



STELLA MARY'S COLLEGE OF ENGINEERING

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai and Accredited by NAAC & NBA (Mech& CSE))

Aruthenganvilai, Kallukatti Junction Azhikal Post, Kanyakumari District-629202, Tamil Nadu

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING ACADEMIC YEAR : 2023-2024 / EVEN

STUDENT NAMELIST FOR ELECTIVE COURSE ENROLLMENT [PROFESSIONAL ELECTIVE IV and V]

Year : III
Semester : 06
Regulation : 2021
Subject Code and Name : 1. EE3020 – Smart System Automation
2. EE3035 –Grid Integrated Techniques and Challenges

Sl. No.	Register Number	Name of the Student
1	963521105003	ABITHRAN M
2	963521105005	AKASH M
3	963521105006	ANBU MESHACH P
4	963521105007	ASHA R
5	963521105008	ASKAR A U
6	963521105009	ASWIN C
7	963521105011	BABU HUSSAIN S
8	963521105012	BINUMON S
9	963521105013	EPSIBHA S
10	963521105014	JAISON S
11	963521105015	JINOBIN S U
12	963521105016	KITHLIN MARESH E
13	963521105018	MAHESH KUMAR P
14	963521105019	MANIKANDAN A
15	963521105020	MANJU N
16	963521105023	PRAVIN S
17	963521105025	REBISHA R
18	963521105026	RENJITH R
19	963521105027	RENUKA K
20	963521105028	RIJO A
21	963521105030	SARAVANAN G
22	963521105032	SUTHEESH S
23	963521105033	SUVATHIA M

24	963521105034	THANUSH S
25	963521105301	ANAND M.P
26	963521105302	ARAVIND.A
27	963521105303	E.POOVARASAN

STUDENT NAMELIST FOR ELECTIVE COURSE ENROLLMENT [MANDATORY ELECTIVE II]

Year : III
Semester : 06
Regulation : 2021
Subject Code and Name : 1. MX3089 – Industrial Safety

Sl. No.	Register Number	Name of the Student
29.	963521105003	ABITHRAN M
30.	963521105005	AKASH M
31.	963521105006	ANBU MESHACH P
32.	963521105007	ASHA R
33.	963521105008	ASKAR A U
34.	963521105009	ASWIN C
35.	963521105011	BABU HUSSAIN S
36.	963521105012	BINUMON S
37.	963521105013	EPSIBHA S
38.	963521105014	JAISON S
39.	963521105015	JINOBIN S U
40.	963521105016	KITHLIN MARESH E
41.	963521105017	LEGAN R
42.	963521105018	MAHESH KUMAR P
43.	963521105019	MANIKANDAN A
44.	963521105020	MANJU N
45.	963521105023	PRAVIN S
46.	963521105025	REBISHA R
47.	963521105026	RENJITH R
48.	963521105027	RENUKA K
49.	963521105028	RIJO A
50.	963521105030	SARAVANAN G
51.	963521105032	SUTHIEESH S
52.	963521105033	SUVATHA M

53.	963521105034	THIANUSH S
54.	963521105301	ANAND M.P
55.	963521105302	ARAVIND.A
56.	963521105303	E.POOVARASAN

STUDENT NAMELIST FOR ELECTIVE COURSE ENROLLMENT [OPEN ELECTIVE I]

Year : III
Semester : 06
Regulation : 2021
Subject Code and Name : 1. OCS351 – Artificial Intelligence and Machine Learning Fundamentals

Sl. No.	Register Number	Name of the Student
1	963521105003	ABITHRAN M
2	963521105005	AKASH M
3	963521105006	ANBU MESHACH P
4	963521105007	ASHA R
5	963521105008	ASKAR A U
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7	963521105011	BABU HUSSAIN S
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13	963521105018	MAHESH KUMAR P
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19	963521105027	RENUKA K
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24	963521105034	THANUSH S
25	963521105301	ANAND M.P

26	963521105302	ARAVIND.A
27	963521105303	E.POOVARASAN

STUDENT NAMELIST FOR ELECTIVE COURSE ENROLLMENT [PROFESSIONAL ELECTIVE V and VI]

Year : IV
Semester : 08
Regulation : 2017
Subject Code and Name : 1. GE8076 Professional Ethics in Engineering
2. GE8073 Fundamentals of Nanoscience

Sl. No.	Register Number	Name of the Student
1	963520105001	ABINESH A
2	963520105002	AJISHA A
3	963520105003	ALEX PANDIAN S
4	963520105004	ANUSHA S
5	963520105005	ASWIN S
6	963520105006	BABITHA RAJLIN R C
7	963520105007	EZHIL MONISA M K
8	963520105008	JEBE ESTHER BABITHA S
9	963520105009	JETTISON ACKSNO J
10	963520105010	JULIUS NIWIN L
11	963520105012	LEENA K
12	963520105013	LIBIN M L
13	963520105015	LINSIN BEDSHO S
14	963520105016	MANOJKUMAR B
15	963520105017	MINISH D
16	963520105018	PRABIN S
17	963520105019	PRATHEEBA V
18	963520105020	PRATHEEP K
19	963520105021	PRATHIKA V G
20	963520105022	PRIYA N
21	963520105024	RAM PRAKASH M V
22	963520105025	REXSON LESO N
23	963520105027	SAHAYA LISMEN RAI S
24	963520105028	SIVA S
25	963520105029	SIVA SANKAR K
26	963520105030	SUVIN S

27	963520105031	VELMURUGAN M
28	963520105032	VIDHYAPPRATHA M S
29	963520105033	WINCILIN RIJO J
30	963520105301	ABISHEK S
31	963520105302	BIJO JOHNSON
32	963520105303	JACOB THAMPI VAIDYAN
33	963520105304	S KAMESH
34	963520105305	NASEEM A
35	963520105701	VINUSHIYA.A


HEAD OF THE DEPARTMENT
DEPT. OF ELECTRICAL & ELECTRONICS ENGINEERING
STELLA MARY'S COLLEGE OF ENGINEERING
ARUTHENGANYILAI, AZHIKAL P.O. - 629 202
KANYAKUMARI DISTRICT

COURSE OBJECTIVES:

- To introduce the smart system technologies and its role in real time applications
- To teach the architecture and requirements of Home Automation.
- To provide an insight into smart appliances and energy management concepts.
- To familiarize the design and needs of smart wearable devices
- To teach the basics of robotics and its role for automation.

UNIT I INTRODUCTION

6

Overview of a smart system - Hardware and software selection - Smart sensors and Actuators – Communication protocols used for smart systems.

UNIT II HOME AUTOMATION

6

Home Automation – System Architecture - Essential Components- Design Considerations: Control Unit, Sensing Requirements, Communication, Data Security.

UNIT III SMART APPLIANCES AND ENERGY MANAGEMENT

6

Significance of smart appliances for energy management -Smart Meters: Significance, Architecture & Energy Measurement Technique – Security Considerations.

UNIT IV SMART WEARABLE DEVICES

6

Body Area Networks - Sensors– communication protocol for Wearable devices- Application of Smart Wearable in Healthcare & Activity Monitoring.

UNIT V EMBEDDED SYSTEMS AND ROBOTICS

6

Fundamental concepts in Robotics- Robots and Controllers components - Embedded processor based: pick and place robot- Mobile Robot Design- UAV.

30 PERIODS**LAB COMPONENTS:****30 PERIODS**

1. Laboratory exercise: Use Arduino/ R pi/ any other Embedded processors to give hands on training to understand concepts related to smart automation.
 - a) Hands on experiments based on Ubidots & Thing speak / Open-source Analytics Platform
 - b) Design and implementation of a smart home system .
 - c) Bluetooth Based Home Automation Project using Android Phone
 - d) GSM Based Home Devices Control
 - e) Pick and place robots using Arduino/ any suitable Embedded processor
2. Assignment: Revolution of Smart Automation system across the world and its current scope available in India
3. Mini project: Design of a Smart Automation system (for any application of students choice)

TOTAL: 30+30 = 60 PERIODS**COURSE OUTCOMES:**

At the end of this course, the students will have the ability to

CO1: Understand the concepts of smart system design and its present developments.

CO2: Illustrate different embedded open-source and cost-effective techniques for developing solution for real time applications.

CO3: Acquire knowledge on different platforms and Infrastructure for Smart system design.

CO4: Infer about smart appliances and energy management concepts.

CO5: Improve Employability and entrepreneurship capacity due to knowledge upgradation on embedded system technologies.

TEXTBOOKS:

1. Grimm, Christoph, Neumann, Peter, Mahlknecht and Stefan, Embedded Systems for Smart Appliances and Energy Management, Springer 2013, 1st Edition.
2. KazemSohraby, Daniel Minoli and TaiebZnati, Wireless Sensor Networks Technology, Protocols, and Applications, John Wiley & Sons, 2007, 1st Edition.
3. NilanjanDey, Amartya Mukherjee, Embedded Systems and Robotics with Open-Source Tools, CRC press, 2016, 1st Edition.

REFERENCES:

1. Thomas Bräunl, Embedded Robotics, Springer, 2003.
2. Raj Kamal, Embedded Systems - Architecture, Programming and Design, McGraw- Hill, 2008
3. Karim Yaghmour, Embedded Android, O'Reilly, 2013.
4. Steven Goodwin, Smart Home Automation with Linux and Raspberry Pi, Apress , 2013
5. C.K. Toh, AdHoc mobile wireless networks, Prentice Hall, Inc, 2002.
6. Anna Ha'c, Wireless Sensor Network Designs, John Wiley & Sons Ltd, 2003.
7. J. J. Craig, "Introduction to Robotics Mechanics and Control", Pearson Education.
8. Y. Koren, "Robotics for Engineers", McGraw-Hill.
9. Robert Faludi, Wireless Sensor Networks, O'Reilly, 2011.

List of Open Source Software/ Learning website:

1. <https://microcontrollerslab.com/home-automation-projects-ideas/>
2. <https://www.learnrobotics.org/blog/simple-robot/>
3. <https://robo-labor.com/homelab/en/iot>
4. [https://electrovolt.ir/wp-content/uploads/2018/03/Exploring Raspberry Pi Molloy Derek ElectroVolt.ir .pdf](https://electrovolt.ir/wp-content/uploads/2018/03/Exploring_Raspberry_Pi_Molloy_Derek_ElectroVolt.ir_.pdf)
5. [http://www.robot.bmstu.ru/files/books/\(Ebook%20-%20English\)%20Mcgraw-Hil,%20Pic%20Robotics%20-%20A%20Beginner'S%20Guide%20To%20Robotic.pdf](http://www.robot.bmstu.ru/files/books/(Ebook%20-%20English)%20Mcgraw-Hil,%20Pic%20Robotics%20-%20A%20Beginner'S%20Guide%20To%20Robotic.pdf)

MAPPING OF COs WITH POs AND PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	3	1	3	-	-	-	-	-	-	-	1	2	2
CO2	3	1	2	2	3	-	-	-	-	-	-	-	1	1	3
CO3	2	2	3	2	3	-	-	-	-	-	-	-	2	2	2
CO4	2	2	2	1	3	-	-	-	-	-	-	-	1	2	2
CO5	3	2	2	2	3	-	-	-	1	-	-	-	2	2	3
Avg	2.4	1.6	2.4	1.6	3	-	-	-	1	-	-	-	1.4	1.8	2.4

MAPPING OF COs WITH POs AND PSOs

	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	-	3	2	-	-	-	-	-	-	-	-	3	-	2
2	3	2	3	3	-	-	-	-	-	-	-	-	3	3	3
3	3	2	3	3	2	-	-	-	-	-	-	-	3	3	3
4	3	2	3	3	-	-	-	-	-	-	-	-	3	3	3
5	3	2	3	3	2	-	-	-	-	-	-	-	3	3	3
avg	3	2	3	2.8	2	-	-	-	-	-	-	-	3	3	2.8

EE3035

GRID INTEGRATING TECHNIQUES AND CHALLENGES

L T P C

2023

COURSE OBJECTIVES:

- To study about the present power Scenario
- To model a micro grid system
- To model power converter for grid interconnection
- To integrate wind energy conversion system with grid
- To simulate power converters like three phase inverters and DC-DC converters

UNIT I PRESENT POWER SCENARIO IN INDIA

6

Introduction - Thermal Power Plant , Components of Thermal Power Plant , Major Thermal Power Plants in India- Gas-Based Power Generation - Nuclear Power Plants -Hydropower Generation - Pumped Storage Plants - Solar Power - Wind Energy – Power plants India

UNIT II POWER GRIDS

6

Introduction -Electric Power ,Background , The Construction of a Power Grid System , Basic Concepts of Power Grids -Load Models - Transformers in Electric Power Grids - Modelling a Microgrid System

UNIT III MODELING OF CONVERTERS IN POWER GRID DISTRIBUTED GENERATION SYSTEMS

6

Introduction - Single-Phase DC/AC Inverters with Two Switches, Three-Phase DC/AC Inverters, Pulse Width Modulation Methods, The Triangular, The Identity Method, Analysis of DC/AC Three-Phase Inverters. Micro grid of Renewable Energy Systems- DC/DC Converters in Green Energy -Pulse Width Modulation -Sizing of an Inverter for Microgrid Operation, Sizing of a Rectifier for Microgrid Operation, The Sizing of DC/DC Converters for Micro grid

UNIT IV WIND ENERGY SYSTEM GRID INTEGRATION

6

roduction- Significance of Electrical Power Quality in Wind Power System- Integration Issues in
id-Connected Wind Energy- Effect of Power Quality Issues, Importance of Custom Power
evelopes- Power Quality Point of View.

UNIT V GRID INTER CONNECTION

6

Grid Code requirements-Grid integration of WECS-Grid Integration of PV systems

30 PERIODS

LAB COMPONENT

30 PERIODS

1. Develop a model for the control of DC micro grid for non linear loads
2. Simulation study of three phase inverters with fixed and sine PWM techniques, Simulation and Design of buck/boost converters.
3. Simulate a Grid Connected Wind Energy System with STATCOM and investigate the improvement in power quality.

TOTAL: 30+30 = 60 PERIODS

COURSE OUTCOMES:

Upon completion of the course, Students able to

- CO1 Review the power sector scenario in India.
- CO2 Model a microgrid system
- CO3 Model a converter for power grid distributed system.
- CO4 Integrate wind energy system.
- CO5 Simulate three phase inverter with fixed and sine PWM.

TEXT BOOKS:

1. Brian D'Andrade "The Power Grid", Academic Press, 1st Edition, 2017.
2. Yang Han, "Modeling and Control of Power Electronic Converters for Microgrid Applications", Springer, 1st Edition 2022.
3. Siegfried Heier, "Grid Integration of Wind Energy: Onshore and Offshore Conversion Systems", John Wiley & Sons, Ltd, 2014, 3rd Edition.

REFERENCES:

1. Integration of Renewable Energy Sources with Smart Grid, M. Kathiresan, A. Mahaboob Subahani, and G.R. Kanaga chidambaresan, Scrivener & Wiley, 2021, 1st Edition.
2. Control and Operation of Grid-Connected Wind Energy Systems, Ali M. Eltamaly, Almoataz Y. Abdelaziz, Ahmed G. Abo-Khalil, Springer 2021, 1st Edition.
3. Design of smart power grid renewable energy systems, Third Edition, Ali Keyhani, Wiley 2019.
4. Power Electronic Converters, Teuvo Suntio, Tuomas Messo, Joonas Puukko, Wiley 2017, 1st Edition.
5. Fundamentals of Power Electronics with MATLAB, Randall Shaffer, Laxmi publications, 2013, 2nd Edition.
6. Power Conversion and Control of Wind Energy Systems, Bin Wu, 2011, Wiley-IEEE, 1st Edition.
7. Wind Power Integration - Connection and System Operational Aspects, Brendan Fox, 2014, IET, 2nd Edition.
8. Renewable Energy Devices and Systems with Simulations In MATLAB and ANSYS, Frede Blaabjerg, Dan M. Ionel, CRC press, 2017, 1st Edition.

OPEN ELECTIVE I AND II

1 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING FUNDAMENTALS

LTPC

2023

OBJECTIVES:

Understand the importance, principles, and search methods of AI
Provide knowledge on predicate logic and Prolog.
Introduce machine learning fundamentals
Study of supervised learning algorithms.
Study about unsupervised learning algorithms.

UNIT I INTELLIGENT AGENT AND UNINFORMED SEARCH

6

Introduction - Foundations of AI - History of AI - The state of the art - Risks and Benefits of AI - **Intelligent Agents** - Nature of Environment - Structure of Agent - Problem Solving Agents - Formulating Problems - **Uninformed Search** - Breadth First Search - Dijkstra's algorithm or Uniform-cost search - Depth First Search - Depth Limited Search

UNIT II PROBLEM SOLVING WITH SEARCH TECHNIQUES

6

Informed Search - Greedy Best First - A* algorithm - Adversarial Game and Search - **Game Theory** - Optimal decisions in game - Min Max Search algorithm - Alpha-beta pruning - **Constraint Satisfaction Problems (CSP)** - Examples - Map Coloring - Job Scheduling - Backtracking Search or CSP

UNIT III LEARNING

6

Machine Learning: Definitions – Classification - Regression - approaches of machine learning models - Types of learning - Probability - Basics - Linear Algebra – Hypothesis space and inductive bias, Evaluation. Training and test sets, cross validation, Concept of over fitting, under fitting, Bias and Variance - **Regression:** Linear Regression - Logistic Regression

UNIT IV SUPERVISED LEARNING

6

Neural Network: Introduction, Perceptron Networks – Adaline - Back propagation networks - **Decision Tree:** Entropy – Information gain - Gini Impurity - classification algorithm - Rule based Classification - **Naïve Bayesian classification** - **Support Vector Machines (SVM)**

UNIT V UNSUPERVISED LEARNING

6

Unsupervised Learning – Principle Component Analysis - **Neural Network:** Fixed Weight Competitive Nets - Kohonen Self-Organizing Feature Maps – **Clustering:** Definition - Types of Clustering – Hierarchical clustering algorithms – k-means algorithm

TOTAL : 30 PERIODS

PRACTICAL EXERCISES: 30 PERIODS

Programs for Problem solving with Search

1. Implement breadth first search
2. Implement depth first search
3. Analysis of breadth first and depth first search in terms of time and space
4. Implement and compare Greedy and A* algorithms.

Supervised learning

5. Implement the non-parametric locally weighted regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs
6. Write a program to demonstrate the working of the decision tree based algorithm.
7. Build an artificial neural network by implementing the back propagation algorithm and test the same using appropriate data sets.
8. Write a program to implement the naïve Bayesian classifier.

Unsupervised learning

9. Implementing neural network using self-organizing maps

vii. Rajni Kothari, Rethinking Democracy, Orient Longman, New Delhi, 2005.

MX3089

INDUSTRIAL SAFETY

L T P C

3 0 0 0

OBJECTIVES

- To Understand the Introduction and basic Terminologies safety.
- To enable the students to learn about the Important Statutory Regulations and standards.
- To enable students to Conduct and participate the various Safety activities in the Industry.
- To have knowledge about Workplace Exposures and Hazards.
- To assess the various Hazards and consequences through various Risk Assessment Techniques.

UNIT I SAFETY TERMINOLOGIES

Hazard-Types of Hazard- Risk-Hierarchy of Hazards Control Measures-Lead indicators- lag Indicators-Flammability- Toxicity Time-weighted Average (TWA) - Threshold Limit Value (TLV) - Short Term Exposure Limit (STEL)- Immediately dangerous to life or health (IDLH)- acute and chronic Effects- Routes of Chemical Entry-Personnel Protective Equipment- Health and Safety Policy-Material Safety Data Sheet MSDS

UNIT II STANDARDS AND REGULATIONS

Indian Factories Act-1948- Health- Safety- Hazardous materials and Welfare- ISO 45001:2018 occupational health and safety (OH&S) - Occupational Safety and Health Audit IS14489:1998- Hazard Identification and Risk Analysis- code of practice IS 15656:2006

UNIT III SAFETY ACTIVITIES

Toolbox Talk- Role of safety Committee- Responsibilities of Safety Officers and Safety Representatives- Safety Training and Safety Incentives- Mock Drills- On-site Emergency Action Plan- Off-site Emergency Action Plan- Safety poster and Display- Human Error Assessment

UNIT IV WORKPLACE HEALTH AND SAFETY

Noise hazard- Particulate matter- musculoskeletal disorder improper sitting posture and lifting Ergonomics RULE & REBA- Unsafe act & Unsafe Condition- Electrical Hazards- Crane Safety- Toxic gas Release

UNIT V HAZARD IDENTIFICATION TECHNIQUES

Job Safety Analysis-Preliminary Hazard Analysis-Failure mode and Effects Analysis- Hazard and Operability- Fault Tree Analysis- Event Tree Analysis Qualitative and Quantitative Risk Assessment- Checklist Analysis- Root cause analysis- What-If Analysis- and Hazard Identification and Risk Assessment

TOTAL : 45 PERIODS

Course outcomes

on completion of this course the student will be able:

- Understand the basic concept of safety.
- Obtain knowledge of Statutory Regulations and standards.
- Know about the safety Activities of the Working Place.
- Analyze on the impact of Occupational Exposures and their Remedies
- Obtain knowledge of Risk Assessment Techniques.

performance of a traction unit.

- To understand the main aspects of Traction.

TEXT BOOKS:

1. Wadhwa, C.L. "Generation, Distribution and Utilization of Electrical Energy", New Age International Pvt. Ltd, 2003.
2. Dr. Uppal S.L. and Prof. S. Rao, 'Electrical Power Systems', Khanna Publishers, New Delhi, 15th Edition, 2014.
3. Energy Efficiency in Electric Utilities, BEE Guide Book, 2010

REFERENCES

1. Partab.H, "Art and Science of Utilisation of Electrical Energy", Dhanpat Rai and Co, New Delhi, 2004.
2. Openshaw Taylor.E, "Utilization of Electrical Energy in SI Units", Orient Longman Pvt. Ltd, 2003.
3. Gupta.J.B, "Utilization of Electric Power and Electric Traction", S.K.Kataria and Sons, 2002.
4. Cleaner Production – Energy Efficiency Manual for GERIAP, UNEP, Bangkok prepared by National Productivity Council.

GE8076

PROFESSIONAL ETHICS IN ENGINEERING

LTPC
3003

OBJECTIVES:

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

UNIT I HUMAN VALUES

10

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

UNIT II ENGINEERING ETHICS

9

Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Models of professional roles - Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories.

UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION

9

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS

9

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

JNIT V GLOBAL ISSUES

8

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Code of Conduct – Corporate Social Responsibility.

TOTAL: 45 PERIODS

OUTCOMES:

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

TEXT BOOKS:

1. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delhi, 2003.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

REFERENCES:

1. Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009.
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.
5. Laura P. Hartman and Joe Desjardins, "Business Ethics: Decision Making for Personal Integrity and Social Responsibility" Mc Graw Hill education, India Pvt. Ltd., New Delhi, 2013.
6. World Community Service Centre, 'Value Education', Vethathiri publications, Erode, 2011.

Web sources:

1. www.onlineethics.org
2. www.nspe.org
3. www.globalethics.org
4. www.ethics.org

MG8591

PRINCIPLES OF MANAGEMENT

**LT P C
3 0 0 3**

OBJECTIVES:

- To enable the students to study the evolution of Management, to study the functions and principles of management and to learn the application of the principles in an organization.

UNIT I INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS

9

Definition of Management – Science or Art – Manager Vs Entrepreneur - types of managers - managerial roles and skills – Evolution of Management – Scientific, human relations, system and contingency approaches – Types of Business organization - Sole proprietorship, partnership, company-public and private sector enterprises - Organization culture and Environment – Current trends and issues in Management.

analysis.

- Ability to explain the medical assistance/techniques, robotic and therapeutic equipments.

TEXT BOOKS:

1. Leslie Cromwell, "Biomedical Instrumentation and Measurement", Prentice Hall of India, New Delhi, 2007.
2. Khandpur R.S, Handbook of Biomedical Instrumentation, Tata McGraw-Hill, New Delhi, 2nd edition, 2003
3. Joseph J Carr and John M. Brown, Introduction to Biomedical Equipment Technology, John Wiley and sons, New York, 4th edition, 2012

REFERENCES

1. John G. Webster, Medical Instrumentation Application and Design, John Wiley and sons, New York, 1998.
2. Duane Knudson, Fundamentals of Biomechanics, Springer, 2nd Edition, 2007.
3. Suh, Sang, Gurupur, Varadraj P., Tanik, Murat M., Health Care Systems, Technology and Techniques, Springer, 1st Edition, 2011.
4. Ed. Joseph D. Bronzino, The Biomedical Engineering Hand Book, Third Edition, Boca Raton, CRC Press LLC, 2006.
5. M.Arumugam, 'Bio-Medical Instrumentation', Anuradha Agencies, 2003.

GE8073

FUNDAMENTALS OF NANOSCIENCE

L T P C
3 0 0 3

OBJECTIVES:

To learn about basis of nanomaterial science, preparation method, types and application

UNIT I INTRODUCTION

8

Nanoscale Science and Technology- Implications for Physics, Chemistry, Biology and Engineering- Classifications of nanostructured materials- nano particles- quantum dots, nanowires-ultra-thinfilms-multilayered materials. Length Scales involved and effect on properties: Mechanical, Electronic, Optical, Magnetic and Thermal properties. Introduction to properties and motivation for study (qualitative only).

UNIT II GENERAL METHODS OF PREPARATION

9

Bottom-up Synthesis-Top-down Approach: Co-Precipitation, Ultrasonication, Mechanical Milling, Colloidal routes, Self-assembly, Vapour phase deposition, MOCVD, Sputtering, Evaporation, Molecular Beam Epitaxy, Atomic Layer Epitaxy, MOMBE.

UNIT III NANOMATERIALS

12

Nanoforms of Carbon - Buckminster fullerene- graphene and carbon nanotube, Single wall carbon Nanotubes (SWCNT) and Multi wall carbon nanotubes (MWCNT)- methods of synthesis(arc-growth, laser ablation, CVD routes, Plasma CVD), structure-property Relationships applications- Nanometal oxides-ZnO, TiO₂, MgO, ZrO₂, NiO, nanoalumina, CaO, AgTiO₂, Ferrites, Nanoclays- functionalization and applications-Quantum wires, Quantum dots-preparation, properties and applications.



STELLA MARY'S COLLEGE OF ENGINEERING

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai and Accredited by NAAC & NBA (Mech & CSE))

Aruthenganvilai, Kallukatti Junction Azhikal Post, Kanyakumari District-629202, Tamil Nadu

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

ELECTIVE SUBJECT WILLINGNESS FORM [2023-2024/EVEN] [Regulation 2017]

Name:

S P Balvin

Year: IV

Semester: 08

The students are asked to select one subject each from Professional Elective IV and V listed below

96352605010

PROFESSIONAL ELECTIVE - V (VIII SEMESTER)

Flexible AC Transmission Systems	Soft Computing Techniques	Power Systems Dynamics	SMPS and UPS	Electric Energy Generation, Utilization and Conservation	Professional Ethics in Engineering	Principles of Management
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PROFESSIONAL ELECTIVE – VI (VIII SEMESTER)

Energy Management and Auditing	Data Structures	High Voltage Direct Current Transmission	Microcontroller Based System Design	Smart Grid	Biomedical Instrumentation	✓ Fundamentals of Nanoscience
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Student Signature



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Aruthengavilal, Kallukatti Junction Azhikal Post, Kanyakumari District-629202, Tamil Nadu
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

ELECTIVE SUBJECT WILLINGNESS FORM [2023-2024/EVEN] [Regulation 2017]

Name:

Pasthola . V

Year: IV

Semester: 08

The students are asked to select one subject each from Professional Elective IV and V listed below

263520105019

PROFESSIONAL ELECTIVE - V (VIII SEMESTER)

Flexible/AC Transmission Systems	Soft Computing Techniques	Power Systems Dynamics	SMPS and UPS	Electric Energy Generation, Utilization and Conservation	Professional Ethics in Engineering	Principles of Management
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PROFESSIONAL ELECTIVE – VI (VIII SEMESTER)

Energy Management and Auditing	Data Structures	High Voltage Direct Current Transmission	Microcontroller Based System Design	Smart Grid	Biomedical Instrumentation	✓ Fundamentals of Nanoscience
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Student Signature



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Aruthenganvilai, Kallukatti Junction Azhikal Post, Kanyakumari District-629202, Tamil Nadu

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING ELECTIVE SUBJECT WILLINGNESS FORM [2023-2024/EVEN][Regulation 2021]

Name: Pravin S

Year: III

Semester: 06

*Note : Registration of Professional Elective Courses from Verticals: **PROFESSIONAL ELECTIVE COURSES**

Professional Elective Courses will be registered in Semesters V and VI. These courses are listed in groups called verticals that represent a particular area of specialisation / diversified group. Students are permitted to choose all the Professional Electives from a particular vertical or from different verticals. Further, only one Professional Elective course shall be chosen in a semester horizontally (row-wise). However, two courses are permitted from the same row, provided one course is enrolled in Semester V and another in semester VI. The registration of courses for B.E./B.Tech (Honours) or Minor degree shall be done from Semester V to VIII. The procedure for registration of courses explained above shall be followed for the courses of B.E./B.Tech (Honours) or Minor degree also. For more details on B.E./B.Tech (Honours) or Minor degree refer to the Regulations 2021, Clause 4.10. (Amendments) Total number of courses per vertical may change in the each programme of study as 6 or 7 or 8. If there is shortage of courses in a vertical the same may be chosen from another vertical of the same programme.

Professional Elective	Vertical I Power Engineering	Vertical II Converters and Drives	Vertical III Embedded Systems	Vertical IV Electric Vehicle Technology	Vertical V Advanced Control	Vertical VI Diversified Courses
1	Utilization and Conservation of Electrical Energy	Special Electrical Machines	Embedded System Design	Electric Vehicle Architecture	Process Modeling and Simulation	Energy Storage Systems
2	Under Ground Cable Engineering	Analysis of Electrical Machines	Embedded C- Programming	Design of Motor and Power Converters for Electric Vehicles	Computer Control of Processes	Hybrid Energy Technology
3	Substation Engineering and Automation	Multilevel Power Converters	Embedded Processors	Electric Vehicle Design, Mechanics and Control	System Identification	Design and Modelling of Renewable Energy Systems
4	HVDC and FACTS	Electrical Drives	Embedded Control for Electric Drives	Design of Electric Vehicle Charging System	Model Based Control	Grid Integrating Techniques and Challenges
5	Energy Management and Auditing	SMPS and UPS	Smart System Automation	Testing of Electric Vehicles	Non Linear Control	Sustainable and Environmental Friendly HV Insulation System
6	Power Quality	Power Electronics for Renewable Energy Systems	Embedded System for Automotive Applications	Grid Integration of Electric Vehicles	Optimal Control	Power System Transients
7	Smart Grids	Control of Power Electronics Circuits	VLSI Design	Intelligent control of Electric Vehicles	Adaptive Control	PLC Programming
8	Restructured Power Market	-	MEMS and NEMS	-	Machine Monitoring System	Big Data Analytics
9	-	-	Digital Signal Processing System Design	-	-	-

OPEN ELECTIVE COURSES

Open Elective I	Artificial Intelligence and Machine Learning Fundamentals	IoT Concepts and Applications	Data Science Fundamentals	Augmented Reality/Virtual Reality	-	-
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MANDATORY COURSES

Mandatory Course II	Well Being with Traditional Practices - Yoga, Ayurveda and Siddha	History of Science and Technology in India	Political and Economic Thought for a Humane Society	State, Nation Building and Politics in India	Industrial Safety	-
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S. Pro
Student Signature



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Aruthenganvilai, Kallukatti Junction Azhikal Post, Kanyakumari District-629202, Tamil Nadu

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

ELECTIVE SUBJECT WILLINGNESS FORM [2023-2024/EVEN][Regulation 2021]

Name: **ANAND M.P.**

Year: **III**

Semester: **06**
963521105301

*Note : Registration of Professional Elective Courses from Verticals: **PROFESSIONAL ELECTIVE COURSES**

Professional Elective Courses will be registered in Semesters V and VI. These courses are listed in groups called verticals that represent a particular area of specialisation / diversified group. Students are permitted to choose all the Professional Electives from a particular vertical or from different verticals. Further, only one Professional Elective course shall be chosen in a semester horizontally (row-wise). However, two courses are permitted from the same row, provided one course is enrolled in Semester V and another in semester VI. The registration of courses for B.E./B.Tech (Honours) or Minor degree shall be done from Semester V to VIII. The procedure for registration of courses explained above shall be followed for the courses of B.E./B.Tech (Honours) or Minor degree also. For more details on B.E./B.Tech (Honours) or Minor degree refer to the Regulations 2021, Clause 4.10. (Amendments) Total number of courses per vertical may change in the each programme of study as 6 or 7 or 8. If there is shortage of courses in a vertical the same may be chosen from another vertical of the same programme.

Professional Elective	Vertical I Power Engineering	Vertical II Converters and Drives	Vertical III Embedded Systems	Vertical IV Electric Vehicle Technology	Vertical V Advanced Control	Vertical VI Diversified Courses
1	Utilization and Conservation of Electrical Energy	Special Electrical Machines	Embedded System Design	Electric Vehicle Architecture	Process Modeling and Simulation	Energy Storage Systems
2	Under Ground Cable Engineering	Analysis of Electrical Machines	Embedded C- Programming	Design of Motor and Power Converters for Electric Vehicles	Computer Control of Processes	Hybrid Energy Technology
3	Substation Engineering and Automation	Multilevel Power Converters	Embedded Processors	Electric Vehicle Design, Mechanics and Control	System Identification	Design and Modelling of Renewable Energy Systems
4	HVDC and FACTS	Electrical Drives	Embedded Control for Electric Drives	Design of Electric Vehicle Charging System	Model Based Control	Grid Integrating Techniques and Challenges
5	Energy Management and Auditing	SMPS and UPS	Smart System Automation	Testing of Electric Vehicles	Non Linear Control	Sustainable and Environmental Friendly HV Insulation System
6	Power Quality	Power Electronics for Renewable Energy Systems	Embedded System for Automotive Applications.	Grid Integration of Electric Vehicles	Optimal Control	Power System Transients
7	Smart Grids	Control of Power Electronics Circuits	VLSI Design	Intelligent control of Electric Vehicles.	Adaptive Control	PLC Programming
8	Restructured Power Market	-	MEMS and NEMS	-	Machine Monitoring System	Big Data Analytics
9	-	-	Digital Signal Processing System Design	-	-	-

OPEN ELECTIVE COURSES

Open Elective I	Artificial Intelligence and Machine Learning Fundamentals	IoT Concepts and Applications	Data Science Fundamentals	Augmented Reality/Virtual Reality	-	-
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MANDATORY COURSES

Mandatory Course II	Well Being with Traditional Practices - Yoga, Ayurveda and Siddha	History of Science and Technology in India	Political and Economic Thought for a Humane Society	State, Nation Building and Politics in India	Industrial Safety	-
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Student Signature



STELLA MARY'S COLLEGE OF ENGINEERING

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Aruthenganvilai, Kallukatti Junction Azhikal Post, Kanyakumari District-629202, Tamil Nadu

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING ACADEMIC YEAR : 2023-2024 / ODD

STUDENT NAMELIST FOR ELECTIVE COURSE ENROLLMENT [PROFESSIONAL ELECTIVE I, II and III]

Year : III
Semester : 05
Regulation : 2021
Subject Code and Name : 1. EE3006 – Power Quality
2. EE3007 – Smart Grid
3. EE3016 – Embedded System Design

Sl. No.	Register Number	Name of the Student
1.	963521105003	ABITHRAN M
2.	963521105005	AKASH M
3.	963521105006	ANBU MESHACH P
4.	963521105007	ASHA R
5.	963521105008	ASKAR A U
6.	963521105009	ASWIN C
7.	963521105011	BABU HUSSAIN S
8.	963521105012	BINUMON S
9.	963521105013	EPSIBHA S
10.	963521105014	JAISON S
11.	963521105015	JINOBIN S U
12.	963521105016	KITHLIN MARESH E
13.	963521105017	LEGAN R
14.	963521105018	MAHESH KUMAR P
15.	963521105019	MANIKANDAN A
16.	963521105020	MANJU N
17.	963521105023	PRAVIN S
18.	963521105025	REBISHA R
19.	963521105026	RENJITH R
20.	963521105027	RENUKA K
21.	963521105028	RIJO A
22.	963521105030	SARAVANAN G
23.	963521105032	SUTHEESH S

24.	963521105033	SUVATHIA M
25.	963521105034	THANUSHI S
26.	963521105301	ANAND M.P
27.	963521105302	ARAVIND.A
28.	963521105303	E.POOVARASAN

STUDENT NAMELIST FOR ELECTIVE COURSE ENROLLMENT [MANDATORY ELECTIVE I]

Year : III
Semester : 05
Regulation : 2021
Subject Code and Name : 1. MX3081 – Introduction to Women and Gender Studies

SL No.	Register Number	Name of the Student
1.	963521105003	ABITHRAN M
2.	963521105005	AKASH M
3.	963521105006	ANBU MESHACH P
4.	963521105007	ASHA R
5.	963521105008	ASKAR A U
6.	963521105009	ASWIN C
7.	963521105011	BABU HUSSAIN S
8.	963521105012	BINUMON S
9.	963521105013	EPSIBHA S
10.	963521105014	JAISON S
11.	963521105015	JINOBIN S U
12.	963521105016	KITHLIN MARESH E
13.	963521105017	LEGAN R
14.	963521105018	MAHESH KUMAR P
15.	963521105019	MANIKANDAN A
16.	963521105020	MANJU N
17.	963521105023	PRAVIN S
18.	963521105025	REBISHIA R
19.	963521105026	RENJITH R
20.	963521105027	RENUKA K
21.	963521105028	RIJO A
22.	963521105030	SARAVANAN G
23.	963521105032	SUTHEESH S

24.	963520105028	SIVA S
25.	963520105029	SIVA SANKAR K
26.	963520105030	SUVIN S
27.	963520105031	VELMURUGAN M
28.	963520105032	VIDHYAPPRATHA M S
29.	963520105033	WINCILIN RIJO J
30.	963520105301	ABISHEK S
31.	963520105302	BIJO JOHNSON
32.	963520105303	JACOB THAMPI VAIDYAN
33.	963520105304	S KAMESH
34.	963520105305	NASEEM A
35.	963520105701	VINUSHIYA.A

Jayathir
HOD

HEAD OF THE DEPARTMENT
DEPT. OF ELECTRICAL & ELECTRONICS ENGINEERING
STELLA MARY'S COLLEGE OF ENGINEERING
ARUTHENGANVILAI, AZHIKAL P.O. - 629 202
KANYAKUMARI DISTRICT

COURSE OBJECTIVES:

- To learn the basic definitions in Power Quality.
- To study the power quality issues in Single Phase and Three Phase Systems.
- To understand the principles of Power System Harmonics.
- To know the way to use DSTATCOM for Harmonic Mitigation.
- To learn the concepts related with Series Compensation.

UNIT I**INTRODUCTION****(7+2 Skill) 9**

Introduction – Characterization of Electric Power Quality: Transients, short duration and long duration voltage variations, Voltage imbalance, waveform distortion, Voltage fluctuations, Power frequency variation, Power acceptability curves – power quality problems: poor load power factor, Non-linear and unbalanced loads, DC offset in loads, Notching in load voltage, Disturbance in supply voltage – Power quality standards.

UNIT II**ANALYSIS OF SINGLE PHASE AND THREE PHASE SYSTEM****(7+2 Skill) 9**

Single phase linear and non-linear loads – single phase sinusoidal, non-sinusoidal source – supplying linear and nonlinear loads – three phase balanced system – three phase unbalanced system – three phase unbalanced and distorted source supplying non-linear loads – concept of power factor – three phase- three wire – three phase - four wire system.

UNIT III**MITIGATION OF POWER SYSTEM HARMONICS****(7+2 Skill) 9**

Introduction - Principle of Harmonic Filters – Series-Tuned Filters – Double Band-Pass Filters – damped Filters – Detuned Filters – Active Filters – Power Converters – Harmonic Filter Design – Tuned Filter – Second-Order Damped Filter – Impedance Plots for Filter Banks – Impedance Plots for a Three-Branch 33 kV Filter.

UNIT IV**LOAD COMPENSATION USING DSTATCOM****(7+2 Skill) 9**

Compensating single – phase loads – Ideal three phase shunt compensator structure – generating reference currents using instantaneous PQ theory – Instantaneous symmetrical components theory – Generating reference currents when the source is unbalanced –Realization and control of DSTATCOM – DSTATCOM in Voltage control mode.

UNIT V**SERIES COMPENSATION OF POWER DISTRIBUTION SYSTEM****(7+2 Skill) 9**

Rectifier supported DVR – DC Capacitor supported DVR – DVR Structure – Voltage Restoration – Series Active Filter – Unified Power Quality Conditioner.

TOTAL : 45 PERIODS

SKILL DEVELOPMENT ACTIVITIES (Group Seminar/Mini Project/Assignment/Content Preparation / Quiz/ Surprise Test / Solving GATE questions/ etc)

10

1. Harmonic analysis of single phase power converters (Semi converters and Full Converters) with R and RL load via simulation
2. Harmonic analysis of three phase power converters (Semi converters and Full Converters) with R and RL load via simulation
3. Harmonic analysis of single phase inverters with R and RL load via simulation
4. Harmonic analysis of three phase inverters with R and RL load via simulation
5. Mitigation of Harmonics using Tuned Filter

List of Open Source Software/ Learning website:

1. <http://nptel.iitm.ac.in/courses.php>
2. <https://old.amu.ac.in/emp/studym/2442.pdf>
3. <https://electricalacademia.com/electric-power>
4. <https://www.intechopen.com/books/6214>
5. <https://www.cde.com/resources/technical-papers/Mitigation-of-Harmonics.pdf>
6. https://www.academia.edu/43237017/Use_Series_Compensation_in_Distribution_Networks_33_KV

COURSE OUTCOMES:

Upon completion of the course, students will be able to:

- CO1 Use various definitions of power quality for power quality issues
- CO2 Describe the concepts related with single phase / three phase, linear / nonlinear loads and single phase / three phase sinusoidal, non-sinusoidal source
- CO3 Solve problems related with mitigation of Power System Harmonics
- CO4 Use DSTATCOM for load compensation
- CO5 Demonstrate the role of DVR, SAFs UPQC in power distribution systems

TEXTBOOKS:

1. Arindam Ghosh and Gerard Ledwich "Power Quality Enhancement Using Custom Power Devices", Kluwer Academic Publishers, First Edition, 2002
2. G.T.Heydt, "Electric Power Quality", Stars in a Circle Publications, Second Edition, 2011.
3. George J. Wakileh, "Power System Harmonics – Fundamentals, Analysis and Filter Design", Springer – Verlag Berlin Heidelberg, New York, 2019.

REFERENCES:

1. R.C.Duggan "Electric Power Systems Quality", Tata MC Graw Hill Publishers, Third Edition, 2012.
2. Arrillga "Power System Harmonics", John Wiley and Sons, 2003 2nd Edition.
3. Derek A.Paice "Power Electronic Converter Harmonics" IEEE Press, 1995, Wiley – IEE Press 1999, 18th Edition.

MAPPING OF COs WITH POs AND PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	-	-	3	3	-	3	-	3	3	3	3
CO2	3	3	3	3	-	-	3	3	-	3	-	3	3	3	3
CO3	3	3	3	3	-	-	3	3	-	3	-	3	3	3	3
CO4	3	3	3	3	-	-	3	3	-	3	-	3	3	3	3
CO5	3	3	3	3	-	-	3	3	-	3	-	3	3	3	3
Avg	3	3	3	3	-	-	3	3	-	3	-	3	3	3	3

EE3007

SMART GRID

L T P C
3 0 0 3

COURSE OBJECTIVES:

- To understand the evolution of Smart and Interconnected energysystems.
- To understand the various challenges and benefits of smart grid and the national and international initiatives taken
- To understand the concepts related with transmission and distribution in smart grid technologies.
- To get an insight of the various smart measurement technologies.
- To understand the various computing technologies for Smart Operation of the Grid.

UNIT I INTRODUCTION

(7+2 SKILL) 9

Evolution of Energy Systems, Concept, Definitions and Need, Difference between Conventional & Smart Grid, Drivers, structures, functions, opportunities, challenges and benefits of Smart Grid, Basics of Micro grid, National and International Initiatives in Smart Grid.

UNIT II SMART METERING

(7+2 SKILL) 9

Introduction to Advanced Metering infrastructure (AMI) - drivers and benefits, AMI protocols, standards and initiatives, AMI needs in the smart grid, Real time management and control, Phasor Measurement Unit (PMU).

UNIT III SMART GRID TECHNOLOGIES (Transmission)

(7+2 SKILL) 9

Technology Drivers, Smart energy resources, Smart substations, Substation Automation, Feeder Automation, Transmission systems: EMS, Wide area Monitoring, Protection and control.

UNIT IV SMART GRID TECHNOLOGIES (Distribution)

(7+2 SKILL) 9

DMS, Volt/VAr control, Fault Detection, Isolation and service restoration, Outage management, High-Efficiency Distribution Transformers, Phase Shifting Transformers, Electric Vehicles.

UNIT V HIGH PERFORMANCE COMPUTING FOR SMART GRID APPLICATIONS

(7+2 SKILL) 9

Local Area Network (LAN), House Area Network (HAN), Wide Area Network (WAN), Broadband over Power line (BPL), IP based Protocols, Computing technologies for Smart Grid applications (Web Service

ERTICAL III : EMBEDDED SYSTEMS

EE3016

EMBEDDED SYSTEM DESIGN

LTPC

2023

COURSE OBJECTIVES:

- To introduce the Building Blocks of an embedded System and Software Tools
- To emphasize the role of Input/output interfacing with Bus Communication protocol.
- To illustrate the ISR and scheduling for the multitasking process.
- To explain the basics of a Real-time operating system
- To analyze the applications based on embedded design approaches

UNIT I INTRODUCTION TO EMBEDDED SYSTEMS

6

Introduction to Embedded Systems –Structural units in Embedded processor, selection of processor & memory devices- DMA — Memory management methods- Timer and Counting devices, Real Time Clock, In-circuit emulator, Target Hardware Debugging.

UNIT II EMBEDDED NETWORKING

6

Embedded Networking: Introduction, I/O Device Ports & Buses– Serial Bus communication protocols RS232 standard – RS485 – CAN Bus- Serial Peripheral Interface (SPI) – Inter-Integrated Circuits (I²C).

UNIT III INTERRUPTS THE SERVICE MECHANISM AND DEVICE DRIVER

6

Programmed-I/O busy-wait approach without interrupt service mechanism-ISR concept-interrupt sources – multiple interrupts – context and periods for context switching, interrupt latency and deadline – Introduction to Device Drivers.

UNIT IV RTOS-BASED EMBEDDED SYSTEM DESIGN

6

Introduction to basic concepts of RTOS- Task, process & threads, interrupt routines in RTOS, Multiprocessing and Multitasking, Preemptive and non-preemptive scheduling, Task communication- shared memory, message passing- Interprocess Communication- Introduction to process synchronization using semaphores.

UNIT V EMBEDDED SYSTEM APPLICATION DEVELOPMENT

6

Embedded Product Development Life Cycle - Case Study: Precision Agriculture- Autonomous car.

30 PERIODS

LAB COMPONENT:

30 PERIODS

1. Laboratory exercise: Use any Embedded processor/IDE/open source platform to give hands-on training on basic concepts of embedded system design:
 - a) Introduction to IDE and Programming Environment.
 - b) Configure timer block for signal generation (with given frequency).
 - c) Interrupts programming example using GPIO.
 - d) I²C communication with peripherals
 - e) Master-slave communication between processors using SPI.
 - f) Networking of processor using Wi-Fi.
 - g) Basic RTOS concept and programming

MANDATORY COURSES I

MX3081

INTRODUCTION TO WOMEN AND GENDER STUDIES

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

COURSE OUTLINE

UNIT I CONCEPTS

Sex vs. Gender, masculinity, femininity, socialization, patriarchy, public/ private, essentialism, binaryism, power, hegemony, hierarchy, stereotype, gender roles, gender relation, deconstruction, resistance, sexual division of labour.

UNIT II FEMINIST THEORY

Liberal, Marxist, Socialist, Radical, Psychoanalytic, postmodernist, ecofeminist.

UNIT III WOMEN'S MOVEMENTS: GLOBAL, NATIONAL AND LOCAL

Rise of Feminism in Europe and America.
Women's Movement in India.

UNIT IV GENDER AND LANGUAGE

Linguistic Forms and Gender.
Gender and narratives.

UNIT V GENDER AND REPRESENTATION

Advertising and popular visual media.

Gender and Representation in Alternative Media.
Gender and social media.

TOTAL : 45 PERIODS

MX3082

ELEMENTS OF LITERATURE

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

OBJECTIVE:

- To make the students aware about the finer sensibilities of human existence through an art form. The students will learn to appreciate different forms of literature as suitable modes of expressing human experience.

1. COURSE CONTENTS

Introduction to Elements of Literature

1. Relevance of literature

- a) Enhances Reading, thinking, discussing and writing skills.
- b) Develops finer sensibility for better human relationship.
- c) Increases understanding of the problem of humanity without bias.
- d) Providing space to reconcile and get a cathartic effect.

2. Elements of fiction

- a) Fiction, fact and literary truth.
- b) Fictional modes and patterns.
- c) Plot character and perspective.

3. Elements of poetry

- a) Emotions and imaginations.

- Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
- Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
- Apply the concept of testing of hypothesis for small and large samples in real life problems.
- Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control.
- Have the notion of sampling distributions and statistical techniques used in engineering and management problems.

TEXT BOOKS :

1. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.
2. Milton. J. S. and Arnold. J.C., "Introduction to Probability and Statistics", Tata McGraw Hill, 4th Edition, 2007.

REFERENCES :

1. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.
2. Papoulis, A. and Unnikrishnapillai, S., "Probability, Random Variables and Stochastic Processes", McGraw Hill Education India, 4th Edition, New Delhi, 2010.
3. Ross, S.M., "Introduction to Probability and Statistics for Engineers and Scientists", 3rd Edition, Elsevier, 2004.
4. Spiegel. M.R., Schiller. J. and Srinivasan, R.A., "Schaum's Outline of Theory and Problems of Probability and Statistics", Tata McGraw Hill Edition, 2004.
5. Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", Pearson Education, Asia, 8th Edition, 2007.

EE8075

FIBRE OPTICS AND LASER INSTRUMENTS

LT P C

3 0 0 3

AIM:

To contribute to the knowledge of Fibre optics and Laser Instrumentation and its Industrial and Medical Application.

COURSE OBJECTIVES

- To expose the students to the basic concepts of optical fibres and their properties.
- To provide adequate knowledge about the Industrial applications of optical fibres.
- To expose the students to the Laser fundamentals.
- To provide adequate knowledge about Industrial application of lasers.
- To provide adequate knowledge about holography and Medical applications of Lasers.

UNIT I OPTICAL FIBRES AND THEIR PROPERTIES

9

Construction of optical fiber cable: Guiding mechanism in optical fiber and Basic component of optical fiber communication, –Principles of light propagation through a fibre: Total internal reflection, Acceptance angle (θ_a), Numerical aperture and Skew mode, –Different types of fibres and their properties: Single and multimode fibers and Step index and graded index fibers,– fibre characteristics: Mechanical characteristics and Transmission characteristics, – Absorption losses – Scattering losses – Dispersion – Connectors and splicers –Fibre termination – Optical sources: Light Emitting Diode (LED), – Optical detectors: PIN Diode.

2. Sung-Mo kang, Yusuf leblebici, Chulwoo Kim "CMOS Digital Integrated Circuits: Analysis & Design", 4th edition McGraw Hill Education, 2013
3. Wayne Wolf, "Modern VLSI Design: System On Chip", Pearson Education, 2007
4. R. Jacob Baker, Harry W.Li., David E. Boyee, "CMOS Circuit Design, Layout and Simulation", Prentice Hall of India 2005.

EE8010

POWER SYSTEMS TRANSIENTS

L	T	P	C
3	0	0	3

OBJECTIVES: To impart knowledge about the following topics:

- Generation of switching transients and their control using circuit – theoretical concept.
- Mechanism of lightning strokes and the production of lightning surges.
- Propagation, reflection and refraction of travelling waves.
- Voltage transients caused by faults, circuit breaker action, load rejection on integrated power system.

UNIT I INTRODUCTION AND SURVEY

9

Review and importance of the study of transients - causes for transients. RL circuit transient with sine wave excitation - double frequency transients - basic transforms of the RLC circuit transients. Different types of power system transients - effect of transients on power systems – role of the study of transients in system planning.

UNIT II SWITCHING TRANSIENTS

9

Over voltages due to switching transients - resistance switching and the equivalent circuit for interrupting the resistor current - load switching and equivalent circuit - waveforms for transient voltage across the load and the switch - normal and abnormal switching transients. Current suppression - current chopping - effective equivalent circuit. Capacitance switching - effect of source regulation - capacitance switching with a restrike, with multiple restrikes. Illustration for multiple restriking transients - ferro resonance.

UNIT III LIGHTNING TRANSIENTS

9

Review of the theories in the formation of clouds and charge formation - rate of charging of thunder clouds – mechanism of lightning discharges and characteristics of lightning strokes – model for lightning stroke - factors contributing to good line design - protection using ground wires - tower footing resistance - Interaction between lightning and power system.

UNIT IV TRAVELING WAVES ON TRANSMISSION LINE COMPUTATION OF TRANSIENTS

9

Computation of transients - transient response of systems with series and shunt lumped parameters and distributed lines. Traveling wave concept - step response - Bewley's lattice diagram - standing waves and natural frequencies - reflection and refraction of travelling waves.

UNIT V TRANSIENTS IN INTEGRATED POWER SYSTEM

9

The short line and kilometric fault - distribution of voltages in a power system - Line dropping and load rejection - voltage transients on closing and reclosing lines - over



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Aruthenganvilai, Kallukatti Junction Azhikal Post, Kanyakumari District-629202, Tamil Nadu

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

ELECTIVE SUBJECT WILLINGNESS FORM [2023-2024/ODD] [Regulation 2017]

Name: Siva S

Year: IV

Semester: 07

The students are asked to select one subject each from Professional Elective III and IV, Open Elective II listed below

PROFESSIONAL ELECTIVE – III (VII SEMESTER)

Disaster Management	Human Rights	Operations Research	Probability and Statistics	Fibre Optics and Laser Instrumentation ✓	Foundation Skills in Integrated Product Development
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PROFESSIONAL ELECTIVE – IV (VII SEMESTER)

System Identification and Adaptive Control	Computer Architecture	Control of Electrical Drives	VLSI Design	Power Systems Transients ✓	Total Quality Management
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OPEN ELECTIVE – II (VII SEMESTER)

Analytical Methods and Instrumentation	Design of Experiments	Introduction to C Programming	Process Modeling and Simulation	Signals and Systems ✓	Testing of Materials
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

ELECTIVE SUBJECT WILLINGNESS FORM [2023-2024/ODD] [Regulation 2021]

Name: **P. Rijo**

Year: **III**

Semester: **05**

963521105028

*Note : Registration of Professional Elective Courses from Verticals: PROFESSIONAL ELECTIVE COURSES

Professional Elective Courses will be registered in Semesters V and VI. These courses are listed in groups called verticals that represent a particular area of specialisation / diversified group. Students are permitted to choose all the Professional Electives from a particular vertical or from different verticals. Further, only one Professional Elective course shall be chosen in a semester horizontally (row-wise). However, two courses are permitted from the same row, provided one course is enrolled in Semester V and another in semester VI. The registration of courses for B.E./B.Tech (Honours) or Minor degree shall be done from Semester V to VIII. The procedure for registration of courses explained above shall be followed for the courses of B.E./B.Tech (Honours) or Minor degree also. For more details on B.E./B.Tech (Honours) or Minor degree refer to the Regulations 2021, Clause 4.10. (Amendments) Total number of courses per vertical may change in the each programme of study as 6 or 7 or 8. If there is shortage of courses in a vertical the same may be chosen from another vertical of the same programme.

Professional Elective	Vertical I Power Engineering	Vertical II Converters and Drives	Vertical III Embedded Systems	Vertical IV Electric Vehicle Technology	Vertical V Advanced Control	Vertical VI Diversified Courses
1	Utilization and Conservation of Electrical Energy	Special Electrical Machines	Embedded System Design	Electric Vehicle Architecture	Process Modeling and Simulation	Energy Storage Systems
2	Under Ground Cable Engineering	Analysis of Electrical Machines	Embedded C- Programming	Design of Motor and Power Converters for Electric Vehicles	Computer Control of Processes	Hybrid Energy Technology
3	Substation Engineering and Automation	Multilevel Power Converters	Embedded Processors	Electric Vehicle Design, Mechanics and Control	System Identification	Design and Modelling of Renewable Energy Systems
4	HVDC and FACTS	Electrical Drives	Embedded Control for Electric Drives	Design of Electric Vehicle Charging System	Model Based Control	Grid Integrating Techniques and Challenges
5	Energy Management and Auditing	SMPS and UPS	Smart System Automation	Testing of Electric Vehicles	Non Linear Control	Sustainable and Environmental Friendly HV Insulation System
6	Power Quality	Power Electronics for Renewable Energy Systems	Embedded System for Automotive Applications.	Grid Integration of Electric Vehicles	Optimal Control	Power System Transients
7	Smart Grids	Control of Power Electronics Circuits	VLSI Design	Intelligent control of Electric Vehicles.	Adaptive Control	PLC Programming
8	Restructured Power Market	-	MEMS and NEMS	--	Machine Monitoring System	Big Data Analytics
9	-	-	Digital Signal Processing System Design	-	-	-

MANDATORY COURSES

Mandatory Course I	Introduction to Women and Gender Studies	Elements of Literature	Film Appreciation	Disaster Risk Reduction and Management

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STELLA MARY'S COLLEGE OF ENGINEERING

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Aruthengavilal, Kallukatti Junction, Azhikal Post, Kanyakumari District-629202, Tamil Nadu

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING ELECTIVE SUBJECT WILLINGNESS FORM [2023-2024/ODD] [Regulation 2021]

Name: **Thanush.S**

Year: **III**

Semester: **05**

Name: **Thanush.S**

Semester: **05**

Note: Registration of Professional Elective Courses from Verticals: PROFESSIONAL ELECTIVE COURSES
Professional Elective Courses will be registered in Semesters V and VI. These courses are listed in groups called verticals that represent a particular area of specialisation / diversified group. Students are permitted to choose all the Professional Electives from a particular vertical or from different verticals. Further, only one Professional Elective course shall be chosen in a semester horizontally (row-wise). However, two courses are permitted from the same row, provided one course is enrolled in Semester V and another in semester VI. The registration of courses for B.E./B.Tech (Honours) or Minor degree shall be done from Semester V to VIII. The procedure for registration of courses explained above shall be followed for the courses of B.E./B.Tech (Honours) or Minor degree also. For more details on B.E./B.Tech (Honours) or Minor degree refer to the Regulations 2021, Clause 4.10. (Amendments) Total number of courses per vertical may change in the each programme of study as 6 or 7 or 8. If there is shortage of courses in a vertical the same may be chosen from another vertical of the same programme.

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6	Power Quality	Power Electronics for Renewable Energy Systems	Embedded System for Automotive Applications.	Grid Integration of Electric Vehicles	Optimal Control	Power System Transients
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8	Restructured Power Market	-	MEMS and NEMS	-	Machine Monitoring System	Big Data Analytics
9	-	-	Digital Signal Processing System Design	-	-	-

MANDATORY COURSES

Introductory Course I	Introduction to Women and Gender Studies	Elements of Literature	Film Appreciation	Disaster Risk Reduction and Management

Student Signature