 Multiplexer and De-multiplexer using logic gates 4.
- Design, Simulateand implementation of 4 to 2 encoderand decoderusing logic gates
- 6. Design, Simulateand implementation of 4 bit parity generator and checker
- Design, Simulate and implementation of 2 bit Magnitude Comparator
- Constructionand verificationof4 bit synchronousup/down counterandMod-9/Mod-14Ripple counters(Both simulation
- Simulation and ImplementationofSISO, SIPO, PISO andPIPO shift registersusing Flip- flops
- 10. Simulation of 4 bit multiplier and Random number generator using HDL

Additional Experiments:

- 45 Hours Total:
- 1. Design and Implementation of seven segment display using basic logic gates
- 2. Simulation of 4 bit parallel divider and state machine problems

- 1. Ronald J. Tocci, Neal S. Widmer & Gregory L. Moss, "Digital Systems: Principles and Applications", 10th Edition,
- 2. M.MorrisMano, "DigitalDesign", 4thEdition, PrenticeHallofIndiaPvt.Ltd., 2008/Pearson Education (Singapore)Pvt.Ltd.,
- Joseph Cavanagh, "Verilog HDL: Digital Design and Modeling", Taylor & Francis, 2007 4.
- John F.Wakerly, "DigitalDesign", FourthEdition, Pearson/PHI, 2008
- John.MYarbrough, "Digital Logic Applications and Design", Thomson Learning, 2006

1902CS354

OBJECT ORIENTED PROGRAMMING AND DATA STRUCTURES LABORATORY

L

List of Experiments:

- Basic Programs for C++ Concepts
- Array implementation of List Abstract Data Type (ADT)
- Linked list implementation of List ADT
- 4. Cursor implementation of List ADT
- 5. Stack ADT Array and linked list implementations
- 6. Implementation of Stack ADT (by using files (i) and implementing file (iii))
- Implement another Stack Application using array and linked list implementations of Stack ADT (by implementing files (iv) and using file (ii), and then by using files (iii) and (iv)
- 8. Queue ADT Array and linked list implementations
- Search Tree ADT Binary Search Tree
- 10. Implement an interesting application as separate source files and using any of the searchable ADT files developed earlier. Replace the ADT file alone with other appropriate ADT files. Compare the performance.

Total: 45 Hours

Additional Experiments:

- 1. Hash table implementation
- 2. Graph traversals

- 1. F.RichardGilberg, A.Behrouz. Forouzan, Data Structures, A Pseudocode Approach with C. Thomson, 2007.
- 2. M. A. Weiss, Data Structures and Algorithm Analysis in C, Pearson Education, 2009.
- 3. Y.Langsam, M. J.Augenstein and A. M.Tenenbaum, Data Structures using C, Pearson Education, 2004.
- 4. A. M.AhoHopcroft and J.D. Ullman, Data Structures and Algorithms, Pearson education, 2000.

1904GE351

LIFE SKILLS: VERBAL ABILITY

C 2 1

MODULE I VOCABULARY USAGE

SKILL sevelopment

Introduction - Synonyms and Antonyms based on Technical terms - Single word Substitution - Newspaper, Audio and MODULE II COMPREHENSION ABILITY

Skimming and Scanning - Social Science passages - Business and Economics passages - latest political and current event based passages - Theme detection - Deriving conclusion from passages MODULE III

BASIC GRAMMAR AND ERROR DETECTION

Parallelism - Redundancy - Ambiguity - Concord - Common Errors - Spotting Errors - Sentence improvement - Error MODULE IV

REARRANGEMENT AND GENERAL USAGE

6 Hours

Jumble Sentences - Cloze Test - Idioms and Phrases - Active and passive voice - Spelling test.

MODULE V APPLICATION OF VERBAL ABILITY

Business Writing - Business Vocabulary - Delivering Good / Bad News - Media Communication - Email Etiquette -6 Hours Report Writing - Proposal writing - Essay writing - Indexing - Market surveying.

Total:

30 Hours

- 1. Arun Sharma and Meenakshi Upadhyav, How to Prepare for Verbal Ability and Reading Comprehension for CAT, McGrawHill Publication, Seventh Edition 2017
- 2. R S Aggarwal and Vikas Aggarwal , Quick Learning Objective General English ,S.Chand Publishing House, 2017
- 3. Dr.K.Alex , Soft Skills, S.Chand Publishing House, Third Revise Edition, 2014
- 4. Raymond Murphy, Essential English Grammar in Use, Cambridge University press, New Delhi, Third Edition,

1901MCX02

CONSTITUTION OF INDIA

L C 1

MODULE I INTRODUCTION

Historical Background -Constituent Assembly of India - Philosophical foundations of the Indian Constitution -Preamble - Fundamental Rights -Directive Principles of State Policy -Constitutional Remedies for citizens. Fundamental Duties -

MODULE II STRUCTURE AND FUNCTION OF CENTRAL GOVERNMENT

Union Government - Structures of the Union Government and Functions - President- Vice President- Prime Minister -6 Hours Cabinet - Parliament - Supreme Court of India - Judiciary view.

MODULE III STRUCTURE AND FUNCTION OF STATE GOVERNMENT

6 Hours

State Government-Structure and Functions - Governor - Chief minister-Cabinet-State Legislature- Judicial System in States -High Courts and other sub ordinate Courts.

MODULE IV CONSTITUTION FUNCTIONS

Indian Federal System -Center -State Relations- Constitutional Amendments - Constitutional Functionaries - Assessment

MODULE V INDIAN SOCIETY

Society: Nature, Meaning and definition; India Political Structure; Caste, Religion, Languages in India; Constitutional 6 Hours Remedies for citizens-Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled

References:

Total:

30 Hours

- 1. Durga Das Baslli 'Introduction to the Constitution of India " Prentice Hall of India, New Delhi.
- 2. R.C.Agarwal, (1997) 'Indian Political System', S.Chand and Company, New Delhi.
- 3. Maciver and Page, Society: An Introduction Analysis " Mac Milan India Ltd., New Delhi.
- 4. K.L.Sharma, (1997) 'Social Stratification in India: Issues and Themes', Jawaharlal NehruUniversity, New Delhi.

E.G.S. PILLAY ENGINEERING COLLEGE(Autonomous)

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NAGAPATTINAM – 611 002



B.E ELECTRONICS AND COMMUNICATION ENGINEERING Full Time Curriculum And Syllabus

Second Year - Fourth Semester

Course Code	Course Name	L	Т	P	C	Ma	aximum	Marks
Theory Cour	se			L		CA	ES	Total
1901MA402	Probability Theory and Stochastic Processes	3			3	40	60	100
1902EC401	Electronics Circuits	3	-	+-		-	00	100
1902EC402	Signals and Systems		0	+-	3	40	60	100
1902EC403	Electromagnetic Fields	2	1	0	3	40	60	100
1902EC404	Analog Integrated Circuits	$\frac{3}{2}$	0	0	3	40	60	100
1902EC405	Microprocessors and	3	0	0	3	40	60	100
	Microcontrollers	3	0	0	3	40	60	100
Laboratory Co			1					100
	Electronics and Integrated Circuits Laboratory	0	0	2	1	50	50	100
1902EC452	Microprocessors and Microcontrollers Laboratory	0	0	2	1	50	50	
1904GE451	Life Skills: Reasoning	2 -	0	0				100
	Total	19	1		1	100	-	100
udit Course		12	1	4	21	540	460	1000
1901MCX01	Environmental Science	0	0	0	0	100	_	100

 $L-Lecture | T-Tutorial | P-Practical | C-Credit | CA-Continuous Assessment | \ ES-End Semester | \ CA-Continuous | C-Credit | C-Credit | CA-Continuous | C-Credit | C-Cr$

		Total:	45 Hours
Further Read	ng:		
	Modern control systems.	rent	
Course Outco	mes:		
	After completion of the course. Student will be able to		
	1. Students are enabled to use new words in their day to	day commu	nication.
	Students are capable to gather information swiftly wh	nile reading p	assages
	3. Students are proficient during their oral and written c	ommunicatio	on.
	4. Students are equipped to rearrange the sentences voice of the sentence	and able to	identify the
	 Students use their knowledge of the best practices to documents 	o craft effect	ive business
References:			
	Sharma and Meenakshi Upadhyav, How to Prepare for Verbrehension for CAT, McGrawHill Publication, Seventh Edition	•	and Reading
	Aggarwal and Vikas Aggarwal, Quick Learning Objective G Shing House, 2017	eneral Engli	sh ,S.Chand
3. Dr.K.	Alex, Soft Skills, S.Chand Publishing House, Third Revise E	dition, 2014	
	ond Murphy, Essential English Grammar in Use, Cambridg		press, New

Delhi, Third Edition, 2007

Dr. S. RAMABAŁAN, M.E., Ph.D.,
PRINCIPAL
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Thethi, Nagore - 611 062.
Nagapattinam (Dt) Tamil Nadu.

E.G.S.PILLAYENGINEERINGCOLLEGE

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NAGAPATTINAM—611002



B.E. Electronics and Communication Engineering

Full Time Curriculum and Syllabus

Third Year-Fifth Semester

Course	Course Name	L	Т	P	C	Max	imum	Marks
Code	Codise Name	, L	1	P		CA	ES	Total
Theory Cour	rse			1	4			
1702EC501	Analog Communication	3	0	0	3	40	60	100
1702EC502	Antenna and Wave Propagation	3	0	0	3	40	60	100
1702EC503	Digital Signal Processing	3	2	0	4	40	60	100
1702EC504	Computer Networks	3	0	0	3	40	60	100
	Professional Elective – I	3	0	0	3	40	60	100
	Professional Elective – II	3	0	0	3	40	60	100
Laboratory (Course							-
1702EC551	Analog Communication Laboratory	0	0	4	2	50	50	100
1702EC552	Digital Signal Processing Laboratory	0	0	4	2	50	50	100
	Technical Seminar	0	0	2	1	100	-	100
	Life Skills: Aptitude – I	0	0	2	1	100	-	100
	Total	18	2	12	25	540	460	1000
Professional Ele	ective – I							
1703EC501	Nano Electronics	3	0	0	3	40	60	100
1703EC502	Automotive Electronics	3	0	0	3	40	60	100
1703EC503	Micro Electronics	3	0	0	3	40	60	100
1703EC504	Biomedical Engineering	3	0	0	3	40	60	100

1703EC505	Robotic Vision	3	0	0	3	40	60	100
Professional Ele	ective – II					-	h	
1703EC506	Computer Architecture and Organization	3	0	0	3	40	60	100
1703EC507	Advanced Microcontrollers	3	0	0	3	40	60	100
1703EC508	Measurement and Instrumentation	3	0	0	3	40	60	100
1703EC509	Virtual Instrumentation	3	0	0	3	40	60	100
1702CSX01	Operating Systems	3	0	0	3	40	60	100

L-Lecture|T-Tutorial|P-Practical|C-Credit|CA -ContinuousAssessment| ES-EndSemester

1702EC501		ANALO	G COMM	UNICATIO	ON	L	T	P	C
						3	0	0	3
Course Objective									
	1. To provide an								
	2.To study vario					of various	rece	iver.	
	3.To learn Pulse	analog modulat	on and demo	dulation tecl	nniques.				
Unit I	AMPLITUDE M	ODULATION S	YSTEMS				-	9 H	our
Need for modu	lation - Classific			gues-Genera	tion and de	etection:	AM.		
SSB-SC, VSB-	Comparison of	Amplitude mo	dulation sys	tems- AM	transmitter	rs-AM r	eceiv	ers-Si	une
heterodyne recei		1							p
Unit II	ANGLE MODUL	ATION SYSTE	MS				- 1	9 H	our
Frequency mod	llation: Narrowba	and wideban	d FM- Phase	Modulation-	- Generation	of FM s	ignal		
Direct FM, ind	irect FM- Demo	dulation of FM	l signals -FN	A stereo m	ultiplexing-	FM tra	nsmit	ters-	FM
receivers-Recei	er parameter		Ü		. 3				
Unit III	RANDOM PRO							9 H	our
Random variab	les-Random pro-	cess-Auto corre	lation proces	s-Power sp	ectral dens	ity-Statio	nary		
Wiener-Khinch	n theorem Tran								
	in dicoronii, iidi	ismission of rar	dom process	through L	TI system,	WSS er	godic	proc	ess
Gaussian Proces	S. Turi	ismission of ran	dom process	through L	TI system,	WSS er	godic	proc	ess
	NOISE IN COM		dom process	through L	TI system,	WSS er	godic	proc	ess
Unit IV Noise calculation	NOISE IN COM	MUNICATION S Noise temperature	SYSTEM re-Noise equi	through L'	width-Narro	WSS er	godic noise	proc 9 He Nois	ess our
Unit IV Noise calculated AM receiver, No	NOISE IN COM on-Noise figure-Noise in DSBSC re	MUNICATION S Noise temperature eceiver-Noise in	SYSTEM re-Noise equi SSB receive	through L'valent band	width-Narro	WSS er owband -Capture	godic noise and	9 Ho-Nois-	our:
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Unit IV Noise calculated AM receiver,Noteffect-Pre-emph systems.	NOISE IN COM on-Noise figure-Noise in DSBSC re asis and de-emp	MUNICATION S Noise temperature eceiver-Noise in hasis in FM sy	SYSTEM re-Noise equi SSB receive stem-Compa	through L'valent band	width-Narro	WSS er owband -Capture	godic noise and	9 Ho-Nois-	our:
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Noise calculated AM receiver, No effect-Pre-emph systems. Unit V PAM-PWM-PPI	NOISE IN COM on-Noise figure-Noise in DSBSC reasis and de-emp PULSE ANALOGE M-Time Division	MUNICATION S Noise temperature eceiver-Noise in hasis in FM sy G MODULATIO Multiplexing-Pl	SYSTEM e-Noise equi SSB receive estem-Compa M-Pulse Tin	valent band r-Noise in F rison of no	width-Narro	WSS er owbandCapture nance of	noise and AM	9 Ho-Nois thresh and 9 Ho-	e in hold FM
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E.G.S. Pillay Engineering College, Thethi, Nagore - 611 002. Nagapattinam (Dt) Tamil Nadu.

1. J.G. Proakis, "Digital Communications", McGraw Hill, 5th edition, 2007	
2. Simon Haykin, Communication Systems, John Wiley, 2001.	
3. Jack Quinn, 'Digital Data Communication", Prentice Hall; 1st edition,-199)	
3. P.Michael Fitz, Fundamentals of Communication System, Tata McGraw-Hill -2008.	
4. P.Rama Krishna rao, Analog Communication, Tata McGraw-Hill -2011	0)
5. Taub and Schilling, Principles of communication systems, Tata McGraw-Hill, 1995.	11 4
6. Bruce Carlson et al, Communication systems, McGraw-Hill, 2002.	
7. Roddy and Coolen, Electronic communication, PHI, 2003.	

1702EC502	ANTENNAS AND WAVE PROPOGATION	L	Т	P	C
		3	0	0	3
Course Obje					
	1. To introduce the fundamental principles of antenna theory and variou	s types	of an	tenna	s.
	2. Applying the principles of antennas to the analysis, design, and measured 3. To introduce the propagation of radio waves.	iremeni	S OI &	inteni	nas.
	2120 indicaded the propagation of tadio waves.				
Unit 1	FUNDAMENTALS OF RADIATION			9 H	our
Definition o	f antenna parameters - Gain, Directivity, Effective aperture, Radiat	ion Res	sistan		
width. Bean	n width, Input Impedance. Matching - Baluns, Polarization mism	atch, A	Anten	na n	oise
temperature	Radiation from oscillating dipole, Half wave dipole. Folded dipole, Yagi	array.			
Unit II	ANTENNA ARRAYS			9 H	
N element i	mear array, Pattern multiplication, Broadside and End fire array - Conc	ept of	Phase	d arr	ays
Adaptive arr	ay, Basic principle of antenna Synthesis-Binomial Arrays, Tchebychev po	olynom	ial		
Unit III	APERTURE AND SLOT ANTENNAS			9 H	
Radiation fr	mi rectangular apertures, Uniform and Tapered aperture, Horn antenna	, Refle	ector	anten	ına
Aperture blo	ockage, Feeding structures, Slot antennas, Microstrip antennas - Ra	diation	mec	hanisı	m -
	Numerical tool for antenna analysis				
			7		
Principle of antennas- Reapplications, VSWR	SPECIAL ANTENNAS frequency independent antennas —Spiral antenna, Helical antenna, Leconfigurable antenna, Active antenna, Dielectric antennas, Electronic b. Antenna Measurements-Test Ranges, Measurement of Gain, Radiation	and gap	stru	cture arizat	derr and tion
Principle of antennas- Reapplications, VSWR Unit V Modes of Duct propaga	SPECIAL ANTENNAS frequency independent antennas —Spiral antenna, Helical antenna, Leconfigurable antenna, Active antenna, Dielectric antennas, Electronic be Antenna Measurements-Test Ranges, Measurement of Gain, Radiation PROPAGATION OF RADIO WAVES opagation, Structure of atmosphere, Ground wave propagation, Troposation, Troposation, Troposation, Flat earth and Curved earth concept Sk ht, critical frequency, Maximum usable frequency — Skip distance,	and gap pattern ospheric y wave Fading	prop	Moo cture arizat 9 Ho pagati agatio	derrander and tion ours on hope
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E.G.S. Pillay Engineering College, Thethi, Nagore - 611 002. Nagapattinam (Dt) Tamil Nadu.

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- 4. B. Venkataramani and M.Bhaskar, "Digital Signal Processors Architecture, Programming and Applications" Tata McGraw Hill Publishing Company Limited. New Delhi, 2003.
- 3. Robert Schilling & Sandra L.Harris, Introduction to Digital Signal Processing using Matlab", Cengage Learning,2014.
- 5. R. Lakshmi Rekha, "Digital Singal Processing" ALR Publications 2016.

1702EC504		COMPUTER NETWORKS L	T	P	C
		3	0	0	3
		(Common to B.E / B.Tech – CSE, IT & ECE)			
Course Obje	ectives:			44.	
	1. To un	derstand networking concepts and basic communication model			
	2. To un	derstand network architectures and components required for data components	munic	ation.	
	3. To an	alyze the function and design strategy of physical, data link, network la	ayer a	nd	
	transp	port layer			
	4. To accesservice	quire basic knowledge of various application protocol for internet secu	rity is	sues a	and
Unit I	INTRODI	UCTION AND CONCEPTS OF NETWORKS		9 F	lour
Networks –	Categories o	of Networks –Network hardware– Network software– Network Archi	tectur		
reference mod	dels – Netwo	ork LAN technologies - Transmission media.			
Unit II		NK LAYER AND PHYSICAL LAYER		9 H	ours
Data link lay		onality of data link layer- Data link control and protocols - Error Det	ection		
Physical layer Channel capa	er: Basis fo	ernet- Wireless LAN- Broadband wireless – Bluetooth – Data link I or data communication- Wireless transmission- Transmission medi	ayer : a- M	switch ultiple	ing - xing
Unit III		RK LAYER		0.1	
					lours
Internetworki	na Ouslity	onality of network layer- Network addressing- Network routing- Rou of service- Network layer protocols- Switching concepts - Circuit sw	iting	aigori	inms.
THE CHICLY OF KI	ng- Quanty	of service- including layer brotocors- switching concepts — Circuit sw			
switching, Ne	sturntly lawar	design issues	/ICIIII	16 - 1	acke
		design issues.	/Itemi		
Unit IV	TRANSPO	design issues. ORT LAYER		9 F	Iours
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- 6. Larry L. Peterson & Bruce S. Davie, "Computer Networks A systems Approach", Fifth Edition, Morgan Kaufmann, 2012
- 7. William Stallings, —Data and Computer Communicationsl, Tenth Edition, Pearson Education, 2013

1702EC551	ANALOG COMMUNICATION LABORATORY	L	T	P	C
		0	0	4	2
Course Objectives:	The student should be made to:				6
	1. Understand the basics of analog communication.				
	2. Study the different modulators.				
	3. Know the noise performance in communication s	ystem.			
List of Experiments:					
	Demodulation of AM,				
	Demodulation of FM.				
FM modulation					
	PWM and PDM				
5. Study of FDM					
	AM using MATLAB.				
	FM using MATLAB.				
	heterodyne receiver,				
	nalysis of noise in Communication system.				
10. Removal of no	ise in AM and FM.				
	To	tal:	45	Hour	'S
Additional Experiments:	Pace Maker Circuit				
	Industrial Instrumentation amplifier				
Course Outcomes:					
	After completion of the course, Student will be able to)			
	Design of AM and FM Circuits.				
	2. Design of AM and FM Circuits using MATL.	AB.			
	Determine the different multiplexing technique	ie.			
	 Design of Super Heterodyne receiver. 			- 02	
	5. Compute the noise performance in communic	ation sy	/stem.		

1702EC552		DIGITAL SIGNAL PROCESSING LAB	L	T	P	C
			0	0	4	2
		(Common to B.E / B. Tech – ECE, CSE & IT)				
Course Obje	ectives:	The student should be made to:				
	1. To m	ake the students understand the behavior and response of the ods	he filter	using	g diffe	ren
	2. To st spect	udy the output response of the system, sampling rate converum	rsion an	d FF	Т	
	D.	now the generation of the signals and arithmetic operations Processor.	using T	MS3	20C5	X
List of Expe	riments:					
1. Gen	eration of S	ignals				70
2. Prop	perties of D	iscrete time Systems-Linearity, Stability, Causality & Time	Varian	ce.		
3. Sam	pling of an	audio signal with different sampling rate and reconstruct th	ie samp	led si	gnal.	
	n <mark>putati</mark> on of g DFT	DFT of a signal using basic equation and FFT & power sp	ectrum	estim	ation	
- D	1	ulation of IIR filters.				
5. Des	ign and Sim	diation of the inters				
		ulation of FIR filters				

8. Arit	hmetic operat	ions in DSPs		
		eforms using DSPs		
10. Com	putation of cor	nvolution and correlation between signals using DSPs		
		IIR Filters using DSPs		1
12. Impl	lementation of	FIR Filters using DSPs		
		T	otal:	45 Hours
Additional E	Experiments:	https://www.texasinstruments.in		
		Basic experiments using ADSP processor		+
Course Outc	comes:	**************************************		
	After complet	ion of the course, Student will be able to		
		gn of digital filter and Generation of various signals, Analysis m properties.	s of sig	nal and
	2. Com	putation of circular and linear convolution.		
	3. Deter	mine the frequency transformation and Analysis of sampling	rate.	
		gn of digital filters.		
	5. Analy	yze the power spectral density of the system.		

		TECHNICAL SEMINAR	L	T	P	C
			0	0	2	1
Course Object	ctives:	The student should be made to:				
	1.	To develop self-learning skills of utilizing various technical a technical presentation.	resourc	es to i	nake	
	2.	To promote the technical presentation and communication sl	cills.			
		To impart the knowledge on intonation, word and sentence s communicative competence, identifying and overcoming pro	tress fo			
	4.	To promote the ablility for Interacting and sharing attitude.				
		To encourage the commitment-attitude to complete tasks.				

The students are expected to make two presentations on advanced topics (recent trends) related to III or IV semester subjects. A faculty guide is to be allotted and he / she will guide and monitor the progress of the student and maintain attendance also. Students are encouraged to use various teaching aids such as power point presentation and demonstrative models

Evaluation Scheme: Continuous Assessment (100)

Distribution of marks for Continuous Assessment:

Presentation I (40) Report (10) Presentation II (40) Report (10)

		Total Marks (100)
	A .	Total: 45 Hou
Course O	utcomes:	
	After completion of the course, Student will be able	to
	1. Identify and utilize various technical resou	urces available from multiple field.
	2. Improve the technical presentation and con	
	Improve communicative competence.	
	4. Interact and share their technical knowledge	ge.
	5. Understand and adhere to deadlines and co	ommitment to complete the assignments

		LIFE SKILLS: APTITUDE - I	L	Т	P	C
			0	0	2	1
Correct Or	1 - 42	B.E – ECE				
Course Ob			1.111 . C.1	. 1		
		problem solving skill and to improve intellectual o critically evaluate various real life situations be				- 00
	key issues an		by resorting	to Ai	iarysis	SUI
		o demonstrate various principles involved in solv	ing mathem	atical	nrohl	ems
		reducing the time taken for performing job function		aticai	.proor	Cilis
		analytical ability of students				
		logical and critical thinking of Student			77	
Unit I	INTRODUCTION	,	RTCUTS	OF	5 H	ours
Classifican		PLICATION, DIVISION les of Numbers - Divisibility rules - Finding	the unite	digit	Fin	K_dina
remainders	in divisions involving	higher powers - LCM and HCF Models - Frac	tions and I	Jigite	- 5ar	unig
		Shortcuts of addition, multiplication, Division.	dions and L	/igits	– sqt	iaic,
Unit II	Ratio and proportio			T	5 Ho	ours
Definition g		Ratios - Comparison of Ratios - Problems on	Ratios - Co	mpour		
Problems on	Proportion, Mean prop	ortional and Continued Proportion Definition of A	verage - Ru	les of	Avera	ige -
Problems on		Weighted verage - Finding average using assume	d mean meth	od.		
Unit III	Percentages, Profit A				5 Ho	
Percentage	Percentage - Converti	ng a percentage into decimals - Converting a D	Decimal into	a pe	rcenta	ge -
		Problems on percentages - Problems on Profit and e - Discount and Marked Price - Two different artic				
		elling Price Gain% / Loss% on Selling Price.	ics sold at s	anne C	OSt 11	icc -
Unit IV	Coding and decoding				5 Ho	ours
Coding us		oding using different set of letters - Coding into	a number -	Proble		
model - Sol	ving problems by draw	ving the paths - Finding the net distance travelle	ed - Finding	the o	directi	on -
		adows Problems on direction sense using symbols	and notatio	ns.		1
Unit V						
		ries Number and Letter Analogies, Odd man out	t /		5 He	
Difference /	series Product series	- Squares series - Cubes series - Alternate ser	t - Comb	inatio	n seri	es -
Difference Miscellaneo	series - Product series us series - Place values (- Squares series - Cubes series - Alternate ser of letters - Definition of Analogy - Problems on nu	t - Comb mber analog	inatio y - Pr	n seri oblem	es - s on
Difference Miscellaneou letter analog	series - Product series us series - Place values (- Squares series - Cubes series - Alternate ser	t - Comb mber analog	inatio y - Pr	n seri oblem	es - s on
Difference Miscellaneou letter analog	eries Product series us series - Place values (y - Problems on verbal a	- Squares series - Cubes series - Alternate ser of letters - Definition of Analogy - Problems on nu	t - Comb mber analog	inatio y - Pr er Odd	n seri oblem	es - s on out -
Difference Miscellaneou letter analog	eries Product series us series - Place values (y - Problems on verbal a	- Squares series - Cubes series - Alternate ser of letters - Definition of Analogy - Problems on nu	t - Comb mber analog lems on lette	inatio y - Pr er Odd	n seri oblem man o	es - s on out -
Difference Miscellaneou letter analog Problems on	eries Product series us series - Place values o y - Problems on verbal a verbal Odd man out ENT PATTERN:	- Squares series - Cubes series - Alternate ser of letters - Definition of Analogy - Problems on nu analogy - Problems on number Odd man out - Prob	t - Comb mber analog lems on lette	inatio y - Pr er Odd	n seri oblem man o	es - s on out -
Difference Miscellaneou letter analog Problems on	eries Product series us series - Place values o y - Problems on verbal a verbal Odd man out ENT PATTERN: 1 Two tests w	- Squares series - Cubes series - Alternate series fletters - Definition of Analogy - Problems on number Odd man out - Problems on n	t - Comb mber analog lems on lette	inatio y - Pr er Odd	n seri oblem man o	es - s on out -
Difference Miscellaneou letter analog Problems on	eries Product series us series - Place values o y - Problems on verbal a verbal Odd man out ENT PATTERN: 1 Two tests w	- Squares series - Cubes series - Alternate ser of letters - Definition of Analogy - Problems on nu analogy - Problems on number Odd man out - Prob	t - Comb mber analog lems on lette	inatio y - Pr er Odd	n seri oblem man o	es - s on out -
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Difference Miscellaneou letter analog Problems on ASSESSM	eries Product series us series - Place values o y - Problems on verbal a verbal Odd man out ENT PATTERN: 1 Two tests w 2. Five assignm comes: After completion of the series of the s	- Squares series - Cubes series - Alternate series of letters - Definition of Analogy - Problems on number Odd man out - Problems on averages; compare two quantities using rate of the course, Student will be able to a problems on averages; compare two quantities using rate of the course of	Total:	pination sy - Pr or Odd	n seri oblem man o 30 Ho	es - s on out - ours
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Difference Miscellaneou letter analog Problems on ASSESSM	eries Product series us series - Place values o y - Problems on verbal a verbal Odd man out ENT PATTERN: 1. Two tests w 2. Five assignm comes: After completion of t 1. Learners shou shortcut 2. Solve problem 3. Calculate cor 4. Workout cor	- Squares series - Cubes series - Alternate series of letters - Definition of Analogy - Problems on number Odd man out - Problems on averages; compare two quantities using rate of the course, Student will be able to a problems on averages; compare two quantities using rate of the course of	Total:	pination by - Prodd or Odd	n serioblem man of the	es - s on out - ours
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References 1. Arun Shalan Ray S Aga 4. R S Aga 2017. 5. Rajesh V	eries Product series us series - Place values of y - Problems on verbal averbal Odd man out ENT PATTERN: 1 Two tests w 2. Five assignments. 1 Learners show shortcut 2. Solve problems of the completion of the	- Squares series - Cubes series - Alternate series of letters - Definition of Analogy - Problems on number Odd man out - Problems on out - Problems on out - Problems on out - Problems on Odd of the Course, Student will be able to old be able to understand number and solving problems on averages; compare two quantities using rather than on out - Problems on number Odd man out - Problems on out - Problems on number Odd man out - Problems on out - Problems on out - Problems on number Odd man out	Total: Total: Total: While publication, 2dition, S.Ch.	me usinorofit directions 2017.	n serioblem man of 30 Ho	es - s on out - ours rious ess. and tion, 7.
References 1. Arun Sh 2016. 2. Arun Sh 3. R S Aga 4. R S Aga 2017. 5. Rajesh V 6. B.S. Sijv	eries Product series us series - Place values of y - Problems on verbal averbal Odd man out ENT PATTERN: 1 Two tests w 2. Five assignments. 1 Learners show shortcut 2. Solve problems of the completion of the	- Squares series - Cubes series - Alternate series of letters - Definition of Analogy - Problems on number Odd man out - Problems on number of Marks Skill be conducted (5*10) - 50 Marks Skill be conducted (5*10) - 50 Marks Skill be able to all be able to understand number and solving problems on averages; compare two quantities using rate and procepts of Coding and Decoding, ability to be logic behind a sequence. The logic behind a sequence of Coding and Decoding and Decoding ability to be logic behind a sequence. The logic behind a sequence of Coding and Decoding and Decoding ability to be logic behind a sequence. The logic behind a sequence of Coding and Decoding, ability to be logic behind a sequence. The logic behind a sequence of Coding and Decoding, ability to be logic behind a sequence. The logic behind a sequence of Coding and Decoding, ability to be logic behind a sequence. The logic behind a sequence of Coding and Decoding, ability to be logic behind a sequence. The logic behind a sequence of Coding and Decoding, ability to be logic behind a sequence. The logic behind a sequence of Coding and Decoding, ability to be logic behind a sequence. The logic behind a sequence of Coding and Decoding, ability to be logic behind a sequence. The logic behind a sequence of the	Total: Total: Total: While publication, 2dition, S.Ch.	me usinorofit directions 2017.	n serioblem man of 30 Ho	es - s on out - ours rious ess. and tion, 7.

1703	EC501 NANO ELECTRONICS	L	T	P	C
		3	0	0	3
	(Common to B. E / B. Tech – CSE, IT & ECE)				
Cour	se Objectives:				
	1. To be exposed of basic electronics and quantum electronics.				
	2. To be familiar with basic Nano electronics devices and Plasmonics				
	3. To learn about optoelectronics and Spintronics.				
	4. To know various architecture methodologies				
Unit	THE PERSON TO BELLETIKO MED THIS QUINTIEM DEVICES:			Hou	
Class	ification Of Solids-Energy Level-Intrinsic and Extrinsic Semiconductor-Condu	ction	In M	letal _	And
Semi	conductor-Semiconductor Diodes-Basic Principle Of Led-Charge And Spin In S	ingle	Quant	um I	ots-
Could	omb Blockade-Electrons In Mesoscopic Structures-Single Electron Transfer Device	s (Sets)-Ele	ctron	Spin
	sistor -resonant tunnel diodes ,tunnel FETs-quantum interference transistors devices	(QUII	s)-qu	antun	1 dot
Unit	ar autornata(OCAs)-quantum hits(qubits).) TT	
	The state of the s	CC		Hot	
condi	ronic transport in 1,2 and 3 dimensions-quantum confinement -energy sub bands	effec	tive n	nass-d	lode
	action-mean free path in 3D-ballistic conduction -phase coherence length -quantized uer formula-electron transport in pn junctions-short channel nano transistor - single p				
	ce plasmon-nanowire surface plasmons-interaction with matter-channel plasmon-pol				
wave	length metal groves surface plasmon polarizations and localized surface plasmon.	arising	guiui	ng by	Sub
Unit				Hou	ire
	r optonic crystalmaxwells equations bloch's theorem transmission spectranon	linear			
	ic crystals slabnonlinear optonic crystal and its application-fabrication				
	rures(1D,2D&3D)-applications;1D crystals -coupler waveguide-high-Q cavities -coupler waveguide-high-Q cavities				
	le optonic crystal files.	ptome	01 9 5	ui iic	701 1
Unit			1	Hot	ırs
Spin	tunnelling devices-magnetic tunnel junction -tunnelling spin polarization -giant	unnell			
tunne	barriers-tunnel based spin injectors-spin injections and spin transport in hybrid	กลทด	structi	ires -	-spin
	s -spin diodesnagnetic tennel transistor-spin relaxation and spin dephasing-memor				
ferroe	electric random access memory-MRAMS-field sensors - multferro electric sensors-sp	introni	e bios	ensor	S
Unit				Hot	
Archi	tecture principles-mono and multi processor systems-parallel data processing -	ower			
	elism -classic systolic arrays -molecular devices-properties -self-organizati				
	tions, computation montecarlo simulations -computational methods and simula				
	scale modelling -modelling of nanodevices		22		
	TA	1.		- II.	
Rueti	Totaler Reading:	ar:		15 He	ours
ruiti	Ouantum Dots for fiber optic communication				
	Quantum cellular automata				
Cour	se Outcomes:	Fru	101	DIE	ne
Cour	After completion of the course, Student will be able to				
	1. Explain the theory, principle of basic electronics and quantum electronics.	ronice			1
	2. Explain the characteristics of Nano electronics and Plasmonic device				-
	3. Summarize the various type's Optoelectronic crystals and its work		noinle		
	4. Explain the characteristics, theory and construction of Spintronics of				
	5. Design an architecture Nanoelectronics system design	ievices		-1	-
Refer	rences:			_	
	V.Rainer, Nano electronics and information technology, wiley, 3 rd 2012.			= 5/2	
	K.E.Drexlex, Nanosystems, Wiley, revised edition 2014				
	M.C.Gupta, J.Balloto the Handbook of photonics. CRC Press Taylor and Francis Grou	n 2nd 2	ditio	2004	5
	.M.Martinez-Durat,RaulJ.Martin-palma."Nanotechnology for microelectronics and				
	dition, 2006, Elsevier.	ορισι	Jiccii	711103	, 1
	V.Kochelp, M.stroscio, "Introduction to nanoelectropics apported university press(2)	013)			
	RainerWaser,"Nano electronics and information technology; advanced electronic		rial c	nd n	ovel
	evices", Wiley-VCH(2010). Dr. S. RAMABALAN, M.E., Ph.D.,	mate	ııaı č	uiu II	OVEI
	PRINCIPAL				

1703EC502	AND MORISTE EL ECTEDONICO		-	-	
1703EC302	AUTOMOTIVE ELECTRONICS	L	T	P	C
		3	0	0	3
Course Objectives:					
	tomotive mechanical, transmission and braking systems and to u	ndata	tha Ia	tost	-
	wed in the industry.	puate	ine ia	iesi	
			V:		
Unit I AUTOMO	TIVE MECHANICAL SYSTEMS: VEHICLE SYSTEMS		9	Hou	rs
	system, Fuel System (Carburettor& Diesel Fuel Injection, Ignit	ion S			
System and other Auxiliary	Systems (Cooling, Lubrications & Electrical Systems)), Transmit	ission	Syste	em (Fi	ront,
Rear &4 wheel Drive, Man	ual, Automatic Transmission, Differential). Braking System (Dr	um, E	isc, I	Hydra	ulic,
Pneumatic), Steering System	n (Rack and Pinion, Power Steering), Entlebeenew	TShi	P		
	NICS IN AUTOMOTIVE SYSTEMS			Hou	
Need for Electronics in Aut	omotive Systems: Performance (Speed, Power, and Torque), Con	ntrol (Emis	sion,	Fuel
Economy, Drivability, and	Safety) & Legislation (Environmental legislation for pollutio	n & 3	Safety	Nor	ms).
Overview of Vehicle Elect	ronic Systems: Basic electrical components and their operation	n in	an au	itomo	bile:
Power train subsystem (Star	ting systems, Charging systems - Ignition systems - Electronic t	fuel co	ontrol), Cha	assis
Cruico Control Land	ESP) - Comfort and safety subsystems (Night Vision, Airbags,	Seath	elt T	ension	iers,
Cruise Control-Lane-depart Unit III INTEGRA	FED DEVELOPMENT ENVIRONMENT		-	\ II	
	development environment (IDE) - Getting started, HW / SW	2226		Hou	
service Host – target inter-	action) – Booting reconfiguration – Managing IDE – Target se	COLL	igurai	nton (2000
development, debugging - I	ntroduction to an IDE for lab board – RTOS, PC based debugger	ei vei s	, agei	ns, C	1055
	ED SYSTEM IN AUTOMOTIVE APPLICATIONS		- 0	Hou Hou	rc
	ms - Gasoline / Diesel systems, various sensors used in s	systen			
transmission contro! - Vehi	cle safety system – Electronic control of braking and traction -	- Bod	v ele	ctroni	cs –
Infotainment systems - Nav	rigation systems - System level tests - Software calibration usin	g eng	ine ar	nd veł	nicle
dynamometers - Environme	mili tests for Electronic Control Unit - Application of Control of	eleme	nts ar	nd cor	ntrol
methodology in Automotive	System Employability	1			
	D SYSTEM COMMUNICATION PROTOCOUS			Hou	
Introduction to central netw	erking - Communication protocols in embedded systems - SPI,	I2C,	USB	– Veł	nicle
communication protocols -	Introduction to CAN, LIN, FLEXRAY, MOST, KWP2000				
Funthan Daadim	Total		4	15 H	ours
Further Reading: Course Outcomes:	Heat Combustion – Fast moving acceleration –ABS – Fuel Injection	ctor			
	rica of the course Student will be able to				
	etion of the course, Student will be able to				
	cribe various mechanical systems in an automobile	-		F	
	strate different types of electronic systems in an automobile		A 11	,	
	fine the various stages of Integrated development environment to	desig	gn an	FE	neli
Con-	pedded system		7	4-1	(700)
	lain the various embedded systems used in automotive application	ons			V
	npare Vehicle Communication Protocols (K3).	PLO	ne	WIS	hil
References:					//
	Thomas Zurawka, —Automotive Software Engineering P	incip	es. I	Proces	ses.V
	SAE International, 2005.				
	e Handbook, 6th Edition, 2014.			_	
	nobile Electrical and Electronic Systems, 4th edition, 2012.				
	Automotive Electronics Handbook, McGraw Hill Publications	1000)		
	Automotive Embedded System Handbookl, CRC Press, Taylor			;. C-	0112
2009.	remomente Embedded System Handbooks, CRC Press, Taylor	ano	г гапс	is Gr	oup,

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Nagapattinam (Dt) Tamil Nadu.

1703EC503		MICROELECTRONICS	L	T	P	C
			3	0	0	3
		(Common to B. E / B. Tech – CSE, IT & ECE)				
Course Obje			_			
	1. To	be exposed of basics of semiconductor and applications.				
	2. To	be familiar with advanced semiconductors and its applications.				
	3. To	study the different types of amplifiers and its types.				
	4. To	know about fabrication methodologies and circuit designing.				
		36				
Unit I	INTRODU	CTION TO MICROELECTRONICS:			9 Hou	ırs
Basic physic	s of semico	nductor-diode models and circuits-physics of MOS transistor-	MO			
operational a effect transist	mplifiers- se	miconductor theory- diodes -bipolar junction transistor(BJT)-B	BJT :	ampli	fiers-	field
Unit II	MOSFET	AND IC AMPLIFIERS:			9 Hou	ırs
Devices struc	ture and ph	vsical operation-VI characteristics-biasing in MOS amplifier c	ircui			
operation and	models-SPI	CE MOSFET-IC design philosophy-comparison of MOSFET and I	BJT-	curre	nt sou	irce
		eering circuits-high frequency response.				
Unit III		AGE AMPLIFIER AND FEEDBACK:		9	9 Hou	ırs
MOS differen	ntial pair -sr	nall signal operation of MOS differential pair-BJT differential p	oair-c	other	non	idea
		ential pair-differential amplifier with active words-multistage				
		asic feedback topologies-series, shunt feedback-determining the l				
		ck ir amplifiers poles-frequency compensation.		0		
Unit IV		The state of the s				
Ouit IV	MICROEL	ECTRONICS FABRICATION:			9 Hou	ırs
		ECTRONICS FABRICATION:	nced		9 Hou	
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Clean room etching-diffus	ion process	ECTRONICS FABRICATION: illicon wafer production-thermal exidation —lithography —advarand ion implementation-thin film deposition—packaging—yields production—packaging—yields production—yields		litho	grapl	ıy ·
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1703EC505		ROBOTIC VISION	L	T	P	C
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Course Objec	7			2 1		
		earn the image fundamentals and mathematical transforms n		y for rob	otic vis	ion
		inderstand the image segmentation and edge detection method	ods			
	3. 10 8	tudy the concepts of optics and lens systems				
Unit I	INTRO	DDUCTION		-	0 1	lour
		vision- 2D image transform, image filtering, relationship	in with	other re		
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thresholding- h	nistogramr	ning- merging and splitting algorithm- edges in images-di-				
approximation:	s-edge de	tection and localization		· ·		
Unit III		E RECOGNITION				lour
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Unit IV	VIDE	O ANALYTICS \				loui
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objects deduct				_		
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17EC006	_	COMPUTER ARCHITECTURE AND ORGANIZATION	L	T	P	C
			3	0	0	3
		(Common to B.E / B.Tech – CSE, IT & ECE)				
Course Obj	jectives:					
	1.	Describe software and hardware interaction layers in computer architects	ure			
	2.	Describe central processing unit				
	3.	Describe various machine language instructions				
	4.	Describe various addressing modes				
	5.	Describe various instruction types and Instruction cycle				
Unit I		DUCTION OF COMPUTER ORGANIZATION AND DATA ESENTATION IN COMPUTER SYSTEM			9	Hour
Main Comp	onents of	Computers, Standard Organization, Historical Developments, Comp	uter L	evel H	ierarchy	, Vo
Neumann an	nd Non-Vo	n Neumann Model, Positional Numbering Systems, Signed Integer Repre	sentatio	on, Fixe	d and F	loating
	sentation, (Character Codes, Codes for Data Recording and Transmission, Error Detec	ction ar	nd Erroi	Correct	ion.
Unit II		E COMPUTER AND INSTRUCTION SET ARCHITECTURE				Hour
Introduction	, MARIE,	Instruction Processing, Simple Program, Hardwired Control, Micro program,	ramme	d Contr	ol, Real	World
Example of World Exam	Computer	Architecture, Instruction Formats, Instruction Types, Addressing, Instru		Level P	ipelining	, Rea
		- We will the	P			
Unit III		DRY AND STORAGE SYSTEM	V			Hour
Memory - C	lassification	on of memories ROM - ROM organization - PROM - EPROM - EE	PROM	-EAP	ROM, R	AM -
KAM organ	nzation, N	lemory Hierarchy, Cache and Virtual Memory, Interfacing Memory	to a P	rocesso	r Real	Work
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Nagapattinam (Dt) Tamil Nadu.

	BIOMEDICAL ENGINEERING	L	T	P	C
		3	0	0	3
Course Objecti				9	
	1.To gain knowledge about the various physiological		e metho	ds of	
	recording and also the method of transmitting these p				
	2. To study about the various assist devices used in the				
	3. To gain knowledge about various recently develop techniques.	ed diagnostic and	пегарец	ше	
	comiques.	····			
Unit I	PHYSIOLOGIC SYSTEM AND BIO-POTENTIA	L RECORDING		9 H	lours
The origin of	Bic-potentials, Bio potential electrodes, Endocrine Sys				
	em, ECG, EEG, EMG,PCG, lead systems and recording				
characteristics.					
Unit II	BIOLOGICAL AMPLIFIERS AND NON- ELEC	TRICAL		9 F	lours
	PARAMETER MEASUREMENT				
	fier, Blood flow meter, Cardiac output, Respiratory meas	urement, Blood pr	essure,	Temper	ature,
Pulse, Blood Ce				0.1	·
Unit III	ASSIST DEVICES AND DIATHERMY				lours
	kers, DC Defibrillator, Dialysis, Shortwave, Ultrasogical Diathermy	onic and Microw	ave typ	e and	tneii
Unit IV	BIOTELEMETRY AND ITS APPLICATIONS			0.1	lours
	Biotelemetry, Component of Biotelemetry, Application	of Riotelemetry	Radio n		
safety.	in Diotes in Diotes in Early, 11 philoadion	or blotteremeny,	reaction p.	iii, Lice	oti ica
7	RECENT TREND IN IMAGING SYSTEM				
Unit V	THE THE PRESENT OF THE PROPERTY OF THE PROPERT	AND MED	ICAL	9 F	lours
	INSTRUMENTS	AND MED	ICAL	9 F	lours
	INSTRUMENTS es and Digital radiography, Biological effect of NM.	R imaging and U	Jltrasour		
	INSTRUMENTS	R imaging and U	Jltrasour	nd, Me	dical
Thermography	INSTRUMENTS es and Digital radiography, Biological effect of NM. Endoscope unit, Laser in medicine, Cryogenic application	R imaging and U	Jltrasour	nd, Me	
	INSTRUMENTS es and Digital radiography, Biological effect of NM. Endoscope unit, Laser in medicine, Cryogenic applications.	R imaging and U	Jltrasour	nd, Me	dical
Thermography	INSTRUMENTS es and Digital radiography, Biological effect of NM. Endoscope unit, Laser in medicine, Cryogenic applications g: I.Human Anatomy	R imaging and U	Jltrasour	nd, Me	dical
Thermography	INSTRUMENTS es and Digital radiography, Biological effect of NM. Indoscope unit, Laser in medicine, Cryogenic application g: I.Human Anatomy 2.Biological Electrodes	R imaging and U	Jltrasour	nd, Me	dical
Thermography Further Reading	INSTRUMENTS es and Digital radiography, Biological effect of NM Endoscope unit, Laser in medicine, Cryogenic application g: 1.Human Anatomy 2.Biological Electrodes 3.Recent trend in medical application.	R imaging and U	Jltrasour	nd, Me	dical
Thermography	INSTRUMENTS es and Digital radiography, Biological effect of NM. Endoscope unit, Laser in medicine, Cryogenic application g: I.Human Anatomy 2.Biological Electrodes 3.Recent trend in medical application. es:	R imaging and Un, Computer tomo Total:	Jltrasour	nd, Me	dical
Thermography Further Reading	INSTRUMENTS es and Digital radiography, Biological effect of NM. Endoscope unit, Laser in medicine, Cryogenic application g: I.Human Anatomy 2.Biological Electrodes 3.Recent trend in medical application. es: After completion of the course, Student will be able to	R imaging and Un, Computer tomo Total:	Jltrasour	nd, Me	dical
Thermography Further Reading	INSTRUMENTS es and Digital radiography, Biological effect of NM. Endoscope unit, Laser in medicine, Cryogenic application g: 1. Human Anatomy 2. Biological Electrodes 3. Recent trend in medical application. es: After completion of the course, Student will be able to 1. Classify various Bio-Signals and Waveform in Medical course.	R imaging and Un, Computer tomo Total:	Jitrasour graphy	45 h	dical
Thermography Further Reading	INSTRUMENTS es and Digital radiography, Biological effect of NM Endoscope unit, Laser in medicine, Cryogenic application g: 1. Human Anatomy 2. Biological Electrodes 3. Recent trend in medical application. es: After completion of the course, Student will be able to the course of the course	R imaging and Un, Computer tomo Total: O dical Science al parameter meas	Jitrasour graphy	45 h	dical
Thermography Further Readin	INSTRUMENTS es and Digital radiography, Biological effect of NM Endoscope unit, Laser in medicine, Cryogenic application g: I. Human Anatomy 2. Biological Electrodes 3. Recent trend in medical application. es: After completion of the course, Student will be able to 1. Classify various Bio-Signals and Waveform in Medical Explain the Biological amplifiers and Non electric 3. Identify the devices in Medical field for particular and the state of the course of	R imaging and Un, Computer tomo Total: O dical Science al parameter meas	Jitrasour graphy	45 h	dical
Thermography Further Readin	INSTRUMENTS es and Digital radiography, Biological effect of NM Endoscope unit, Laser in medicine, Cryogenic application g: 1. Human Anatomy 2. Biological Electrodes 3. Recent trend in medical application. es: After completion of the course, Student will be able to the course of the course	R imaging and Un, Computer tomo Total: O dical Science al parameter meas	Jitrasour graphy	45 h	dical
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Thermography Further Readin Course Outcon References: 1. Leslie Cromy	es and Digital radiography, Biological effect of NM Endoscope unit, Laser in medicine, Cryogenic application 1. Human Anatomy 2. Biological Electrodes 3. Recent trend in medical application. 2. Explain the Biological amplifiers and Waveform in Med 2. Explain the Biological amplifiers and Non electric 3. Identify the devices in Medical field for particular and Discuss the application of Biotelemetry. 5. Illustrate recent trends in medical Science	R imaging and Un, Computer tomo Total: O dical Science al parameter meas application ntice Hall of India	Ultrasour graphy urement	45 I	dical Hours
Thermography Further Readin Course Outcon References: 1. Leslie Cromv 2. John G.Webs	INSTRUMENTS es and Digital radiography, Biological effect of NM Endoscope unit, Laser in medicine, Cryogenic application g: 1. Human Anatomy 2. Biological Electrodes 3. Recent trend in medical application. es: After completion of the course, Student will be able to the course of the course	R imaging and Un, Computer tomo Total: Oddical Science al parameter meas application Intice Hall of India d Edition, Wiley In	Jitrasour graphy urement	45 h	dical Hours
References: 1. Leslie Cromy 2. John G. Webs 3. Khandpur, R.	INSTRUMENTS es and Digital radiography, Biological effect of NM Endoscope unit, Laser in medicine, Cryogenic application g: I. Human Anatomy 2. Biological Electrodes 3. Recent trend in medical application. es: After completion of the course, Student will be able to 1. Classify various Bio-Signals and Waveform in Med 2. Explain the Biological amplifiers and Non electric 3. Identify the devices in Medical field for particular at 4. Discuss the application of Biotelemetry. 5. Illustrate recent trends in medical Science etl. "Biomedical Instrumentation and Measurement", Prefer, "Medical Instrumentation Application and Design", 30 cm, "Handbook of Biomedical Instrumentation", TATA Medical John M.Brown, "Introduction to Biomedical Equipmentation M.Brown, "Introduction to Biomedical Equipmentation and Measurement and John M.Brown, "Introduction to Biomedical Equipmentation and Measurement", Preference and John M.Brown, "Introduction to Biomedical Equipmentation and Measurement", Preference and John M.Brown, "Introduction to Biomedical Equipmentation and Measurement", Preference and John M.Brown, "Introduction to Biomedical Equipmentation and Measurement", Preference and John M.Brown, "Introduction to Biomedical Equipmentation and Measurement", Preference and John M.Brown, "Introduction to Biomedical Equipmentation and Measurement", Preference and John M.Brown, "Introduction to Biomedical Equipmentation and Measurement", Preference and John M.Brown, "Introduction to Biomedical Equipmentation and Measurement", Preference and John M.Brown, "Introduction to Biomedical Equipmentation and Measureme	R imaging and Un, Computer tomo Total: Odical Science al parameter meas application Intice Hall of India d Edition, Wiley Incomp	Jitrasour graphy urement New D ndia Edi	elhi, 20 tion, 20 2003.	dical Hours 07.

1703EC507	ADVANCED MICROCONTROLLERS		T	P	С
		3	0	- 0	3-
Course Objectives:					
Course Objectives.					
	 To study about concepts of PIC and 8031/8051Microco To know about Motorola Microcontroller 	ntrollers	191		
	3. To explore knowledge about applications of Microcontrol	allana			
	1 and an approximation of inforcement	oners			
	To understand various system design Techniques				
Unit I	8051/8031 MICROCONTROLLERS			9	Hour
Introduction to sing	e chip microcontrollers Intel MCS - 51 family features, 8051/8	031 architec	ture, pin	configu	ration
1/O ports and Memo	ry organization. Instruction set and basic assembly language pr	ogramming			
Unit II	PIC MICROCONTROLLER			9	Hour
A/D Converter –PW	nicro -controller ,CPU Architecture – Instruction set – interrupt. M and introduction to C-Compilers	s- Timers- I2	C Interf	acing –l	JART
Unit III	MOTOROLA 68HC11 MICROCONTROLLERS			9	Hour
Instruction set addi	ressing modes - operating modes- Interrupt system- Serial	Communic	ation In	terface	– A/I
Converter.					
Unit IV	INTERFACING AND APPLICATIONS OF MICRO CO	NTROLLE	RS /	9	Hour
Interrupts, Timer	ounter and Serial Communication. Interfacing LCD Displayave and pulse wave generation, LED, A/D Converter and D/A	av – Kev	pad Inte	erfacing.	MC
Unit V	SYSTEMDESIGN- CASESTUDIES	Converter in	terracing		
	signals for converters and Inverters-Motor Control-Controlling	DC/AC area	lionooo	Maaaaa	Hour
of frequency-Stand	alone Data Acquisition System.	DC/ AC app	mances-	-ivicasur	emem
		Total:		45	Hour
Further Reading:					
	1.RTC- Interface with Motorola Microcontroller, PWM				
C. O.	2.UART- Interface with 68HC11 Motorola Microcontrol				
Course Outcomes:	Employo	ability	1 En	ceps	ene
	After completion of the course, Student will be able to	/		- ()	
				V	
	1. know basics of 8031/8051 Microcontrollers				
	2. Explain fundamentals of PIC Controller				
	2. Explain fundamentals of PIC Controller3. understand concepts of Motorola 68HC11 Mi				
	 2. Explain fundamentals of PIC Controller 3. understand concepts of Motorola 68HC11 Mi 4. Illustrate system design techniques using Micro 	ocontrolle			
	 2. Explain fundamentals of PIC Controller 3. understand concepts of Motorola 68HC11 Mi 4. Illustrate system design techniques using Micro 	ocontrolle			
References:	2. Explain fundamentals of PIC Controller3. understand concepts of Motorola 68HC11 Mi	ocontrolle			
1. Muhammed Ali N	Explain fundamentals of PIC Controller understand concepts of Motorola 68HC11 Mi Illustrate system design techniques using Micro examine applications and interfacing of Micro Mazidi and Janice Gillispie Mazidi — The 8051 Microcontroll	ocontroller controller	î	Systems	Usin
1. Muhammed Ali N	 2. Explain fundamentals of PIC Controller 3. understand concepts of Motorola 68HC11 Mi 4. Illustrate system design techniques using Micro 	ocontroller controller	î	Systems	Usin
1. Muhammed Ali M Assembly and C,II of 2. Muhammad Ali M	2. Explain fundamentals of PIC Controller 3. understand concepts of Motorola 68HC11 Mi 4. Illustrate system design techniques using Micro 5. examine applications and interfacing of Micro Mazidi and Janice Gillispie Mazidi — The 8051 Microcontrolledition, Pearson Education Inc, 2012. Mazidi, Rolin D.Mckinlay, Danny Causey 'PIC Microcontrol	rocontroller controller er and Emb	edded S		
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1. Muhammed Ali M Assembly and C,II e 2. Muhammad Ali M Assembly and CforP 3. John .B.Peatman	2. Explain fundamentals of PIC Controller 3. understand concepts of Motorola 68HC11 Mi 4. Illustrate system design techniques using Micro 5. examine applications and interfacing of Micro Mazidi and Janice Gillispie Mazidi — The 8051 Microcontrolledition, Pearson Education Inc, 2012. Mazidi, Rolin D.Mckinlay, Danny Causey 'PIC Microcontrol IC18', Pearson Education 2008. n, "Design with PIC Microcontroller. Prentice hall, 1997.	rocontroller controller er and Emb ler and Em	edded S		
1. Muhammed Ali M Assembly and C,II e 2. Muhammad Ali M Assembly and CforP 3. John .B.Peatman 4. AjayV Deshmukh	2. Explain fundamentals of PIC Controller 3. understand concepts of Motorola 68HC11 Mi 4. Illustrate system design techniques using Micro 5. examine applications and interfacing of Micro Mazidi and Janice Gillispie Mazidi — The 8051 Microcontrolledition, Pearson Education Inc, 2012. Mazidi, Rolin D.Mckinlay, Danny Causey 'PIC Microcontrol IC18', Pearson Education 2008. In , "Design with PIC Microcontroller . Prentice hall, 1997. Microcontrollers Theory and Applications, Tata McGraw-Hill	rocontroller controller er and Emb ler and Em	edded S		
1. Muhammed Ali M Assembly and C,II e 2. Muhammad Ali M Assembly and CforP 3. John B.Peatman 4. AjayV Deshmukh 5. Gene H.Miller	2. Explain fundamentals of PIC Controller 3. understand concepts of Motorola 68HC11 Mi 4. Illustrate system design techniques using Micro 5. examine applications and interfacing of Micro Mazidi and Janice Gillispie Mazidi — The 8051 Microcontrolledition, Pearson Education Inc, 2012. Mazidi, Rolin D.Mckinlay, Danny Causey 'PIC Microcontrol IC18', Pearson Education 2008. In , "Design with PIC Microcontroller, Prentice hall, 1997. In-Microcontrollers Theory and Applications, Tata McGraw-Hill "Micro Computer Engineering," Pearson Education, 2003	controller controller er and Emb ler and Em	edded S	Systems	
1. Muhammed Ali M Assembly and C,II et 2. Muhammad Ali M Assembly and CforP 3. John .B.Peatman 4. AjayV Deshmukh 5. Gene .H.Miller . 6. Rajkamal,".Mic	2. Explain fundamentals of PIC Controller 3. understand concepts of Motorola 68HC11 Mi 4. Illustrate system design techniques using Micro 5. examine applications and interfacing of Micro Mazidi and Janice Gillispie Mazidi — The 8051 Microcontrolledition, Pearson Education Inc, 2012. Mazidi, Rolin D.Mckinlay, Danny Causey 'PIC Microcontrol IC18', Pearson Education 2008. In , "Design with PIC Microcontroller . Prentice hall, 1997. Microcontrollers Theory and Applications, Tata McGraw-Hill	controller controller er and Emb ler and Em , 2015	edded S bedded	Systems	

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

1703EC508	MEASUREMENT AND INSTRUMENTATION	L	T	P	C
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Course Objective	s:				
	1. Learn the use of DC and AC bridges for measuring R, L and C	C		_8_	
	2. Learn the use of different types of analog meters for measurements	uring	elect	rical	quantities
	such as current, voltage, power, energy, power factor and freq				
350	3. Learn the applications of CRO, other electronic measurements	uring	devi	ces,	graphical
	programming palettes and tools in virtual instrumentation	- 2			- M
Unit I	MEASUREMENT CONCEPTS	_	-	-	9 Hours
	ration and construction of PMMC-Static and dynamic characteristic	's_uni	ts and	l stai	
measurements-erro	or analysis-moving coil, moving iron meters, multi meters-True RMS	s-um	is and	1 3(4)	idalds of
	asyrements: Maxwell, Kelvin, Hay, Schering, Anderson and Wien bridge-	O me	ters.		
Unit II	TRANSDUCERS		- 1		9 Hours
Classification of t	ransducers-selecting a transducer-strain gauges-temperature transducer	– LV	DT A	dvan	tages and
disadvantages-cap	acitive transducers-Piezo electric transducers - opto electronic transducer	S			
Unit III	FUNCTION GENERATORS				9 Hours
	ors-RF signal generators-Sweep generators-Frequency synthesizer-	wave	anal	yzer-	Harmonic
	s-spectrum analyzer-heterodyne wave analyzer-frequency counters- Time				
	ent- Measurement of voltage, current, phase and frequency using CRO.				
Unit IV	VIRTUAL INSTRUMENTATION	**	_ !_		9 Hours
	k diagram of it virtual instrument physical quantities and analog interface.				
	interface- Advantages over conventional instruments- Architecture of a rating system-overview of software-lab view- Graphical user interface-con				
	es – format-data flow programming – editing debugging and running a v				
programming pale		rituai	monu	mone	grapmear
Unit V	MODERN MEASUREMENT TECHNIQUES				9 Hours
A/D &D/A conver	ters-Elements of a digital data acquisition system-interfacing of transduc-	ers –	multi	plexi	
	l systems-digital recording system-liquid crystal display-computer contro				
488 bus-fiber optic	measurements for power and system loss.				
	Tot	al:			45 Hours
Further Reading:				_	
	tor meters and distortion meters-Measurement of Pressure, Temperature,				cial
type	of CRO-Front panel objects-functions and libraries-Optical time domains	refle	et met	er.	
Course Outcomes		leu	MA	1/P	
Απε	er completion of the course, Student will be able to			H	
	 Design different Bridge configurations and their applications. Design different Embedded Projects using Transducers and Sensors. 			V	
-	 Design different Embedded Projects using Transducers and Sensors. Analyze the working of different Equipments used in Instrumentation 	1		-	7
-1-	4. Design different Virtual Instruments using LabVIEW Software.	.1.			
	 interface different analog components to a Computer controlled Instr 	umen	tation	Syste	mi /
References:	The same different and the same same same same same same same sam	differi	tatron	0)50	
	, Dhanesh and N.Manik, Measurement Systems - Application and Des	ign, í	Γata N	/lcGr	aw - Hill,
2007					
2. Sawhnev A K.	"Electrical And Electronic Measurements And Instrumentation" Publi	sher:	Dhar	pat F	Rai & Co.
2005.				Par	
	ck and William D.Cooper, Modern Electronic Instrumentation and Meas	urem	ant Ta	chnic	шес РДІ
2003	on which Discovery, wodern Discounting instrumentation and weak	ui CIII	SILL IC		įαυσ, 1 111,
	K Chauchy Instrumentation Massurement and Analysis Tata MC.	1.7231	2004		
	C.K.Chaudhry, Instrumentation Measurement and Analysis, Tata McGraw	- [11]	,2004		
	Elements of Electronics Instrumentation and Measurement, PHI, 2003.				
6. Alan, S. Morri	s, Principles of Measurements and Instrumentation PHI 2003				

Dr. S. RAMABALAN, M.E., Ph.D.,
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	VIRTUAL INSTRUMENTATION	L	T	P	C
		3	0	0	3
Course Ob	*				
	Analog ic and digital measurements principles				
	2. Understanding Virtual Instrument concepts				
	3. Creating Virtual Instruments for practical works				
Unit I	Introduction to Virtual Instrumentation:			9	Hour
Historical p	perspective - advantage block diagram and architecture of a virtual ins	strument -Conv	ention	al Instr	ument
versus Tra	aditional Instruments - data-flow techniques, graphical programminal programming.	g in data flov	v, cor	npariso	n wit
Unit II	VI programming techniques		T	9	Hour
VIs and sub	b-VIs, loops and charts, arrays, clusters and graphs, case and sequence	structures, form	ula no		
	ables, State machine, string and file I/O, Instrument Drivers, Publishing				
Unit III	Data acquisition basics	,			Hour
Introduction	on to data acquisition on PC, Sampling fundamentals, Input/Output t	echniques and	buses		
	, counters and timers, DMA, Software and hardware installation, Calib				
	equirements	,	ĺ	1	
Unit IV	VI Chassis requirements			9	Hour
Common Ir	nstrument Interfaces: Current loop, RS 232C/ RS485, GPIB. Bus Inter	faces: USB, PC	MCL		
	Firewire. PXI system controllers, Ethernet control of PXI. Network				
		000100 101	011100	00 1110	4450110
	s, VISA and IVI				
			-	9	Hour
Unit V	VI toolsets, Distributed I/O modules and Applications	of process da	rabase		
Unit V Applicati	VI toolsets, Distributed I/O modules and Applications ion of Virtual Instrumentation Instrument Control, Development			manag	gemen
Unit V Applicati system. Sin	VI toolsets, Distributed I/O modules and Applications ion of Virtual Instrumentation Instrument Control, Development mulation of systems using VI, Development of Control system,	Industrial Con	muni	manag cation,	gemen Imag
Unit V Applicati system. Sin acquisition	VI toolsets, Distributed I/O modules and Applications ion of Virtual Instrumentation Instrument Control, Development mulation of systems using VI, Development of Control system, and processing, Motion control. Applications DistributedI/O mo	Industrial Con dules-Virtual	imuni Labor	manage cation, atory,	gemen Imag Virtua
Unit V Applicati system. Sinacquisition Oscilloscop	VI toolsets, Distributed I/O modules and Applications ion of Virtual Instrumentation Instrument Control, Development mulation of systems using VI, Development of Control system, and processing, Motion control. Applications Distributed I/O mode, Virtual function generator, Motioncontrol. Development of Virtual	Industrial Con dules-Virtual	imuni Labor	manage cation, atory,	Image Virtua
Unit V Applicati system. Sin acquisition Oscilloscop	VI toolsets, Distributed I/O modules and Applications ion of Virtual Instrumentation Instrument Control, Development mulation of systems using VI, Development of Control system, and processing, Motion control. Applications DistributedI/O mo	Industrial Con odules-Virtual Il Instrument us	imuni Labor	manage cation, atory, UI, Re	gemen Image Virtua al-time
Unit V Application Application Acquisition Oscilloscop Systems, En	VI toolsets, Distributed I/O modules and Applications ion of Virtual Instrumentation Instrument Control, Development mulation of systems using VI, Development of Control system, and processing, Motion control. Applications DistributedI/O mode, Virtual function generator, Motioncontrol. Development of Virtual mbedded Controller, OPC, HMI/SCADA	Industrial Con dules-Virtual	imuni Labor	manage cation, atory, UI, Re	gemen Imag Virtua al-tim
Unit V Application System. Sind Acquisition Oscilloscop Systems, En	VI toolsets, Distributed I/O modules and Applications ion of Virtual Instrumentation Instrument Control, Development mulation of systems using VI, Development of Control system, and processing, Motion control. Applications DistributedI/O mode, Virtual function generator, Motioncontrol. Development of Virtual mbedded Controller, OPC, HMI/SCADA	Industrial Con odules-Virtual Il Instrument us	imuni Labor	manage cation, atory, UI, Re	gemen Image Virtua al-tim
Unit V Application Application Acquisition Oscilloscop Systems, En	VI toolsets, Distributed I/O modules and Applications ion of Virtual Instrumentation Instrument Control, Development mulation of systems using VI, Development of Control system, and processing, Motion control. Applications DistributedI/O mode, Virtual function generator, Motioncontrol. Development of Virtual mbedded Controller, OPC, HMI/SCADA eading: LabVIEW Graphical Programming	Industrial Con odules-Virtual Il Instrument us	imuni Labor	manage cation, atory, UI, Re	gemen Image Virtua al-tim
Unit V Application Application Acquisition Oscilloscop Systems, En	VI toolsets, Distributed I/O modules and Applications ion of Virtual Instrumentation Instrument Control, Development mulation of systems using VI, Development of Control system, and processing, Motion control. Applications DistributedI/O mode, Virtual function generator, Motioncontrol. Development of Virtual mbedded Controller, OPC, HMI/SCADA eading: LabVIEW Graphical Programming	Industrial Con odules-Virtual Il Instrument us	imuni Labor	manage cation, atory, UI, Re	gemen Image Virtua
Unit V Application Application Acquisition Oscilloscop Systems, En	VI toolsets, Distributed I/O modules and Applications ion of Virtual Instrumentation Instrument Control, Development mulation of systems using VI, Development of Control system, and processing, Motion control. Applications DistributedI/O mode, Virtual function generator, Motioncontrol. Development of Virtual mbedded Controller, OPC, HMI/SCADA eading: LabVIEW Graphical Programming attermes: After completion of the course, Student will be able to	Industrial Conodules-Virtual I Instrument us Total:	imuni Labor	manage cation, atory, UI, Re	gemen Image Virtua al-tim
Unit V Application Application Acquisition Oscilloscop Systems, En	VI toolsets, Distributed I/O modules and Applications ion of Virtual Instrumentation Instrument Control, Development mulation of systems using VI, Development of Control system, and processing, Motion control. Applications DistributedI/O mode, Virtual function generator, Motioncontrol. Development of Virtual mbedded Controller, OPC, HMI/SCADA eading: LabVIEW Graphical Programming atcomes: After completion of the course, Student will be able to 1. Understand importance and applications of virtual instrumentation	Industrial Conodules-Virtual I Instrument us Total:	imuni Labor	manage cation, atory, UI, Re	gemer Imag Virtua al-tim
Unit V Application Application Acquisition Oscilloscop Systems, En	VI toolsets, Distributed I/O modules and Applications ion of Virtual Instrumentation Instrument Control, Development mulation of systems using VI, Development of Control system, and processing, Motion control. Applications DistributedI/O mode, Virtual function generator, Motioncontrol. Development of Virtual mbedded Controller, OPC. HMI /SCADA eading: LabVIEW Graphical Programming itcomes: After completion of the course, Student will be able to 1. Understand importance and applications of virtual instrumentation 2. Understand basic data acquisition techniques of virtual instrument 3. Develop real time applications of virtual instrumentation	Industrial Conodules-Virtual I Instrument us Total:	imuni Labor	manage cation, atory, UI, Re	gemer Imag Virtua al-tim
Unit V Application Application Acquisition Oscilloscop Systems, En	VI toolsets, Distributed I/O modules and Applications ion of Virtual Instrumentation Instrument Control, Development mulation of systems using VI, Development of Control system, and processing, Motion control. Applications DistributedI/O mode, Virtual function generator, Motioncontrol. Development of Virtual mbedded Controller, OPC. HMI /SCADA eading: LabVIEW Graphical Programming steems: After completion of the course, Student will be able to 1. Understand importance and applications of virtual instrumentation 2. Understand basic data acquisition techniques of virtual instruments.	Industrial Conodules-Virtual I Instrument us Total:	imuni Labor	manage cation, atory, UI, Re	gemen Imag Virtua al-tim
Unit V Application System. Sindequisition Oscilloscope Systems, En	VI toolsets, Distributed I/O modules and Applications ion of Virtual Instrumentation Instrument Control, Development mulation of systems using VI, Development of Control system, and processing, Motion control. Applications DistributedI/O mode, Virtual function generator, Motioncontrol. Development of Virtual mbedded Controller, OPC. HMI /SCADA eading: LabVIEW Graphical Programming	Industrial Conodules-Virtual I Instrument us Total:	imuni Labor	manage cation, atory, UI, Re	gemen Imag Virtua al-tim
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System Implementation: Directory implementation — Allocation methods — Free-space management — efficiency and performance — recovery. Case studies: File system in Linux — File system in Windows XP Unit V	Unit IV STO	PRAGE MANAGEMENT			91	Hours
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Unit V	System Implementa	tion: Directory implementation - Allocation methods - Free-space:	manag	ement	- effic	ciency
Unit V 1/O SYSTEMS 1/O Systems - VO Pard Vare - Application I/O interface - kernel I/O subsystem -streams - performance. Mass-Storage Structure: Disk scheduling - Disk management -Swap-space management - RAID - disk attachment - stable storage - tertiary storage. Case study: I/O in Linux. Total: 45 Hours Further Reading: Linux System, Linux Multifunction Server, VMware on Linux Host and Adding Guest OS. Course Outcomes: 1. Understand Operating System Structure, Operations and Services& Illustrate the operating system concepts and its functionalities. 2. Understand Operating System Structure, Operations and Services& Illustrate the operating system concepts and its functionalities. 2. Understand the Process Concept, Multithreaded Programming, Process Scheduling and Synchronization 3. Apply the Concepts of Virtual Memory Management and File Systems 4. Analyze the Secondary Storage and I/O Systems 5. Evaluate the different Protection and Security Mechanisms for Operating System References: 1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 9th Edition, John Wiley and Sons Inc., 2012. 2. Andrew S. Tanenbaum, "Modern Operating Systems", Third Edition Prentice Hall of India Pvt. Ltd, 2010 (Case Study Topic). 3. Harvey M. Deitel, "Operating Systems", Pearson Education Pvt. Ltd, Second Edition, 2002.	and performance 1	ecovery. Case studies: File system in Linux – File system in Windows	XP Ü			,
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Storage Structure: Disk scheduling — Disk management —Swap-space management — RAID — disk attachment —stable storage — tertiary storage. Case study: I/O in Linux. Total: 45 Hours Further Reading: Linux System, LINUX Multifunction Server, VMware on Linux Host and Adding Guest OS. Course Outcomes: After completion of the course, Student will be able to Londerstand Operating System Structure, Operations and Services& Illustrate the operating system cencepts and its functionalities. 2. Understand the Process Concept, Multithreaded Programming, Process Scheduling and Synchronization 3. Apply the Concepts of Virtual Memory Management and File Systems 4. Analyze the Secondary Storage and I/O Systems 5. Evaluate the different Protection and Security Mechanisms for Operating System References: 1. Abraham Silberschatz, Peter Eacr Galvin and Greg Gagne, "Operating System Concepts", 9th Edition, John Wiley and Sons Inc., 2012. 2. Andrew S. Tanenbaum, "Modern Operating Systems", Third Edition Prentice Hall of India Pvt. Ltd, 2010 (Case Study Topic). 3. Harvey M. Deitel, "Operating Systems", Pearson Education Pvt. Ltd, Second Edition, 2002.	I/O Systems - I/O	Fard Vare - Application I/O interface - kernel I/O subsystem -stream	ns – p	erform	ance.	Mass-
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Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL

E.G.S.PILLAYENGINEERINGCOLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to AnnaUniversity, Chennai Accredited by NAAC with "A"Grade | Accredited by NBA (CSE, EEE, MECH)

NAGAPATTINAM—611002



B.E. Electronics and Communication Engineering

Full Time Curriculum and Syllabus

Third Year-Sixth Semester

Course	Course Name	L	Т	P	C	Max	imum	Marks
Code	Course Ivame	Ь	1	P	C	CA	CA ES	
Theory Cou	rse			-				
1701MGX01	Professional Ethics	2	0	0	2	40	60	100
1702EC601	VLSI Design	3	0	0	3	40	60	100
1702EC602	Digital Communication	3	0	0	3	40	60	100
1702EC603	Wireless Networks and Standards	3	0	0	3	40	60	100
1703EC814	Internet of Things (IoT)	3	0	0	3	40	60	100
	Professional(Open) Elective – IV	3	0	0	3	40	60	100
Laboratory	Course				L			
1702EC651	VLSI Design Laboratory	0	0	2	1	50	50	100
1702EC652	Communication and Networks Laboratory	0	0	2	1	50	50	100
	Industrial Visits & Presentation	0	0	0	1	100	360	100
	Life Skills: Aptitude - Il	0	0	2	1	100	191	100
	Total	18	0	6	21	540	460	1000
Professional (O	pen)Elective - III							
1703EC601	Information Theory and Coding	3	0	0	3	4.0	60	100
1703EC602	Digital Contro! Engineering	3	0	0	3	40	60	100

1703EC603	Network Security	3	0	0	3	40	60	100
1703EC604	Real Time Operating Systems	3	0	0	3	40	60	100
1703EC605	Soft Computing	3	0	0.	3	40	60	100
rofessional Ele	ective – IV			-				
1703EC813	Cloud Computing	3	0	. 0	3	40	60	100
1703EC814	Internet of Things (IoT)	3	0	0	3	40	60	100
1703EC815	Big Data Analytics	3	0	0	3	40	60	100
1703EC816	Introduction to Web Technology	3	0	0	3	40	60	100
1703EC817	Grid Computing	3	0	0	3	40	60	100

$L-Lecture |T-Tutorial| P-Practical| C-Credit| CA-Continuous Assessment|\ ES-End Semester |C-Credit| CA-Continuous Assessment|\ ES-End Semester |C-Credit| CA-Continuous Assessment|\ ES-End Semester |\ C-Credit| CA-Continuous Assessment|\ C-Credit| CA-Continuous As$

1701MGX01	PROFESSIONAL ETHICS	L	Т	P	C
		3	0	0	3
Course Obj	ectives:				
	1.To provide basic knowledge about engineering Ethics, Variety	of m	oral	issue	s and
	Moral dilemmas, Professional Ideals and Virtues				
	2. To provide basic familiarity about Engineers as responsible Expe	rime	nters	, Res	earcl
	Ethics, Codes of Ethics, Industrial Standards, Exposure to Safe	ety :	and I	Risk,	Risl
	Benefit Analysis				
	3.To have an idea about the Collegiality and Loyalty, Col	lecti	ve B	argai	ining
	Confidentiality, Occupational Crime, Professional, Employee, I	ntell	ectua	l Pro	perty
	Rights				
	4. To have an adequate knowledge about MNC's, Business, Enviro	onme	ental,	Com	pute
	Ethics, Honesty, Moral Leadership, sample Code of Conduct.				
	5. To use the engineering principles to update and maintain the technology	nical	skill	s.	
7					
Unit I	I ENGINEERING ETHICS				Iour
	ngineering Ethics' - Variety of moral issues - Types of inquiry -				
	normy - Kohlberg's theory - Gilligan's theory - Consensus				sy -
	nd Professionalism - Professional Ideals and Virtues - Uses of Ethic	al T	heori	es.	
	IL ENGINEERING AS SOCIAL EXPERIMENTATION				lour
	as Experimentation – Engineers as responsible Experimenters Rese				Code
	dustrial Standards - A Balanced Outlook on Law - The Challenger (Case	Stud		
	ENGINEER'S RESPONSIBILITY FOR SAFETY				lour
	isk - Assessment of Safety and Risk - Risk Benefit Analysis - R				
	Regulator's Approach to Risk - Case Studies on Chernobyl, Bhop	al M	IIC a	nd St	erlite
copper.					
	RESPONSIBILITIES AND RIGHTS				lour
7 1 . 11 . * 1*4	and Loyalty - Respect for Authority - Collective Bargaining -	- C	onfide	ential	ity -
	_				
Conflicts of	Interest – Occupational Crime – Professional Rights – Employee Ints (IPR) – Discrimination.	Righ	ts – I		

Unit V **GLOBAL ISSUES** 9 Hours Multinational Corporations - Business Ethics - Environmental Ethics - Computer Ethics - Role in Technological Development - Weapons Development - Engineers as Managers - Consulting Engineers - Engineers as Expert Witnesses and Advisors - Honesty - Moral Leadership - Sample Code of Conduct, Total: 45 Hours Further Reading: Case study or: Hiroshima and Nagasaki Course Outcomes: After completion of the course, Student will be able to 1. Helps to examine situations and to internalize the need for applying Ethical principles, values to tackle with various situations. 2 Develop a responsible attitude towards Global issues 3. Envision the societal impact on the products/ projects 4. Understanding the code of ethics and standards 5. Apply ethics in society, discuss the global issues related to engineering and realize the responsibilities and rights in the society References: 1. Charles D Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico, 1999. 2. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, 2003 3. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, 2001. 4. Prof. (Col) P S Bajaj and Dr. Raj Agrawal, "Business Ethics - An Indian Perspective", Biztantra, New Delhi 2004

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

5. David Ermann and Michele S Shaper. "S. RAMABALAN, M.E., Ph.D.,

(2003)

1702EC601	VLSI DESIGN	L	T	P	С
		3	0	0	3
Course Object	tives:				
	1. To understand the CMOS Fabrication Process and CMOS Circu	uits			
	2. To study CMOS Circuits using various Logic Styles				
	3. To provide basic knowledge about Clocking, Memory and VLS	I Subsystem De	sign		
UNIT I				0.1	
An overview and SOI Proc	FABRICATION OF CMOS IC AND PHYSICAL DESIGN of Silicon Semiconductor technology- NMOS fabrication - CMOS fa cess- Layout design rules- Lambda Design Rules Stick Diagrams-VLS	I Layout Design	ı -Full	ll- Tw Custor	in tub m and
An overview and SOI Proc Semi Custom	of Silicon Semiconductor technology- NMOS fabrication - CMOS facess- Layout design rules- Lambda Design Rules Stick Diagrams-VLS Layout- Layout of Basic Structures - CMOS Logic Gates- Implement Basics of MEMS	I Layout Design	ı -Full	ll- Tw Custon	in tub m and using
An overview and SOI Proc Semi Custom CMOS logic-l UNIT II	of Silicon Semiconductor technology- NMOS fabrication - CMOS facess- Layout design rules- Lambda Design Rules Stick Diagrams-VLS Layout- Layout of Basic Structures - CMOS Logic Gates- Implement Basics of MEMS MOS CIRCUIT DESIGN PROCESS	I Layout Designation of given l	r -Full ogic fu	ll- Tw Custon nction	in tub m and using Hours
An overview and SOI Proc Semi Custom CMOS logic-l UNIT II Pass Transisto Clocked CMC	of Silicon Semiconductor technology- NMOS fabrication - CMOS facess- Layout design rules- Lambda Design Rules Stick Diagrams-VLS Layout- Layout of Basic Structures - CMOS Logic Gates- Implement Basics of MEMS	I Layout Design ation of given leads	n -Full ogic fu namic	Il- Tw Custon nction 9 I	in tub m and using Hours
An overview and SOI Proc Semi Custom CMOS logic-lUNIT II Pass Transisto Clocked CMC Falls	of Silicon Semiconductor technology- NMOS fabrication - CMOS facess- Layout design rules- Lambda Design Rules Stick Diagrams-VLS Layout- Layout of Basic Structures - CMOS Logic Gates- Implement Basics of MEMS MOS CIRCUIT DESIGN PROCESS or and Transmission Gate Static CMOS design, Tri-State Circuits- Pse	I Layout Design ation of given leads	n -Full ogic fu namic	ll- Tw Custon nction 9 I CMOS c-Circ	in tub m and using Hours logic uit Pit
An overview and SOI Proc Semi Custom CMOS logic-lunit II Pass Transisto Clocked CMO Falls UNIT III National and	of Silicon Semiconductor technology- NMOS fabrication - CMOS fabress- Layout design rules- Lambda Design Rules Stick Diagrams-VLS Layout- Layout of Basic Structures - CMOS Logic Gates- Implement Basics of MEMS MOS CIRCUIT DESIGN PROCESS or and Transmission Gate Static CMOS design, Tri-State Circuits- Pse OS logic Precharged domino logic- Keeper Circuits - Dual Rail- Cascod	I Layout Design action of given leaded Nmos –dynde Voltage Switch, IEC, CENEEC	n -Full ogic fu namic o ch Logi	Il- Tw Custon nction 9 I CMOS c-Circ 9 I	m and using Hours logic uit Pit Hours nd RE

Conventional CMC SRAM Arrays - DR	OS Latches CMOS D Flip Fop SDFF - TSPC Flip Flop - CMOS Static RAM Dual P LAM and Floating Gate MOSFET - Flash Memory CMOS Clocking Styles Pipelined Sys	ort SRAM -
UNITV	LSI SUBSYSTEM DESIGN	9 Hours
CMOS Mux - Equa Ahead Adder -Carr Multiplier	ality Detector - Shift and Rotation Operation - Parity generators- Ripple Carry Adder y Skip Adder - Carry select - Carry save-Array - Braun/ Baugh Wooley -Modified Boo	-Carry Look oth Encoded
	Total:	45 Hours
Further Reading:	Comparison of Logic Styles - Differential and Sense Amplifier Circuits Prescaler - B ALU CMOS Clock Generation and Distributions - BICMOS-FINFET Technology	it Slice –
Course Outcomes:		
1. 2. 3. 4. 5.	Demonstrate CMOS Fabrication process and Layout Design. Analyze MOS Circuit Design Process. Design the circuits using Various Logic Styles Reveal the operation of CMOS Memory and Clocking Strategies Design building block of VLSI system.	
References:		
1. John P.Uye	mura, "Introduction to VLSI circuits and systems", John Wiley & Sons, 2015	
2. Neil.H.EW Addison W	este David Harris CMOS VLSI Design: A Circuits and Systems Perspective, 4th edition, esley. 2015.	Pearson
3. Kamran Es. 2015.	hraghian, Douglas A. Pucknell, Essentials of VLSI Circuits and Systems Prentice Hall of	India,
4. E. Fabricio	us, Introduction to VLSI Design, 1st edition, McGraw Hill, 2014	
	bick, "CMOS Digital Integrated Circuits", Tata McGraw Hill, 2014	

17EC602	DIGITAL COMMUNICATION L	T	P	C
	3	0	0	3
Course Objective	'es:			
	1. To know the principles of amplitude modulation			
	2. To apply the concepts of Error control coding.			
	3. To understand the various Band pass signaling schemes.			
	4. To understand the principles of spread spectrum.			
UNIT I	AMPLITUDE MODULATION		9	Hours
Review of Four	er and Hilbert Transforms-Amplitude Modulation - AM, DS	BSC. S	SBSC.	VSB-
Spectral analysis	of modulated signals-Demodulation - Square law, envelope detec	tora Cin	non hoto	
opedial allaly bio	of mondatarea significand politicalitation — square law, clivelope deter	iois sui	oer nete	rodvne
receivers.	bemodulation – square law, envelope detect	iois suj	ber nete	rodyne
	ERROR CONTROL CODING TECHNIQUES	wis suj		Hours
receivers. UNIT II	ERROR CONTROL CODING TECHNIQUES		9	Hours
receivers. UNIT II	ERROR CONTROL CODING TECHNIQUES Heart block codes – Hamming codes – Cyclic codes –		9	Hours
volume receivers. UNIT II Channel coding	ERROR CONTROL CODING TECHNIQUES hear block codes – Hamming codes – Cyclic codes –		9 itional c	Hours
UNIT II Channel coding Viterbi decoding UNIT III	ERROR CONTROL CODING TECHNIQUES Control Codes - Hamming codes - Cyclic codes -	Convolu	9 itional o	Hours codes –
Channel coding Viterbi decoding UNIT III Measure of information	ERROR CONTROL CODING TECHNIQUES hearem - Linear block codes - Hamming codes - Cyclic codes - LYTRODUCTION AND INFORMATION THEORY mation - Entropy - Source coding theorem - Discrete memory le	Convolu	9 ntional o	Hours codes – Hours cossless,
UNIT II Channel coding Viterbi decoding UNIT III Measure of information, no	ERROR CONTROL CODING TECHNIQUES LO TRODUCTION AND INFORMATION THEORY mation — Entropy — Source coding theorem — Discrete memory le iseless, BEC, BSC — Mutual information — Channel capacity —	Convoluess chan	9 utional o 9 nels— lo 1 Hartle	Hours codes – Hours ossless, ey law-
UNIT II Channel coding Viterbi decoding UNIT III Measure of information, no	ERROR CONTROL CODING TECHNIQUES hearem - Linear block codes - Hamming codes - Cyclic codes - LYTRODUCTION AND INFORMATION THEORY mation - Entropy - Source coding theorem - Discrete memory le	Convoluess chan	9 ntional o 9 nels— lo Hartle W algo	Hours codes – Hours ossless, ey law-
Viterbi decoding UNIT II Channel coding Viterbi decoding UNIT IX Measure of informedeterministic, no Transform codin UNIT IV	ERROR CONTROL CODING TECHNIQUES Records - Linear block codes - Hamming codes - Cyclic codes - UN TROBUCTION AND INFORMATION THEORY mation - Entropy - Source coding theorem - Discrete memory legiseless, BEC, BSC - Mutual information - Channel capacity - LPC - Shannon Fano coding, Huffman Coding, Run length cod BANDPASS SIGNALING	Convoluess chan	9 nels— lo Hartle W algo	Hours codes – Hours ossless, ey law- rithm. Hours
UNIT II Channel coding Viterbi decoding UNIT III Measure of informedeterministic, not Transform codin UNIT IV Comparison of b	ERROR CONTROL CODING TECHNIQUES LA TRODUCTION AND INFORMATION THEORY mation — Entropy — Source coding theorem — Discrete memory le iseless, BEC, BSC — Mutual information — Channel capacity — LPC — Shannon Fano coding, Huffman Coding, Run length cod	Convolues chan Shannor ling, LZ	9 nels— lo nels— lo n Hartle W algo ML dete	Hours codes – Hours ossless, ey law- rithm. Hours ection -

BFSK, DPSK - Principles of QAM - Introduction to Band Pass Sa	mpling theor	em.		
'UNIT V SYNCHRONISATION AND SPREAD SPE TECHNIQUES	CTRUM			9 Hours
Importance of Sync hronisation - Carrier, frame and symbol/Chi	n gymahrani	zation	n took	migues Com I
Spectrum - PN Sequences, Direct Sequence and Frequency Hop	p syncinom.	Zauoi	1 (60)	System DED
Analysis, Processing gain and Jamming Margin, Spread spectrum in	ping spread	Spec	urum	Systems, BER
That you, Troce sang gam and Januaring Margin, Spread spectrum in			S.	
Fronth are D 1	Tota			45 Hours
Further Reading: Frequency of Spread Spectrum - TDMA -	FDMA – CI	DMA	– OF	DMA.
Course Outcomes: Employ	abilitu		Fng	reprenew
After completion of the course, Student will be		/		7/
1. Design and implement the amplitude modula	tion	-		V
2. An ability to apply the concepts of Error con-	rol coding.	1		
3. Capable of configuring Source coding schem		/		
4. Design and implement band pass signaling so		ł .		
References:	ım.			
			- ,	
 Simon Haykin, "Digital Communications", John Wiley, 201 				
2. J.G Proakis. — Digital Communication, 5/e, Tata Mc Graw	Hill Compar	ny, 20	008.	0.00
3. Bernard Sklar, "Digital Communication", 2nd Edition, Pears	son Educatio	n. 20	06.	
4. Herbert Taub & Donald L Schilling, "Principles of Company	nication Syst	tems'	, 3rd	Edition Tata
McGraw Hill, 2008.	7-		,	201011, 1414
McGraw Hill, 2008. 5. H P Hsu, Schaum Outling Series — Analog application of the E.G.S. Pilley Engineering	ME Ph Dation	sf T	MH 2	006
F.C.S. PRINCIPAL	- Intratification	ion,	(7111 2	000 ;
- Co. I may chambering	anallo			
Thethi, Nagore - 611 6	02.			
17EC603 WIRELESS NETWORKS AND STAND	ARDS	L	T	P C
THE STATE OF THE S	ARDS	3	0	$\frac{1}{0}$ $\frac{1}{3}$
(Common to B.E / B.Tech – CSE, IT & ECE)			0	0 3
Course Objectives:				
1. To study about Wireless networks, protocol stack and st	andards			
2. To study about rundamentals of Access Techniques and		ncols		
3. To study about Localization, Positioning and Wireless S		0015		
2 State of the Control of the Contro	out it			
Unit I Overview of Wireless Sensor Networks and Wireless Tra	nsmission			9 Hours
Introduction of WSN, Basic Overview of the Technology, Range	of Applicat	ions	Exam	inles of WSN
Applications, Frequencies for radio transmission, Signals, Antenn	na. Signal P	ropas	ration.	Multiplexing.
Modulation, Spread Spectrum	, ,	1.2	,	6,
Unit II Multiple Access Techniques				9 Hours
Introduction, Narrowband Chamelized Systems, Spectral Efficiency,	Wideband	Syste	ms, C	comparisons of
FDMA, TDMA, and DS CDMA, Capacity of DS-CDMA System, Comp	arison of DS-	CDM	A vs.	TDMA System
Capacity, Frequency Hopping Spread Spectrum with M-ary frequence	y Shift Keyi	ng, O	rthogo	onal Frequency
Division Multiplexing (OLDM), Municarrier DS-CDMA (MC-DS-CI	DMA), Rando	om A	ccess	Methods, Idle
Signal Casting Multiple Access, Packet Reservation Multiple Access, Err	or Control Sc	nemes	s for L	
Unit III Roming and Transport Control Protocols for Wireless Se	ensor Networ	ks		9 Hours
Introduction Data Dissemination and Gathering, Routing Challenges and	Design Issue:	s in W	/ireles	S
Sensor Networks, Rousing Strategies in Wireless Sensor Networks, T	raditional Tra	anspo	rt Coi	ntrol Protocols,
Transport Protocol Design Issues, Examples of Existing Transport Cont	rol Protocols,	Perfo	orman	ce of Transport
Control Protocols				
Unit IV Localization and positioning				9 Hours
Properties of localization and positioning procedures, Possible approache	s, Mathemati	cal ba	sics fo	or the lateration

problem, Single-hop localization, Positioning in multihop environments, Topology control - Motivation and basic ideas, Controlling topology in flat networks, Hierarchical networks by dominating sets, Hierarchical networks by clustering, Combining hierarchical topologies and power control, Adaptive node activity Security in Wireless Systems and Wireless Application Protocol 9 Hours Security and Privacy Needs of a Wireless System, Required Features for a Secured Wireless Communications System, Methods of Providing Privacy and Security in Wireless Systems, Wireless Security and Standards, IEEE 802.11 Security in North American Cellular/PCS Systems, Security in GSM, GPRS, and UMTS, Data Security, Air Interface Support for Authentication Methods, WAP Programming Model, WAP Architecture, WAP Advantages and Disauvantages, Applications of WAP, imode versus WAP Total: 45 Hours Further Reading: Network Management and Operating Management for Wireless Sensor Networks Performance and Traffic Management Node and Network Architecture Time synchronization, Naming and addressing Course Outcomes: After completion of the course, Student will be able to Analyse the challenges and constraints of wireless servor network and its subsystems Examine the Multiple Access Techniques, Spread Spectrum and Multiplexing Analyse the protocols used at the Routing and Transport Control 4. compare and analyse the types of Localization, positioning and topology techniques Identify the application areas and practical implementation issues. References: 1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education 2012. Vijay Garg. "Wireless Communications and networking", First Edition, Elsevier 2007. 3. Kazem Schraby, "Wireless Sensor Networks Technology, Protocols and Applications", Wiley Interscionee 2007. Hoiger Karl, "Protocols and architectures for Wireless Sensor Networks", John Wiley & Sons 2005. Dr. S. RAMABALAN M.E. Ph.D. E.G.S. Pillay Engineering College, Thethi, Nagore - 611 002 Nagapattinam (Dt) Jamil Nadu,
VLSI DESIGN LABORATOR Nil Nadu, 17EC651 T P C L 0 1 0 Course Objectives: 1. To gain expertise in design, development and simulation of digital circuits with Verlog HDL. 2. To apply concepts and methods of digital system design techniques through hands-on experiments. 3. To develop skills, techniques and learn state-of-the-art engineering tools (such as HUL Xiling tools List of Experiments: I. Design and simulation of Combinational Logic Circuit using Verilog HDL 1. Adder - Carry Select & Carry Save, Multiplexer and Demultiplexer, Encoder and Decoder

III. Design and simulation of Sequential Logic Circuit using Verilog HDL

III. CMOS Circuit design using SPICE (DC and Transient Analysis)

Flip-flops, Counters, Shift Registers

Frequency Dividers

	100111	F-6.V.,					
	The second second second second	D and NOR Gates					
	MOS Latch						
	Impleme	ntation					
	oit Adder						
	4 Multiplie	1					
10. AL	LU Design						
			Tot	al:		45]	Hours
Additiona	d Experim						
		bronous Sequential Logic circuits.					
		ehronous Sequential Logic circuits.					
Course O		Emple	yabilit	V			
		apletion of the course, Student will be able	to	1			
		m and simulation of Combination Logic C			L_{*}		
	2. Design	n and simulation of Sequential Logic Circ	uit using Verile	g HDL.			
	3. Desig	a. Simulate and Extract the layouts of Ana	log IC Blocks	using sp	ice.		
		ze transient characteristics.				1, 14,	
	. 5/ linpa	at the logic modules into FPGA boards.					
170450		COMMUNICATION AND NET WORLD (Common to B.E / B.Tech – CSE, IT & ECE)	CIPAL M.E. M				
1702EC652		COMMUNICATION AND NET WORKS SA	e . 613 Celles	L	T	P	C
		10	Tamil 002. Se.	0	0	4	2
		(Common to B.E / B.Tech – CSE, IT & ECE)	Wadu.				
Course Object	ctives						
	1. To	make students aware about various types of c	ables used in gu	ided medi	ia like	coaxial	cable,
	<u>ლი</u>	tical fiber cable, twisted pair cables and its cat	egories				
	1. To	understand the working difference between st	traight cable and	cross ove	er cab	le.	
	3 10	use the packet tracer to simulate various netw	orks.				
List of Expe	rimen tst						
1. Stud	y of Networ	k Topologies				140	50
2. Impl	ententation	And Study of Stop & Wait Protocol					
3. Impl	ementation	And Study of Go Back N Protocol					
4. Impl	ementation	And Study of Selective Repeat Protocol					
5. Conf	igure a Net	work Using Distance Vector Routing Protocol					
6. Coni	ligure a Net	work Using Link State Vector Routing Protoco	ol				
		And Study of CSMA/CA Protocol					
8. Impi	ementation (of Data Encryption And Decryption			1904		
		work Topology Using Packet Tracer Software					
		rio And Study The Performance of Network W	/ith CSMA/CD	Protocols	throu	oh Simu	lation
		Section 200		Total:			Hours
Additional E:	eperiments:			I VIIII		7.0	TTOUI S
		Create Scenario And Study The Performan	ce of Token Bu	ıs And Te	oken	Ring Pr	otocols
		rough Simulation					
		idy of Socket Processing					
Course Out.	comes:						
	After com	etion of the course. Student will be able to					

- 1. To explain how communication works in computer networks and to understand the basic terminology of computer networks.
- 2. To become familiar with the network simulator Packet Tracer.
- 3. To be able to analyze different protocols used for packet communication like ALOHA Protocol.
- 4. To understand the working of LAN Card, Hub, TELNET and to understand the working difference between straight cable and cross over cable.
- 5. To explain the role of protocols in networking and to analyze the services and features of the various layers in the protocol stack.

References:

- 1. Computer Networks: A Systems Approach, 4th Ed. (2007), by Larry Peterson and Bruce Davie. Covers background networking material with which students should have familiarity.
- 2. Computer Networking: A Top-Down Approach Featuring the Internet, 5th Ed. (2010), by James F. Kurose and Keith W. Ross. Covers similar material to Peterson and Davie.

		LIFE SKILLS: APTITUDE - II	L	T	P	C
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		B.E – ECE				
Course O	bjectives:					
	L To brush	up problem solving skill and to improve intellectual ski	ill of the stude	nts		
	2. To be ab	le to critically evaluate various real life situations by	resorting to	Analy	sis O	f key
	issues and					
		le to demonstrate various principles involved in solving the time taken for performing job functions.	ng mathemati	cal pro	oblem	s and
		ce analytical ability of students				
		ent logical and critical thinking of Student				
		di ostiosa di oriesar dimining of Student		_		
Unit I	Partnership. Mir. Compound inter	stures and Allegations, Problem on Ages, Simple I	nterest,		5 F	lour
Allegation	rule - Problems on	Allegation – Problems on ages - Definitions Simple	nares- Probler Interest - Prob	ns on	mixti	ures iteres
Allegation and amoun	rule - Problems on nt - Problems when	Allegation - Problems on ages - Definitions Simple rate of interest and time period are numerically equa	Interest - Prol al - Definition	blems and f	on in formu	teres la fo
Allegation and amount amount in principle a	rule - Problems on nt - Problems when compound interest- ind time period	Allegation – Problems on ages - Definitions Simple rate of interest and time period are numerically equal - Difference between simple interest and compound in	Interest - Prol al - Definition	blems and f	on in formu n the	teres la fo sam
Allegation and amour amount in principle a Unit II	rule - Problems on nt - Problems when compound interest- ind time period Blood relations	Allegation – Problems on ages - Definitions Simple rate of interest and time period are numerically equa - Difference between simple interest and compound in Clocks, Calendars	Interest - Profil - Definition nterest for 2 y	blems and f ears o	on in formunthe	teres la fo same
Allegation and amount amount in principle a Unit II Defining t	rule - Problems on nt - Problems when compound interest- ind time period Blood relations, the various relations	Allegation – Problems on ages - Definitions Simple rate of interest and time period are numerically equal - Difference between simple interest and compound in Clocks, Calendars among the memoers of a family - Solving Blood F	Interest - Profil - Definition nterest for 2 y	and fears o	on informulation the	la fo sam
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Allegation and amount in principle a Unit II Defining to problems of any rand Unit III Relation be Problems of Man-Day-Unit IV Problems of Different in Unit V	rule - Problems on nt - Problems when compound interest and time period. Blood relations on Blood Relations on Blood Relations on the angle is known of a Leap Year - Firdem calendar date. Time and Distant on relative speed - if on races - Problems I sails memory bata Interpretation tabular form - in leis in Data Sufficient and C.	Allegation - Problems on ages - Definitions Simple rate of interest and time period are numerically equal - Difference between simple interest and compound in Clocks, Calendars among the memoers of a family - Solving Blood Fosing symbols and notations - Finding the angle when m - Relation between Angle, Minutes and Hours - ading the number of Odd days - Framing the year code ce, Time and Work ce and time - Converting kmph into m/s and vice versa Problems on trains - Problems on boats and streams - on Unitary method - Relation between Men, Days, Holeans on alternate days - Problems on Pipes and Cisternation and Data Sufficiency - Problems on data redundancy rision Reasoning	Interest - Profil - Definition interest for 2 years and work - Problems on Hours and Wons.	les - Seven - Seases - Find	on in formula the solvin Findir in cloing the specific sp	Hour arts
Allegation and amount in principle a Unit II Defining to problems of time when Definition of any rand Unit III Relation be Problems of Man-Day-Unit IV Problems of Different in Unit V Problems	rule - Problems on nt - Problems when compound interest and time period. Blood relations on Blood Relations on Blood Relations on Blood Relations on the angle is known of a Leap Year - Firdum calendar date. Time and Distantion relatives speed, distant on relative speed - Footens I pats medical representation tabular form - Indeed in Data Sufficient and Compound Compou	Allegation – Problems on ages - Definitions Simple rate of interest and time period are numerically equal Difference between simple interest and compound in Clocks, Calendars among the memoers of a family - Solving Blood Fosing symbols and notations - Finding the angle when m - Relation between Angle, Minutes and Hours - Inding the number of Odd days - Framing the year code ce, Time and Work ce and time - Converting kmph into m/s and vice versa on Unitary method - Relation between Men, Days, Holems on alternate days Problems on Pipes and Cisternation and Data Sufficiency Problems on Line Graphs Problems on Bar Graphs ciency - Problems on data redundancy cistera Reasoning and - Froblems on Circular arrangement - Problems on	Interest - Prolal - Definition interest for 2 y Relation puzz the time is girl Exceptional of for centuries - Problems of Problems	blems and fears of the cars of	on in formula the solvin Finding the specific control of the solvin solv	Hour arts Hour arts Hour arts
Allegation and amount in principle a Unit II Defining to problems of time when Definition of any rand Unit III Relation by Problems of Man-Day-Unit IV Problems Different in Unit V Problems Selections	rule - Problems on nt - Problems when compound interest and time period. Blood relations on Blood Relations on Blood Relations on Blood Relations on the angle is known of a Leap Year - Fird mealeness date. Time and Distantion relative speed - Footens on races - Problems on raburar form - models in Data Sufficient and Composition on	Allegation – Problems on ages - Definitions Simple rate of interest and time period are numerically equal Difference between simple interest and compound in Clocks, Calendars among the memoers of a family - Solving Blood Fasing symbols and notations - Finding the angle when m - Relation between Angle, Minutes and Hours - ading the number of Odd days - Framing the year code ce, Time and Work ce and time - Converting kmph into m/s and vice versa Problems on trains - Problems on boats and streams - on Unitary method - Relation between Men, Days, Hours on alternate days - Problems on Pipes and Cisternation and Data Sufficiency Problems on Line Graphs - Problems on Bar Graphs ciency - Problems on data redundancy	Interest - Proul - Definition interest for 2 years and the time is given by the time is given	les - S ven - S cases - Find n aver circu rk - P on P	on in formula the solvin Findir in cloing the specific character of the solvin	Hours of the color

on strengt	thening and weakening of arguments.		
		Total:	30 Hours
ASSESSI	MENT PATTERN:		
	1. Two tests will be conducted (25 * 2) - 50 marks		
	2. Five assignments will be conducted (5*10) - 50 Marks		
Course O	Dutcomes: (Lil)	evelop m	ont
	After completion of the course, Student will be able to	~~~	CIU
	1. Solve problems on Partnership, Mixture & Allegation apply real life situations	and ages east tin	ne using shortcuts and
*	2. Workout family relationships concepts, ability to visuathe logic behind a Sequence.	alize clocks & ca	lendar and understand
	3. Calculate concepts of speed, time and distance, underswork.		
	 d. Learners should be able to understand various charts an 	d interpreted data	least time.
	Workout puzzles, ability to arrange things in an orderly	fashion.	//
Reference			
1.	Arun Sharma, 'How to Prepare for Quantitative Aptitude for publication, 2016.	the CAT', 7th e	dition, McGraw Hills
2.	Arun Sharma, 'How to Prepare for Logical Reasoning for CAT' 2017.	, 4 th edition, McG	Fraw Hills publication,
3.	R S Agarwal, 'A modern approach to Logical reasoning', revised	edition, S.Chand	publication, 2017
4.		minations', revis	sed edition, S.Chand
5.	Rajesh Verma, "Fast-Track Objective Arithmetic", 3rd edition Ac	hant publication.	2018.
	b.S. Sijwani and Indu Sijwali. "A New Approach to CASON Arihnat publication, 2014. Dr. S. RAMABALAM	Verbal & No	

PRINCIPAL

1703EC601		MFORM	ATION TH	EORY AN	D CODI	NG	L	T	P	C
							3	0	0	3
Course Ob	iectives:									
	1. Te knov	y basics of In	formation]	Theory						
D		stand noisels								
	3. To have	a complete i	understandi	ng of netwo	ork info	mation				
		v ahout sourc								
Unit I	INFORM	ATION TH	EORY						9	Hours
sequences-/	Average in	of information co formation co k-off source.	ontent of s							
Unit II	CAPACIT	TY OF MOIS	SELESS CI	HANNEL					9	Hours
		n for a Huffman cod						Kraft ory.	inec	quality,
Unit III	Charlin	IL CAPACI	TY						9	Hours
			A							TIOMIL

capacity Theorem. Bi	nary Cycle Codes-Algebraic structures of cyclic codes	
	ORK INFORMATION THEORY	9 Hours
Gaussian multiple us	ser channels, Multiple access channel, Encoding of correla	ited sources, Relay
channel, Source codi	ng and rate distortion with side information, General multi-term	ninal networks
	E CODING AND FUNDAMENTAL LIMITS ON	9 Hours
	RMANCE	
Encoding of the so	ource output-Shannon's encoding algorithm-Communication	Channels-Discrete
communication chara	nels -Source coding theorem-Huffman coding-Discrete mem-	ory less Channels-
Mutual information (Larnel Carrolly	
	Total:	45 Hours
Further Reading:		
	! Mark-o nstatistical model for information source	
	2. Broadcast channel	
	3. Conditions channels	
Course Outcomes:		
Alier cor	appellon of the course, Student will be able to	
<u>1.</u> illusi	trate the concept of Information theory	
z. ande	rstand of noiseless channel performance	
	v different charmel capacity techniques	
4. reco	enize busies of Information theory	
	ze source coding and its limit affect performance	
References		
	numerication Systems, John Wiley & Sons. Pvt. Ltd, 2009	
	mation theory - Thomas Cover, Joy Thomas: Wiley 1999	
	y and Reliable Communication, R. G. Gallager, Wiley, 1966	
	by "information theory, inference & learning algorithms" - Car	mbridge University
Press 2003.		
5. Taub & Schilling.	Principles of Communication Systems, Tata McGraw-Hill, 200	7
	latterjee, Principles of Digital Communication, Wiley Eastern L	
	3. Inference, and Learning Algorithms, D. J. C. MacKay, Cam	bridge Univ. Press,
2003		

1703EC602		DIGITAL CONTROL ENGINEERING	L	Т	P	С
	1		3	0	0	3
Course Obje	ectives:					9 74
	K:	nowledge about principles of basic controllers				
	2. Et	fucate the students about stability analysis of digital con-	trol systems			
		nin the students to develop digital control algorithms				
Unit I	PRINCIP	LES OF CONTROLLERS				9 Hours
Review of fr	equency and	time response analysis and specifications of control sy	stems, need for	cont	rollers,	continues
time compen	cations, com	inues time Pi PD PID controllers, digital PID controller	rs			
Unit II	SIGNAL	PROCESSING IN DIGITAL CONTROL				9 Hours
Sampling, th	he and frequ	lency demain description, aliasing, hold operation, mat	hematical mod	el of	sample	and hold,
zero and first	order hold.	factors limiting the choice of sampling rate, reconstruction	on			
Unit III	MODELI	NO AND ANALYSIS OF SAMPLED DATA CONTR	OL SYSTEM			9 Hours
		The state of the s				

				e variable
concepts, first companion, second companion, Jordan canonical models, discrete state principles	variauic	, illou	cis, c	iciliciliai y
Unit IV DESIGN OF DIGITAL CONTROL ALGORITHMS				9 Hours
Review of orinciple of compensator design, Z-plane specifications, digital compensa	tor des	ign u	sing	
response plots, discrete integrator, discrete differentiator, development of digital PID of	controll	er, tra	ınsfer	function,
design in the Z-plane				
Unit V PRACTICAL ASPECTS OF DIGITAL CONTROL ALGORITHMS				9 Hours
Algorithm development of PID control algorithms, software implementation, implement	ation u	sing n	nicrop	processors
and microcontrollers, finite word length effects, choice of data acquisition systems, micro	control	ler bas	sed te	mperature
control systems, microcontroller based motor speed control systems				
Tot	al:			45 Hours
Further Reading:		121		
Digital Contro! Engineering in Power electronics Course Outcomes:	1	11	7 [
	11,40	1/1	nt	requen
After completion of the course. Student will be able to Understand the basics of different controllers used in digital control	Dual la	11-		7
2. Analyze signals in both time domain and Z domain	Engine	ering	-	/ /
3. Understand the basic knowledge necessary for sampled data control	or into m		-/	
4. Understand the state variable technique	system			
5. Develop the algorithm for digital control systems			1/	
References:			/	
1. M.Copal, "Digital Control and Static Variable Methods", Tata McGraw Hill, New	Delhi	1997		
2. John J. D'Azzo, "ConstantiveHoupios, Linear Control System Analysis and Design			Hill. 1	1995
3. Kenneth J. Ayala, "The 3001 Microcontroller- Architecture, Programming and app				
Intercation II 7 to Fid for 1964		- ,		
Dr. S. RAMABALAN, M.E., Ph.D.,				
PRINCIPAL				
E.G.S. Pillay Engineering Collège, Thethi, Nagore - 611 002.				
inclin indusic - bil bil				
1703EC603 NETWORK SECURIT Nagapattinam (Dt) Tamil Madu	L	Т	P	С
NEI WORK SECURI Nagapattinam (Dt) Tamil Nadu.	L 3	T 0	P 0	C 3
(Common to B.E / B.Tech – CSE, IT& ECE)			_	
(Common to B.E / B.Tech – CSE, IT& ECE) Course Objectives:			_	
(Common to B.E / B.Tech – CSE, IT& ECE) Course Objectives: L. To gain knowledge on the various attacks in a network			_	
Common to B.E / B.Tech – CSE, IT& ECE) Course Objectives: 1. To gain knowledge on the various attacks in a network 2. To acquire knowledge on various encryption standards.	3		_	
(Common to B.E / B.Tech – CSE, IT& ECE) Course Objectives: L. To gain knowledge on the various attacks in a network	3		_	
Common to B.E / B.Tech – CSE, IT& ECE) Course Objectives: 1. To gain knowledge on the various attacks in a network 2. To acquire knowledge on various encryption standards. 3. To build the ability to develop security standard based on the requirements.	3		_	3
Common to B.E / B.Tech – CSE, IT& ECE) Course Objectives: L. To gain knowledge on the various attacks in a network 2. To acquire knowledge on various encryption standards. 3. To build the ability to develop security standard based on the requirement. Unit i INTRODUCTION	ement	0	0	3 8 Hours
Common to B.E / B.Tech – CSE, IT& ECE) Course Objectives: Logain knowledge on the various attacks in a network Logain knowledge on various encryption standards. Logain knowledge on various encryption standards. Lobain the ability to develop security standard based on the requirements. Unit i INTRODUCTION Security Threats, Security Attacks, Security Services, Mechanisms- Model for Newscars, Security Services, Mechanisms- Medical for Newscars, Security Services, Mechanisms Services, Mechanisms Services, Mecha	ement	Secu	o rity-	8 Hours Classical
Common to B.E / B.Tech – CSE, IT& ECE) Course Objectives: L. Lo gain knowledge on the various attacks in a network 2. To acquire knowledge on various encryption standards. 3. To build the ability to develop security standard based on the requirements. Unit i INTRODUCTION Security Threats, Security Attacks, Security Services, Mechanisms- Model for Netherlands Substitutions-Transpositions Techniques- Substitutions-Transpositions Techniques- Stream Cipher, Block Commons- Stream Cipher Cip	ement	Secu	o rity-	8 Hours Classical
Common to B.E./ B.Tech – CSE, IT& ECE) Course Objectives: L. Logain knowledge on the various attacks in a network 2. To acquire knowledge on various encryption standards. 3. To build the ability to develop security standard based on the requirements. Unit i INTRODUCTION Security Threats, Security Attacks, Security Services, Mechanisms- Model for Notencyption Techniques- Substitutions-Transpositions Techniques- Stream Cipher, Block CECB-CEC-CFB-CFB.	ement	Secu	o rity-	8 Hours Classical or Modes-
Common to B.E / B.Tech – CSE, IT& ECE) Course Objectives: L. Lo gain knowledge on the various attacks in a network 2. To acquire knowledge on various encryption standards. 3. To build the ability to develop security standard based on the requirements. Unit i INTRODUCTION Security Threats, Security Attacks, Security Services, Mechanisms- Model for Netherlands Substitutions-Transpositions Techniques- Substitutions-Transpositions Techniques- Stream Cipher, Block Commons- Stream Cipher Cip	ement	Secu	o rity-	8 Hours Classical
Common to B.E / B.Tech – CSE, IT& ECE) Course Objectives: Logain knowledge on the various attacks in a network 2. To acquire knowledge on various encryption standards. 3. To build the ability to develop security standard based on the requirements. Unit i INTRODUCTION Security Threats, Security Attacks, Security Services, Mechanisms- Model for Notein Encryption Techniques- Substitutions-Transpositions Techniques- Stream Cipher, Block CECB-CEC-CEB-CEB. Unit II BLOCK CEPHERS AND THE DATA ENCRYPTION STANDARD	eement etwork ipher-E	Secu	o rity-	8 Hours Classical or Modes-
Common to B.E./ B.Tech – CSE, IT& ECE) Course Objectives: L. Logain knowledge on the various attacks in a network 2. To acquire knowledge on various encryption standards. 3. To build the ability to develop security standard based on the requirements. Unit i INTRODUCTION Security Threats, Security Attacks, Security Services, Mechanisms- Model for Notencyption Techniques- Substitutions-Transpositions Techniques- Stream Cipher, Block CECB-CEC-CFB-CFB.	eement etwork ipher-E	Secu	o rity-	8 Hours Classical or Modes-
Common to B.E / B.Tech – CSE, IT& ECE) Course Objectives: Logain knowledge on the various attacks in a network 2. To acquire knowledge on various encryption standards. 3. To build the ability to develop security standard based on the requirements. Unit i INTRODUCTION Security Threats, Security Attacks, Security Services, Mechanisms- Model for Notein Encryption Techniques- Substitutions-Transpositions Techniques- Stream Cipher, Block CECB-CEC-CEB-CEB. Unit II BLOCK CEPHERS AND THE DATA ENCRYPTION STANDARD	eement etwork ipher-E	Secu	o rity-	8 Hours Classical or Modes-
Common to B.E / B.Tech – CSE, IT& ECE) Course Objectives: L. Lo gain knowledge on the various attacks in a network 2. To acquire knowledge on various encryption standards. 3. To build the ability to develop security standard based on the requirements. Security Threats, Security Attacks, Security Services, Mechanisms- Model for Nethercyption Techniques- Substitutions-Transpositions Techniques- Stream Cipher, Block CECB-CEC-CFB-OFB Unit II BLOCK CIPHERS AND THE DATA ENCRYPTION STANDARD Simple DES-Differential cryp analysis- DES-Modes of operation-Triple DES-AES-RC4—In the control of the control o	eement etwork cipher-E	Secu Block	rity- Ciphe	8 Hours Classical or Modes- 8 Hours
Common to B.E./ B.Tech – CSE, IT& ECE) Course Objectives: L. To gain knowledge on the various attacks in a network 2. To acquire knowledge on various encryption standards. 3. To build the ability to develop security standard based on the requir Unit i INTRODUCTION Security Threats, Security Attacks, Security Services, Mechanisms- Model for Note Encryption Techniques- Substitutions-Transpositions Techniques- Stream Cipher, Block CECB-CEC-CFB OFB. Unit II BLOCK CIPHERS AND THE DATA ENCRYPTION STANDARD Simple DES-Differential cryptonalysis- DES-Modes of operation-Triple DES-AES-RC4 — Unit III BASH ALGORITHM, KEY MANAGEMENT Hash Function-Message Digest algorithm (MD 5)- Secure Hash Algorithm- Diffie-He Management Techniques- Key Distribution- Key Agreement - Elliptic Curve Cryptography.	ement etwork ipher-E	Secu Block	rity- Ciphe	8 Hours Classical or Modes- 8 Hours 9 Hours nge- Key
Course Objectives: I. 10 gain knowledge on the various attacks in a network 2. To acquire knowledge on various encryption standards. 3. To build the ability to develop security standard based on the require Unit i INTRODUCTION Security Threams, Security Attacks, Security Services, Mechanisms- Model for Note Encryption Techniques- Substitutions-Transpositions Techniques- Stream Cipher, Block CECB-CEC-CEB-OFB. Unit II BLOCK CEPHERS AND THE DATA ENCRYPTION STANDARD Simple DES-Differential cryptomalysis- DES-Modes of operation-Triple DES-AES-RC4-II Unit III HASH ALGORITHM, KEY MANAGEMENT Hash Function-Message Digest algorithm (MD 5)- Secure Hash Algorithm- Diffie-He Management Techniques- Key Distribution- Key Agreement - Elliptic Curve Cryptograuthentication Protocols	ement etwork ipher-E	Secu Block	rity- Ciphe	8 Hours Classical er Modes- 8 Hours 9 Hours nge- Key gnatures-
Course Objectives: 1. To gain knowledge on the various attacks in a network 2. To acquire knowledge on various encryption standards. 3. To build the ability to develop security standard based on the requirement. Unit i INTRODUCTION Security Threats, Security Attacks, Security Services, Mechanisms- Model for Note Encryption Techniques- Substitutions-Transpositions Techniques- Stream Cipher, Block CECB-CEC-CES-OFB. Unit II BLOCK CEPHERS AND THE DATA ENCRYPTION STANDARD Simple DES-Differential cryp analysis- DES-Modes of operation-Triple DES-AES-RC4-Duit II	etwork cipher-E	Secu Block	rity- Ciphe	8 Hours Classical or Modes- 8 Hours 9 Hours nge- Key gnatures-
Course Objectives: 1. To gain knowledge on the various attacks in a network 2. To acquire knowledge on various encryption standards. 3. To build the ability to develop security standard based on the requirements. Unit i INTRODUCTION Security Threams, Security Attacks, Security Services, Mechanisms- Model for Notencryption Techniques- Substitutions-Transpositions Techniques- Stream Cipher, Block CECB-CEC-CES-OFB. Unit II BLOCK CIPHERS AND THE DATA ENCRYPTION STANDARD Simple DES-Differential cryp analysis- DES-Modes of operation-Triple DES-AES-RC4-Duit III BLOCK CIPHERS AND THE DATA ENCRYPTION STANDARD Unit III BASH ALGORITHM, KEY MANAGEMENT Hash Function-Message Digest algorithm (MD 5)- Secure Hash Algorithm- Diffie-He Management Techniques- Key Distribution- Key Agreement - Elliptic Curve Cryptograuthentication Protocols Unit IV SECURITY TYP-CYTICE & SYSTEM SECURITY Authentication applications - Kerberos X.509 Authentication services - Internet Firewall	ement etwork ipher-E	Security Sec	rity- Ciphe Exchaital Si	8 Hours Classical or Modes- 8 Hours 9 Hours nge- Key gnatures- em: Roles
Course Objectives: L. To gain knowledge on the various attacks in a network 2. To acquire knowledge on various encryption standards. 3. To build the ability to develop security standard based on the require threats, Security Attacks, Security Services, Mechanisms- Model for Notein Threats, Security Attacks, Security Services, Mechanisms- Model for Notein Techniques- Substitutions-Transpositions Techniques- Stream Cipher, Block CECB-CEC-CFS-OFB. Unit II BLOCK CIPHERS AND THE DATA ENCRYPTION STANDARD Simple DES-Differential cryptomalysis- DES-Modes of operation-Triple DES-AES-RC4-Dunit III HASH ALGORITHM, KEY MANAGEMENT Hash Function-Message Digest algorithm (MD 5)- Secure Hash Algorithm- Diffie-He Management Techniques- Key Distribution- Key Agreement - Elliptic Curve Cryptograuthentication Protocols Unit IV SECURITY PLACTICE & SYSTEM SECURITY Authentication applications - Kerberos - X.509 Authentication services - Internet Firewall of Firewalls - Firewall related terminology- Types of Firewalls - Firewall designs	ement etwork ipher-E RSA. Ilman I raphy -	Secu Block Key E Digirusted	rity- Ciphe Exchantal Si	8 Hours Classical or Modes- 8 Hours 9 Hours nge- Key gnatures- em: Roles ommerce
Course Objectives: L. To gain knowledge on the various attacks in a network 2. To acquire knowledge on various encryption standards. 3. To build the ability to develop security standard based on the requirement. Unit i INTRODUCTION Security Threats, Security Attacks, Security Services, Mechanisms- Model for Notencryption Techniques- Substitutions-Transpositions Techniques- Stream Cipher, Block CECB-CEC-CEB-OPB. Unit II BLOCK CEPHERS AND THE DATA ENCRYPTION STANDARD Simple DES-Differential cryp analysis- DES-Modes of operation-Triple DES-AES-RC4— Unit II HASH ALGORITHM, KEY MANAGEMENT Hash Function-Message Digest algorithm (MD 5)- Secure Hash Algorithm- Diffie-He Management Techniques- Key Distribution- Key Agreement - Elliptic Curve Cryptog Authentication Protocols Unit IV SECURITY TRACTICE & SYSTEM.SECURITY Authentication applications - Kerberos - X.509 Authentication services - Internet Firewall of Firewalls - Firewall related terminology- Types of Firewalls - Firewall designs Transactions. Intruder - Intrusion detection system - Virus and related threats - Countern	ement etwork ipher-E RSA. Ilman I raphy -	Secu Block Key E Digirusted	rity- Ciphe Exchantal Si	8 Hours Classical or Modes- 8 Hours 9 Hours nge- Key gnatures- em: Roles ommerce
Course Objectives: L. To gain knowledge on the various attacks in a network 2. To acquire knowledge on various encryption standards. 3. To build the ability to develop security standard based on the requirements. Security Threams, Security Attacks, Security Services, Mechanisms- Model for Notein Techniques- Substitutions-Transpositions Techniques- Stream Cipher, Block CECB-CEC-CEB-OFB. Unit II BLOCK CIPHERS AND THE DATA ENCRYPTION STANDARD Simple DES-Differential cryp analysis- DES-Modes of operation-Triple DES-AES-RC4-Dunit II HASH ALGORITHM, KEY MANAGEMENT Hash Function-Message Digest algorithm (MD 5)- Secure Hash Algorithm- Diffie-He Management Techniques- Key Distribution- Key Agreement - Elliptic Curve Cryptog Authentication Protocols Unit IV SECURITY PLACTICE & SYSTEM SECURITY Authentication applications - Kerberos - X.509 Authentication services - Internet Firewall of Firewalls - Firewall designs	ement etwork ipher-E RSA. Ilman I raphy -	Secu Block Key E Digirusted	rity- Ciphe Exchar tal Si Syste E-C	8 Hours Classical or Modes- 8 Hours 9 Hours nge- Key gnatures- em: Roles ommerce

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. IPSecurity: 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 SSLAttacks fixed in v3- Exportability-Encoding-Secure Electronic Transaction (SET).

		Total:	45 Hours
Furthe	r Reading:		
	Attacks- Primarily test- factoring, Discrete Logarithms		
4	2. Malicious software-viruses-Firewalls- Security Standard	S.	
Course	Outcomes		
	After completion of the course. Student will be able to		
	 Identify vulnerability of computer networks to security the 	reats.	
	Acquire knowledge on existing security algorithms and of	ryptography standar	ds.
	 Understand various cryptography techniques and their in 		
	 Analyze the type of security threat and the appropriate se 	curity standard to be	adopted
	5 Formulate and implement new security standards	X	
Refere			
1.	William Stallings, "Cryptography and Network Security: Principles and Technical Reference, Fourth Edition, 2004		
2.	Alfred J. Menezus, Paul C. VanOorSchot, Scott A. Van Stone, "Handboo Press, 1996.	k Of Applied Crypto	graphy", CRC
3.	Atul Kahate "Cryptography and Network Security". Tata McGraw-Hill		
4.	Bruce Schneier, "Applied Cryptography: Protocols, Algorithms, and Sou Wiley, John & Sons, Incorporated, October 1995.	irce Code in C",Seco	nd Edition,
5.	Richard E. Smith, "Internet Cryptography", Addison- Wesley, 1997		

1703EC604		REAL TIME OPERATING SYSTEM	L	T	P	C
			3	0	0	3
		(Common to B.E / B. Tech - CSE, IT & ECE)				
Course Obje	ectives:	Cain knowledge in the following:				
	1. lois	portance of deadlines and concept of task scheduling.				
	III	ont will be able to understand and design real time operating system dided industry.	ns w	hich	are bac	kbone of
Unit I	INTROD	UCTION TO REAL TIME SYSTEMS		1		8 Hours
Stimating	rooram run	ies, traditional performance measures, perform ability, cost function				
Estimating pu	rogram run FEATUR	ES OF REAL TIME OPERATING SYSTEM				9 Hours
Estimating Pl Unit II Messages	rogram run FEATUR	ES OF REAL TIME OPERATING SYSTEM Xes pipes timer function events memory management Interrupt basis	ic sy	stem	desigr	9 Hours
Estimating of Unit Iï Messages of RT (OS designations)	rogram run FEATUR ee s mailbo gn principie	ES OF REAL TIME OPERATING SYSTEM Are pipes timer function events memory management Interrupt basis, interrupt toutines, task structures and priority.) Current research in	ic sy	stem	desigr	9 Hours
Estimating pure the Linit II Messages quarter (OS designed) Works and Messages an	rogram run FEATUR 	ES OF REAL TIME OPERATING SYSTEM Are pipes timer function events memory management Interrupt basis, interrupt toutines, task structures and priority.) Current research in	ic sy	stem	desigr	9 Hours using an udies: Vx
Estimating of Unit Ii Messages of RT (OS designed Morks and Morks	rogram run FEATUR es mailbo gn principie ficro OSAL EMBEU ito a system	ES OF REAL TIME OPERATING SYSTEM Xes pipes timer function events memory management Interrupt basis, interrupt soutines, task structures and priority.) Current research in DED SYSTEMS FROCESSOR Hardware units and devices in a system, software, Examples, SoC a	ic sy	stem OS. C	desigr	9 Hours using an udies: Vx
Estimating polymit II Messages of the Cost of the Cos	rogram run FEATUR S mailbo gn principie ficro OSAL EMECO ito a system Complex Sy	ES OF REAL TIME OPERATING SYSTEM Xes pipes timer function events memory management Interrupt basis; interrupt coutines, task structures and priority.) Current research in OED SYSTEMS FROCESSOR	ic sy	stem OS. C	desigr	9 Hours using an udies: Vx
Estimating of Unit II Messages of RT (OS designed Works and Monte III Embedded in technology of Unit IV Threads and Communicate Functions.	rogram run FEATUR S mailbo gn principie flore OSAL EMEETE Ito a system Complex Sy UNIT-VI esks Ta ion, Signal Real-Time	ES OF REAL TIME OPERATING SYSTEM Are pipes timer function events memory management Interrupt basis, interrupt soutines, task structures and priority.) Current research in TED SYSTEMS FROCESSOR Hardware units and devices in a system, software, Examples, SoC assem design and processors, System Design process,	ic sy RTO and V	stem OS. C	desigr Case St	9 Hours using an udies: Vx 9 Hours 8 Hours er-process ons, Pipe

B.E E	lectronics and Communication Engineering E.G.S. Pillay Engineering College	(Autono	mous)	Regula	tions 201
Tools, Host and Targe	evolopment Process and Testing: Introduction to Embedded Software et Machines, Linking and Locating Software, Getting Embedded Iware-Software Design and Co-design, Testing on Host Machine, Software Design and Co-design and Co-	Softwa	are int	o the	Target
	Tota	al:		45	Hours
Further Reading:					
	Basics of operating system; Basics of Embedded system				
Course Outcomes:					
After co	in pletion of the course, Student will be able to Franchistia	Witt	u		
	Understand the basics of RTOS and LINUX		1		
	Handle the RTOS mail boxes, time functions	- E1	un	APRE	rneu
3.	Know the Embedded system design process.	1		// .	
4	Operate the R FOS systems and functions.			V	
	Understand the Embedded software testing and development	t			
REFERENCE BUOK	3.	-			
1. An Embedded	Software Primer, David E. Simon Pearson Education Asia Publication	n ISBN	V-13		
	ic hs. C.M. Krishna and Kang G. Shin, TMH Publication/ISBN 13:				
	iem: Architecture Programming and Design Rajakamat, TMH Publica	tion SB	N 13		
	Dr. S. RAMABALAN, M.E., Ph.D., PRINCIPAL				
17CS208	SOFT COMPUTING G.S. Pillay Engineering College,	L	Т	P	C
	Thethi, Nagore - 611 002.	3	0	0	3
	(Common to B.E / B. Tealagap Glan Gin [6:1] Ta)mil Nadu.				
Course Objectives:	Hagapaten (am 422) (a) (iii Neats	1			
	carn the various soft computing frame works.				
	te tamiliar with design of various neural networks.				
	Be exposed to fuzzy logic.				
	earn genetic programming.				
1 31 1	cara genero programmag.				
Unit I INTROD	TIOTION		1	0	Hours
	k: Introduction, characteristics- learning methods – taxonomy – Evo	lution	of nour		
basic models a new year	at technologies - applications. Fuzzy logic: Introduction - crisp sets-	fuzzy s	of neur	ai iici rich ral	lations
	artesia productor relation - classical relation, fuzzy relations, t				
	hazzy sets. Consider algorithm- Introduction - biological background				
	Genetic basic concepts.	i - tradi	попаг	ориии	Zation
	NETWORKS			0	House
	n - linear separability - hebb network - supervised learning netwo	1			Hours
adaptive linear nearor, associative memory nearwork fi ite:	the libit adaptive linear neuron, BPN, RBF, TDNN- associative work between associative memory network, BAM, hopfield network rative associative memory network – unsupervised learning network — associative memory network – unsupervised learning network.	e memos, iterat	ory ne tive au	twork: toasso	auto-
Unit III FUZZY I	JOCIC			9	Hours
	ieatures, fuzzification, methods of membership value assignment	s-Defu	zzifica		
	v midwette and fuzzy measures: fuzzy arithmetic -extension prin				
	fluzzy integrals - fluzzy rule base and approximate reasoning : trut				
	of rules decomposition of rules, aggregation of fuzzy rules, fuzzy				
	azy expert system-fuzzy decision making.				
	CASGORITHM			9 1	Hours
	search space general genetic algorithm – operators - Generational	cvcle -	stoppi		
- constraints - classifier	price generic programming – multilevel optimization – real life pro	olem- a	dvance	es in G	A
	SOFT COMPUTING TECHNIQUES & APPLICATIONS	eioin- a	- Tuilo		Hours
	ten s - gereiko neuro hybrid systems - genetic fuzzy hybrid and fuzz	v genet	ic hyb		
simplified fuzzy ARTN	AAP - Applications: A fusion approach of multispectral images w	ith SA	R ont	imizet	ion of
traveling sales man prob	olemusing genetic algorithm approach, soft computing based hybrid	fuzzv c	ontrol	ers	1011 01
	Service we within a product, soft companie based nyorid	a considery	OIII OI.	VIJ	

Further Read 4.

Total:

45 Hours

	1. Reinforcement learning
	2. Applications of neuro fuzzy system
Course	e Outcomes;
	After completion of the course, Student will be able to
	1. Apply various soft computing frame works.
	2. Design of various neural networks.
	3. Use fuzzy logic.
	4. Apply genetic programming.
	5. Discuss hybrid soft computing
Refere	nces:
1.	J.S.R.Jang, C.T. Sun and E.Mizutani. "Neuro-Fuzzy and Soft Computing", PHI / Pearson Education 2004.
2.	S.N.Sivanandam and S.N.Deepa. "Principles of Soft Computing", Wiley India Pvt Ltd., 2011.
3.	S.Rajasekaran and G.A. Vijaya aksimiPai. "Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis
	& Applications', Prentice-Fall of India Pvt. Ltd., 2006.
4.	David E. Goldberg, "Genetic Algorithm in Search Optimization and Machine Learning" Pearson Education India, 2013.
5.	George J. Klie, the St. Clair, Bo Yuan, "Fuzzy Set Theory: Foundations and Applications" Prentice Hall, 1997.

PROFESSIONAL (OPEN) ELECTIVES – IV

17IT703		CLOUD COMPUTING L		T	P	C
		3		0	0	3
		(Common to B.E / B.Tech – CSE, IT & ECE)				
Course Of	ojectives:					
	I To	understand the differences between traditional deployment and cloud	co	mpu	ting	
	2. To	determine whether existing applications to the cloud makes technical	an	ıd bu	sines	sense
	3. 10	team how to build a transactional web application for the cloud or mi	gra	ate o	ne to	it
Unici	Cloud Are	nitecture Basics				9 Hours
laaS, PaaS	, SaaS. Bene.	metaphorical interpretation-cloud architecture standards and interope its and challenges of cloud computing, public, private clouds com-				
Unit II	on in seabling End to End					9 Hours
	the state of the s	grategic alignment and architecture development cycle-strategic	im	nact		
	HDZCL-D uSINES					
	ment delivery	s criteria technical criteria-cloud opportunities—evaluation criteria and testion.	na	weig	gni-Ei	
Unitall	tent delivery i	stworks-capacity planning-security architecture and design. Reation Architectures				9 Hours
Unit III Developme	ment delivery i ent environmo	stworks-capacity planning-security architecture and design. Heating Architectures hts for service development; Amazon, Azure, Google App-cloud plats			indus	9 Hours
Unit III Developme Unit IV	ment delivery i ent environmo	stworks-capacity planning-security architecture and design. Heating Architectures ats for service development; Amazon, Azure, Google App-cloud plats are Application late the Cloud			indus	9 Hours
Unit III Developme Unit IV Web Appli	nent delivery i ent environmo How catten Design	etworks-capacity planning-security architecture and design. Reation Architectures hts for service development; Amazon, Azure, Google App-cloud platture Application late the Cloud - Machine Image Design-privacy design –Database management			indus	9 Hours try 9 Hours
Unit III Developme Unit IV Web Appli Unit V	ment delivery i ent en ironmo How Lution Design Specializad	stworks-capacity planning-security architecture and design. lication Architectures also for service development; Amazon, Azure, Google App-cloud plats we Application late the Cloud - Machine Image Design-privacy design —Database management Cloud Architecture	fori	m in	indus	9 Hours try 9 Hours 9 Hours
Unit III Developme Unit IV Web Appli Unit V	ment delivery in ent environmo How ination Design Specializate distribution	etworks-capacity planning-security architecture and design. Reation Architectures hts for service development; Amazon, Azure, Google App-cloud platture Application late the Cloud - Machine Image Design-privacy design –Database management	fori	m in	indus	9 Hours try 9 Hours 9 Hours
Unit III Developme Unit IV Web Appli Unit V Workload	ment delivery in ent environmo How ination Design Specializate distribution	stworks-capacity planning-security architecture and design. lication Architectures also for service development; Amazon, Azure, Google App-cloud plats we Application late the Cloud - Machine Image Design-privacy design —Database management Cloud Architecture	fori	m in	indus	9 Hours try 9 Hours 9 Hours quality
Unit III Developme Unit IV Web Appli Unit V Workload metrics & S	nent delivery in ent environmo How suffer, Design Specialized distribution SLA	istworks-capacity planning-security architecture and design. lication Architectures ats for service development; Amazon, Azure, Google App-cloud platione Application lists the Cloud - Machine Image Design-privacy design —Database management - Cloud Architecture - architecture-Dynamic scalability-Cloud bursting-hypervisor clust	fori	m in	indus	9 Hours try 9 Hours 9 Hours quality
Unit III Developme Unit IV Web Appli Unit V Workload metrics & S	nent delivery in ent environmo How indica. Design Specializate distribution SLA eading.	istworks-capacity planning-security architecture and design. lication Architectures ats for service development; Amazon, Azure, Google App-cloud platione Application lists the Cloud - Machine Image Design-privacy design —Database management - Cloud Architecture - architecture-Dynamic scalability-Cloud bursting-hypervisor clust	fori	m in	indus	9 Hours try 9 Hours 9 Hours quality
Unit III Developme Unit IV Web Appli Unit V Workload metrics & S	ment delivery in ent environmo How Callon Design Specialized distribution SLA eading.	Ideation Architectures Ites for service development; Amazon, Azure, Google App-cloud plats In Service development; Amazon, Azure, Google App-cloud plats In Application line the Cloud In Machine Image Design-privacy design —Database management Cloud Architecture architecture—architecture—architecture—architecture—architecture—cloud—bursting-hypervisor—clust Total:	fori	m in	indus	9 Hours try 9 Hours 9 Hours quality
Unit III Developme Unit IV Web Appli Unit V Workload metrics &S	ent environmo How Localization Specializati distribution SLA eading. 1. Do 2. No	Ideation Architectures Itention Architectures Itention Architectures Itention Architectures Into for service development; Amazon, Azure, Google App-cloud platfore Application late the Cloud Image Design-privacy design —Database management Cloud Architecture Interpretation architecture Interpretation of scalability-Cloud bursting-hypervisor clust Interpretation of the companies	fori	m in	indus	9 Hours try 9 Hours 9 Hours quality
Unit III Developme Unit IV Web Appli Unit V Workload metrics &S	nent delivery in the property of the property	Ideation Architectures Itention Architectures Itention Architectures Itention Architectures Into for service development; Amazon, Azure, Google App-cloud platfore Application late the Cloud Image Design-privacy design —Database management Cloud Architecture Interpretation architecture Interpretation of scalability-Cloud bursting-hypervisor clust Interpretation of the companies	fori	m in	indus	9 Hours try 9 Hours 9 Hours quality
Unit II Developme Unit IV Web Appli Unit V Workload metrics &S	ent environmo How Lation Design Specialized distribution SLA Lation accordes: After octro	istworks-capacity planning-security architecture and design. lication Architectures ats for service development; Amazon, Azure, Google App-cloud plations for service development; Amazon, Azure, Google App-cloud plations for a service development. Hachine Image Design-privacy design —Database management. Cloud Architecture architecture-Dynamic scalability-Cloud bursting-hypervisor clust Total:	fori	m in	indus	9 Hours try 9 Hours 9 Hours quality
Unit III Developme Unit IV Web Appli Unit V Workload	ent environmo How Lation Design Specialized distribution SLA eading. 1. Do accomes: After como	Idention Architectures Itention Architectures Itention Architectures Itention Architectures Itention Architectures Itention Architecture Itention Into the Cloud Itention Into the Cloud Itention Into the Cloud Image Design-privacy design —Database management Cloud Architecture Inchitecture Inchitecture—In	erii	m in	indus ervice	9 Hours try 9 Hours quality 5 Hours
Unit II Developme Unit IV Web Appli Unit V Workload metrics &S	ent environmo How Gutton Design Specialized distribution SLA eading. 1. De accomes: After como Ur 2. Un	Itention Architectures Itention Architectures Itention Architectures Itention Architectures Itention Architectures Itention Architecture Itention Architecture Index Application into the Cloud Itention Image Design-privacy design —Database management Cloud Architecture Itentiocture -Dynamic scalability-Cloud bursting-hypervisor clust Itention of the course, Student will be able to Itention of the course, Student will be able to Itention of the course, Student will be able to Itention of the course, Student will be able to Itention of the course, Student will be able to	erii	m in	indus ervice	9 Hours try 9 Hours quality 5 Hours

	5. Design scarable cloud environment for elastic demands
Refere	nces:
1.	John Rhoton . Cloud Computing Explained: Handbook for Enterprise Implementation 2013 edition, 2013, recursive press
2.	RajkumarBuyya, Christian Vecchiola, S.ThamaraiSelvi, Mastering Cloud Computing: Foundations and Applications Programming, MorganKaufmann, Elsevier publication, 2013
3.	Thomas Erl, Zeigham Mahmood, and Ricardo Puttini, Cloud Computing Concepts, Technology & Architecture, PRENTICE HALL, 2013
4.	Reese, G (2009). Cloud Application Architectures: Building Applications and Infrastructure in the Cloud.

17CS033		INTERNET OF THINGS	L	T	P	С
			3	0	0	3
		Coramon to B.E / B.Tech – CSE, IT & ECE)				
Course Ob	ectives:					
	1. 1	o anderstand the concepts of Internet of Things				
	2. 7	o introduce network and communication protocols of IoT				
	3. 1	o build fo'l applications.				
Unit l	Inconstruct	ion to loT			0	Hours
		eristics of 4oT, Physical design of IoT, Logical design of IoT,	D41			
Communica Netwo!k(31	ition model 111	s & ATTS, Machine to Machine, Difference between IoT and			ware	define
Unit II		and Communication Aspects				Hour
		as issues, MAC protocol survey, Survey routing protocols, So	ensor de	eployi	nent &	& Node
		ation & dissemination				
	Challeng				9	Hour Hour
		elopment challenges, Security challenges, Other challenges				
Unit IV	the state of the same of the same					Hour
		istry applications, Surveillance applications, Other IoT application	ons	- 1		
Unit V	Developi					Hour
		Introduction to different foT tools, Developing applications through embedded system platform, Implementing IoT concept				eloping
			otal:		45	Hour
Further Re	adlagi					
	1. 3	loud Computing				
	2 1	lockers and Containers				
Course Oa	ខ្មែលខេត្ត:					
	Astar con	plation of the course. Student will be able to				
	1. (enderstand the concepts of Internet of Things				
	2. 8	malyze basic protocols in wireless sensor network				
	3, 1	Design to Tapplications in different domain and be able to analyz	e their	perfor	mance	8
	4. j)	aplement basic IoT applications on embedded platform				
	5. 1	Davelop the coding using Python programming.				
References	4					
1. Vijay Ma	diseul, Ars	ndeep Bahga, "Internet of Things: A Hands-On Approach"				
The state of the s						

1703EC815	BIG BATA ANALYTICS	L	T	P	C
		3	0	0	3
	(Cogmon to B.E / B.Tech – CSE& IT)				
Course Objectives:					
1,	Be exposed to big data				

	2. Learn the different ways of Data Analysis				
	3. Learn the mining and clustering				-
	4. Be familiar with the data streams and visualization				
Unit I	INTRODUCTION TO BIG DATA			9 H	ours
Introdu	action to Big Data Platform - Chailenges of conventional systems - Web data - E	voluti	on of	` Ana	lytic
	lity, analytic processes and tools, Analysis vs reporting - Modern data analytic tools	s, Sta	stical	conc	epts:
	ng distributions, resampling, statistical inference, prediction error.				
Unit II					ours
Regres	sion modeling, Multivariate analysis, Bayesian modeling, inference and Bayesian	n net	works	, Sup	port
	and kernel methods, Analysis of time series: linear systems analysis, nonlinear dynar				
	al networks: learning and generalization, competitive learning, principal component ks; Fuzzy logic extracting fuzzy mode's from data, fuzzy decision trees, Stochastic s				eurai
Unit II		carcii	meun		ours
	action to Stream - Conscepts - Stream data model and architecture - Stream Computin	g San	nnling		
stream	- Filtering streams - Counting distinct elements in a stream - Estimating moments	— Со	untin	g one	ness
	indow - Decaying window - Realtime Analytics Platform(RTAP) applications - cas				
sentime	ent analysis, stock market predictions				
Unit il	V FREQUENT TEMSETS AND CLUSTERING			9 H	ours
Mining	Frequent itemsets - Market based model - Apriori Algorithm - Handling larg	e data	a sets		
	y - Limited Pass algorithm - Counting frequent itemsets in a stream - Clust				
	chical - 16- Micais - Clastering high dimensional data - CLIQUE and PROCLUS				ttern
	clustering methods—Clustering in non-euclidean space—Clustering for streams and I	Paralle	elism.		
T mit	TO A THE STATE OF				
Unit V			\perp	9 H	ours
MapRe	educe - Pradoop, Tive, MapR - Sharding - NoSQL Databases - S3 - Hadoop Distribu			9 H	
MapRe				9 H	
MapRe Visuali	educe - Fredeop, Files, MapR - Sharding - NoSQL Databases - S3 - Hadoop Distributed to the Lations - Visual data analysis techniques, interaction techniques; Systems and applications - Total	ations		9 H	-
MapRe Visuali	educe - Fondoop, hive, who R - Sharding - NoSQL Databases - S3 - Hadoop Distributations - Visual data analysis techniques, interaction techniques; Systems and applications - Total Reading.	ations		9 Hetems	-
MapRe Visuali	educe - Fordoop, hive Jolap R - Sharding - NoSQL Databases - S3 - Hadoop Distributations - Visual data unalysis techniques, interaction techniques; Systems and applications - Visual data unalysis techniques, interaction techniques; Systems and applications - Visual data unalysis techniques, interaction techniques; Systems and applications - Visual data unalysis techniques, interaction techniques; Systems and applications - Visual data unalysis techniques, interaction techniques; Systems and applications - Visual data unalysis techniques, interaction techniques; Systems and applications - Visual data unalysis techniques, interaction techniques; Systems and applications - Visual data unalysis techniques, interaction techniques; Systems and applications - Visual data unalysis techniques, interaction techniques; Systems and applications - Visual data unalysis techniques, interaction techniques; Systems and applications - Visual data unalysis techniques, interaction techniques; Systems and applications - Visual data unalysis techniques, interaction techniques; Systems and applications - Visual data unalysis techniques - Visual data unalysis techniqu	ations		9 Hetems	-
MapRe Visuali Furthe	rduce - Fordeop, him, Map? - Sharding - NoSQL Databases - S3 - Hadoop Distributions - Visual data unalysis techniques, interaction techniques; Systems and applicate reaction: Total Reading: 1. Analyzing org data with twitter 2. Sig data for Ecommerce and Big data for blogs	ations		9 Hetems	-
MapRe Visuali Furthe	educe - Fordeop, hive Johan - Sharding - NoSQL Databases - S3 - Hadoop Distributions - Visual data unalysis techniques, interaction techniques; Systems and applicate Reading. 1. Analyzing org data with twitter 2. Big data for Ecommerce and Big data for blogs 4. Outcomes:	ations		9 Hetems	-
MapRe Visuali Furthe	Total Analyzing org data with twitter 1. Analyzing org data with twitter 2. Sig data for Ecommerce and Big data for blogs a Outcomes: A ter completion of the course, Student will be able to	ations		9 Hetems	-
MapRe Visuali Furthe	Total data for Ecommerce and Big data for blogs e Outcomes: Analyzing of the course, Student will be able to Analyzing of the course, Student will be able to Analyzing analysis methods.	ations		9 Hetems	-
MapRe Visuali Furthe	Total Analyzing org data with twitter 1. Analyzing org data with twitter 2. Big data for Ecommerce and Big data for blogs Be Outcomes: A ter completion of the course, Student will be able to 1. Apply the statistical analysis methods. 2. Compare and contrast various soft computing frameworks	ations		9 Hetems	-
MapRe Visuali Furthe	educe — Fordeop, hive Johan? — Sharding — NoSQL Databases - S3 - Hadoop Distributions - Visual data analysis techniques, interaction techniques; Systems and applications - Visual data analysis techniques, interaction techniques; Systems and application of Reading. 1. Analyzing org data with twitter 1. 2. Big data for Ecommerce and Big data for blogs 2. Big data for Ecommerce and Big data for blogs 3. A ter completion of the course, Student will be able to 4. Apply the statistical analysis methods. 2. Compare and contrast various soft computing frameworks 3. Design distributed file systems	ations		9 Hetems	-
MapRe Visuali Furthe	Total data analysis rechniques, interaction techniques; Systems and applications - Visual data analysis rechniques, interaction techniques; Systems and applications. Total Total data for Ecommerce and Big data for blogs a Outcomes: A fact completion of the course, Student will be able to 1. Apply the statistical analysis methods. 2. Compare and contrast various soft computing frameworks 3. Design distributed file systems 4 Apply Stream data model.	ations		9 Hetems	-
MapRe Visuali Furthe	Total data analysis rechniques, interaction techniques; Systems and applications - Visual data analysis rechniques, interaction techniques; Systems and applications. Total Total data analysis rechniques, interaction techniques; Systems and application of the commerce and Big data for biogs e Outcomes: A tier completion of the course, Student will be able to a copy the statistical analysis methods. Compare and contrast various soft computing frameworks Design distributed file systems Apply Stream data model. Use Visualization techniques	ations		9 Hetems	-
MapRe Visuali Furthe Course	Total completion of the course, Student will be able to Analyzing of the course, Student will be able to	ations		9 Hetems	-
MapRe Visuali Furthe Course	rduce - Landcop, hise, wap? - Sharding - NoSQL Databases - S3 - Hadoop Distributions - Visual data analysis techniques, interaction techniques; Systems and applications - Visual data analysis techniques, interaction techniques; Systems and applications received to the commerce and Big data for blogs. 1. Analyzing org data with twitter 1. 2. Big data for Ecommerce and Big data for blogs. 2. Big data for Ecommerce and Big data for blogs. 3. Apply the statistical analysis methods. 4. Lompare and contrast various soft computing frameworks. 5. Lompare and contrast various soft computing frameworks. 6. Apply Stream data model. 6. Use Visualization techniques. 6. Michael Borthold, David J. Hand, Intelligent Data Analysis, Springer, 2007. 6. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Careful Contractions of the contraction of the contra	ations		9 Hetems	ours
MapRe Visuali Furthe Course	reduce - Ivadoop, hive, MapR - Sharding - NoSQL Databases - S3 - Hadoop Distributions - Visual data analysis recliniques, interaction techniques; Systems and applications - Visual data analysis recliniques, interaction techniques; Systems and applications of Reading; 1. Analyzing orgidate with twitter 1. Big data for Ecommerce and Big data for blogs 2. Big data for Ecommerce and Big data for blogs 3. After completion of the course, Student will be able to 1. Apply the statistical analysis methods. 2. Compare and contrast various soft computing frameworks 3. Design distributed file systems 4. Apply Stream data model. 5. Use Visualization techniques nces: Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007. Anand Rajaraman and Jeffrey David Uilman, Mining of Massive Datasets, Capress, 2012.	ations al:	dge (9 Hotems 45 Ho	rsity
MapRe Visuali Furthe Course	Educe - Paddop, hive, dapR - Sharding - NoSQL Databases - S3 - Hadoop Distributions - Visual data analysis techniques, interaction techniques; Systems and applications - Visual data analysis techniques, interaction techniques; Systems and applications - Visual data analysis techniques Total Total Reading: 1. Analyzing org data with twitter 2. Sig data for Ecommerce and Big data for blogs 2. Outcomes: A terr completion of the course, Student will be able to 1. Apply the statistical analysis methods. 2. Compare and contrast various soft computing frameworks 3. Design distributed file systems 4. Apply Stream data model. 5. Use Visualization techniques nces: Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007. Anand Rajaramen and Jeffrey David Ullman, Mining of Massive Datasets, Capress, 2012. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge	ations al:	dge (9 Hotems 45 Ho	rsity
MapRe Visuali Furthe Course 2	Educe - Paddop, hive, dapR - Sharding - NoSQL Databases - S3 - Hadoop Distributions - Visual data analysis techniques, interaction techniques; Systems and applications - Visual data analysis techniques, interaction techniques; Systems and applications - Visual data analysis techniques Total Total Reading: 1. Analyzing org data with twitter 1. Analyzing org data with twitter 1. Analyzing org data with twitter 2. Sig data for Ecommerce and Big data for blogs 2. Outcomes: A tier completion of the course, Student will be able to 1. Apply the statistical analysis methods. 2. Compare and contrast various soft computing frameworks 3. Design distributed file systems 4. Apply Stream data model. 5. Use visualization techniques nces: Michael Borthold, David J. Hand, Intelligent Data Analysis, Springer, 2007. Anand Rajaranan and Jeffrey David Ullman, Mining of Massive Datasets, Capress, 2012. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Advanced analystics, John Wiley & sons, 2012.	ations al: ambri	dge U	9 Hetems 45 He	rsity
MapRe Visuali Furthe Course Refere	Educe – Findeop, Nive, WapR – Sharding – NoSQL Databases - S3 - Hadoop Distributions - Visual data analysis techniques, interaction techniques; Systems and applications - Visual data analysis techniques, interaction techniques; Systems and applications - Visual data analysis techniques, interaction techniques; Systems and applications - Analyzing org data with twitter 1. Analyzing org data with twitter 1. Analyzing org data with twitter 1. Analyzing org data with twitter 2. Big data for Ecommerce and Big data for blogs B. Outcomes: A for completion of the course, Student will be able to 1. Apply the statistical analysis methods. 2. Compare and contrast various soft computing frameworks 3. Design distributed file systems 4. Apply Stream data model. 5. Use Visualization techniques 1. Anand Rafaraman and Jeffrey David Uilman, Mining of Massive Datasets, Capress, 2012. Bill Franks, Teming the Big Data Tidal Wave: Finding Opportunities in Huge Advanced analysics, John Wiley & sons, 2012. Glenn J. Making Sense of Data, John Wiley & Sons, 2007 Pete Warden,	ations al: ambri	dge U	9 Hetems 45 He	rsity
MapRe Visuali Furthe Course 2	Educe - Paddop, hive, dapR - Sharding - NoSQL Databases - S3 - Hadoop Distributions - Visual data analysis techniques, interaction techniques; Systems and applications - Visual data analysis techniques, interaction techniques; Systems and applications - Visual data analysis techniques Total Total Reading: 1. Analyzing org data with twitter 1. Analyzing org data with twitter 1. Analyzing org data with twitter 2. Sig data for Ecommerce and Big data for blogs 2. Outcomes: A tier completion of the course, Student will be able to 1. Apply the statistical analysis methods. 2. Compare and contrast various soft computing frameworks 3. Design distributed file systems 4. Apply Stream data model. 5. Use visualization techniques nces: Michael Borthold, David J. Hand, Intelligent Data Analysis, Springer, 2007. Anand Rajaranan and Jeffrey David Ullman, Mining of Massive Datasets, Capress, 2012. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Advanced analystics, John Wiley & sons, 2012.	ations al: ambri	dge U	9 Hetems 45 He	rsity
MapRe Visuali Furthe Course 2	reduce - Ivadeop, Nive, WapR - Sharding - NoSQL Databases - S3 - Hadoop Distribution is a visual data analysis techniques, interaction techniques; Systems and applications - Visual data analysis techniques, interaction techniques; Systems and applications - Visual data analysis techniques, interaction techniques; Systems and applications - Visualization of the course, Student will be able to - L. Apply the statistical analysis methods. 2. Compare and contrast various soft computing frameworks 3. Design distributed file systems 4. Apply Stream data model. 5. Use Visualization techniques nces: Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Ca. Press, 2012. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Advanced analystics, John Wiley & sons, 2012. Glenn J. Myatt. Making Sense of Data, John Wiley & Sons, 2007 Pete Warden, O'Reilin, 2013.	ations al: ambri	dge U	9 Hetems 45 He	rsity

1702CS601	INTRODUCTION TO WEB TECHNOLOGY	L	Т	P	C
		3	0	0	3
Course Objectives:					1
	opart the new concepts in Web Technologies				
] () ()	evelon undurstanding about the different technologies used in day XML, Ped, Rails and PHP	the W	orld \	Vide	Web
	UCTION		10	Hou	ırs

XHTML Evolution of HTML and XHTML- Standard XHTML Document Structure- Basic Text Markup-Images-Hypertext Links-Lists- Tables- Forms- Frames. Cascading Style Sheets Introduction to CSS - Levels of Style Sheets- Style Specification Formats- Selector Forms- Property Value Forms - Font Properties- List Properties - Color- Alignment of Text - Background Images- Span and Div Tags. Unit II XML 9Hours Introduction to SGML - features of XML - XML as a subset of SGML - XML Vs HTML - Views of an XML document - Syntax of MML Mocument Structure - Namespaces- XML Schemas- simple XML documents - Different forms of markup that can occur in XML documents - Document Type declarations - Creating XML DTDs - Displaying XML Data in HTML browser - Converting XML to HTML with XSL minimalist XSL style sheets - XML applications 可可可 Unit III Origin and Use of Pori- Scalars and their Operations - Assignment Statements and Simple Input and Output -Centrel Statement & Fundamentals of Arrays - Hashes References- Functions- Pattern Matching - File Input and Output - Simple programs in Perl - Using Perl for CGI Programming. THP & MISON Origin and Lise of PHD. Overview of PHP- General Syntactic Characteristics Operations and Expressions-Control Statements- Arrays- Functions-Pattern Matching- Form Handling- Files-Cookies-Session Tracking -Database Connectivity. Simple programs in PHP and MySQL. TAMES & AJAX 9 Hours RAILS - Overview of Pails- Document Requests- Processing Forms- Rails Application with Databases -Layours AJAX - Njax Overview of Ajax - Basics of Ajax - Rails with Ajax. Total: 45 Hours Further Reading Date analytics & Sever less Computing Course Outromes After a muletion of the course, Students will be able to Devolor web pages using basic HTML Appl. XVII. tack iques in web design Impernent CGI using Peri implement PHP & MySQL database connectivity for real world applications Use Assault with Rails. References: Behalde Beitel, Nieto, Lin, Sadhu, XML How to Program, Pearson Education, New Delhi, 2011 Kogent Learning Salutions Inc. Web Technologies Black Book, Dreamtech Press, New Delhi, 2009 3. Chris Hater, With Programming Building Internet Applications 3rd ed., Wiley India Edition, New Delhi, 4. Phil Ballard, Michael Moncur, Sams Teach Yourself Ajax, JavaScript and PHP, Pearson Education New Felhi 2009 5. Achyu. 5 Godhole, Atal Kahate, Web Technologies TCP/IP Architecture and Java Programming, 2nd ed. Tata McCraw Hill Education Private Limited, New Delhi, 2010 Pankaj Sharma, Estroduction to Web Technology, Katson Books, New Delhi, 2008 Bankira Patel, Lai Pilani Bank, Antoduction to Web Technology & Internet, Acme Learning Private Limber New Point 2000

	CRECOMPUTING	L	T	P	C
	X X	3	0	0	3
	(B.E./ B. Feon – ECE)				
Course Out	ectives;				
	1. To introduce the underlying concepts and architecture of Grid Com	puting	9		
4	2. To understand the grid security and management				
	3. To introduce various grid middlewares				
Unit i	Concepts And Architecture			9 H	our
Introduction-	Parallel and Distributed Computing-Cluster Computing-Grid Compu	iting-	Anat	omy	and

Grid Security-A Brief Security Primer-PKI-X509 Certificates-Grid Security-Grid Scheduling and Resource Management-Scheduling Paradigms- Working principles of Scheduling -A Review of Condor, SGE, PBS and LSF-Grid Scheduling with QoS Unit IV Data Management And Grid Portals 9 Hour Data Management-Challenges-Architectura Approaches-Collective Data Management Services-Federation Services-Grid Portals-First-Generation Grid Portals-Second-Generation Grid Portals. Unit V Grid Middleware 9 Hour List of globally available Middlewares - Case Studies-Recent version of Globus Toolkit and gLite Architecture, Components and Features.	Unit II	Grid Monitoring	9 Hours
Unit III Grid Security And Resource Management Grid Security - A Brief Security Primer-PKI-X509 Certificates-Grid Security-Grid Scheduling and Resource Management-Scheduling Paradignas- Working principles of Scheduling - A Review of Condor, SGE, PBS and LSF-Grid Scheduling with QoS Unit IV Data Management And Grid Portals 9 Hour Data Management - Challenges-Architecture Approaches-Collective Data Management Services-Federation Services-Grid Portals-First-Generation Grid Portals-Second-Generation Grid Portals. Unit V Grid Middleware 9 Hour List of globalty available Middlewares - Case Studies-Recent version of Globus Toolkit and gLite Architecture, Components and Features. Total: 45 Hour Course Onformers After completion of the source, Student will be able to 1.	Grid Mo Network	nitoring Architecture (GMA) - An Overview of Grid Monitoring Systems- GridICE - J. Weather Service-R-GMA-Other Monitoring Systems- Ganglia and GridMon	AMM -MDS-
Management-Scheduling Paradigms- Working principles of Scheduling -A Review of Condor, SGE, PBS an LSF-Grid Scheduling with QoS Unit IV Data Management And Grid Portals Data Management Challenges-Architecture Approaches-Collective Data Islamagement Services-Federation Services-Grid Portals-First-Generation Grid Portals-Second-Generation Grid Portals. Unit V Grid Middleware 9 9 Hour List of globally available Middlewares - Case Studies-Recent version of Globus Toolkit and gLite Architecture, Components and Features. Total: 45 Hour Course Outcomest After completion of the course, Student will be able to Linderstand the resource and data management of grid 3. Analyze the socurity requirements of grid 4. Utilize the data management and grid portals 5. Use the grid middlewares like globus toolkit References: I.Macznen La Wark Buker, The Grid Core Technologies, John Wiley & Sons ,2005. 2.Ian Foster & Carl Kesseman. The Grid 2 - Blueprint for a New Computing Infrastructure , Morga Kauman - 2004.		Grid Security And Resource Management	9 Hours
Data Management-Categories and Origins of Structured Data-Data Management Challenges-Architecture Approaches-Collective Data Management Services-Federation Services-Grid Portals-First-Generation Grid Portals-Second-Generation Grid Portals. Unit V G id Middleware 99 Hour List of globally available Middlewares - Case Studies-Recent version of Globus Toolkit and gLite Architecture, Components and Features. Total: 45 Hour Course Observed: After completion of the course, Student will be able to L. Understand the concepts of Grid Architecture 2. Understand the resource and data management of grid 3. Analyze the security requirements of grid 4. Utilize the data management and grid portals 5. Use the grid middlewares like globus toolkit References: 1. Maoznen L., Clark Baker, The Grid Core Technologies, John Wiley & Sons, 2005. 2. Jan Foster & Carl Kesseman. The Grid 2 — Blueprint for a New Computing Infrastructure , Morga Kauman — 2004.	Manager	ment-Scheduling Paradigms- Working principles of Scheduling -A Review of Condor, & d Scheduling with QoS	
Approaches-Collective Data Management Services-Federation Services-Grid Portals-First-Generation Grid Portals-Second-Generation Grid Portals. Unit V Grid Middleware 9 9 Hour List of globally available Middleware - Case Studies-Recent version of Globus Toolkit and gLite Architecture, Components and Features. Total: 45 Hour Course Observation of the course, Student will be able to I. Understand the concepts of Grid Architecture 2. Understand the resource and data management of grid 3. Analyze the security requirements of grid 4. Othize the data management and grid portals 5. Use the grid middlewares like globus toolkit References: 1. Macznen La, Mark Baker, The Grid Core Technologies, John Wiley & Sons ,2005. 2. Jan Foster & Carl Kesselman. The Grid 2 — Blueprint for a New Computing Infrastructure , Morga Kauman — 2004.	Unit IV	Data Management And Grid Portals	9 Hours
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E.G.S. PILLAY ENGINEERINGCOLLEGE

(Autonomous)

Approved by AICTE, New Delhi|Affiliated to AnnaUniversity, Chennai Accredited by NAAC with "A"Grade|Accredited by NBA (CSE, EEE, MECH)

NAGAPATTINAM—611002



B.E. Electronics and Communication Engineering

Full Time Curriculum and Syllabus

Final Year-Seventh Semester

Course	CourseName	T	T	P	C	Max	imum	Marks
Code	Courselvame	L	94	P	U	CA	ES	Total
Theory Coun	rse	-						
1702EC701	Microwave Engineering	2	0	0	2	40	60	100
1702EC702	Optical Communication	. 3	0	0	3	40	60	100
1702EC703	Wireless Communication	3	0	0	3	40	60	100
1702EC704	Image Processing	* 3	0	0	3	40	60	100
	Professional (Open)Elective – V	3	0	0	3	40	60	100
	Professional Elective – VI	3	0	0	3	40	60	100
LaboratoryC	Course							
1702EC751	Microwave and Optical Communication Laboratory	0	0	2	1	50	50	100
1702EC752	Mini Project	0	0	0	1-	100	-	100
1704EC753	In-plant Training/ Internship Presentation	0	0	0	1	100	-	100
1704GE751	Life Skills: Competitive Exams Preparation	2	0	0	2	100	-	100
	T	otal 20	0	6	24	640	460	1100
Professional Ele	ective - V				-	·		
1703MG701	Principles of Management	3	0	0	3	40	60	100
1703MG702	Disaster Management	3	0	0	3	40	60	100
1703MG703	Total Quality Management	3	0	0	3	40	60	100

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1702EC701		N	IICROWAVI	E ENGIN	EER	ING				L	T	P	C
										3	0	0	3
Course Objective	es:												
	1.To gain	knowledge abo	out RF Electron	nics.									
	2. To stud	y about the var	ious microway	e compor	ent,	signa	l gen	erator	s and a	ampli	ifiers.		
	3. To gain	knowledge ab	out integrated	circuits ar	nd mi	crow	ave n	neaur	ements	S			
Unit I	INTROD	UCTION TO	DEFIECTO	ONICS		-						0.1	loui
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U nit II	MICROV	VAVE COMP	ONENTS							- 1		9 H	loui
ntroduction to M	lictowaves and	I their applicat	lions, Coaxial	Line Cor	npon	ents,	Wav	e-gui	de Co	mpor	nents,	Direct	ion
Couplers, Hybrid	Tee junction,	Magic Tee, At	tenuators, Ferr	rite Devic	es, Is	olato	rs, C	ircula	tors, C	Cavity	Res	onators	, R
entrant Cavities, V	0					-							
Unit III	MICROV	VAVE SIGNA	L GENERAT	ORS AN	DAI	MPL	IFIE	RS				9 H	loui
Vacuum Tube Tri	iodes Resonai	nt Cavity Davi	cas Daflay V	luctron T	`\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Covi	+ V	luatro	n M.	147	Covi	tı Vl.	****
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 $L-Lecture |T-Tutorial| P-Practical| C-Credit| CA-Continuous Assessment| \ ES-End Semester$

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

Reinhold Ludwing, Pavel Bretchko, "RF Circuit design: Theory and applications", Pearson Education Asia Publication, New Delhi 2001.

 Secondations For Microwave Engineering, R. R. Collin, McGraw Hill
 Microwave Communications – Components and Circuits, E. Hund, McGrawHill.

 Microwave Devices and Circuits, S. Y. Liao, PHI.

 Secondations – Chatarjee, East – West Press Pvt. Ltd.

1702EC70)2	OPTICAL COMMUNICATION L	T	P	C
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	 To lear structur 	n the basic elements of optical fiber transmission link, fiber mod	es cor	ıfigura	itions and
		erstand the different kind of losses, signal distortion in optical wave gation factors. Design optimization of SM fibers, RI profile and cut-off			
	3. To lear	n about various Optical Sources and Detectors.			
	To Exp	fore the trends of optical fiber measurement systems.			
	5. To Enri	ch the idea of optical fiber networks algorithm such as SONET/SDH	and or	tical (CDMA
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Unit I		CTION TO OPTICAL FIBERS		Hou Hou	
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Unit II Attenuatio Optical Vi Dispersion GI fibers-l connectors	SIGNAL En - Absorption Vave guides-In , Signal distortion Mode Coupling - Expanded E:	losses, Scattering losses, Bending Losses, Core and Cladding losses formation Capacity determination -Group Delay-Material Dispon in SM fibers-Polarization Mode dispersion, Intermodal dispersion of -Optical fiber connectors, Fiber alignment and Joint Losses - Item Connectors - Fiber Couplers	s, Sigr ersion - Puls Fiber	ial Dis , Wa e Broa Splice	stortion in ve guide adening in s – Fiber
Unit II Attenuation Optical Victorian Dispersion GI fibers-liconnectors Unit III	SIGNAL En - Absorption Vave guides-In , Signal distortion Mode Coupling - Expanded Et SOURCES	losses, Scattering losses, Bending Losses, Core and Cladding losses formation Capacity determination -Group Delay-Material Dispon in SM fibers-Polarization Mode dispersion, Intermodal dispersion of -Optical fiber connectors, Fiber alignment and Joint Losses - Income Connectors - Fiber Couplers	s, Sigr ersion - Puls Fiber	al Dis , Wa e Broa Splice	stortion in ve guide adening in s – Fiber
Unit II Attenuation Optical Victorial Dispersion GI fibers-leconnectors Unit III Optical son internal - efficiency Optical Deficiency	SIGNAL I n - Absorotion Vave guides-In , Signal distorti Mode Coupling - Expanded E: SOURCES urces: Light En quantum efficie -Resonant frequetectors: PIN	losses. Scattering losses, Bending Losses, Core and Cladding losses formation. Capacity determination. Group Delay-Material Dispon in SM fibers-Polarization Mode dispersion, Intermodal dispersion of Optical fiber connectors, Fiber alignment and Joint Losses. Som Connectors. Fiber Couplers. AND DETECTORS mitting Diodes. LED structures - surface and edge emitters, mono active. Lasers Diodes Modes and Threshold condition. Rate equation sencies. Injection laser diode structures.	s, Sigr ersion - Puls Fiber and he as -Ex	nal Distriction, Was Broad Splice Phouse House ternal and part of the state of the	stortion in ve guide adening in s – Fiber rs ructures - Quantum properties.
Unit II Attenuation Optical Vi Dispersion GI fibers-l connectors Unit III Optical son internal - efficiency Optical De Comparison	SIGNAL In Absorption Vave guides-In Signal distortion of Sources and Expanded Expand	losses. Scattering losses, Bending Losses, Core and Cladding losses formation. Capacity determination -Group Delay-Material Dispon in SM fibers-Polarization Mode dispersion, Intermodal dispersion of -Optical fiber connectors, Fiber alignment and Joint Losses - I sam Connectors - Fiber Couplers. SAND DETECTORS mitting Diodes - LED structures - surface and edge emitters, mono a many lasers Diodes Modes and Threshold condition -Rate equation as a polymer injection laser diode structures. Photo detectors, Avalanche photo diodes, construction, character can Photo detector noise -Noise sources, Signal to Noise ratio. Detec	s, Sigrersion - Puls - Puls - Puls - iber	nal Distance, Was end Broad Splice Houstern statemal and propose	stortion in ve guide adening in s – Fiber rs ructures - Quantum properties, time.
Unit II Attenuation Optical Vi Dispersion GI fibers-le connectors Unit III Optical sociatemal - efficiency Optical De Compariso Unit IV	SIGNAL E n - Absorption Vave guides-In , Signal distortion Mode Coupling - Expanded E: SOURCES urces: Light End quantum efficient -Resonant frequence etectors: PIN in of performant	Josses. Scattering losses, Bending Losses, Core and Cladding losses formation. Capacity determination -Group Delay-Material Dispon in SM fibers-Polarization Mode dispersion, Intermodal dispersion of -Optical fiber connectors, Fiber alignment and Joint Losses — Sand Detectors—Fiber Couplers SAND DETECTORS Ditting Diodes - LED structures - surface and edge emitters, mono assecy, lasers Diodes Modes and Threshold condition -Rate equation is noise-injection laser diode structures. Photo detectors, Avalanche photo diodes, construction, character are Photo detector noise—Noise sources. Signal to Noise ratio, Detector RECEIVER AND MEASUREMENTS	s, Sigrersion - Puls - Puls - Puls - Ind he - Ex - Ex - Istics - Ex	nal Distriction, Was end Broad Splice House House ternal and pronse House House	stortion in ve guide adening in s – Fiber rs ructures - Quantum properties time.
Unit II Attenuation Optical Victorial Dispersion GI fibers-liconnectors Unit III Optical societies internal - cefficiency Optical Decompariso Unit IV Fundament Quantum measurement	SIGNAL I n - Absorotion Vave guides-In , Signal distorti Mode Coupling - Expanded E: SOURCES urces: Light En quantum efficie -Resonant frequetectors: PIN on of performant FIBER OP tall receiver ope limit. Fiber A ents - Fiber ou	losses. Scattering losses, Bending Losses, Core and Cladding losses formation. Capacity determination -Group Delay-Material Dispon in SM fibers-Polarization Mode dispersion, Intermodal dispersion of -Optical fiber connectors, Fiber alignment and Joint Losses - I sam Connectors - Fiber Couplers. SAND DETECTORS mitting Diodes - LED structures - surface and edge emitters, mono a many lasers Diodes Modes and Threshold condition -Rate equation as a polymer injection laser diode structures. Photo detectors, Avalanche photo diodes, construction, character can Photo detector noise -Noise sources, Signal to Noise ratio. Detec	s, Sigratersion Pulse Fiber Ind he as -Ex istics for res	al Distance And Property of the Control of the Cont	stortion in ve guide adening in s – Fiber rs ructures - Quantum properties, time. rs of Error – ex profile
Unit II Attenuation Optical Victorial Dispersion GI fibers-le connectors Unit III Optical son internal - of efficiency Optical De Compariso Unit IV Fundament Quantum measurement	SIGNAL I n - Absorotion Vave guides-In , Signal distorti Mode Coupling - Expanded E: SOURCES urces: Light En quantum efficie -Resonant frequetectors: PIN on of performant FIBER OP lameter operations of performant measurements	Josses. Scattering losses, Bending Losses, Core and Cladding losses formation. Capacity determination -Group Delay-Material Dispon in SM fibers-Polarization Mode dispersion, Intermodal dispersion of -Optical fiber connectors, Fiber alignment and Joint Losses — Learn Connectors — Fiber Couplers. SAND DETECTORS Ditting Diodes - LED structures - surface and edge emitters, mono a next lasers Diodes Modes and Threshold condition -Rate equation is notes - injection laser diode structures. Photo detectors, Avalanche photo diodes, construction, character are Photo detector noise —Noise sources. Signal to Noise ratio, Detector Configuration. Pre complifiers, Error sources — Receiver Configuration—Internation measurements — Fiber Refatt- off Wave length Measurements — Fiber Numerical Aperture Nature of the Configuration of	s, Sigrersion - Puls - Puls - Piber - Ind he - Ex - Istics - tor res - Probab - ractive	al Dis., Wa e Broas Splice Houtero statemal and ponse Houility comments independent	rs rctures - Quantum rs oroperties time. rs of Error - ex profile s - Fiber
Unit II Attenuation Optical Vice Dispersion GI fibers-leconnectors Unit III Optical sociaternal - efficiency Optical De Compariso Unit IV Fundament Quantum measuremed diameter in Unit V	SIGNAL E n Absorption Vave guides-In , Signal distorti Mode Coupling — Expanded E: SOURCES urces: Light En quantum efficie -Resonant frequetectors: PIN on of performent FIBER OP Italian Fiber A ents — Fiber cureaurements OPTICAL	Josses, Scattering losses, Bending Losses, Core and Cladding losses formation. Capacity determination -Group Delay-Material Dispon in SM fibers-Polarization Mode dispersion, Intermodal dispersion on in SM fibers-Polarization Mode dispersion, Intermodal dispersion of -Optical fiber connectors, Fiber alignment and Joint Losses — Sand Connectors—Fiber Couplers SAND DETECTORS Ditting Diodes - LED structures - surface and edge emitters, mono assect, lasers Diodes Modes and Threshold condition -Rate equation associes-injection laser diode structures. Photo detectors, Avalanche photo diodes, construction, character are Photo detector noise—Noise sources, Signal to Noise ratio, Detector Capacity Capacity Configuration—Internation measurements—Dispersion measurements—Fiber Reference of Wave length Measurements—Fiber Numerical Aperture Measurements—Fiber Numerica	s, Sigrersion - Puls - Puls - Piber - Ind he - Sistics - Ex - Ind he - Ind	al Dis. Wae Broad Splice Houtero statemal and propose Houility of the independent Hou	rs ructures Quantum oroperties time. rs of Error ex profile s – Fiber
Unit II Attenuation Optical Victorial Dispersion GI fibers-leconnectors Unit III Optical sociatemal - efficiency Optical De Compariso Unit IV Fundament Quantum measuremediameter m Unit V Basic Netw	SIGNAL En Absorotion Vave guides-In Absorotion Vave guides-In Signal distortion Mode Coupling — Expanded Et SOURCES urces: Light En quantum efficier-Resonant frequetectors: PIN Signal FIBER OP La receiver optimit. Fiber A ents — Fiber curements — OPTICAL Volks — SONET	Josses, Scattering losses, Bending Losses, Core and Cladding losses of formation Capacity determination -Group Delay-Material Dispon in SM fibers-Polarization Mode dispersion, Intermodal dispersion of -Optical fiber connectors, Fiber alignment and Joint Losses — Sem Connectors — Fiber Couplers SAND DETECTORS Ditting Diodes — LED structures - surface and edge emitters, mono as accy, lasers Diodes Modes and Threshold condition -Rate equation as noises - injection laser diode structures. Photo detectors, Avalanche photo diodes, construction, character are Photo detector noise —Noise sources, Signal to Noise ratio, Detect TIC RECEIVER AND MEASUREMENTS Detection — Pre complifiers, Error sources — Receiver Configuration— Internation measurements— Dispersion measurements — Fiber Relation of Wave length Measurements — Fiber Numerical Aperture Measurements — Fiber Numerical Aper	s, Sigrersion - Puls - Puls - Piber - Ind he - Sistics - Frobab -	al Disa, Was e Broad Splice Houstern statemal and propose in the	rs ructures Quantum oroperties time. rs of Error ex profile s – Fiber
Unit II Attenuation Optical Vi Dispersion GI fibers-le connectors Unit III Optical son internal - e efficiency Optical De Compariso Unit IV Fundament Quantum measurement diameter in Unit V Basic Netv linear effe Performance	SIGNAL En Absorotion Vave guides-In Absorotion Vave guides-In Signal distortion Mode Coupling — Expanded Et SOURCES urces: Light En quantum efficier-Resonant frequetectors: PIN Sonot performen FIBER OP La ceiver operation of performen to the ceiver operation of performen FIBER OP La ceiver operation of performen FIBER OP La ceiver operation of performen La ceiver operation of performen La ceiver operation of performen La ceiver operation of PTICAL volks — SONE) La ceiver on Netwo	losses. Scattering losses, Bending Losses, Core and Cladding losses, formation Capacity determination -Group Delay-Material Dispon in SM fibers-Polarization Mode dispersion, Intermodal dispersion in GM fiber connectors, Fiber alignment and Joint Losses — I commectors — Fiber Couplers SAND DETECTORS Ditting Diodes - LED structures - surface and edge emitters, mono a model laser of Diodes and Threshold condition -Rate equation is noise-injection laser diode structures. Photo detectors, Avalanche photo diodes, construction, character are photo detector noise—Noise sources. Signal to Noise ratio, Detector Receiver And Measurements TIC RECEIVER AND MEASUREMENTS Particle Transcruments - Dispersion measurements — Fiber Relater off Wave length Measurements — Fiber Numerical Aperture Measurements — Fiber Numerical Aperture Measurements — Link Power budget -Rise time budget—Noise Principles of WDM Ferformance of WDM + EDFA system — Solito	s, Sigratersion Puls Fiber Ind he as -Ex istics for reserved Probabilitation Measure Indiana Putted National P	al Disa, Wa e Broad Splice Phoustero statemal and phonse Phousility comments Houndary	rs rs quantum oroperties time. rs of Error - ex profile s - Fiber

Further Rea	nding.				
T di tilor Tec	Design Optimization of SM fibers-RI profile and cut-off wavelength.				_
	Fiber amplifiers- Power Launching and coupling, Lencing schemes				
Course Out	comes:	110			
	After completion of the course, Student will be able to	Spy -			-
	1. Discuss the various optical fiber modes, configurations.				
	2. Demonstrate various signal degradation factors associated with optical fibe	r. V			
	3. Classify various optical sources and optical detectors and their use in the optical system.	otical co	mmun	ication	1
	4. Explain Various Fiber Optic measurements.	-			_
	5. Calculate the digital transmission and its associated parameters on system p	erforma	ince.		
References:					
1. Gerd Keis	er. "Optical Fiber Cemmunication" Mc Graw -Hill International, 4th Edition., 2	010			
	enior, "Optical Fiber Communication", Second Edition, Pearson Education, 20		~	1	
3. Ramaswan	ni. Siyarajun and Sasaki "Cortical Networks", Moroan Kaufmann, 2009	42	1		
4. J.Senior, "	Optical Communication, Principles and Practice", Prentice H. Or S. RAMAB	ALCANO	000	Dh B	
5. J.Gower,	Optical Communication System", Prentice Hall of India, 2001. PRING	CIPAL			
1	E.G.S. Pillay Eng Thethi, Nago Nag apattinam (ineering ore - 611	002.		
1702EC703	WIRELESS COMMUNICATIONS	L	T	P	C
		3	0	0	3
	(Common to B.E./ B.Tech – FCF, IT)				

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1702EC703	WIRELESS COMMUNICATIONS	L	T	P	C
		3	0	0	3
	(Common to B.E / B. Tech – ECE, IT)				
Course Obje	ectives:				-li-
	1. To become skilled at fundamentals of mobile and wireless communications.	ation techr	ologie	s and	its
	applications.				
	2. To create the student to work on the transceivers for wireless channels	i.			
Unit I	Introduction		Hours		
Introduction	to wireless Communication systems - Evolution of Mobile communicati	on system	-20	i, 3G,	4G,
UMTS, LTE.	WLL, WLAN, WPAN, Bluster 15, Ultra Wide Band				
Unit II	Mobile Radio Propagation	10) Hou	'S	
Large scale	ath loss - Path loss in their F- Space and TwoRay models -Link Budget of	lesign –Sn	nall sc	ale fac	ding-
Parameters of	of mobile multipath channels -Time dispersion parameters-Coherence band	lwidth –D	oppler	sprea	ad &
Coherence tin	me, Fading deleto Multiput lime delayspread-flat fading				
	ective fading Fading due to Doppler spread -fast fading -slow fading.				
Unit III	Cellular Communication		Hour		
Introduction,	Frequency 1966, Compassion ent techniques, Hand off Strategies, Interfer	ence and	System	Capa	icity,
Trunking and	f Grade of Service, improving Coverage and capacity in cellular systems.M	Iultiple A	ccess t	echnic	ques:
FDMA, TDM	14, CDMA, SDMA				
Unit IV	Modulation Schemes and Spread Spectrum	12	2 Hou	·s	
Modulation to	echniques: M-QAM, M-PSK, GMSK, Spread Spectrum Systems: PN sequence	ce-m-sequ	ence		
-Direct Sequ	ence Spread Spectrum-Frequency Hopping Spread Spectrum, Synchronizate	tion techn	iques	for Sp	oread
Spectrum sig	nals. Diversity and Combining Techniques: Time Diversity, Frequency diversity	sity, Space	Diver	sity	
Unit V	Multiple Antenna Techniques		Hours		
MIMO syste	ns - spatial multiplexing - System model - Pre-coding - Beam forming - Spa	ce Time (Coding	Alan	nouti
scheme -Cha	mnel state information-composity in fading and non-fading channels- comb	ining tech	niaues	-Sele	ction
combining, E	qual gam combining. Maximum ratio Combining, RAKE receiver. Introducti	on to OFI)M		
				otal:	45
Further Rea	ding:				
	WANET, Ict. Zighe Technology, WiMax, WLAN				
Course Outc	00362				
	After completion of the course, Student will be able to				
	1. Characterize interie enc. Letwern mobile and hase stations				

2	 Apply the knowledge in understanding the allocation of the limited wire government regulatory agencies. 	eless spectrum by
	3. Predict the received signal through the multipath channel.	Entreprend
	4. Analyze and Evaluate receiver and transmitter diversity techniques.	1 7 7
	5. Analyze the multiple antenna techniques	V
References:		y .
1. Rappapor	. T.S., "Wireless Communications: Principles and Practices", Second Edition	PHI, 2014
2. Andrea Go	oldsmith, "Wireless Communication", Cambridge University Press, 2005	
	Molisch "Treless Communications", John Wiley, 2010	
4. John G. Pi	oakis. "Digital Communication" McGraw Hill, 4th Edition, 2008	
	Stuber. "Principles of Mabile Communication", 3rd Edition, Springer Internation	onal Ltd.,2011
	Lee, "Wireless and Ceffular Communications" Edition McGraw Hill, 2000	

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

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Thethi, Nagore - 611 002.
Namanattinam (Dt) Tamil Nadu.

	Nagapattinam (Dt) Tamil Nadu.				
1702EC704	EMAGE PROCESSING	L	Т	P	C
		3	0	0	3
	(Common to ECE/CSE/IT)				
Course Object					
	1. To make the students to understand the digital image fundamentals.				
	2. To study the digital image using different transforms.				
	3. To acquire the basic knowledge in filters, image enhancement, image	restora	tion a	nd	
	compression techniques.				
Unit I	DIGITAL IMAGE FUNDAMENTALS			9 H	lours
Elements of di	gital image processing systems, Elements of visual perception, Image sampling	andqı	iantiza	ation,	Basic
	between pixels. Image Transforms:Discrete Fourier transform, Cosine,Hadar				
Slant transform	No.				
Unit II	IMAGE ANALYSIS			9 H	lours
Histogram	cessing the three and specification techniques, Basics of spatial filtering, Sn	noothi	ng		
	Sharpening spatial filters Image smoothing and sharpening using frequency do	main f	lters.		
Unit III	IMAGE SEGMENTATION			9 H	lour
Point, fine and	ledge detection Detection of its lated points, Line detection, Edge models, Bar	sic edg	gedete	ction,	Edge
linking and b multivariable i	oundary detection. Thresholding-basic global thresholding, Otsu's method, littesholding. Region-based segmentation-Region growing, Regionsplitting and	Multip	le, Va	ariable	and
linking and a multivariable was Unit IV	oundary detection. Thresholding-basic global thresholding, Otsu's method, livesholding. Region-based segmentation-Region growing, Regionsplitting and IMAGE RESTORATION AND RECOGNITION	Multip mergir	le, Va	ariable 9 H	and Iours
linking and be multivariable a Unit IV Image degrada	oundary detection. Thresholding-basic global thresholding, Otsu's method, largesholding. Region-based segmentation-Region growing, Regionsplitting and IMAGE RESTORATION AND RECOGNITION tion/restoution-model. Noise models, Restoration-Spatial Filtering, Constrained.	Multip mergir ed Lea	le, Va ng. stsqua	ariable 9 H re filte	and Iours ering
linking and a multivariable was Unit IV Image degrada Inverse filteri	coundary detection. Thresholding-basic global thresholding, Otsu's method, invesholding. Region-hased segmentation-Region growing, Regionsplitting and IMAGE RESTORATION AND RECOGNITION attions restoration model. Noise models, Restoration-Spatial Filtering, Constraining, Wiener Filtering, Object recognition-Patterns and patternclasses, Matching.	Multip mergir ed Lea	le, Va ng. stsqua	ariable 9 H re filte	and Iours ering
linking and a multivariable with IV Unit IV Image degrada Inverse filtericlassifiers. Ne	coundary detection. Thresholding-basic global thresholding, Otsu's method, largesholding. Region-based segmentation-Region growing, Regionsplitting and IMAGE RESTORATION AND RECOGNITION attorners to missing models, Restoration-Spatial Filtering, Constraining, Wiener Filtering, Object recognition-Patterns and pattern classes, Matchiaral networks-Sackground, Training by Back Propagation.	Multip mergir ed Lea	le, Va ng. stsqua	9 H re filte n Dis	lours ering, tance
unit IV Image degrada Inverse filteri classifiers, Ne Unit V	coundary detection. Thresholding-basic global thresholding, Otsu's method, largesholding. Region-based segmentation-Region growing, Regionsplitting and IMAGE RESTORATION AND RECOGNITION at a second for model. Noise models, Restoration-Spatial Filtering, Constraining, Wiener Filtering, Object recognition-Patterns and pattern classes, Matchigral networks—Suckeround, Training by Back Propagation.	Multip mergin ed Lea ing-Mi	le, Vang. stsqua nimui	9 H re filte n Dis	e and
linking and a multivariable was Unit IV Image degrada Inverse filteri classifiers. Ne Unit V Fundamentals.	coundary detection. Thresholding-basic global thresholding, Otsu's method, bresholding. Region-based segmentation-Region growing. Regionsplitting and IMAGE RESTORATION AND RECOGNITION attorder restoution model. Noise models, Restoration-Spatial Filtering, Constraining, Wiener Filtering, Object recognition-Patterns and patternclasses, Matchidral networks-background. Training by Back Propagation. Easie perspection methods-Hutfman coding, Golomb coding, Arithmetic coding.	Multip mergin ed Lea ing-Mi	le, Vang. stsqua nimur	9 H re filte n Dis	lours ering tance
linking and a multivariable was Unit IV Image degrada Inverse filteri classifiers. Ne Unit V Fundamentals.	coundary detection. Thresholding-basic global thresholding, Otsu's method, largesholding. Region-based segmentation-Region growing, Regionsplitting and IMAGE RESTORATION AND RECOGNITION at a second for model. Noise models, Restoration-Spatial Filtering, Constraining, Wiener Filtering, Object recognition-Patterns and pattern classes, Matchigral networks—Suckeround, Training by Back Propagation.	Multip mergin ed Lea ing-Mi	le, Vang. stsqua nimur	9 H re filte n Dis 9 H ng.	lours ering tance
linking and a multivariable was Unit IV Image degrada Inverse filteri classifiers. Ne Unit V Fundamentals.	Total:	Multip mergin ed Lea ing-Mi	le, Vang. stsqua nimur	9 H re filte n Dis 9 H ng.	lours
linking and a multivariable was unit IV Image degrada Inverse filteri classifiers. Ne Unit V Fundamentals, coding, Run	Total:	Multip mergin ed Lea ing-Mi ing, L2 Wavele	stsqua nimui	9 H re filte n Dis 9 H ng.	lour
Unit IV Image degrade Inverse filteri classifiers. Ne Unit V Fundamentals, coding, Run Further Read	transform and Their properties. Homomorphic filtering, Morphological image products and Lineir properties.	Multip mergin ed Lea ing-Mi ing, L2 Wavele	stsqua nimui ZW etcodi	9 H re filte n Dis 9 H ng. 45 H	lour tance lour
Unit IV Image degrada Inverse filteri classifiers, Ne Unit V Fundamentals, coding, Run Further Read	tions restoration. Thresholding-basic global thresholding, Otsu's method, invesholding. Region-hased segmentation-Region growing, Regionsplitting and IMAGE RESTORATION AND RECOGNITION Itions restoration model. Noise models, Restoration-Spatial Filtering, Constraineng, Wiener Filtering, Object recognition-Patterns and patternolasses, Matchignal networks-Background, Training by Back Propagation. Pasic compression methods-Huffman coding, Golomb coding, Arithmetic coding heads coding. Lossless and Lossy predictive coding, Block transform coding, Ving: Ing: Itansform as filteir properties. Homeomorphic filtering, Morphological image pation. Opening and closing, Segmentation using morphological watersheds,	Multip mergin ed Lea ing-Mi ing, L2 Wavele	stsqua nimui ZW etcodi	9 H re filte n Dis 9 H ng. 45 H	lours lours
Unit IV Image degrada Inverse filteri classifiers, Ne Unit V Fundamentals, coding, Run Further Read	transform and Their properties. Homomorphic filtering, Morphological image products and Lineir properties.	Multip mergin ed Lea ing-Mi ing, L2 Wavele	stsqua nimui ZW etcodi	9 H re filte n Dis 9 H ng. 45 H	lours lours
linking and a multivariable was Multivariable was Unit IV Image degrada Inverse filtericlassifiers. Ne Unit V Fundamentals coding, Run	described discretion. Thresholding-basic global thresholding, Otsu's method, in esholding. Region-based segmentation-Region growing, Regionsplitting and IMAGE RESTORATION AND RECOGNITION attention model. Noise models, Restoration-Spatial Filtering, Constraining, Wiener Filtering, Object recognition-Patterns and patternclasses, Matching at herwork-background. Training by Back Propagation. Busic conversion methods-hurman coding, Golomb coding, Arithmetic coding the coding. Lossless and Lossy predictive coding, Block transform coding, Value. Total: Ing: transform and their properties. Homomorphic filtering, Morphological image processing and closing. Segmentation using morphological watersheds, vorks in image processing. Digitar image watermarking.	Multip mergin ed Lea ing-Mi ing, Lz Wavele rocessi Applie	stsqua nimur ZW etcodia	9 H re filte n Dis 9 H ng. 45 H	lours lours
linking and a multivariable with IV Image degrada Inverse filtericlassifiers. Ne Unit V Fundamentals. coding, Run Further Read KL Dila netv Course Outco	Total: Incompletion of the course, Student will be able to Parcompletion of the course, Student will be able to Parcompletion of the course, Student will be able to	Multip mergin ed Lea ing-Mi ing, Lz Wavele rocessi	stsqua nimur ZW etcodia	9 H re filte n Dis 9 H ng. 45 H	lours lours
linking and a multivariable with IV Image degrada Inverse filtericlassifiers. Ne Unit V Fundamentals. coding, Run Further Read KL Dila netv Course Outco	Total:	Multip mergin ed Lea ing-Mi ing, Lz Wavele rocessi	stsqua nimur ZW etcodia	9 H re filte n Dis 9 H ng. 45 H	lours lours

3. Segment the image using edge detection, thresholding and region based approach.
4. Develop a method to restore the image and object recognition
5. Compress the image using lossy and lossless compression techniques.

References:
1. C.Rafeal Gonzalez and E.Richard Woods, Digital Image Processing, Third Edition, Pearson Education 2008.
2. Anil K.Jain, Fundamentals of Digital Image Processing, PHI, 2010.
3. S Jayaraman, S Esakkirajan T Veerakumar, Digital Image Processing, Mc Graw-Hill, 2010
4. K.William Pratt, Digital Image Processing, John Wiley, 1997.
5. M.A.Sid Ahmed, Image Processing Theory, Algorithm and Architectures and Graw - Hill, 1995.

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

	E.G.S. Pillay Engineering College,				
1702EC751	Attachante and Confest Magazais Ath Annah	L	T	P	(
	Nagapattinam (Dt) Tamil Nadu.	0	0	4	2
Course Objects	1227a a -				
	 To have a detailed practical study on microwave equipments and microwave 	ostrip con	npon	ents.	
	 To study the optical devices and to use in appropriate application. 				
List of Experim	ents:				
	Experiments:				
	n – Mode characteristics				
2. Gunn Diode –					
	ency and Vave Length Measurement				
	upler - Directivity and Coupling Coefficient - S - parameter				
Measurement					
	- parameter measurement				
	d Power measurement				
	racterization of L-Plane T, H-Plane T and Magic T.				
8. Radiation Part	em of Aria naas.				
9. Antenna Gair	ivieus une in enti				
OPTICAL EXP					_
1. DC characteris	stics of LED and FIN Photo Diode.				
2. Mode Charact					
3. Measurement	of Connector and Bending Losses.				
4. Fiber Optic An	ialog and Digita. Link				
	value Determination for Fibers			7	
6. Attenuation M	eastroment in Fibers.				
Contend be					
	f Manchester coding.				
o thay o	A AMERICAN SOCIETY	Total:	45	Hou	rc
Course Outcom	96.	r otal.	44.3	HOU	13
	ter completion of the course. Student will be able to				
/1	And the second s				
-	1. Apie to study and analyze microwave equipments.				
	2. Able to study and analyze optical devices.				

1703MG001	PRINCIPLES OF MANAGEMENT	L	Т	P	С
7		3	0	0	3
Course Objectives					
Course Objectives:	1				
2. To study i	the students to study the evolution of Management he functions and principles of management he application of the principles in an organization				
Unit I INTRODU	CTION TO MANAGEMENT AND ORGANIZATIONS			9 H	ours
Definition of Management skills – Evolution of Mana Business organization –	- Science or Art - Manager Vs Entrepreneur - Types of manager viewent - Scientific. Human relations, System and contingency Sole proprietorship, partnership, Company-public and privativironment - Current trends and issues in Management.	approa	ches -	l roles - Type	and es of
Unit II PLANNIN				9 H	ours
	using — Planning Process — Types of planning — Objectives — Sett legic Management — Planning Tools and Techniques — Decision m	-		_	
Unit III ORGANIS	ING			9 H	ours
Line and staff authority - I Design - Human Resource	pul and informal organization — Organization chart — Organization of authority — Centralization and Management — HR Planning, Recruitment, Selection, Train. Career planning and Management.	d Decen	traliza	ation -	- Job
Unit IV DERECTE	4C			9 H	ours
satisfaction - Job enrichm	and Group behaviour – Motivation – Motivation theories – Motivation – Leadership – Types and theories of leadership – Communication – Effective communication – Communication and	nunication		-	
Unit V CONTROL	JLING			9 H	ours
	trolling - Budgetary and non-budgetary control techniques – Use ductivity problems and management – Control and performance				
	Tota	:		45 H	ours
Further Reading:	cision roles of managers.				
	Cision foles of managers.				
Course Outcomes.					
	letion of the course, Student will be able to				
	plain the elements of Management and Organization.	mwe kom mesena n			
	numarize the types, policies, tools and techniques in Planning in Mare the job design and human resource management in Organizin		ent		
4. Ht	strate the skills of leadership and communication				
	erprof the controlling techniques in Management				
References: 1. Stephen A. Robbin	ns & David A. Decenzo & Mary Coulter, "Fundamentals of Mana	zement"	7 th 1	Edition	1.
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	& Mary Courser, "Management", 10th Edition, Prentice Hall (Inc.	lia) Pvt.	Ltd.,	2009.	
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1703MG@02	DISASTER MANAGEMENT	L	T	P	C
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Course Objectives:					
1. To provide an	exposure to disasters, their significance and types.				
To understand	I the relationship between vulnerability, disasters, disaster prevention immery understanding of approaches of Disaster Risk Reduction (DR		k reduc	tion	
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	rought. Fire etc. – Classification, Causes, Impacts including soc				
environmental, health	ought. The tie = Classification, Causes, impacts including soci, psychosocial, etc Differential impacts- in terms of caste, classon'ts during various types of Disasters.				
Unit II RPPR	OACHES TO DISASTER RISK REDUCTION (DRR)				lour
	ises. Calture of safety, prevention, mitigation and preparedness				
	ral Measures, Roles and responsibilities of-community, Panchaya				
	LBs. States Centre, and other stakeholders- State Disaster Manager	ment A	uthority	y(SDM	1A) ·
	- Advisories from Appropriate Agencies				
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	R-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPM				lour
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Refer	rences:
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2	Gupta Anii K. Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
3	KapurAnu Vulnerable India. A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010
4	Dr.Mimalinipandev. "Disaster Management", wiley India Pvt Ltd.
	C. K. Rajan. NavalePandharinath"Earth and Atmospheric Disaster Management: Nature an Manmade" B S Publication
- 6	Shailesh Shukla, Shamna Flassain "Biodiversit, Darenmon and Disaster Management Unique Publications

PRINCIPAL

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

2. To study the TQM principles and its strategies. 3. To impact knowledge on TQM gools for continuous improvement. Unit I INTRODUCTION	Course Objectives: 1. To learn concepts, dimension quality and philosophies of TQM. 2. To study the TQM principles and its strategies. 3. To appart knowledge on TQM roots for continuous improvement. Init I INTRODUCTION 9 Hours Definition of Quality - Dimensions of Quality - Quality Planning - Quality costs - Analysis Techniques for Quality Sots - Basic concepts of Total Quality Management - Historical Review - Quality Statements - Strategic Planning, Jerning Philosophy - Choosy philosophy - Continuous Process Improvement - JuranTrilogy, PDSA Cycle, 58, Jaizen - Obstacles to TOM Implementation ToM PRINCIPLES 9 Hours frinciples of TOM, Learnership - Centepts - Role of Schlor Management - Quality Council, Customer satisfaction— Justomer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Into HII ISTATESTOCAL PROCESS CONTEND (SPC) Policy The seven tools of quality - Businesing Sourcing, Supplier Selection, Supplier Rating, Relationship Development, Inti HI ISTATESTOCAL PROCESS CONTEND (SPC) Phours The seven tools of quality - Statistical Fundamentals - Measures of central Tendency and Dispersion, Population and Jample, Normal Curve, Control Charts for variables X bar and R chart and attributes P, NP, C, and u charts, dustrial Examples, Process copanity, Concept of six sigma - New seven Management tools 1. Total TOOLS 9 Hours enchmarking - Reasons to Benchmark - Benchmarking Process, Quality Function Deployment(QFD) - House of Vality Of D Process, and Benchmark - States of FMEA - Casestudies 1. Total: 45 Hours urther Reading: 1. Case Study TOM Quality and Environmental Concepts in real World Applications		TOTAL QUALITY MANAGEMENT	L	Т	P	С
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,	After completion of the course, Student will be able to
	1. Understand the concepts, dimension quality and philosophies of TQM.
	2. Understand the principles of TQM and its strategies.
	3. Apply seven statistical quality and management tools
	4. Understand TQM tools for continuous improvement.
	5 Understand the QMS and EMS
References	
1.	Rathakrishnan, Gas Dynamics, 5th edition, PHI Learing Private Limited, 2013.
2.	N. Gupta and B. Valarmathi, Total Quality Management, Tata McGraw-Hill Publishing Company Pvt. Ltd., New Delni, 2009.
3.	S. Komar, Total Quality Management, Laxmi Publications Ltd. New Delhi, 2006
4,	P.N. Muherjee, Total Quality Management, Prentice Hall of India, New Delhi, 2006.
5.	Dale H. Besterfited, Total Quality Management, Pearson Education Inc., New Delhi, 2003.
6.	James R. Evans and William M. Lidsay, The Management and Control of Quality, South- Western2002

1703MG006	INDUSTRIAL ECONOMICS	L	T	Р	С
		3	0	0	3
Course Objectives:					
 To introduce the industry. 	e upneepts of micro, macroeconomic systems and busin	ness decision	ns in		
,	dedge on laws of domand & supply and methods of forecast	ing thedemai	nd		
3. To emphasis the	systematic evaluation of the costs, breakeven point for retu	irn on econo	mics		
and disseonomic					
Unit I INTROI	HORON				9 Hours
Introduction to industria	conomics Wiere and Macro economics - Kinds of E	Economic Sy	stems	- Pro	duction
Possibility Frontier - Opp	sociarity Cost - Objective of Organizations - Kinds of Organ	ization.			
Unit H DEMAN	DAND SUPPLY			(9 Hours
Functions of Demand an	d Supply - Law of diminishing Marginal Utility - Law of I	Demand and	Suppl	v Elas	ticity of
Demand - Demand Fored	acting Methods - Inclifierence curve.			J —	
	CHIGN AND COST				9 Hours
Production Function - Re	aturns to Scale - Law of Variable Proportion - Cost and Revo	enue concept	ts and	Cost	Curves -
Revenue curves - Econor	nius and Dis-Economies of scale - Break Even point.	I			
	TSTRUCTURE		1		9 Hours
Market Structure - Percei	n Competition - Monopoly - Monopolistic - Oligopoly - Cor	nponents of	Prici		
Pricing - Capira, Duageti	ng RR - ARR - DPV - Return on Investment - Payback Per	iod.		.0	
Unit V INTROI	UCTION TO MACRO ECONOMICS AND FINANCIA	L	T.	-	Hours
ACCOU					
National Income - Calci	ilation Methods - Problems - Inflation - Deflation - Busin	ness Cycle -	Taxe	s - Di	rect and
Indirect Taxes - Fiscal ar					
		Total:		45	Hours
Further Reading:					
	Andre and the acteriaics of Indian Economy				
	Role and functions of Control bank - LPG - GATT - WTO.				
Course Outcomes:					
After con	to dien of the course. Student will be able to				

Unit V	USUSINESS DYNAMICS - ENGINEERING SERVICES INDUSTRY	9 Hours			
The Industry - Engineering Services Industry - Product Development in Industry versus Academia - The IPD Essentials - Introduction to Vertical Specific Product Development Processes - Product Development Trade-offs -					
Intelled	ctual Property Rights - Security and Configuration Management.				
	Total:	45 Hours			
Furthe	er Reading:				
	1. Rapid Prototyping and Rapid Manufacturing				
	2. PESTLE Analysis				
Course	e Outcomes:				
	After completion of the course, Student will be able to				
	Define, formulate and analyze a problem				
	2. Solve specific problems independently or as part of a team				
	3. Gain knowledge of the Innovation & Product Development process in the Bus	iness Context			
	# Work independently and also in teams				
	Manage a project from beginning to end				
Refere	ences:				
i.	Mark S Sanders and Ernest J McCormick, "Human Factors in Engineering and Design", McGr Education, Seventic Edition, 2013	raw Hill			
2.	Hirryappa 6. — Corporate Strategy - Managing the Businessl, Author House, 2013.				
3.		raw Hill, Fifth			
	Edition, 2011.				
4.	John W Newstorn and Kenk Davis, 'Organizational Behavior', Tata McGraw Hill, Ele 2005	venth Edition,			
5.	A. Potez i DivolorPeople and Performancel, Butterworth - Heinemann [Elsevier], Oxford,	2004.			
6.	Vined Kamur Gury and Venkita Krishnan N K				

Frofessional Electives - VI

1703EC021	ADV ANCED DIGITAL SIGNAL PROCESSING	L	Т	P	C
		3	0	0	3
Course Objectives:	To provide in-depre treatment on methods and techniques in	1	1		
	Discrete-time surpai transforms, digital filter design, optimal filtering	r			
2	Power spectrum estimation, multi-rate digital signal processing		-		
3.	DSP architectures which are of importance in the areas of signal process municacions.	essing,	contro	l and	
Unit! Parasa	etric Methods for Power Spectrum Estimation			9 F	lours
Estimation of spectra	acumetric Methods for Power Spectrum Estimation from finite duration observation of signals; Non-Parametric Metho	ds: Bar	lett -		lours h and
Blackman - Jukey me Unit III Adapti	ve Signal Processing			9 F	Iours
FIR Adaptive Thers	: Stoepest descent adaptive filter - LMS algorithm - converge neellation channel causal zation; Adaptive recursive filters - recursive	ence of	LMS uares.	algori	
	ate Signal Processing				lours
	to: De l'ille partier de la factor l' = Viiter design and impleme	ntation	forsa	npling	g rate
	e 7 ansforms			9 H	lours
	Discrete Fourier transform - discrete cosine transform; WaveletTrans: function spaces- posted spaces —Haarwavelet function - orthogor				

normalization of Haar b	oases at differentscales - Daubechies wavelets -support of wavelet system.	8	45	
Further Reading:	Total:		45	Hours
ruither Reading	http://www.ti.com/processors/dsp/overview.html		,	-
Course Outcomes:				- 5
	apietion of the course. Student will be able to		î.	
	sign adaptive filters for a given application Employa bi	life	1	
	ign multirate DSP systems.	to a y	lon	eurs
References	VJEW	reg.	pur c	CARL
 J.G. Proakis an 	d U.G. Manolakis, Digital Signal Processing Principles, Algorithms and	Applic	ations'	,
Pearson Educat	tion New Deth. (14), 2005.	3.8		
2. Monson H. Hay	ves, "Statistical Digital Signal Processing and Modeling", Wiley, 2002.			
3. Roberto Crist, '	"Mudern Digital Signal Processing". Thomson Brooks/ Cole, 2004.			
	Rau and Ailes Benardikar, Waveler Transforms: Introduction to Theory	and Ar	plicati	ons".
_	tion Asia, 2000		N	01.10 [3
	K. I Ramaguanudran and N.G Reshmi, "Insights into Wavelets."	2000	1	
6. Theorem in the	whee" Julianipa Frentice Hall of India, 2010. Dr. S. RAMAI	2011	-	
U. Theory has re	as account grown required from of mura, 2010. S. CAMA	NCIPA	N, M.E	Ph.D.
	E.G.S. Pillay Er			Ida
	Thathi Na	MOTO 6	14 nh2	
1702EC022	Namanatina	(Dt) T	amil Na	Nu. C
1703EC022	T AREDDED SYSTEMS			3
		3	0 0	3
Course Objectives:	CHICAGO CALLANDO COMO COMO COMO COMO COMO COMO COMO CO			-
the second of th	in this course it is aimed to Understand the fundamentals of embedded sy	/stems	differe	nces of
	microprocessor and controller.	Bioing	differe	
1911	Understand the interpeontroller architecture and pin diagrams.			
	Uniterstand and able to write the assemble language program.			
	Uncertained and able to write the I/O and timers/counter programming			
5	To use the embedded controllers. In real time applications			
	ed system introduction			Hours
	dded system embedded system architecture, classifications of e			
	issues in embedded systems, fundamentals of embedded processor ar			
	amentals of Vonneuman/Harvard architectures, types of microcontr	rollers,	, selec	tion of
microcontroilers.	The Contract of Book is a negative of			YT
	ptroßer (89 Ct 1 & 8955)	0021		Hours
	agram of each scries -Complete Pin description-Difference between struction see used in ATMEL-Types of instructions -Timers/Counte			
	as commers Simple programs.	15 WIU	11/0	ports -
	o. itoriure		9	Hours
	Microcontrollers, Architecture of AVR Atmega32x Microcontroller,	Pin d		
Family Overview, Atme	age 12 Family Members, AVR Assembly Language Programming.			,
	ice laterfactog		9	Hours
Assembly Language بين	of Embodies of Incommunity-Interfacing Simple I/O Devices Like Li	ED, Se		
LCD, Switches -39c51	and AVR controller			
	ed controllers Application			Hours
	Signal Contillating Relay Interfacing, Opto isolator and Stepper Mo	otor In	terfacii	ıg,
PWM Programming as	ed DC Motor Control and various control applications.			
	Total:		45	Hours
Further Reading:	Senal communications, i2e communications			
Course Outcomes.				
After con	upletion of the course, Student will be able to			

1. Understand the micro and macroeconomic environment for a favorable business environment

2. Apply laws of demand and supply in engineering economy and forecast the demand

3. Evaluate the various costs and breakeven point for organizational profitability

4. Analyze the pricing, payback on investments and e-commerce completions.

5. Asses the influence of macro level economics, taxation in businesses and financial accounting process

References:

1. A Ramachandra Aryssri and V V Ramana Murthy, Engineering Economics and Financial Accounting, Tara McGraw Hill Publishing Company Limited, New Delhi, 2006.

2. R Kosawan, C Elanchezhian and T Sunder Selwyn, Engineering Economics and Financial Accounting, Laxmi Publication Ltd. New Delhi, 2005.

3. V I. Samuel Paul and G S Gupta, Managerial Economics Concepts and Cases, Tata McGraw Hill Publishing Company Limited. New Delhi, 1981.

4. S N Maheswari, Financial and Management Accounting, SultanChand

5. V I. Samuel Paul and G S Gupta, Managerial Economics-Concepts andCases.

6. Barthwell R.R., Industrial Economics - An Introductory Text Book, New Age.

1703MG0	FOUNDATION SKILLS IN INTEGRATED PRODUCT DEVELOPMENT	L	Т	P	С
	-	3	0	0	3
Course Of	jectives:				-
2. To	understand the recent subsequent development of global trends and development of global trends and development types of products and services conceptualize, prototype and develop product management plan for a new product new product and development methodology integrating the hardware, software, co	t base	ed on	the typ	ne of
	channeal systems	HILFOIS	, elec	tromes	anu
	understand requirement engineering and know how to collect, analyze and arrive at oduct development and convert them in to design specification	requ	ireme	nts for	new
Unit I	FUNDAMENTALS OF FRODUCT DEVELOPMENT	======		9 H	ours
of Product	n to Product Development Methodologies and Management - Overview of Products Development - Overview of Product Development methodologies - Product I ent Planning and Management.	and Life (Servic	ces - T - Pro	ypes
Unit II	REQUIREMENTS AND SYSTEMDESIGN			9 H	ours
Requireme Requireme	nt Engineering - Types of Requirements - Quality Function Deployment & Int Management - Introduction to System Modeling - System Optimization-System S	Phase pecif	s - Nicatio	Aodeli n.	ng -
Unit III	DESIGN AND TESTING				ours
Design and	n to Concept generation Techniques - Concept Screening & Evaluation - Detailed Verification - High Level /Low Level product Design - S/W Testing- Hardware S out and Hardware Testing				
NT *4 FR7	SUSTENANCE ENGINEERING AND END-OF-LIFE (EOL) SUPPORT			9 H	
Unit IV	e-Maintenance and Repair - Earn norments - Product EOL - Obsolescence Manager			- 11	ours

- 1. Explain 3051,52 and AVR Microcontroller Architecture.
 2. Develop an Assembly Language Program.
 3. Build an interface for I/O Devices using Embedded C and ALP
 4. Make use of internal and external peripherals.
 5. Develop an interface for Sensors and Actuators.

 References:
 1. Programming PIC ancrocontrollers with PIC basic by chuck helebuyek
 2. PIC microcontrollers-programming in basic by Milan verle.
 3. Mohammad All Mazidi, Sermad Naimi, SepehrNaimi; The AVR Microcontroller and Embedded Systems
 - using Assembly and C; is fedition, earson Education India.
 - 4. Dhanar jay Cadre, Programming and Customizing the AVR Microcontroller; 1 st Edition, McGraw Hill.

 5. The 2051 Advance True it and English file State and Using Agreemble and C. Second Edition Michaelmand All
 - The 8051 Microspanifolds and Pinbedded Systems Using Assembly and C Second Edition Muhammad Ali Mazidi Janica Cirilagie Mexidifa 6 a.D. McKinlay

UNEBEDDUD SYSTEMS LABORATORY
List of Experior netst
1. StudyofARMevarusunnasysien:
2. Interfacing ADC and DAC
3. Interfacing Commercial Commerc
4. Interfacing realtimectock and scrait port
5. Interfacing responses and Cas
6. Interfacing EPROManc interrupt
7. Mailbox
8. Interrupt performance characteristics of a R MandFPGA
9. FlashingorLEL's
10. Interfacilitystapper motor anotemperaturesensor
11. Implement nazigosepratocol with ARM
Total: 45 Hours
Additional Lagswithents:
LL_UCD display using Arduino processor
2. Interfacing of keyboard and serial port using Arduino processor
Course Outcomes! Entrepreneurship
A first completion of the course. Student will be able to
1. Writeprograms in ARViforaspecific Application V
1 & Interface A/Dane D//sconvertorswith ARMsystem
3 Writeprogrammesforingerfacingkeyboard, display, motorandsensor
© Comadateamini project inembeddedsystem
References:
 Sedra and Smith, "Micro Electronia Circuits"; Sixth Edition, Oxford University Press, 2011
2. Robert i. Hoylestad and Louis Masheresky, "Electronic Devices and Circuit Theory", 10th Edition, Pearson
Education (1991, 2004
3. David A. Ball. "Llectronic Devices and Circuits", Fifth Edition, Oxford University Press 2008
4. Millman I. and Tautoria "Pulse Digital and Switching Wavelons, RAMABALAN M.E., Ph.D.,
5 Millorgy contribution to become a distribution and the Property of the Contribution
E.G.S. Pillay Engineering College,

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

1703EC923	PATELL RECOGNITION AND MACHINE LEARNING	L	T	P	C
		3	0	0	3
	(Common to B.E / B.Tech - CSE, IT & ECE)				
Course Objectives:	The state of the s				
h. P	from the knownedge of moders, methods and tools used to solve regres	sion, c	lassifi	cation,	,
f_{i}	enture selection and density estimation problems				
2. P	rovide knowledge of learning and adaptation in supervised modes of	learni	ng		
	rovide knowledge of recognition, decision making and statistical lea-			ms.	

	4. Provide knowledge of all tent research topics and issues in Pattern Recog	mition ai	id Mac	chine
	5. Provide knowledge about tinear functions			
Unit I	SPEECH FUNDAMENTALS		91	Hours
Articulatory	Phonetics - Production and Classification of Speech Sounds; Acoustic Phonetics -	- acousti	cs of s	speech
production; Methods	Review of Digital Signal Processing concepts; Short-Time Fourier Transform, F	ilter-Ba	nk and	I LPC
Unit H	VLS) SIGNAU PROCESSING		91	Hours
An overvial Techniques:	of DSP concepts. Representations of DSP algorithms Loop bound and iteration bo Retiming. Esticion and Unfalding	ound-Tra	nsforr	nation
Unit III	RESYSTEM DESIGN		91	Hours
Characteristi low noise cir	os-amplifier of the manners-stability considerations-constant gain circles-concles broadband-high purver and multistage amplifiers.	stant VS	WR c	ircles-
Unit IV	MULTIMENA COMMUNICATION		91	Hours
animation_v	- Multimedia skills - Multimedia components and their characteristics - Text, sour deathardward	nd, imag	es, gra	phics,
	CLOUD COMPUTERG Stor Network in section of System Models for Distributed and Cloud Computer System		12 I	Hours
Juay) : u.			mnuti	no on
demand.	lic vs Pro to Cicus -Cloud Structors - Croud ecosystem - Service manageme Total:			ng on Hours
demand. Further Rea	diag:	45	+ 15	Hours
demand.	Total:	45	+ 15	Hours
demand.	ding: Dimensional Requesion and Model Selection, On Feature Selection in Gaussian M	45	+ 15	Hours
demand. Further Rea	diag: Dimensional Requesion and Model Selection, On Feature Selection in Gaussian M Const. After complete on the opense, Turbont will be able to	45 lixture C	+ 15 l	Hours
demand. Further Rea	ding: Dimensional Reduction and Model Selection, On Feature Selection in Gaussian M Const. A precumplation of the opening, become will be able to Laddenty areas where Pattern Recognition and Machine Learning can offer a	45 lixture C	+ 15 l	Hours
demand. Further Rea	diag: Dimensional Requesion and Model Selection, On Feature Selection in Gaussian M Const. After complete on the opense, Turbont will be able to	45 lixture C	+ 15 l	Hours
demand. Further Rea	ding: Omensional Reduction and Model Selection, On Feature Selection in Gaussian M Course From places of the openses about will be able to From places where Patient Recognition and Machine Learning can offer a 2: Days the the exempth and limitations of some techniques used in computation	45 lixture C	+ 15 l	Hours
demand. Further Rea	ding: Dimensional Reduction and Model Selection, On Feature Selection in Gaussian Model	45 lixture C	+ 15 l	Hours
Further Rea	diag: Dimensional Reduction and Model Selection, On Feature Selection in Gaussian Model Selection, On Feature Selection in Gaussian Model Selection, On Feature Selection in Gaussian Model Selection and Machine Learning can offer a 1. denuty areas where Patient Recognition and Machine Learning can offer a 2: Dasc the the grenath and limitations of some techniques used in computation to classification, regression and density estimation problems Describe genetic aggorithms, validation methods and sampling techniques	45 lixture C	+ 15 l	Hours
Further Rea	ding: Dimensional Reduction and Model Selection, On Feature Selection in Gaussian Model Selection, On Feature Selection in Gaussian Model Selection, On Feature Selection in Gaussian Model Selection and Machine Learning can offer a 2th Describe the extensity and limitations of some techniques used in computation to classification, regression and density estimation problems Describe genetic aggorithms, validation methods and sampling techniques at 1 Describe some discriminative, generative and kernel based techniques in Secribe and in the delivery sequential data.	45 lixture C solution ional Ma	+ 15 lusteri	Hours
Course Outo References: 1 Lawrence	ding: Dimensional Reduction and Model Selection, On Feature Selection in Gaussian Model Selection, On Feature Selection in Gaussian Model Selection, On Feature Selection in Gaussian Model Selection and Machine Learning can offer a 2th Data the the extensity and limitations of some techniques used in computation to the strong for classification, regression and density estimation problems Describe genetic aggorithms, validation methods and sampling techniques at Describe some discriminative, generative and kernel based techniques 3th Describe and model sequential data	45 Solution ional Ma	+ 15 lusteri	Hours
References: 1. Lawrence i 2. Keshab k 3. Reinhold L	Total: Dimensional Reduction and Model Selection, On Feature Selection in Gaussian Model Selection and Machine Learning can offer a 2th Gaussian Computation and Machine Learning can offer a 2th Gaussian Gaussian Model Selection, On Feature Selection in Gaussian Model Selection, On Feature Selection in Gaussian Model Selection and Machine Learning can offer a 2th Gaussian Model Selection and Machine Learning can offer a 2th Gaussian Model Selection and Machine Learning can offer a 2th Gaussian Model Selection and Machine Learning can offer a 2th Gaussian Model Selection and Machine Learning can offer a 2th Gaussian Model Selection and Machine Learning can offer a 2th Gaussian Model Selection and Machine Learning can offer a 2th Gaussian Model Selection and Machine Learning can offer a 2th Gaussian Model Selection and Machine Learning can offer a 2th Gaussian Model Selection and Machine Learning can offer a 2th Gaussian Model Selection and Machine Learning can offer a 2th Gaussian M	ducation ey, inter	+ 15 lusteri	Hours
References: 1.Lawrence i 2. Keshab k 3.Reinhold L	diag: Dimensional Reduction and Model Selection, On Feature Selection in Gaussian Model Selection, On Feature Selection in Gaussian Model Selection, On Feature Selection in Gaussian Model Selection and Machine Learning can offer a 2t Describe the greenath and limitations of some techniques used in computation of classification, regression and density estimation problems Describe genetic aggorithms, validation methods and sampling techniques at Describe and model sequential data Turdamentals of Speech Recognition", Pearson Earlies and Medical Sequential data Turdamentals of Speech Recognition, Pearson Earlies and Medical Sequential data Turdamentals of Speech Recognition, Pearson Earlies and Implementation, Wilesen Earlies and Implement	ducation ey, inter	+ 15 lusteri	Hours

1703EC024	SPEECH PROCESSING	L	T	P	C
		3	0	0	3
Course Obje	petives:	1	L		
	is. To make the students to understand the digital Speech fundamentals,				
	2. To study the digital models and processing of speech signal				
	3. To acquite the basic knowledge in filters, voice enhancement, voice res	toratio	n and		
Unit I	SPEECH PRODUCTION MGDEL			9 H	ours
1D sound w	raves-functional block of the Vocal tract model—Linear predictive co- effici nethod-Levinson-durbin algorithm-Auto-co- variance method-Lattice structur			-Aut	to-

Lattice co-efficient from IPC-Phonotic Representation of speech-Perception of Loudness - Critical bands -
Pitch perception - Audslery masking.
Unit IT SEATURE EXTRACTION OF THE SPEECH SIGNAL 9 Hours
Endpoint detection-Dynamic time warping. Eltch frequency estimation: Autocorrelation approach- Homomorphic
approach-Formant frequency estimation using vocal tract model and Homomorphic approach-Linear predictive co-
efficient -Poles of the vocal tract-Reffection co-efficient-Log Arearatio
Unit III FREQUENCY DOMAIN METHODS FOR SPEECH PROCESSING 9 Hours
Cepstrum- Line spectral frequencies- Functional blocks of the ear- Mel frequency cepstral co-efficients-
Spectrogram-Thus resolution versus il equancy ensolution-Discrete wavelettransformation.
Unit IV PATTERN RUCOS ATTION FOR SPEECH DETECTION 9 Hours
Back-propagation Neural Neural Neural Vootor Machine-Hidden Markov Model (HMM)-Gaussian Mixture
Model(GMM) -Unsuber Led Learning system. K-Means and Fuzzy K-means clustering - Kohonen self-
organizing man-Duntus anality adaction techniques: Principle component analysis (PCA), Linear
discriminant analysis (LDA), Kernel LDA (KLDA), Independent component analysis(ICA). Unit V SPEECH ANALYSIS AND SYNTHYSIS 9 Hours
Z TIOUIS
Non-uniform quantization for Guessian distributed data- Adaptive quantization-Differential pulse code modulation-
Code Exhad Linear production of ELF aduation assessment of the compressed speech signal Text to Speech (TTS)
analysis -Evolution of queen a speakeris's mems-limit selection methods - TTS Applications
Further Reading: 45 Hours
Phonetic Mechanisms in Speach Feix epison
Disorders of serraheral and Central Auditory Processing
Neurobiology of Statistical talormation Processing in the Auditory Domain
Course Outcomes
After completion of the course, Student will be able to
Illustrate how the speech production is modeled
2. Sommarize the various techniques involved in collecting the features from the speech signal
in both time and frequency domain
summarize the runctional blocks of the ear.
4 cumpare the various nattern recognition techniques involved in speech and speaker
detection
summarize the various speech compression techniques
References:
1. L.R.Rabiner and R.W.Schafer. Introduction to Digital speech processing", now publishers USA, 2007
2. E.S.Gooi, "Digital speech processing testing testing testing restrict." Springer, 2014
3. L.R.Rabiner and "W.S.Shofer," The Processing of speech signals", PrenticeHall, 1978
4. T.F. Quatieri, "Discrete-line Speech Equal Processing", Prentice-Hall, PTR, 2001
5. L. Hanzaetel, "Voice Compression and Communications", Wiley/ IEEE ,2001.

1703EC025	3 % C1 C1 1 B1-	L	T	P	C
	VESI Signal Processing	3	0	0	3
Course Ob	ectives:		'		
	1. To enable students to Jesign VLSI systems with high speed and low	power.			
	 To encourage students to develop a working knowledge of the central ideas of implementa DSF algorithm with optimized hardware. 				
Unit I	INTRODUCTION TO DEP SYSTEMS			9 F	lours
	of DSP concerts, Representations of DSP algorithms, Systolic Architectur x-Matrix Multiplication, 2D Systolic Array Design, Digital Lattice Filter St				m,

Derivation of One-Multiplies Laulee Ethern Managined Lattice Filter, Pipelining of Lattice Filter.	
Unit II PIPELINING AND RETIVING	9 Hours
Scaling and Hound of Noise and France description of digital filters, Scaling and Round off No	ise
computation, Round off Noise in Pipelined HR Filters, Round off Noise Computation using st	ate variable
description, Slow-down, Retiming and Pineliping.	
Unit III BIT-LEVEL ARITHMETIC ARCHITECTURES	9 Hours
Bit level arithmene archite stures- parallel multipliers, interleaved floor-plan and bit-plane- based dig	gital filters, Bit
serial multipliers. Bit serial filter design und mephamentation. Canonic signed digit arithmetic, Distrib	
Unit IV REPAINANT ARTECHMETIC	9 Hours
Redundant administration Redundant near the representations carry free radix-2 addition and subtraction	, Hybrid radix-4
addition, Radix-2 hybrid and undant multiplication architectures, data format conversion, Redundant t	o Non
redundant convertar.	
Unit V NUMBER AL STRENGTH REDUCTION	9 Hours
Numerical Strength Reduction Subscreen on Plan pation, Multiple Constant Multiplication, Subscreen	pression
Sharing in Digital Filter, And New And Market and Number Splitting.	
TC-4-1.	45.16.
Further Reading	45 Hours
1. Special decoders	
the contract of the contract o	
Course Outcomes: Enterpreneurship	
	h.SL
After proportion of the course, Student will be able to	HIL
2 Know about algorithmic strength reduction	
Convolue HP, filters	
I Identify bit level arithmetic algorithms	
References	
References:	Wilay
References: 1. Kechao & Parkin' VLSI Eightel Signal Processing Systems, Design and implementation", V	Wiley,
References:	Wiley,
References: 1. Kechan K. Parkin v VLSI Engited a ginal Processing Systems, Design and implementation ", V Intersections, June 1997.	
References: 1. Kechao K. Parka v. VLSI English Signal Processing Systems, Design and implementation ", V. Interscience, Linu 2. U. Mei er - Basia District Signal Processing Systems, Design and implementation ", V. Interscience, Linu 2. U. Mei er - Basia District Signal Processing Systems, Design and implementation ", V. Interscience, Linu 2. U. Mei er - Basia District Signal Processing Systems, Design and implementation ", V. Interscience, Linu 2. U. Mei er - Basia District Signal Processing Systems, Design and Implementation ", V. Interscience, Linu 2. U. Mei er - Basia District Signal Processing Systems, Design and Implementation ", V. Interscience, Linu 2. U. Mei er - Basia District Signal Processing Systems, Design and Implementation ", V. Interscience, Linu 2. U. Mei er - Basia District Signal Processing Systems, Design and Implementation ", V. Interscience, Linu 2. U. Mei er - Basia District Signal Processing Systems, Design and Implementation ", V. Interscience, Linu 2. U. Mei er - Basia District Signal Processing Systems, Design and Implementation ", V. Interscience, Linu 2. U. Mei er - Basia District Signal Processing Systems, Design and Implementation ", V. Interscience, Linu 2. U. Mei er - Basia District Signal Processing Systems, Design and Interscience, Linu 2. U. Mei er - Basia District Signal Processing Systems, Design and Implementation ", V. Interscience, Linu 2. U. Mei er - Basia District Signal Processing Systems, Design and Interscience, Linu 3. U. Mei er - Basia District Signal Processing Systems, Design and Interscience, Linu 4. U. Mei er - Basia District Signal Processing Systems, Design and Interscience, Linu 4. U. Mei er - Basia District Signal Processing Systems, Design and Interscience, Linu 4. U. Mei er - Basia District Signal Processing Systems, Design and Interscience, Linu 4. U. Mei er - Basia District Signal Processing Systems, Design and Interscience, Linu 4. U. Mei er - Basia District Signal Processing Systems, Design and Design and Design and Design and Des	
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References: 1. Kecha. C. Park. VLSI Legital's goal Processing Systems, Design and implementation", Valuation of the Interscience, Law. 2. U. Meiller Basic District Street Street Street Systems, Design and implementation ", Valuation of the Interscience Law. 2. U. Meiller Basic District Street	
References: 1. Kecha. C. Park. VLSI Ligital's gizel Processing Systems, Design and implementation", V. Interscience, Linux. 2. U. Meyer Basic District Systems are a sing with Field Programmable Gate Arrays", Spring Edicion, 2001. S. RAMABALAN, M.E., Ph.D.	
References: 1. Kechao K. Parkin VI.S. Explicit signal Processing Systems, Design and implementation ", Vinterscience, Line 2. U. Meyer - Basia District View of State Arrays", Spring with Field Programmable Gate Arrays", Spring Edition 2001. S. RAMABALAN, M.E., Ph.D. PRINCIPAL E.G.S. Pillay Engineering College,	
References: 1. K. colab. K. Park in VLSI English Signal Processing Systems, Design and implementation ", V. Interscience, Laure 22. U. Mei er - Bassa District State 2001. S. RAMABALAN, M.E., Ph.D.	

1703EC026	D.S. ON CONTRACTOR	L	T	P	C
	RF SYSTEM DESIGN	3	0	0	3
Course Obj	ectives:				
	1. To understand the basics of system design				
	To understand the concepts of radio architectures				
	 To introduce to the students the transmitter and receiver system designantly sit. 	n techn	iques	and	
	4 To learn the applications of RE systems in wireless communication.				
Unit I	. TRANSCEIVER ARCHITECTURES		T	9 H	ours
	and Homodyne architectures. Discrete and CMOS realization passive	e com	ponent	ts for	RF
Impedance	Matching Distortion IP's and Blocking Effects, Noise Figure, Noise ma	tching	condi	tions.	Friis

loss, Active mixers. Gilbert cells. linearity and Noise Figure of mixers	
Unit III OSCILLATORS	9 Hours
Negative tran conductance, nonlinearit, and Differential LC tuned oscillators, Ring oscilloscillator, Quadrature oscillators—Phase noise	
Unit IV PLLS AND SYNTHESEZERS	9 Hours
Phase Detectors, charge pumps and their transfer functions, Synthesizers based on first, seco PLLs and stability issues, introduction to integer and fractional N synthesizers	nd and third order
Unit V POWER AMPLIFIERS	9 Hours
Class A, B, C, D, E, F and AB power amplifiers, Linearization and impedance matching amplifiers.	g issues of power
Total:	45 Hours
Further Reading: Measurement of noise, Jitter, SFOR, intermodulation products for RF system	
Course Outcomes	
rier completion of the course. Student will be able to	¥-
1. Understand radio transceiver architectures	
2. Design and Analyze CMOS LNAs, Mixers	
3. Dosign and Analyze Oscillators, PLLs,	
Design and Analyze Synthesizers and Power Amplifiers.	
References:	
1. B. Razavi, — RF Microero-Tronics!, Pearson Education, 2nd edition, 2012.	
 Thomas Lee, — The Design of CMOS Radio Frequency Integrated Circuits, Cam Press, Second Edition, 2004 	bridge University
 Zhipe: Chi. Weh Performance High Speed VLSI Architectures for Wireless Applications University of Minnesota, 2000. 	Communication

E.G.S.PH.LAYENGINEERINGCOLLEGE

(Autonomous)

Approved by AICTE, New Delhi Affiliated to AnnaUniversity, Chennai Accredited by NAAC with "A"Gradej Accredited by NBA (CSE, EEE, MECH)

NAGAPATTINAM—611002



B.E. Diectronics and Communication Engineering

Full Time Curriculum and Syllabus

Fourth Year-Eighth Semester

Course	Course Name		т	Т	P	C	Max	imum	Marks
Code	Const Haile	L	1	P		CA	ES	Total	
Theory Cou	rse					-			
	Professional Elective -VII		3	-	-	3	40	60	100
	Professional Elective -VIII		3	-	э	3	40	60	100
	Profescional Elective - IX		3			3	40	60	100
Laboratory	Course					-			
1704EC851	Project Work		-	-	18	9	50	50	100
		ctal	9	3	18	18	170	230	400
Professional El	lective - VII	-							
1703EC027	Multimedia Communication		3	0	0	3	40	60	100
1703EC028	Wireless Sensor Networks		3	0	0	3	40	60	100
1703EC029	Rada, and Nuvigation Aids		3	0	0	3	40	60	100
1703EC030	Microwave Integrated Circuits		3	0	0	3	40	60	100
1703EC03 i	Satellile Communication		3	0	0	3	40	60	100
Professional El	lective - VIII								
1703EC032	System-on Chip Design		3	0	0	3	40	60	100
1703EC033	Network on Chip Design		3	0	0	3	40	60	100
1703EC034	Low Power VLS/ Design		3	0	0	3	40	60	100
1703EC035	Analog IC Design		3	0	0	3	40	60	100
1703EC036	iMixed Signal CMOS Design		3	0	0	3	40	60	100

Professional El	ective - EX							7.8
1703EC037	Electromagnetic Interference and Compatibility	3	0	0	3	40	60	100
1703EC038	Digita! System Design and Testing	3	0	0	3	40	60	100
1703EC039	Optical Networks	3	0	0	3	40	60	100
1703EC040	RF MEMS	3	0	0	3	40	60	100
1703EC041	Digital Switching and Transmission	3	0	0	3	40	60	100
1703EC042	ARM Processors	3	0	0	3	40	60	100
1703EC043	Mooile Computing	3	0	0	3	40	60	100

Professional Elective - VII

	MAIL TIMEDIA COMMUNICATIONS I	LT	P	С
		3 0	0	3
	(Common to B.E / B.Tech –ECE, CSE, IT)			
Course Objective				
	To have a detailed knowledge of compression and decompression techniques	S		
7.00	To introduce the concepts of multimedia communication			
	. To introduce standards of MPEG			
Unit I	ntroduction to Mullimedia Communications		5 !	Hours
Components of	nultimedia system. Desirable features, Applications of multimedia system	s, Intro	duction	to
different types. A	ultimedia storage device.			
	igital audio representation			Hours
Digital audio re	presentation and processing-time domain and transform domain repres	entation	s. Cod	ing
standards mans m	ission and processing of digital audio. Musical instrument synthesizers.			
	mage coding algorithms			Hours
Still image cod	ing-IPEG. Discrete cosine Transform. Sequential and Progressive DC	T based	lencod	ing
algorithms, loss.	ess cooling, hierarchical coding. Basic concepts of discrete wavelet trans	sform c	oding a	ınd
	coding algorithms. Introduction to JPEG2000.	-		
	IPEG			Hours
MPEG video enc	1, structure of encoding and decoding process, MPEG 2 enhancements, and oder.	differen	t blocks	of
Unit V	irbea and ing	T	10	
				Hours
Content based vi		on. Di		Hours oding
Content based vitechniques and video and H263 video a	dec coding overvize of MPEG 4 video, motion estimation and compensation in additional based of MPEG 4 video encoder and decoder.	on. Di	ferent o	oding
and H263 viden:	dec coding-overvizer of MPEG 4 video, motion estimation and compensation in additional compensation models. Block diagram of MPEG 4 video encoder and decoder, ording to finiques. Total:	on. Dit	ferent o	oding
techniques and vand H263 video: Further Reading	dec coding-overview of MPEG 4 video, motion estimation and compensation in addition models. Block diagram of MPEG 4 video encoder and decoder, ording techniques. Total:	on. Dir An over	ferent o	oding H261
techniques and vand H263 video: Further Reading	dec. coding-synthese of MPEG 4 video, motion estimation and compensation in additional models. Block diagram of MPEG 4 video encoder and decoder. coding techniques. Total: Advanced compression rechniques	on. Dir	ferent o	oding H261
techniques and vand H263 video: Further Reading	dec. colling-synches of MPEG 4 video, motion estimation and compensationification models. Block diagram of MPEG 4 video encoder and decoder, ording techniques. Total: Advanced compression rechniques Coding Techniques	on. Din	ferent o	oding H261
Further Reading	dec. coding-overvise of MPEG 4 video, motion estimation and compensation in details. Block diagram of MPEG 4 video encoder and decoder, ording techniques. Total: Advanced compression rechniques Coding Techniques s:	on. Di	ferent o	oding H261
Further Reading	dec. coding-overview of MPEG 4 video, motion estimation and compensation models. Block diagram of MPEG 4 video encoder and decoder, ording techniques. Total: Advanced compression rechniques Coding Techniques so the completion of the course, Student will be able to	on. Din	ferent o	oding H261
techniques and vand H263 video: Further Reading Course Outcome	dec. colling-byteries of MPEG 4 video, motion estimation and compensation models. Block diagram of MPEG 4 video encoder and decoder, orling techniques. Total: Advanced compression rechniques Coding Techniques s: ther completion of the course, Student will be able to L. Describe various multimedia components	on. Din	ferent o	oding H261
techniques and vand H263 video: Further Reading Course Outcome	dec. colling-synches. If MPEG 4 video, motion estimation and compensation in adels. Block diagram of MPEG 4 video encoder and decoder, ording techniques. Total: Advanced compression rechniques. Coding Techniques. Coding Techniques. Iter completion of the course, Student will be able to Describe various multimedia components. Describe compression and decompression techniques.	on. Din	ferent o	oding H261
Further Reading	dec. coding average of MPEG 4 video, motion estimation and compensation models. Block diagram of MPEG 4 video encoder and decoder, ording techniques. Total: Advanced compression rechniques Coding Techniques ter completion of the course, Student will be able to Describe various multimedia components Describe compression and decompression techniques Apply the compression concepts in multimedia communication	on. Din	ferent o	oding H261
Further Reading	dec coding synthics of MPEG 4 video, motion estimation and compensation models. Block diagram of MPEG 4 video encoder and decoder, coding techniques. Total: Advanced compression techniques Coding Techniques Coding Techniques The completion of the course, Student will be able to Describe various multimedia components Describe compression and decompression techniques Apply the compression concepts in multimedia communication Describe the video encoding	on. Din	ferent o	oding H261
Further Reading	dec. coding average of MPEG 4 video, motion estimation and compensation models. Block diagram of MPEG 4 video encoder and decoder, ording techniques. Total: Advanced compression rechniques Coding Techniques ter completion of the course, Student will be able to Describe various multimedia components Describe compression and decompression techniques Apply the compression concepts in multimedia communication	on. Din	ferent o	oding H261
Further Reading Course Outcom References:	dec coding synthics of MPEG 4 video, motion estimation and compensation models. Block diagram of MPEG 4 video encoder and decoder, coding techniques. Total: Advanced compression techniques Coding Techniques Coding Techniques Total: Describe various multimedia components Describe compression and decompression techniques Apply the compression concepts in multimedia communication Describe the video encoding	on. Din	ferent o	oding H261

- 2. J.S. Chitode, "Information coding techniques", Technical publications, 1st edition 2007.
- 3. Raif steinmetz, Klara Nahrstedt, "Multimedia: Computing, Communications and Applications", Pearson education, 2002
- 4. John Billamil, Louis Molina, "Multimedia: An Introduction", PHI, 2002

1703EC028	WIRELESS SENSOR NETWORKS	L	T	P	С
		3	0	0	3
	(Common to B.E / B.Tech – CSE, IT & ECE)				
Course Obje					*:
	1. To study about Wireless networks, protocol stack and standards.				
	2. To study about fundamentals of 3G Services, its protocols and app				
	3. To study about evolution of 4G Networks, its architecture and app	lications.			
#I24 #	WHO IS DOC APPROXIMATE TO SHARE OF SHARE				
Unit I	WIRELESS NETWORK ARCHITECTURE				lour
System archit BRAN, Hipe	Wireless network logical architecture – Network physical architecture ecture, protector architecture, physical layer, MAC layer, 802.11 Enhance (LAN2 – Bluetooth- VoWLAN and VoIP security – WPA- IEEE80 um allocation for WIMAX	ements - Hipe	r LAl	V: WA	ATM laye
	ADHOC AND SENSOR NETWORKS -Mobile IP: IP packet delivery, Agent discovery, tunneling and encap.	1.1	1	91	lour
enhancements recovery, Infl	Time out freezing, Selective retransmission, Transaction oriented 3	on control, far Indirect TCP	st retr	orking ansm oping	it/fas TCP
networks	Tanadan dilang		.0. 5	0 111	
Unit IV	DESIGN OF WIRELESS WIDE AREA NETWORK			9 F	lour
LTE network Unit V Introduction - network rout	GMSC/SMS-IVMSC, Firewall, DNS/DHCP-High speed Downlink pararchitecture and pretabol. CURRENT AND FLTURE OF WIRELESS NETWORKING TEC- 4G vision – 4G features and challenges - Applications of 4G – Leading-Network independent roaming- Gigabit wireless LANs- OFD and coding with hims Sot schedules Cognitive Radio	CHNOLOGY ing edge WNT	`: Wir	9 H	lour mes
		Total:		45 H	lour
Further Read	ing.				
į.	Signal Encoding Techniques, Cordiess Systems and Wireless Local Lo				
	Equalization, Coding, and Diversity, Heterogeneous Wireless Network	S		0	
Course Outco		preneu	MA	1D	
Į.	After completion of the course, Student will be able to			1/	
	1. Conversant with the latest 3G/4G and WIMAX networks and its	rchitecture.		/	
1	2. Design and implement Routing Techniques				
	of Anaryze wireless network environment for any application using	g latest wirele	ss pro	tocol	s and
ļ.	standards,				
1	4. Compare and Analyze the Different types Networks				
	5. Implement different type of applications for smart phones an	d mobile dev	rices	with	lates
D - C	network strategies.				
References:		1100 1 1	r mm	C 3.4	1
Broadban	Iman, Stefan Parkvall, Johan Skold and Per Berning, "3G Evolution d', Second Edition, Academie Pless, 2008.		LTE:	tor M	obili
	umar, D. Manjunath, Joy kuri, "Wireless Noworking, Libst Edition, Els		0.20		
	ıykin , Michael Moher, David Kollolliai, Godern Wireless Communic	cations", First	Editic	n, Pe	arso
Education	Ur. S. KANIAUS CO.				
	PRINCIPAL				
	- C. Dilloy Engineering College,				

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

1703EC029	RADAR AND NAVIGATION AIDS	L	Т	P	С
300		3	0	0	3
Course Obje	ctives:				
	L. Able to understand radar equations and types of radar				
	Able to understand aids and navigation systems				
4	3. Obtain the knowledge of Doppler effects and equations nd detect the mov	ng ob	jects		
WT 14 H			-		
Unit I	RADAR EQUATIONS				ours
RADAR BIO	ck Diagram & operation- RADAR Frequencies- RADAR Equation- Detection	n of s	signal	s in N	oise-
	s section of targets- RADAR cross section fluctuations- transmitter power- puls	e repe	tition	freque	ency-
Unit II	and propagation effects	-	T -		
	MTI AND PULSE DOPPLER RADAR	1 75	1	9 H	ours
Mon Cohorer	to Doppler & MTI RADAR - Delay Line canceller - Moving Target Detector - Pu	ilse D	opple	r RAL	AR-
Sequential Lo	t MTE-CW RADAR- FMCW RADAR- Tracking RADAR- Monopulse Tracki	ng – (Conic	al Scai	n and
Unit III	PAD A SIGNAL DETECTION AND PROPAGATION ON WAVES		_	Δ.Τ.	
		. 1. 1	C		ours
	teria- automatic detection- constant false alarm rate receiver- information avail				
propagation	agram- pulse compression introduction to clutter- surface clutter RADAR	equa	-11011	anom	aious
Unit IV	TRACKING, MAGING AND SCANNING RADAR		1	0 II	ours
	read monop the tracking control scan and sequential lobing, low angle tra	cking	oir o		
radar. Introdu	iction to synthetic aperture radar thacking in range and Doppler, acquisition Pri	ncinle	an :	hased	arrav
	scanning, and its operation. Radio ranges: LF/MF four course radio ranges,				
range vor rec	e vine equipment. Is perbolic system of nevigation: LORAN, DECCA	V 1 11	Ommin	anco	ionai
	SATELLITE NAVIGATIONAL SYSTEM		1	9 H	ours
	nding system. Ground controlled approach system, Microwave landing system	n. Dis	tance		
equipment .	ACAN Doppler pavigation Doppler effect, Track stabilization .SATELL	ITE 1	navig	ation	GPS
principle of o	permion per tion hospion determination, principle of GPS receiver and applicati	ons	Ü		
	Total:			45 H	ours
Further Rea		-		10 11	7413
	GPS principle of operation, Position location determination, principle of	of GF	S re	ceiver	and
	asplications		5 10	001101	ana
Course Outc	omes: Fmployabi	itt	1		
	After completion of the course. Student will be able to	1			
	1. Students equipped to find the range and tracking moving object	-			
	2. Learn the equations of radar and Doppier effect				
	5. Study the satellite navigation system				
	4. Learn the range equation				
	5. Understand Principles of navigation and landing aids		1		
References:	170	-/			
1. "Inc	oduction to radar system", Merrili Lskolnik 3 rd edition Tata McGraw 2003	1			
2. "Elei	neras electronic payigation system", N.S. Nagaraja, 2 nd edition Tata McGrava Nich	REOF	n.D.		
3. " Pri:	nerts electronic navigation system, N.S.Nagaraja, 2 nd edition Tata McGraya No. ple of Radar, J.C. Loomay, Phil. 2 nd edition 2004, Dr. S. RANNABACIPAL				
4. "Rad	lar Principles Person 2 Veebles John Wiley 2004	Colle	ge,		
27/2-71	E.G.S. Pillay Engineering Thethi, Nagore - 611	002.			
	Thethi, Nagore - 611 Nagapattinam (Dt) Tam	il Nad	u.		
	Nagapattinam (50)				

1703EC030	MICROWAVE INTEGRATED CIRCUITS	L	T	P	C
		3	0	0	3
Course Object	ives:				
	 To unhance the students knowledge in the area of planar microwa make them understand the intricacies in the design of microwave c 			ing ar	nd to
	2. To impart knowledge about the state of art in MIC technology.				

Unit I INTRODUCTION TO MICROWAVE CIRCUITS 9 Hours
Definitions – Frequency Bands – Lumped versus Distributed Circuits - Behavior of finite length transmission
lines - General Characteristics of PC Boards - Transmission Lines on PC Boards - Passives made from
Transmission Lines - Resonators - Combiners, Splitters and Couplers
Unit II MATCHING NETWORKS AND FILTER DESIGN 9 Hours
Circuit Representation of two port RF/Microwave Networks: Low Frequency Parameters, High Frequency
Parameters, Transmission Matrix, ZY Smith Chart, Design of Matching Circuits using Lumped Elements,
Matching Network Design using Distributed Elements, 11 ter design.
Unit III AMPLIFIERS AND OSCILLATORS 9 Hours
Amplifiers: Stability of an active networks - Gain Consideration in Amplifiers - Noise
Consideration in active networks - Brondband Amplifier design - Low Noise Amplifier Design, Oscillators: Oscillator versus Amplifier Design - Oscillation conditions - Design and stability considerations of Microwave
Transistor Oscillator
Unit IV MIXERS AND CONTROL CIRCUITS 9 Hours
Mixer Types - Conversion Loss - SSB and DSB Mixers - Design of Mixers: Single Ended Mixers - Single
Balanced Mixers - Sub Merctonic Olode Mixers , Microwave Diodes , Phase Shifters - PIN Diode Attenuators
Unit V MICTOWAYER DESIGNAND MEASUREMENT TECHNIQUES 12 Hours
Microwave Integral of Company and Material Hybrid versus Monolithic MICs - Multichip Module
Technology Fabrica Technolysis, Miniaturization techniques, Introduction to SOC, SOP, Test fixture
measurements, brobe traffer transferentials, thornal and cryogenic measurements, experimental field probing
techniques.
Total: 45 + 15 Hours
Further Reading
T. Menolitie Microvave Integrated circuit (mmic) technology for space
2. Int. graded Microwave puckaging Antenna design
Course Outcomes:
After completion of the course, Student will be able to
1. Equipped from fundamentals to recent techniques in MIC technology.
2, the appeadently design and assess the performance of various planar configurations.
· 3. Know measurement technique Entrepreneur hip
4 Abre to design microwave amplifiers and oscillators
a. Able to design tumped and uranibated elements.
References:
1. Thomas H.Lec, Planar Microwave Engineering", Cambridge University Press, 2004,
2. Matthe a W. Kacmanesh, "Raon Prequency and Microwave Electronics", Pearson Education,
R Edit of 110
3. "Microwa at Transfor Angulacis — Analysis and Design", II Edition, Prentice Hall, New Jersy
4. Ravender Gayal, "Mor of the MIC; Technology & Design", Artech House, 1989.
 5. Gupta K.C. and Amarin singh. Microwave Integrated Circuits", John Wiley, New York, 1975. 6. Hoffman R.A. Scant Book Department of Circuits", Artech House, Boston, 198
7. Ulrich L. Rohde and D. Microwave Circuit Design for Wireless Applications", John W. Dr. S. RAMARAL AND DESIGN FOR THE STATE OF THE S
W.Dr. S. RAMABALAN, M.E. Ph.D. PRINCIPAL
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Thethi, Nagore - 611 002.
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Nagapattinam (Dt) Tamil Nadu.

1703EC031	SATELLET'E COMMUNICATION	L	T	P	C
		3	0	0	3
Course Objects	AG.				
	Le To impart knowledge about the Satellite communication.				
	2. To enhance the students' knowledge in astronomy and space				
Unit I S/	ATELLITE ORBITS			9 H	ours

Introduction - Spectrum allocations for satellite systems -Kepler's Laws - orbital parameters - orbital perturbations - station keeping - Type of orbits - Geo stationary orbits - look angle determination- limits of visibility - eclipse sub-sitellite point - sun transit outage - launching procedures - launch vehicles and propulsion. Unit II SPACE AND EARTH SEGMENT Spacecraft technology- structure- power supply- attitude and orbit control - thermal control and propulsion communication subsystems - telementy, tracking and command - TranspondersAntenna subsystem, Equipment reliability. Earth station technology -Receive only home TV systems - MATV - CATV - Transmit Receive Earth Stations. Unit III I SATELLITE ACCESS 9 Hours Modulation and Multiples in a Voice, Data, Video, Analog - digital transmission system-Digital video broadcast - multiple access: FDMA, TDMA, CDMA- assignment methods -spread spectrum communication -compression encryption. Mobile satellite Service GSW, CPS, communication between satellites SATELLITEEINK DESIGN Introduction- Equivalent isotropic addited power -Transmission Losses - Link power budget equation -System Noise, Carrier to Noise ratio - uplink - downlink - effects of rain - combined uplink and downlink C/N ratio -inter modulation noise - Interference between satellite circuits. SHITTING TYPENCATIONS 12 Hours Satellite mobile activity — 19 AT Nadas at GPS - O homm-iridium Direct Broadcast satellites (DBS) - Direct to home Broad ast (DTH) -(Misital audio broadcast (DAB) - World space services, Business TV (BTV) -GRAMSAT - Specialized survives: E roull, Wideo conferencing, Internet- INTELSAT Series- INSAT -INMARSAT. Remote sea and 45 Hours Total: Further Reading. Linearthend in saterity communication, Recent launching satellites and its application, Commenication between satellites, Comparison of satellite Course Outcomes: After compaction of the pourse, Student will be able to Our use orbital medianics and launch methodologies. Describe various space subsystems. 5. Excusin different subsystems of earth segment Design and analyze link power budget for satellites Describe in training Satellite Applications Referenceat 1. Wilbut L. Frackert, Hender G. Nayderhoud, Robert A. Nelson, "Satellite Communication Systems Engineering , Planace Hall Scarcon, 2007 2. N.Agarwai, "Design of Geodynchronous Space Craft", Prentice Hall, 1986. Bruce R. Elbert, "The Satellite Communication Applications", Hand Book, Artech House Bostan London, 1:197. Tri T. Ha. "Digital Satellite Communication" 11 nd edition, 1990. Emanuel Fitheriakis, "Manual of Satellite Communications", Mc Graw Hill Book Co., 1984. "Telseammunication Trans Mission Systems", Mc Graw-Hill Book Co., 1983 Brian Ackrego, "World Stablife Communication and earth station Design", BSP professional Books, 1990. G.B. Bleszard, "Introducing Smallile communications", NCC Publication, 1985.

Professional Electives - VIII

1703EC032	SYSTEM ON CHIP DESIGN	L	T	P	C
		3	0	0	3
Course Objectives:			L		

M.Richieria, "Satellite Communication Systems-Design Principles", Macmillan 2003.

To introduce architecture and design concepts underlying system on chips To gain knowledge of designing SoCs To impart knowledge about the hardware-software design of a modest complexity chip the way from specifications, modeling, synthesis and physical design Unit I : SYSTEW ARCHITECTURE: OVERVIEW 9 Hours Components of the system --Processor architectures --Memory and addressing --system level interconnection -SeC design requirements and specifications -design integration -design complexity cycle time, die area and cost, ideal and oractical scaling, area-time-power tradeoff in processor design, Configurabile Unit II PROCESSOR SELECTION FOR SOC 9 Hours Overview occasion core selection. Basic concepts—instruction set, branches, interrupts and exceptions. Paric elements in instruction handling -Minimizing pipeline delays -reducing the cost of branches -Robust processors - Vector processors, VLIW processors, Superscalar processors. Unit III 9 Hours SoC external memory, SoC internal memory, Scratch pads and cache memory -cache organization and write policies -strategies for line replacement at mise time -split I-and D-caches -multilevel caches -SoC memory systems -board based memory systems -simple processor/memory interaction Unitiv INTERCONNECT ARCHITECTURES AND SOC CUSTOMIZATION 9 Hours Bus architectures -SoC standard buses -AMBA, CoreConnect -Processor customization approaches Reconfigurable teconologies -mastring designs onto reconfigurable devices -FPGA based design -Architecture of FPGA, FPGA interconnect technology, FPGA memory, Floor plan and routing. Unit v FFGA BASED EMBEDDED PROCESSOR 9 Hours Hardware Johnware task paragosing - FPGA fabric Immersed Processors -Soft Processors and Hard Processors - 7 col flow for Hardware Coldesign-Interfacing Processor with memory and peripherals - frees of Concentrations of the Mississipping interface. Avaion Switch Matrix, OPB Bus Interface, Creating a Customized Antonicommisser -FPGA-based Signal interfacing and Conditioning 45 Hours Total: Further Readings lidedest avstem design trends ..MPSot. a nestgo Course Outcomes: After completion of the course. Student will be able to Explain an important compenents of a System-on-Chip and an embedded system, Ve. cichal browne are embadded sortware 2.Outline the anglor design flows for digital hardware and embedded software LISCUSS for major produced and trade-offs concerning performance, cost and power Lamber of the strain of the strain of the systems Agein the knowledge of designing SoCs. at adarstand designing adaptement in specification, Modelling, synthesis and physical References: 1. Michael J. Frynn and Wayne Luk, Computer System Design: System-on-Chip", John Wiley and sons, 1011 2. Rabul Dobey. Introduction to Embudded System Design Using Field Programmable Gate Arrays', Springer Verlay Condon Ltd., 2009. 3. Sudeen Passiona and wind Dud, On-Chip Communication Architectures-System on Chip Interconnect, Essever, 2011 4. Wayne Wolf, "Modern WLSI Design - System - on - Chip Design", Prentice Hall, 3rd Edition, Wayne Wolf Modern VLST Design - 1P pase pace Hall, 4th Edition, 2008. Dr. S. RAMABAKAN, M.E., Ph.D.,

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Nagapattinam (Dt) Tamil Nadu.

1703EC033	NETWORK ON CHIP	L	Т	P	C
		3	0	0	3
		1			
Course Obj	the contract of the contract o				
	Lunderstand the various classes of Interconnection networks				
	2 learn about different routing rechniques for on-chip network				
	5.know the importance of flow control in on-chip network				_
Unit i	ICN ARCHITECTEDER			9 H	anr
	Classification of ICNs - Topologies - Direct networks - Indirect networks-P	erform	ance		
Unit ii	SPATCHING TECHNLOGIES	CHIOTHI	ance	9 H	
Basic switch	ing techniques - Virtual channels - Hybrid switching techniques Optimizing	switch	ing te		
	of sylitching fechniques - Deadlock, livelock and Starvation		0	1	
Unit 111	Legetimo technologies			9 H	our
Taxonom (of reading alarminance Deterministic routing algorithms - Partially adapt	ive alg	orithn	ns - F	ull
	orithms - Routing in MINs - Routing in switch-based networks with irregular				
allocation po	dicies Figue control				
Unit (1)	VETWORK OF CHIP		1	9 H	our
NoC Archite	actives - Remarkablementers - Ama, energy and reliability constraints - No	C desi	ign Ite	ernativ	res
dali y-si Se	ics (OoS)/Isages to NoC architectures				
Unit V	EMERCING TRENUS			9 H	our
. Fault tolera	ance เรียบราคา มีเทศรัฐบาน อสาระที่มีคากปลังอักการอย่าง technologies- 3D NoC- Simul	ation			
	T	otal:		45 H	our
Further Rea	plings				
	EMphaprocessor System on chip (MpSOC)				
	2.NgC in Real time systems (RTS)				
Course Out	**************************************				
and the facility of the facili	EU Bre S				
	After completion of the course. Student will be able to				
	After completion of the course. Student will be able to				
	After completion of the course, Student will be able to it, fulnity the major components required to design an on-chip network				
	After completion of the course, Student will be able to 1. Identify the major components required to design an on-chip network 2. Compare different switching leshingues	- 100			
	After completion of the course, Student will be able to it identify the major components required to design an on-chip network at compare different switching lechniques at Sevaluate the performance of given on chip process				
References.	After completion of the course, Student will be able to it deathly the major components required to design an on-chip network accompare different synching techniques between the performance of given on chip process between the dead look free and live look free routing protocols a. Simplate and cases the performance of given on chip network				
References.	After completion of the course, Student will be able to the dentity the major components required to design an on-chip network the compare different synching lechniques Shavaruate the performance of given on chip process Tethousing the dead lock free and live lock free routing protocols	rks: .A	ın E	nginee	erin
I. Kan	After completion of the course, Student will be able to I. Identify the major components required to design an on-chip network L. Compare different synching lechniques Set valuate the performance of given on chip process Futuousmuse the dead lock free and live lock free routing protocols Simplicite and agrees the performance of given on chip network Laures, auditaker Valantaneniti, Laoner Ni, "Interconnection Networks (1996) and Laures (1996) and Laures (1996).				
7. I.a. Apr 2. Wil	After completion of the course, Student will be able to I dentify the major components required to design an on-chip network Longare different synching techniques Longare different synching techniques Longare different synching techniques Longare different synching techniques Longare different synchimance of given on chip network Longare and easies the performance of given on chip network Longare and easies Talamaneniii. Lioner Ni, "Interconnection Netwo				
Apr Apr 	After completion of the course, Student will be able to I deathly the major components required to design an on-chip network A compare different synching techniques Servature the performance of given on chip process Semousmus the dead look fireband live look free routing protocols Simplate and cases the performance of given on chip network Actuals, audhaker Valantanonili, Lioner Ni, "Interconnection Networough and Magniferent 2002 light language Dalay, Brigh Towles, "Principles and Practices of Interconnection finants, 2004	on Net	works	", Mo	rga
2. Will Kau 3. Gio	After completion of the course, Student will be able to I deathly the major components required to design an on-chip network A compare different synching techniques 5. Evaluate the performance of given on chip process Demonstrate the dead lock free and live lock free routing protocols 5. Simplishe and agrees the performance of given on chip network August and haker Valantanentil Lioner Ni, "Interconnection Networoach Avorgan scattmann, 2002 lizard langue Dally, Brian Towles, "Principles and Practices of Interconnection for any 204 vanni De Wichell Luca Banini, "Networks on Chips; Technology and Tool	on Net	works	", Mo	rgai
7. Apr 2. Wil Kau 3. Gio 200	After completion of the course, Student will be able to I death the major components required to design an on-chip network A compare different synching lechniques 5. Evaluate the performance of given on chip process Tethousing the dead lock free and live lock free routing protocols 5. Simplishe and agrees the performance of given on chip network 2. Sunday, madhakar Yalamanonili, Lioner Ni, "Interconnection Network 3. Evaluate the performance of given on chip network	on Net	works	", Mo Kaufm	rga
1. I.a. Apr 2. Will Kau 3. Gio 200 4. Nati	After completion of the course, Student will be able to I death the major components required to design an on-chip network A compare different switching feelinques Sevaruate the performance of given on chip process Temoustante the dead lock free and live lock free routing protocols Simulate and agree the performance of given on chip network Analo, muchaker Valamanentii, Lioner Ni, "Interconnection Network analo, Michell Euca Banini, "Networks on Chips: Technology and Tool Galie Di Enright Januar Li-Sinameth, "On-Chip Networks (Synthesis I	on Net	works	", Mo Kaufm	rga
1. La. Apr. 2. Will Kau 3. Gio 200 4. Nate Arc.	After completion of the course, Student will be able to I deathly the major components required to design an on-chip network Looppare different synching techniques Looppare different dead look fireb and live look free routing protocols Looppare different dead look fireb and live look free routing protocols Looppare different dead look fireb and live look free routing protocols Looppare different dead look fireb and live look free routing protocols Looppare different lives performance of given on chip network Looppare different lives designed lives and Practices of Interconnection Looppare different lives design, "Principles and Practices of Interconnection Looppare different lives design, "Networks on Chips: Technology and Tool Looppare different lives design, "On-Chip Networks (Synthesis Intercure)", Morgan and Claypool, 2001	on Netros", Mon	works	", Mo Kaufm Comp	rgan
1. Apr. 2. Wil Kau 3. Gio 200 4. Nation 5. Fays	After completion of the course, Student will be able to I death the major components required to design an on-chip network A compare different switching feelinques Sevaruate the performance of given on chip process Temoustante the dead lock free and live lock free routing protocols Simulate and agree the performance of given on chip network Analo, muchaker Valamanentii, Lioner Ni, "Interconnection Network analo, Michell Euca Banini, "Networks on Chips: Technology and Tool Galie Di Enright Januar Li-Sinameth, "On-Chip Networks (Synthesis I	on Netros", Mon	works	", Mo Kaufm Comp	rgan

1703EC034	LOW POWER VLSI DESIGN	L	T	P	C
		3	0	0	3
Course Objective					
Iden	ify sources of power in an IC.				
Iden	lify the power reduction techniques based on technology indep	endent and	techr	olog	У
depe	i dent				

Design memory circuits with low power dissipation.		Power dissipation mechanism in various MOS logic style.	
Unit 1		Identify suitable techniques to reduce the power dissipation.	
Hierarchy of limits of power — Sources of power consumption — Physics of power dissipation in CMOS FET devices — Basic principle of low power design. Unit II POWER OF HAZATION 9 Hour Logic level power optimization — Circuit level tow power design — circuit techniques for reducing power consumption in address and multipliers. Unit III DESIGN OF LAW POWER CMOS CIRCUITS 9 Hour Computer at the tooks techniques for low power system — reducing power consumption in memories — low power clock, inter-connect and layout design — Advanced techniques — Special techniques. Unit IV POWER ESTIMATION 9 Hour Power Estimation — Simulation power analysis.—Probabilistic power analysis. Unit V SYNTHESIS AND SOFT WARE DESIGN FOR LOW POWER 9 Hours Synthesis for Low power. Synthesis for Low power Selected level transform — software design for low power. Further Read ag. Total: 45 Hours Further Read ag. Total: 45 Hours Further Read ag. Total: 45 Hours Further Read ag. After a supplemental figure CMOS circuits and low VDD for non-critical paths. Course Cuarcoures. After a supplemental figure CMOS circuits. After a supplemental figure CMOS circuits. References: 1 Gary Seas, Francia allow conver digital VLSI design". Kluwer, 1998. 2. Knushid Rev. and S. Francia allow conver CMOS VLSI circuit design", Wiley, 2000. 3. Dimitrio-Soudris Chirstian Figure, Costas Goutis, "Designing CMOS Circuits for Low Power", Kluwer, 1992. 4. J.B. Kale and Lift Law, Town voltage CMOS VLSI circuit CMOS design", Kluwer, 1995. 5. Abdelatt Reference and R. W. Brosedersen, "Low power digital VLSI design", Kluwer, 1995. 5. Abdelatt Reference and R. W. Brosedersen, "Low power digital VLSI design", Kluwer, 1995. 5. Abdelatt Reference and R. W. Brosedersen, "Low power digital VLSI design", Kluwer, 1995. 7. James B. Kule, Shih-Chia, "Low voltage CMOS VLSI Circuits", Wiley 1999.		Design memory curouits with low power dissipation.	
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Unit 101 DESIGN OF LOW POWER CMOS CIRCUITS Computer arithmetic techniques for tow power system — reducing power consumption in memories — low power clock, inter-connect and leyout design — Advanced techniques — Special techniques. Unit IV POWER ESTEMATION 9 Hour Power Listenation — Simulation power analysis — Probabilistic power analysis. Unit V POWER ESTEMATION 9 Hour Power analysis — Probabilistic power analysis. Unit V POWER ESTEMATION 9 Hour Power analysis — Probabilistic power analysis. Unit V POWER ESTEMATION 9 PHOUR 9 Hour Power analysis — Probabilistic power analysis. Unit V POWER ESTEMATION 9 PHOUR 9 Hour Power analysis — Probabilistic power analysis. Unit V POWER ESTEMATION 9 PHOUR 9 Hour Power Power. Total: 9 Hour Power Synthesis for low power. Total: 45 Hour Power Read 8.5. I mail VID prentecture, High VDD for critical paths and low VDD for non-critical paths. Course Guacemes. After completion of the course, Student will be able to 1.1. Attoo the basics and advanced techniques in low power design process in proceeding and process of the low power CMOS circuits 1.2. Attoo power Estemation in low power 4.2. Analyze Power Estemation in low power 5. Symbolis the Low Power CMOS VLSI circuit design", Wiley, 2000. 3. Dimitrios Soudris Chiratian Pigner, Cestar Goutis, "Designing CMOS Circuits for Low Power", kluwer, 2002. 4. J.B.K. to ord J.P.L.L., Flow voltage CMOS VLSI Circuits", Wiley 1999. 5. A P.A. bendrasekeren and R. W. Broadersen, "Low power digital CMOS design", Kluwer, 1995. 5. Abdelatified out Michael Elmason, "Low power digital VLSI design", Kluwer, 1995. 5. Abdelatified out Michael Elmason, "Low power digital VLSI design", Kluwer, 1995. 5. Jones B.K. Low, Solib-Chael Lat, "Low voltage SOI CMOS VLSI devices and Circuits", John Wiley	Logic lev	el power ontimization – Circuit level low power design – circuit techniques for	r reducing power
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Power Estimation techniques — fosic power estimation — Simulation power analysis — Probabilistic power analysis. Unit V		ck. Inter connect and layout design - Advanced techniques - Special techniques.	
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Synthesis for law power Schavioral level transform - software design for low power. Total: 45 Hours		numeron techniques - locic power estimation - Simulation power analysis -Pro-	obabilistic power
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Course Objectives			7115	***	
Tolin	out knowledge shout the Analog VI SI Design.			.,	
	innee the students' knowledge in classical VLSI Design	1			
				-	
Minist V 1 186 NO	DEVICES AND CIRCUITS			9 H	ours
United a distriction					
	VUSI design flow - Device modeling -Moore's lay	w- MOS transistors	- depl	etion	and
Evoluter of 10's .	VLS1 design flow - Device modeling -Moore_s law perations - NMCR and CMOS inverter circuits - Stick				
Evolution of 10's a enhancement mode of	VUS1 design flow - Device modeling -Moore_s law perations - NMOS and CMOS inverter circuits - Stick B circuits using CMOS				

NMOS and CMOS fabrication - Newell, Pewell and twin tub processes	
Unicity implementation strategies	0.11-
PLDs - PAL, PLA, CPLD, Full custom and Seral custom ASIC design- Standard cell design, FPGA	9 Hours
block architectures FPGA interconnect - Routing - FPGA, Xilinx 4000 series - Altera Cyclone III	A building
Unit IV CURRENT TRENDS	9 Hours
BiCMOS and GaAs devices- introduction to Low power VLSI circuit techniques - Introduction to at	9 Hours
mixed signal design.	maiog and
Unit V VERILOG HARDWARE DESCRIPTION LANGUAGE	9 Hours
Introduction it Verlag Holl -Behavior modeling Tasks and functions -Verilog structure, sy	vntax and
seminatics. Generalized and Datafles greatering Design examples - Adders, Multiplexers, F.	lin Flons
Registers courages	пр тюры,
Total:	45 Hours
Burther Readings	
Analog Design Essentials	
Statifity and Escandacy Compensation	
Course Outcome.	
After complete world comme Student will be able to	
L. Daplace the operation and characteristics of MOS transistor	
2. Disease the steps involved in fabrication of IC	
Octifie vie rost of slick diagram and Layout diagram	
Discuss the besid concepts of FPGA and ASIC	
1 Use the Vernog liDit for digital design	
References	
1 Packing Polyand Pelman on K. "Paste VI St Design!, PHI publication, Second Edition, 2011.	
2. Charle F. Roll — Digital Systems Dodge Using VHDLI, CL Engineering/Cengage Learni	ing India
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 Samir PartitlesVerillog HDL Guide to Digital design and synthesisl, Second Edition Education, 2006. 	Pearson
4. M.J. Smith I application specific integrated circuits!, Addison Wesley, 2008.	
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1763MC936	MAXED MONAL CMOS DESIGN	L	T	P	C
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Course Objectives.	1. Yo know mixed signal circuits like DAC, ADC, P		1		
	2. To gain knowledge on filter design in mixed signa 3. To acquire knowledge on design different archite 1 mode		ed sig	gnal	
Unit I CMOS AMPLIFOTES BASICS			9 Hours		
Unit! (MU) S	EVERY HER LIS BASICS			9 H	ours
Introduction to MOS odefling and a decimal a	Capacitances- bassive components and their parasiti		d lar		
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