SIRCRREDDYCOLLEGEOFENGINEERING

(AUTONOMOUS)

Approved by AICTE & Permanently Affiliated To JNTUK, Kakinada
Accredited By NBA, Accredited By NAAC with 'A' Grade

DEPARTMENT OF ELETRONICS AND COMMUNICATION ENGINEERING

CR24

(Applicable from the academic year 2025-26 onwards)

Course Structure & Syllabus

ELETRONICS AND COMMUNICATION ENGINEERING

II M.TECH I & II SEMESTER

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DEPARTMENT OF ELETRONICS AND COMMUNICATION ENGINEERING

PROGRAMME STRUCTURE

*Students be encouraged to go to Industrial Training/Internship for at least 2-3 weeks during semester break

Course code	Course Name	Periods /Week		Credits
		Lecture (L)	Practice (P)	
II YEAR I-SEMISTER				
245721E51 245721E52 245721E53	1. Scripting Languages for VLSI 2. Digital System Design & Verification 3. Hardware Software co-design	3	0	3
245721E61 245721E62 245721E63 245721E64 245721E65 245721E66	1. Business Analytics 2. Industrial Safety 3. Operations Research 4. Cost Management of Engineering Projects 5. Composite Materials 6. Waste to Energy	3	0	3
245721PW1	Dissertation Phase -I /Industrial Project **(to be continued and evaluated next semester)**	0	20	10#
		Total		16

#Evaluated and Displayed in IV Semester Marks list.

*Students going for Industrial Project/Thesis will complete these courses through MOOCs.

Course code	Course Name	Periods /Week		Credits
		Lecture (L)	Practice (P)	
II YEAR II-SEMISTER				
245722PW2	Project/ Dissertation Phase-II **(continued from III semester)**	0	32	16
		Total		16

Audit Course 1& 2

1. English for Research Paper Writing
2. Disaster Management
3. Sanskrit for Technical Knowledge
4. Value Education
5. Constitution of India
6. Pedagogy Studies
7. Stress Management by Yoga
8. Personality Development through Life Enlightenment Skills

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SCRIPTING LANGUAGES FOR VLSI

	L	P	C
II Year I Semester	**3**	**0**	**3**

Course Code: 245721E51

Course Outcomes: At the end of this course, the student will be able to:

CO-1: Gain fluency in programming with scripting languages

CO-2: Create and run scripts using PERL/TCL/PYTHON in CAD Tools

CO-3: Demonstrate the use of PERL/PYTHON/ TCL in developing system and web applications

Mapping of Course Outcomes with PO's and PSO's:

Course outcome s	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1		1			2			3					1	1
CO2			2		3	3			3				2	2
CO3		2			3				3				2	2

UNIT-I:

Introduction to Scripts and Scripting: Basics of Linux, Origin of Scripting languages, scripting today, Characteristics and uses of scripting languages.

PERL: Introduction to PERL, Names and values, Variables and assignment, Scalar expressions, Control structures, Built-in functions, Collections of Data, working with arrays, Lists and hashes, Simple input and output, Strings, Patterns and regular expressions, Subroutines, Scripts with arguments.

UNIT-II:

Advanced PERL: Finer points of Looping, Subroutines, Using Pack and Unpack, working with files, Type globs, Eval, References, Data structures, Packages, Libraries and modules, Objects, Objects and modules in action, tied variables, interfacing to the operating systems, Security issues.

UNIT-III:

TCL: The TCL phenomena, Philosophy, Structure, Syntax, Parser, Variables and data in TCL, Control flow, Data structures, Simple input/output, Procedures, Working with Strings, Patterns, Files and Pipes, Example code.

UNIT-IV:

Advanced TCL: The eval, source, exec and up-level commands, Libraries and packages, Namespaces, trapping errors, Event-driven programs, Making applications 'Internet aware', 'Nuts-and-bolts' internet programming, Security issues, TCL and TK integration.

UNIT-V:

PYTHON: Introduction to PYTHON language, PYTHON-syntax, statements, functions, Built-in functionsand Methods, Modules in PYTHON, Exception Handling.

Text Books:

1. The World of Scripting Languages- David Barron, Wiley Student Edition, 2010.
2. PYTHON Web Programming, Steve Holden and David Beazley, New Riders Publications

References:

1. TCL/TK: A Developer's Guide- ClifFlynt, 2003, Morgan Kaufmann Series.
2. Core PYTHON Programming, Chun, Pearson Education, 2006.
3. Learning Perl, Randal L. Schwartz, O‟ Reilly publications 6th edition 2011.
4. Linux: The Complete Reference", Richard Peterson McGraw Hill Publications, 6th Edition,2008.

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DEPARTMENT OF ELETRONICS AND COMMUNICATION ENGINEERING

DIGITAL DESIGN AND VERIFICATION

	L	P	C
II Year I Semester	**3**	**0**	**3**

Course Code: 245721E52

Course Outcomes: At the end of this course, students will be able to

CO-1: Familiarity of Front end design and verification techniques and create reusable test environments.

CO-2: Verify increasingly complex designs more efficiently and effectively.

CO-3: Use EDA tools like Cadence, Mentor Graphics.

Mapping of Course Outcomes with PO's and PSO's:

Course outcome s	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1		1			2			3					1	1
CO2			2		3	3			3				2	2
CO3		2			3				3				2	2

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Unit 1

Revision of basic Digital systems: Combinational Circuits, Sequential Circuits, Logic families. Synchronous FSM and asynchronous design, Meta-stability, Clock distribution and issues, basic building blocks like PWM module, pre-fetch unit, programmable counter, FIFO, Booth'smultiplier, ALU, Barrel shifter etc.

Unit 2

Verilog /VHDL Comparisons and Guidelines, Verilog: HDL fundamentals, simulation, and test bench design, Examples of Verilog codes for combinational and sequential logic, Verilog AMS. IP and Prototyping: IP in various forms: RTL Source code, Encrypted Source code, Soft IP,Netlist, Physical IP, and Use of external hard IP during prototyping, Case studies, and Speedissues.

Unit 3

System Verilog and Verification: Verification guidelines, Data types, procedural statements and routines, connecting the test bench and design, Assertions, Basic OOP concepts, Randomization. Testing of logic circuits: Fault models, BIST, JTAG interface Introduction to basic scripting language: Perl, Tcl/Tk

Unit 4

Current challenges in physical design: Roots of challenges, Delays: Wire load models

Generic PD flow, Challenges in PD flow at different steps, SI Challenge - Noise & Crosstalk, IR Drop, Process effects: Process Antenna Effect &Electro migration

Unit 5

Programmable Logic Devices: Introduction, Evolution: PROM, PLA, PAL, Architecture of PAL's, Applications, Programming PLD's, FPGA with technology: Anti-fuse, SRAM, EPROM, MUX,FPGA structures, and ASIC Design Flows, Programmable Interconnections, Coarse grained reconfigurable devices

Text Books:

1. Douglas Smith, "HDL Chip Design: A Practical Guide for Designing, Synthesizing &
2. Simulating ASICs & FPGAs Using VHDL or Verilog", Doone publications, 1998.
3. Samir Palnitkar, "Verilog HDL: A guide to Digital Design and Synthesis", Prentice Hall,2nd Edition, 2003.

Reference Books:

1. Doug Amos, Austin Lesea, Rene Richter, "FPGA based Prototyping Methodology Manual", Synopsys Press, 2011.
2. Christophe Bobda, "Introduction to Reconfigurable Computing, Architectures, Algorithms and Applications", Springer, 2007.
3. Janick Bergeron, "Writing Test benches: Functional Verification of HDL Models", Second Edition, Springer, 2003.

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DEPARTMENT OF ELETRONICS AND COMMUNICATION ENGINEERING

HARDWARE SOFTWARE CO-DESIGN (ELECTIVE V)

	L	P	C
II Year I Semester	**3**	**0**	**3**

Course Code: 245721E53

Course outcomes: At the end of the course the student able to

CO-1: About the Hardware-Software Code sign Methodology.

CO-2: How to select a target architecture and how a prototype is built and how emulation of a prototype is done.

CO-3: Brief view about compilation technologies and compiler development environment.

CO-4: Understand the importance of system level specification languages and multi-language co simulation.

Mapping of Course Outcomes with PO's and PSO's:

Course outcome s	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	3		3	3		1						2	2
CO2		2	1		3			3			2		2	1
CO3		1		2	2				3				2	1
CO4					2						1		2	1

UNIT-I: Co- Design Issues: Co- Design Models, Architectures, Languages, A Generic Co-design Methodology. **Co- Synthesis Algorithms:** Hardware software synthesis algorithms: hardware – software partitioning distributed system co-synthesis.

UNIT-II: Prototyping and Emulation

Prototyping and emulation techniques, prototyping and emulation environments, future developments in emulation and prototyping architecture specialization techniques, system communication infrastructure

Target Architectures

Architecture Specialization techniques, System Communication infrastructure, Target Architecture and Application System classes, Architecture for control dominated systems (8051-Architectures for High performance control), Architecture for Data dominated systems (ADSP21060, TMS320C60), Mixed Systems.

UNIT-III: Compilation Techniques and Tools for Embedded Processor Architectures

Modern embedded architectures, embedded software development needs, compilation technologies, practical consideration in a compiler development environment.

UNIT-IV: Design Specification and Verification

Design, co-design, the co-design computational model, concurrency coordinating concurrent computations, interfacing components, design verification, implementation verification, verification tools, Interface verification.

UNIT-V: Languages for System-Level Specification and Design-I

System-level specification, design representation for system level synthesis, system level specification languages.

Languages for System-Level Specification and Design-II

Heterogeneous specifications and multi language co-simulation, the cosyma system and Lycos system.

Text Books:

1. Hardware / Software Co- Design Principles and Practice – Jorgen Staunstrup, Wayne Wolf – 2009, Springer.
2. Hardware / Software Co- Design - Giovanni De Micheli, Mariagiovanna Sami, 2002, Kluwer Academic Publishers.

Reference Books:1.A Practical Introduction to Hardware/Software Co-design -Patrick R. Schaumont - 2010 – Springer Publications.

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DEPARTMENT OF ELETRONICS AND COMMUNICATION ENGINEERING

BUSINESS ANALYTICS

(Open Elective)

	L	P	C
II Year I Semester	**3**	**0**	**3**

Course Code: 245721E61

Course Outcomes:

CO-1: Students will demonstrate knowledge of data analytics.

CO-2: Students will demonstrate the ability of think critically in making decisions based on data and deep analytics.

CO-3: Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.

CO-4: Students will demonstrate the ability to translate data into clear, actionable insights

Mapping of Course Outcomes with PO's and PSO's:

Course outcome s	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	3											2	2
CO2	3	3					2			1			2	2
CO3	3	2											2	2
CO4	1						2						2	

Unit1:

Business analytics: Overview of Business analytics, Scope of Business analytics, Business Analytics Process, Relationship of Business Analytics Process and organisation, competitive advantages of Business Analytics.

Statistical Tools: Statistical Notation, Descriptive Statistical methods,

Review of probability distribution and data modelling, sampling and estimation methods overview.

Unit 2:

Trendiness and Regression Analysis: Modelling Relationships and Trends in Data, simple Linear Regression.Important Resources, Business Analytics Personnel, Data and modelsfor Business analytics, problem solving, Visualizing and Exploring Data, Business Analytics Technology

Unit 3:

Organization Structures of Business analytics, Team management, Management Issues, Designing Information Policy, Outsourcing, Ensuring Data Quality, Measuring contribution of Business analytics, Managing Changes.Descriptive Analytics, predictive analytics, predicative Modelling, Predictive analytics analysis,DataMining,Data Mining Methodologies, Prescriptive analytics and its step in the business analytics Process, Prescriptive Modelling, nonlinear Optimization.

Unit 4:

Forecasting Techniques: Qualitative and Judgmental Forecasting, Statistical Forecasting Models, Forecasting Models for Stationary Time Series, Forecasting Models for Time Series with a Linear Trend, Forecasting Time Series with Seasonality, Regression Forecasting with Casual Variables, Selecting Appropriate Forecasting Models.

Monte Carlo Simulation and Risk Analysis: Monte CarleSimulation

Using Analytic Solver Platform, New-Product Development Model, Newsvendor Model, Overbooking Model, Cash Budget Model.

Unit 5:

Decision Analysis: Formulating Decision Problems, Decision Strategies with the without Outcome Probabilities, Decision Trees, The Value of Information, Utility and Decision Making.

Recent Trends in : Embedded and collaborative business intelligence, Visual data recovery, Data Storytelling and Data journalism

Reference:

1. Business analytics Principles, Concepts, and Applications by Marc J. Schniederjans, Dara G. Schniederjans, Christopher M. Starkey, Pearson FTPress.
2. Business Analytics by James Evans, persons Education.
3.

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DEPARTMENT OF ELETRONICS AND COMMUNICATION ENGINEERING

INDUSTRIAL SAFETY

(Open Elective)

	L	P	C
II Year I Semester	**3**	**0**	**3**

Course Code: 245721E62

Unit-1:

Industrial safety: Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive steps/procedure, describe salient points of factories act 1948 for health and safety, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc, Safety color codes. Fire prevention and firefighting, equipment and methods.

Unit-2:

Fundamentals of maintenance engineering: Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost & its relation with replacement economy, Service life of equipment.

Unit-3:

Wear and Corrosion and their prevention: Wear- types, causes, effects, wear reduction methods, lubricants-types and applications, Lubrication methods, general sketch, working and applications, i. Screw down grease cup, ii. Pressure grease gun, iii. Splash lubrication, iv. Gravity lubrication, v. Wick feed lubrication vi. Side feed lubrication, vii. Ring lubrication, Definition, principle and factors affecting the corrosion. Types of corrosion, corrosion prevention methods.

Unit-4:

Fault tracing: Fault tracing-concept and importance, decision treeconcept, need and applications, sequence of fault finding activities, show as decision tree, draw decision tree for problems in machine tools, hydraulic, pneumatic, automotive, thermal and electrical equipment"s like, I. Any one machine tool, ii. Pump iii. Air compressor, iv. Internal combustion engine,v. Boiler,vi .Electrical motors, Types of faults in machine tools and their generalcauses.

Unit-5:

Periodic and preventive maintenance: Periodic inspection-concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii.Air compressors, iv. Diesel generating (DG) sets, Program and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance

Reference:

1. Maintenance Engineering Handbook, Higgins & Morrow, Da InformationServices.
2. Maintenance Engineering, H. P. Garg, S. Chand andCompany.
3. Pump-hydraulic Compressors, Audels, McgrewHillPublication.
4. Foundation Engineering Handbook, Winterkorn, Hans, Chapman &HallLondon

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DEPARTMENT OF ELETRONICS AND COMMUNICATION ENGINEERING

OPERATIONS RESEARCH

(Open Elective)

	L	P	C
II Year I Semester	**3**	**0**	**3**

Course Code: 245721E63

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

CO-1: Students should able to apply the dynamic programming to solve problems of discreet and continuous variables.

CO-2: Students should able to apply the concept of non-linear programming

CO-3: Students should able to carry out sensitivity analysis

CO-4: Student should able to model the real world problem and simulate it.

Mapping of Course Outcomes with PO's and PSO's:

Course outcome s	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	3											2	2
CO2	3	3					2			1			2	2
CO3	3	2											2	2
CO4	1						2						2	

Unit 1:

Optimization Techniques, Model Formulation, models, General L.R Formulation, Simplex Techniques, Sensitivity Analysis, Inventory Control Models

Unit 2

Formulation of a LPP - Graphical solution revised simplex method - duality theory - dual simplex method - sensitivity analysis - parametric programming

Unit 3:

Nonlinear programming problem - Kuhn-Tucker conditions min cost flow problem - max flow problem - CPM/PERT

Unit 4

Scheduling and sequencing - single server and multiple server models - deterministic inventory models - Probabilistic inventory control models - Geometric Programming.

Unit 5

Competitive Models, Single and Multi-channel Problems, Sequencing Models, Dynamic Programming, Flow in Networks, Elementary Graph Theory, Game Theory Simulation

References:

1. H.A. Taha, Operations Research, An Introduction, PHI, 2008
2. H.M. Wagner, Principles of Operations Research, PHI, Delhi, 1982.
3. J.C. Pant, Introduction to Optimisation: Operations Research, Jain Brothers, Delhi, 2008
4. Hitler Libermann Operations Research: McGraw Hill Pub. 2009
5. Pannerselvam, Operations Research: Prentice Hall of India 2010
6. Harvey M Wagner, Principles of Operations Research: Prentice Hall of India 2010

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DEPARTMENT OF ELETRONICS AND COMMUNICATION ENGINEERING

COST MANAGEMENT OF ENGINEERING PROJECTS
(Open Elective)

II Year I Semester	**L**	**P**	**C**
	3	**0**	**3**

Course Code: 245721E64

Introduction and Overview of the Strategic Cost Management Process Cost concepts in decision-making; Relevant cost, Differential cost, Incremental cost and Opportunity cost. Objectives of a Costing System; Inventory valuation; Creation of a Database for operational control; Provision of data for Decision-Making.

Project: meaning, Different types, why to manage, cost overruns centres, various stages of project execution: conception to commissioning. Project execution as conglomeration of technical and non-technical activities.Detailed Engineering activities. Pre project execution main clearances and documents Project team: Role of each member. Importance Project site: Data required with significance. Project contracts.Types and contents. Project execution Project cost control. Bar charts and Network diagram. Project commissioning: mechanical and process

Cost Behavior and Profit Planning Marginal Costing; Distinction between Marginal Costing and Absorption Costing; Break-even Analysis, Cost-Volume-Profit Analysis. Various decisionmaking problems. Standard costing and Variance Analysis. Pricing strategies: Pareto Analysis. Target costing, Life Cycle Costing. Costing of service sector.Just-in-time approach, Material Requirement Planning, Enterprise Resource Planning, Total Quality Management and Theory of constraints.Activity-Based Cost Management, Bench Marking; Balanced Score Card and ValueChain Analysis.Budgetary Control; Flexible Budgets;Performance budgets; Zero-based budgets.Measurement of Divisional profitability pricing decisions including transfer pricing.

Quantitative techniques for cost management, Linear Programming, PERT/CPM, Transportation problems, Assignment problems, Simulation, Learning Curve Theory.

References:

1. Cost Accounting A Managerial Emphasis, Prentice Hall of India, New Delhi
2. Charles T. Horngren and George Foster, Advanced Management Accounting
3. Robert S Kaplan Anthony A. Alkinson, Management & Cost Accounting
4. Ashish K. Bhattacharya, Principles & Practices of Cost Accounting A. H. Wheeler publisher
5. N.D. Vohra, Quantitative Techniques in Management, Tata McGraw Hill Book Co. Ltd.

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COMPOSITE MATERIALS

(Open Elective)

II Year I Semester	**L**	**P**	**C**
	3	**0**	**3**

Course Code: 245721E65

UNIT–I:
INTRODUCTION: Definition – Classification and characteristics of Composite materials. Advantages and application of composites. Functional requirements of reinforcement and matrix.Effect of reinforcement (size, shape, distribution, volume fraction) on overall composite performance.

UNIT – II:
REINFORCEMENTS: Preparation-layup, curing, properties and applications of glass fibers, carbon fibers, Kevlar fibers and Boron fibers. Properties and applications of whiskers, particle reinforcements. Mechanical Behavior of composites: Rule of mixtures, Inverse rule of mixtures. Isostrain and Isostress conditions.

UNIT – III:
Manufacturing of Metal Matrix Composites: Casting – Solid State diffusion technique, Cladding – Hot isostaticpressing. Properties and applications. Manufacturing of Ceramic Matrix Composites: Liquid Metal Infiltration – Liquid phase sintering. Manufacturing of Carbon – Carbon composites: Knitting, Braiding, Weaving. Properties and applications.

UNIT–IV:
Manufacturing of Polymer Matrix Composites: Preparation of Moulding compounds and prepregs – hand layup method – Autoclave method – Filament winding method – Compression moulding – Reaction injection moulding. Properties and applications.

UNIT – V:
Strength: Laminar Failure Criteria-strength ratio, maximum stress criteria, maximum strain criteria, interacting failure criteria, hygrothermal failure. Laminate first play failure-insight strength; Laminate strength-ply discount truncated maximum strain criterion; strength design using caplet plots; stress concentrations.

TEXT BOOKS:

1. Material Science and Technology – Vol 13 – Composites by R.W.Cahn – VCH, West Germany.
2. Materials Science and Engineering, An introduction. WD Callister, Jr., Adapted by R. Balasubramaniam, John Wiley & Sons, NY, Indian edition,2007.

References:

1. Hand Book of CompositeMaterials-ed-Lubin.
2. Composite Materials – K.K.Chawla.
3. Composite Materials Science and Applications – Deborah D.L.Chung.
4. Composite Materials Design and Applications – Danial Gay, Suong V. Hoa, and Stephen W. Tasi.

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WASTE TO ENERGY

(Open Elective)

II Year I Semester	**L**	**P**	**C**
Course Code: 245721E66			
	3	**0**	**3**

Unit-I:

Introduction to Energy from Waste: Classification of waste as fuel – Agro based, Forest residue, Industrial waste - MSW – Conversion devices – Incinerators, gasifiers, digestors

Unit-II:

Biomass Pyrolysis: Pyrolysis – Types, slow fast – Manufacture of charcoal – Methods - Yields and application – Manufacture of pyrolytic oils and gases, yields and applications.

Unit-III:

Biomass Gasification: Gasifiers – Fixed bed system – Downdraft and updraft gasifiers – Fluidized bed gasifiers – Design, construction and operation – Gasifier burner arrangement for

thermal heating – Gasifier engine arrangement and electrical power – Equilibrium and kinetic consideration in gasifier operation

Unit-IV:

Biomass Combustion: Biomass stoves – Improved chullahs, types, some exotic designs, Fixed bed combustors, Types, inclined grate combustors, Fluidized bed combustors, Design, construction and operation - Operation of all the above biomass combustors.

Unit-V:

Biogas: Properties of biogas (Calorific value and composition) - Biogas plant technology and status - Bio energy system - Design and constructional features - Biomass resources and their classification - Biomass conversion processes - Thermo chemical conversion - Direct combustion - biomass gasification - pyrolysis and liquefaction - biochemical conversion - anaerobic digestion - Types of biogas Plants – Applications - Alcohol production from biomass - Bio diesel production - Urban waste to energy conversion - Biomass energy programme in India.

References:

1. Non Conventional Energy, Desai, Ashok V., Wiley Eastern Ltd., 1990.
2. Biogas Technology - A Practical Hand Book - Khandelwal, K. C. and Mahdi, S. S., Vol. I & II, Tata McGraw Hill Publishing Co. Ltd., 1983.
3. Food, Feed and Fuel from Biomass, Challal, D. S., IBH Publishing Co. Pvt. Ltd., 1991.
4. Biomass Conversion and Technology, C. Y. WereKo-Brobby and E. B. Hagan, John Wiley & Sons, 1996.

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(DISSERTATION) DISSERTATION PHASE – I AND PHASE – II

	L	P	C
II Year I Semester	**0**	**20**	**10**

Course Code: 245721PW1

Course Outcomes: At the end of this course, students will be able to

CO-1: Ability to synthesize knowledge and skills previously gained and applied to an in-depth study and execution of new technical problem.

CO-2: Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design.

CO-3: Ability to present the findings of their technical solution in a written report.

CO-4: Presenting the work in International/ National conference or reputed journals.

Mapping of Course Outcomes with PO's and PSO's:

Course outcome s	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	1	3									1	1
CO2		3	3	3									2	2
CO3	3		2	3	3	3				3			2	1
CO4	3									3	3	3	2	2

Syllabus Contents:

The dissertation / project topic should be selected / chosen to ensure the satisfaction of the urgent need to establish a direct link between education, national development and productivity and thus reduce the gap between the world of work and the world of study.

The dissertation should have the following

- Relevance to social needs of society
- Relevance to value addition to existing facilities in the institute
- Relevance to industry need
- Problems of national importance
- Research and development in various domain

The student should complete the following:

- Literature survey Problem Definition
- Motivation for study and Objectives
- Preliminary design / feasibility / modular approaches
- Implementation and Verification
- Report and presentation

The dissertation stage II is based on a report prepared by the students on dissertation allotted to them. It may be based on:

- Experimental verification / Proof of concept.
- Design, fabrication, testing of Communication System.
- The viva-voce examination will be based on the above report and work.

Guidelines for Dissertation Phase – I and II at M. Tech. (Electronics):

- As per the AICTE directives, the dissertation is a yearlong activity, to be carried out and evaluated in two phases i.e. Phase – I: July to December and Phase – II: January to June.
- The dissertation may be carried out preferably in-house i.e. department‟s laboratories and centers OR in industry allotted through department‟s T & P coordinator.
- After multiple interactions with guide and based on comprehensive literature survey, the student shall identify the domain and define dissertation objectives. The referred literature should preferably include IEEE/IET/IETE/Springer/Science Direct/ACM journals in the areas of Computing and Processing (Hardware and Software), Circuits-Devices and Systems, Communication-Networking and Security, Robotics and Control Systems, Signal Processing and Analysis and any other related domain. In case of Industry sponsored projects, the relevant application notes, while papers, product catalogues should be referred and reported.
- Student is expected to detail out specifications, methodology, resources required, critical issues involved in design and implementation and phase wise work distribution, and submit the proposal within a month from the date of registration.

- Phase – I deliverables: A document report comprising of summary of literature survey, detailed objectives, project specifications, paper and/or computer aided design, proof of concept/functionality, part results, A record of continuous progress.
- Phase – I evaluation: A committee comprising of guides of respective specialization shall assess the progress/performance of the student based on report, presentation and Q &A. In case of unsatisfactory performance, committee may recommend repeating the Phase-I work.
- During phase – II, student is expected to exert on design, development and testing of the proposed work as per the schedule. Accomplished results/contributions/innovations should be published in terms of research papers in reputed journals and reviewed focused conferences OR IP/Patents.
- Phase – II deliverables: A dissertation report as per the specified format, developed system in the form of hardware and/or software, a record of continuous progress.
- Phase – II evaluation: Guide along with appointed external examiner shall assess the progress/performance of the student based on report, presentation and Q &A. In case of unsatisfactory performance, committee may recommend for extension or repeating the work