



DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Minutes of BOS meeting

DATE: 05.04.2017

TIME: 10AM TO 12.30PM

VENUE: VLSI LAB

- Dr.E.Logashanmugam, Faculty Head of school of electrical and electronics greeted all the members of the board. Dr.G.Sundari, Professor and Head of the ECE department welcomed the external and internal members of the board of studies. The guidelines of the syllabus given by the management were explained by HOD to all the members of the BOS. The external members also ratified the decision to revise the syllabus under the mentioned guidelines. The HODs of ECE, EEE, E&I, E&C and ETCE under the Faculty of Electrical and Electronics, Staff members from the faculty attended the meeting to have an effective interaction with the members as and when required.
- Dr.G.Sundari, Prof. & Head Department of Electronics and Communication started the meeting by welcoming both the external and the internal numbers to the Board of Studies meeting. The guidelines of the syllabus given by the management were explained by HOD to all the members of the BOS. The external members also ratified the decision to revise the syllabus under the mentioned guidelines.
- Dr.T.Ravi, proposed syllabus revision in 'Nano Electronics' Dr.M. Madhavi Latha, Professor, JNTU College of Engineering, Hyderabad accepted the changes.
- Dr.P.Chitra suggested the inclusion of topic synchronization in 'Digital Communication' subject. Dr.Ram Bilas Pachori, Professor, IIT Indore suggested to add the topics such as Tracking and acquisition, application of spread spectrum techniques and types of sampling.
- Dr. M. Madhavi Latha accepted the changes incorporated in the subject 'Advanced Electronic Test Engineering' suggested by Dr.P.kavipriya. The new courses introduced are Computer Architecture and operating systems, Professional Training-2 and Project Work (Phase 1).
- Dr.T.Ravi also presented the new course introduced for PG courses are Pervasive Computing, Fundamentals of IoT, Microcontrollers, Network Programming, Design of Embedded Systems, Advanced Digital Signal Processing and Microcontrollers and IoT Lab. The Syllabus Revision carried out in PG courses is RF Circuit Design and MEMS technology
- Dr.Sivakumaran accepted the changes made in the subject 'Discrete Electronic circuits' by adding the oscillators as suggested by Mrs. Sujatha.



SATHYABAMA UNIVERSITY

(Established under Section 3 of the UGC Act, 1956)

Declared as Category 'A' University by MHRD, Govt. of India
Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai – 600 119, Tamil Nadu. India..



- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Dr.Sundarsingh, Faculty/EEE to present the curriculum revisions before the board.
- He presented the old and new syllabus for Power System Analysis before the board and discussed the valid additions made in the syllabus.
- Dr.V.Sivachidambaranathan put forth the syllabus of the new courses, 'Electrical Power Quality' for the approval of the board. Dr. A.Amalin Prince approved the Syllabus for this new course.

The next BOS meeting may be scheduled on Oct 2017 to review and finalize the syllabus revision process.

The following internal and external members were present in the meeting.

INTERNAL MEMBERS	SIGNATURE
1. Dr.E.Logashanmugam	
2. Dr.G.Sundari	
3. Dr.N.M.Nandhitha	
4. Dr.V.Sivachidambaranathan	
5. Dr.V.Vijaya Baskar	
6. Dr.S.Lakshmi	
7. Dr.T.Ravi	
8. Dr.V.G.Sivakumar	
9. Dr. P. Kavipriya	
10. Dr.P.Chitra	



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11. Dr.S.Karthikeyan

[Signature]

12. Ms.K.Srilatha

13. Dr.R.Ramadevi

R.R. Ramadevi

14. Mrs.K.Sujatha

15. Dr.Susitra

[Signature]

EXTERNAL MEMBERS

Dr. M. Madhavi Latha
Professor, JNTU College of Engineering
Hyderabad

MML
5/4/17

Dr.Ram Bilas Pachori
Professor, IIT Indore

[Signature]
5/4/17

Dr.Sivakumaran,
Professor, NIT, Thiruchirapaali

[Signature]
5/4/17



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FACULTY OF ELECTRICAL AND ELECTRONICS

Minutes of BOS Meeting

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- Dr.V.Sivachidambaranathan, Prof.& Head, Dept of Electrical and Electronics Engineering requested Dr.Sundarsingh, Faculty /EEE to present the curriculum revisions before the board
- Dr.V.Sivachidambaranathan, put forth the syllabus of the new course, 'Electric Power Quality' for the approval of the board. Dr. A.Amalin Prince approved the Syllabus for this new course.

SEE1612	Electrical Power Quality	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To impart knowledge on sources and characteristics of power quality.
- To study the measurement and analysis of power quality indices.
- To understand the various power quality improvement techniques.
- To get acquainted with the high power applications.

UNIT I CHARACTERISATION OF ELECTRIC POWER QUALITY

9

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

UNIT II SOURCE OF POWER QUALITY PROBLEMS

9

Hrs. Static power converter-DC/AC pulse width modulated drives-Switched mode power supplies-AC voltage regulators-Cycloconverter-Arc furnaces-Static VAR compensator-Inverters for Dispersed generation-Electronic phase control.

UNIT III MEASUREMENT OF POWER QUALITY INDICES

9

Hrs. Measurement-General, Basic Equipment used for the analysis of non-sinusoidal voltages and currents, requirements of instrument response, Presentation of harmonic data, Transducers for harmonic measurements, Distortion factor, Crest factor.

UNIT IV ANALYSIS OF POWER QUALITY INDICES

9

Hrs. Analysis methods-Harmonic current calculation, System frequency response calculations, Modelling Guide lines for Harmonic Analysis, Telephonic Interference, Line notching Calculations, Total Harmonic distortion, Displacement power factor improvement calculation.

UNIT V POWER QUALITY IMPROVEMENT TECHNIQUES

9

Hrs. Power factor corrector-Harmonic filter-passive, Active and Hybrid filters –Static compensator-Distribution static compensator-Dynamic voltage restorer- Protecting sensitive loads using DVR - Use of PWM techniques in power quality improvement.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Understand the characterization of electric power quality.
- CO2 - Evaluate the various source of power quality problems.
- CO3 - Analyze different types of power quality indices.
- CO4 - Design various methods for power quality measurements.
- CO5 - Apply and analyze the various power quality improvement techniques.
- CO6 - Implement power quality methods in high power applications.

REFERENCES

1. Arindam Ghosh “Power Quality Enhancement Using Custom Power Devices”, Kluwer Academics Publishers, 2002
2. G.T Heydt, “Electric Power Quality”, Stars in Circle Publications, 1994, (2nd Edition).

3. J.Arilliga, N.R.Watson and S.Chen, “Power System QualityAssessment”, John wiley& Sons,England, 2000.
4. Robert W. Erickson &Dragon Maksimovic, “Fundamentals of Powerelectronics” second edition, 2001 spring and Business media.
5. IEEE Recommended practices and requirements for Harmonic control in Electrical power systems, IEEE Std. 519-1992.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max.Marks:100

Exam Duration: 3 Hrs.

PART A: 10 Question of 2 marks each – No choice

20 Marks

PART B: 2 Questions from each unit of internal choice; each carrying 16 marks **80 Marks**



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4. Dr.V.Sivachidambaranathan	
5. Dr.V.Vijaya Baskar	
6. Dr.S.Lakshmi	
7. Dr.T.Ravi	
8. Dr.V.G.Sivakumar	
9. Dr. P. Kavipriya	
10. Dr.P.Chitra	



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11. Dr.S.Karthikeyan

[Signature]

12. Ms.K.Srilatha

13. Dr.R.Ramadevi

R.Ramadevi

14. Mrs.K.Sujatha

15. Dr.Susitra

[Signature]

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Professor, JNTU College of Engineering
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Professor, IIT Indore

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5/4/17

Dr.Sivakumaran,
Professor, NIT, Thiruchirapaali

[Signature]
5/4/17

SEE1302	POWER SYSTEM ANALYSIS	L	T	P	Credits	Total Marks
		3	1	0	4	100

COURSE OBJECTIVES

- To impart knowledge in modelling of power system elements
- To implement Numerical methods in power flow problem
- To analyze the system in various faulted conditions.
- To have a knowledge in stability and security of power systems

UNIT 1 POWER SYSTEM MODELING

14 Hrs.

Need for system analysis in planning and operation of power system - per phase analysis of symmetrical three-phase system. General aspects relating to power flow, short circuit and stability analysis - Modeling of generator, load, shunt capacitor, transmission line, shunt reactor for short circuit, power flow and stability studies -per unit representation - bus admittance by analytical method and direct inspection method.

UNIT 2 POWER FLOW ANALYSIS

10 Hrs.

Problem definition - bus classification - derivation of power flow equation - solution by Gauss Seidel and Newton Raphson methods by polar form - P V bus adjustments for both methods - computation of slack bus power, line flow and transmission loss.

UNIT 3 SYMMETRICAL SHORT CIRCUIT ANALYSIS

12 Hrs.

Need for short circuit study - Bus impedance matrix formation - Symmetrical short circuit analysis using Z-bus. - computations of short circuit capacity, post fault voltage and current.

UNIT 4 UNSYMMETRICAL SHORT CIRCUIT ANALYSIS

12 Hrs.

Symmetrical component transformation - sequence impedances.- Sequence Networks - unsymmetrical short circuit analysis for single line fault, line to line fault and double line to ground fault using Z-bus - computations of short circuit capacity, post fault voltage and current.

UNIT 5 STABILITY & SECURITY ANALYSIS

12 Hrs.

Distinction between steady state and transient state - Concepts of Stability & Security - Swing equation-solution to swing equation - step by step method - power angle equation - equal area criterion - critical clearing angle and time. Stability analysis of single machine connected to infinite bus by modified Euler's method - Multi-machine stability analysis using Runge Kutta method.

Max. 60 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Model Impedance, Reactance networks and develop bus admittance matrix.
- CO2 - Examine load flow in a power grid using bus admittance matrix.
- CO3 - Examine fault currents and post fault voltages in symmetrical short circuit using bus impedance matrix.
- CO4 - Estimate fault currents and post fault voltages in unsymmetrical short circuit using symmetrical components.
- CO5 - Evaluate the stability conditions in power grid for minor and major disturbances.
- CO6 - Develop the mathematical solution for achieving stability in power grid during transient state.

TEXT / REFERENCE BOOKS

1. John J. Grainger and Stevenson Jr. W.D., "Power System Analysis", Tata McGraw Hill, 2017.
3. Kothari .D.P and Nagarath .I.J., "Power system Engineering", 2nd Edition, Tata McGraw Hill, 2011.
4. Stagg, G.W. and El-Abaid, A. H. "Computer Methods in Power System Analysis", McGraw-Hill International Book Company, 1994.
5. Nagarath, I.J., and Kothari, D.P., "Modern Power System Analysis", 4th Edition, Tata McGraw Hill Publishing Company, 2011.
6. Hadi Saadat, "Power system Analysis", Tata McGraw Hill Publishing Company, 3rd Edition, 2011.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks: 80

PART A: 10 questions of 2 marks each - No choice

PART B: 2 questions from each unit of internal choice, each carrying 12 marks

Exam Duration: 3 Hrs.

20 Marks

60 Marks



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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Minutes of BOS meeting

DATE: 03.10.2017

TIME: 10AM TO 12.30PM

VENUE: VLSI LAB

- Dr.N.M.Nandhitha ,Dean and Head, School of Electrical and Electronics Engineering greeted all the internal members of the board of studies. The HODs of ECE, EEE, E&I, E&C and ETCE under the Faculty of Electrical and Electronics, Staff members from the faculty attended the meeting to have an effective interaction with the members as and when required.
- Dr.T.Ravi, proposed syllabus revision in 'MEMS and its applications. Dr.M. Madhavi Latha, Professor, JNTU College of Engineering, Hyderabad accepted the changes. Dr.S.Karthikeyan presented the changes made in 'Pattern Recognition and Image vision'. Dr.Ram Bilas Pachori, Professor, IIT Indore accepted the changes.
- Dr.P.Chitra suggested the inclusion of topic synchronization in 'Digital Signal processing' subject. Dr.Ram Bilas Pachori, Professor, IIT Indore suggested to add the topics such as Applications of Multirate signal processing, Speech compression, Adaptive filter, Musical sound processing.
- Dr S Lakshmi, proposed syllabus revision in 'Analog integrated circuit'. Dr.M. Madhavi Latha, Professor, JNTU College of Engineering, Hyderabad accepted the changes. The new courses introduced are Telecommunication Systems and Services, Microprocessors and Microcontrollers and Embedded Systems.
- Dr.T.Ravi also presented the new course introduced for PG courses are Software Modeling For Embedded System, Wireless Sensor Networks for IoT, Embedded OS and Device Drivers, Embedded OS and device drivers lab, Industry 4.0, and Mobile Application Development. The Syllabus Revision carried out in PG courses is Robotics and Computer Vision.
- Dr.R.Ramadevi proposed the introduction of new subject 'Soft Computing techniques'. Dr.Sivakumaran suggested to add an unit on Genetic algorithm.



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- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Dr.Radhika.S, Faculty/EEE to put forth the feedback collected from Staff and 2014 – 2016 Batch Students and requested the board members to approve for the shift in the course titled “Digital Signal Processing & its Applications” (SEC1315) to Semester 6 in 2015 Regulations. With respect to this change the course titled “Principles of Embedded System” (SEC1317) is suggested to shift to Semester 7 in 2015 Regulations.
- Dr.V.Sivachidambaranathan, presented the old and new syllabus for Special Electrical Machines and Power Generation and Utilization before the board and discussed the valid additions made in the syllabus.
- Dr. V. Sivachidambaranathan requested Dr.Vanitha, Faculty /EEE to present the syllabus of the new course, ‘Energy Storage Systems’ for the approval of the board. Dr. A.Amalin Prince approved the Syllabus for this new course.

The next BOS meeting may be scheduled on April 2018 to review and finalize the syllabus revision process.

The following internal members were present in the meeting.

INTERNAL MEMBERS

SIGNATURE

1. Dr.N.M.Nandhitha
2. Dr.V.Sivachidambaranathan
3. Dr.V.Vijaya Baskar
4. Dr.S.Lakshmi
5. Dr.T.Ravi
6. Dr.V.G.Sivakumar
7. Dr. P. Kavipriya



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8. Dr.P.Chitra

P. Chitra

9. Dr.S.Karthikeyan

S. Karthikeyan

10. Mrs.K.Srilatha

K. Srilatha

11. Mrs.L.Magthelin Therase

L. Magthelin Therase

12. Mrs.I.Rexiline Sheeba

I. Rexiline Sheeba

13. Dr.Susitra

S. Susitra

14. Dr.Ramadevi

R. Ramadevi

15. Mrs. Sujatha

S. Sujatha

EXTERNAL MEMBERS

Dr. M. Madhavi Latha
Professor
JNTU College of Engineering
Hyderabad

MML
30/10/17

Dr.Ram Bilas Pachori
Professor, IIT Indore

R. Bilas Pachori
31/10/17

Dr.Sivakumaran,
Professor, NIIT, Thiruchirappalli

S. Sivakumaran
30/10/17



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Date :23rd October, 2017

FACULTY OF ELECTRICAL AND ELECTRONICS

DATE: 03.10.2017

Venue: VLSI LAB

Time:10.A.M to 12.30 P.M

- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Dr.Radhika.S, Faculty/EEE to put forth the feedback collected from Staff and 2014 – 2016 Batch Students and requested the board members to approve for the shift in the course titled “Digital Signal Processing & its Applications” (SEC1315) to Semester 6 in 2015 Regulations. With respect to this change the course titled “Principles of Embedded System” (SEC1317) is suggested to shift to Semester 7 in 2015 Regulations.
- Dr.V.Sivachidambaranathan, presented the old and new syllabus for Special Electrical Machines before the board and discussed the valid additions made in the syllabus.
- Dr.G.T.Sundarajan ,put forth the revised PG syllabus for the Power Electronics Lab for the approval of the board. Dr. M.D.Selvaraj approved the revised Syllabus.
- Dr. V. Sivachidambaranathan requested Dr.Vanitha, Faculty /EEE to present the syllabus of the new course, ‘Energy Storage Systems’ for the approval of the board. Dr. A.Amalin Prince approved the Syllabus for this new course.

Name of the Course: SPECIAL ELECTRICAL MACHINES

Course Code : SEE1307

Unit	Content	Remarks
I	STEPPING MOTORS Constructional features, principle of operation, types, modes of excitation, Torque production in Variable Reluctance (VR) stepping motor, Static and Dynamic characteristics, Applications. Introduction to Drive systems for open loop control, Closed loop control of stepping motor	Inclusion
II	SWITCHED RELUCTANCE MOTORS Principle of Operation, Constructional features, Torque equation, Power Semi Conductor Switching Circuits, frequency of variation of inductance of each phase winding - Control circuits of SRM- Torque – Speed Characteristics, Microprocessor based control of SRM Drive, Applications	Inclusion In order to have an exposure on control circuits for SRM
III	SYNCHRONOUS RELUCTANCE MOTORS Constructional features: axial and radial air gap Motors. Operating principle, reluctance torque – phasor diagram, Speed torque characteristics, Applications	No change
IV	PERMANENT MAGNET BRUSHLESS DC MOTORS Commutation in DC motors, Electronic Commutation- Difference between mechanical and electronic commutators Hall sensors, Optical sensors, Construction and principle of PMBL DC Motor, Torque and E.M.F equation, Torque-speed characteristics, Power Controllers-Drive Circuits, Applications.	No change
V	PERMANENT MAGNET SYNCHRONOUS MOTORS Construction and types, Principle of operation, EMF and Torque equation, Phasor diagram- Torque Speed Characteristics, Power controllers- Self control, Vector control, Microprocessor based Control, Applications	No change

SEE6528	POWER ELECTRONICS LAB	L	T	P	Credits	Total Marks
		0	0	6	3	100

LIST OF EXPERIMENTS

1. Single Phase Half and Full converter with R, RL, RLE loads.
2. Three Phase Half and Full converter with R, RL, RLE loads.
3. Speed control of PMDC motor using Voltage Commutated Chopper.
4. IGBT based speed control of three phase induction motor using PWM technique.
5. Three Phase AC voltage regulator.
6. Four quadrant chopper fed DC motor
7. Resonant DC to DC Converter.
8. Single phase cycloconverter.

SEE6530	POWER ELECTRONICS LAB	L	T	P	Credits	Total Marks
		0	0	6	3	100

LIST OF EXPERIMENTS

1. Single Phase Half and Full converter with R, RL, RLE loads.
2. Three Phase Half and Full converter with R, RL, RLE loads.
3. Speed control of PMDC motor using Voltage Commutated Chopper.
4. Speed control of PMDC motor using Current Commutated Chopper.
5. IGBT based speed control of three phase induction motor using PWM technique.
6. Three Phase AC voltage regulator.
7. Four quadrant chopper fed DC motor
8. Modified McMurray - Bedford Inverter.
9. Resonant DC to DC Converter.
10. Single phase cycloconverter

SEE1613	ENERGY STORAGE SYSTEMS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To develop the ability to understand / analyze the various types of energy storage.
- To study the various applications of energy storage systems.
- To analyze various types of energy storage devices and perform the selection based on techno-economic view point.

UNIT 1 INTRODUCTION

8 Hrs.

Necessity of energy storage – types of energy storage – comparison of energy storage technologies – Applications.

UNIT 2 ELECTRICAL ENERGY STORAGE

10 Hrs.

Fundamental concept of batteries – measuring of battery performance, charging and discharging of a battery, storage density, energy density, and safety issues. Types of batteries – Lead Acid, Nickel – Cadmium, Zinc Manganese dioxide and modern batteries for example zinc-Air, Nickel Hydride, Lithium Battery.

UNIT 3 FUEL CELL

9 Hrs.

Fuel Cell – History of Fuel cell, Principles of Electrochemical storage – Types – Hydrogen oxygen cells, Hydrogen air cell, Hydrocarbon air cell, alkaline fuel cell, detailed analysis – advantage and drawback of each type.

UNIT 4 THERMAL STORAGE SYSTEM

9 Hrs.

Thermal storage – Types – Modelling of thermal storage units – Simple water and rock bed storage system – pressurized water storage system – Modelling of phase change storage system – Simple units, packed bed storage units - Modelling using porous medium approach, Use of Transys

UNIT 5 ALTERNATE ENERGY STORAGE TECHNOLOGIES

9 Hrs.

Flywheel, Super capacitors, Principles & Methods – Applications, Compressed air Energy storage, Concept of Hybrid Storage – Applications.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Understand the different energy storage technology
- CO2 - Analyze the technical aspects of battery storage system
- CO3 - Examine the performance of fuel cell storage system
- CO4 - Evaluate the performance of different thermal storage system
- CO5 - Criticize the different alternate energy storage technology
- CO6 - Select suitable alternate energy storage technology for real world application

TEXT / REFERENCE BOOKS

1. Ibrahim Dincer and Mark A. Rosen, "Thermal Energy Storage Systems and Applications", John Wiley & Sons 2002.
2. James Larminie and Andrew Dicks, "Fuel cell systems Explained", Wiley publications, 2003.
3. Lunardini.V.J, Heat Transfer in Cold Climates, John Wiley and Sons 1981..
4. Ru-shiliu, Leizhang and Xueliang sun, "Electrochemical technologies for energy storage and conversion", Wiley publications, 2012.
5. Schmidt.F.W and Willmott.A.J, Thermal Storage and Regeneration, Hemisphere Publishing Corporation, 1981.

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- Dr S Lakshmi, proposed syllabus revision in 'Analog integrated circuit'. Dr.M. Madhavi Latha, Professor, JNTU College of Engineering, Hyderabad accepted the changes. The new courses introduced are Telecommunication Systems and Services, Microprocessors and Microcontrollers and Embedded Systems.
- Dr.T.Ravi also presented the new course introduced for PG courses are Software Modeling For Embedded System, Wireless Sensor Networks for IoT, Embedded OS and Device Drivers, Embedded OS and device drivers lab, Industry 4.0, and Mobile Application Development. The Syllabus Revision carried out in PG courses is Robotics and Computer Vision.
- Dr.R.Ramadevi proposed the introduction of new subject 'Soft Computing techniques'. Dr.Sivakumaran suggested to add an unit on Genetic algorithm.



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- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Dr.Radhika.S, Faculty/EEE to put forth the feedback collected from Staff and 2014 – 2016 Batch Students and requested the board members to approve for the shift in the course titled “Digital Signal Processing & its Applications” (SEC1315) to Semester 6 in 2015 Regulations. With respect to this change the course titled “Principles of Embedded System” (SEC1317) is suggested to shift to Semester 7 in 2015 Regulations.
- Dr.V.Sivachidambaranathan, presented the old and new syllabus for Special Electrical Machines and Power Generation and Utilization before the board and discussed the valid additions made in the syllabus.
- Dr. V. Sivachidambaranathan requested Dr.Vanitha, Faculty /EEE to present the syllabus of the new course, ‘Energy Storage Systems’ for the approval of the board. Dr. A.Amalin Prince approved the Syllabus for this new course.

The next BOS meeting may be scheduled on April 2018 to review and finalize the syllabus revision process.

The following internal members were present in the meeting.

INTERNAL MEMBERS

SIGNATURE

1. Dr.N.M.Nandhitha

2. Dr.V.Sivachidambaranathan

3. Dr.V.Vijaya Baskar

4. Dr.S.Lakshmi

5. Dr.T.Ravi

6. Dr.V.G.Sivakumar

7. Dr. P. Kavipriya

[Handwritten signatures for internal members]



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8. Dr.P.Chitra

P. Chitra

9. Dr.S.Karthikeyan

S. Karthikeyan

10. Mrs.K.Srilatha

K. Srilatha

11. Mrs.L.Magthelin Therase

L. Magthelin Therase

12. Mrs.I.Rexiline Sheeba

I. Rexiline Sheeba

13. Dr.Susitra

S. Susitra

14. Dr.Ramadevi

R. Ramadevi

15. Mrs. Sujatha

S. Sujatha

EXTERNAL MEMBERS

Dr. M. Madhavi Latha
Professor
JNTU College of Engineering
Hyderabad

MML
30/10/17

Dr.Ram Bilas Pachori
Professor, IIT Indore

R. Bilas Pachori
31/10/17

Dr.Sivakumaran,
Professor, NIIT, Thiruchirappalli

S. Sivakumaran
30/10/17



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School of Electrical and Electronics Engineering

Minutes of Board of Studies Meeting held on 21st May, 2018

**(Venue: Conference Hall, IEC, Sathyabama Institute of Science and Technology,
Chennai 119)**

Time: 9.00 AM – 11.30 AM

In the beginning of the meeting Dr. N. M. Nandhitha, Dean, School of EEE welcomed all the members and briefed them about the progress of the Department. The BOS members expressed their highly appreciation and satisfaction about the courses and activities of the Department. After that the BOS discussed and resolved the following items:

The Agenda for the meeting was as follows:

- Discussions were held on course structure and course outcomes.
- New & Revised Syllabus
- Inclusion of branch specific and new elective subjects
- Bringing down the overall credits to 180.
- Dr M D Selvaraj. Professor, IIITDM accepted the changes suggested by Dr T.Ravi in the subject 'Programming in HDL'. Dr.Sivakumaran, Prof., NIT, Trichy suggested to include Modeling a test bench, timing and delays , Switch level modeling.
- Dr.S.Lakshmi suggested the change in 'Optical Communication'. Dr.sivakumaran accepted the change.
- The new courses introduced are RF and Microwave Engineering, Data communication and networking, Satellite Communications and Project Work (Phase - II).
- Dr.T.Ravi also presented the new course introduced for PG courses are RTOS Programming, Cloud Computing, High Performance Computing, Advanced Digital Image Processing , Big Data Technologies, RTOS Programming lab.
- The Syllabus Revision carried out in PG courses is VLSI circuit Design for Imaging Applications.
- Dr.Selvaraj suggested specific mentioning should be made in the curriculum with regard to:



- a) Program outcomes
- b) Program specific outcomes
- c) Course objectives
- d) Course outcomes

- Dr.Ramadevi suggested the inclusion of Field and HART protocol in 'Logic and Distributed Control system'. Dr.sivakumaran accepted the change.
- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Dr.Sundarsingh, Faculty/EEE to present the curriculum revisions before the board for the subject Power System Protection and Switch gear and High Voltage Engineering.
- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Dr.Rameshbabu, Faculty/EEE to present the curriculum revisions for the subject Analysis of Inverters before the board.
- They presented the old and new syllabus before the board and discussed the valid additions made in the syllabus.
- Dr.V.Sivachidambaranathan put forth the syllabus of the new courses, 'Industrial Instrumentation and Automation' for the approval of the board. Dr. A.Amalin Prince approved the Syllabus for this new course.

The next BOS meeting may be scheduled on Oct 2018 to review and finalize the syllabus revision process.



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The following internal and external members were present in the meeting.

INTERNAL MEMBERS

SIGNATURE

1. Dr.N.M.Nandhitha

2. Dr.S.Lakshmi

3. Dr.V.Vijaya Baskar

4. Dr.V.Sivachidambaranathan

5. Dr.T.Ravi

6. Dr. P. Kavipriya

7. Dr.P.Chitra

8. Dr.S.Karthikeyan

9. Mrs.K.Srilatha

10. Dr.V.Balamurugan

11. Mrs.L.Magthelin Therase

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13. Dr.Ramadevi

14. Mrs.K.Sujatha

15. Dr.Susitra



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External members

Dr.N.Shivakumaran

Professor,
Dept. of I & C
NIT, Trichy

Dr. N. Shivakumaran
21/5/18

Dr.M.D.Selvaraj,

Associate Professor,
IIITDM, kancheepuram

Dr. M. D. Selvaraj
21/5/18



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School of Electrical and Electronics

Minutes of Board of Studies Meeting held on 21-05-2018

**Venue : Conference Hall IEC, Sathyabama Institute of Science and Technology,
Chennai-119**

- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Dr.Sundarsingh, Faculty/EEE to present the curriculum revisions before the board for the subject Power System Protection and Switch gear.
- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Dr.Rameshbabu, Faculty/EEE to present the curriculum revisions for the subject Analysis of Inverters before the board.
- They presented the old and new syllabus before the board and discussed the valid additions made in the syllabus.
- Dr.V.Sivachidambaranathan put forth the syllabus of the new courses, 'Industrial Instrumentation and Automation' for the approval of the board. Dr. A.Amalin Prince approved the Syllabus for this new course.

Name of the Course: **POWER SYSTEM PROTECTION AND SWITCH GEAR**

Course Code : **SEE1401**

Unit	Content	Remarks
I	INTRODUCTION Essential requirements of protection – nature and causes of faults – types of faults – effects of faults – zones of protection – protection schemes – CTs and PTs and their applications – Basic relay terminology over current relay, directional relay - Micro processor based over current relay	Content deleted Content Included
II	PROTECTIVE RELAYS Electromagnetic relays – operating principle – torque equation – relay characteristics – over current relay, directional relay , distance relay, differential relay, negative sequence relay, amplitude and phase comparator of over current static relays, duality between comparators. Micro processor based over current relay. Basic relay terminology	Content Deleted Content included
III	APPARATUS PROTECTION Protection of Generator– stator & rotor protection – Large Motor protection. Transformer protection – Bus bar protection – Transmission line protection	
IV	THEORY OF ARC QUENCHING. Arcing phenomena – theory and methods of arc quenching – recovery voltage – restriking voltage – RRRV – resistance switching – current chopping – capacitive current breaking – characteristics of fuses – HRC fuse.	
V	CIRCUIT BREAKERS Classification Of Circuit Breakers – Air Circuit Breakers – Oil Circuit Breakers – Vacuum Circuit Breaker – Sf6 Circuit Breakers – Selection Of Circuit Breakers – Rating Of Circuit Breakers – Testing Of Circuit Breakers.	

Name of the Course: Analysis of Inverters Course Code : SEE5102		
Unit	Content	Remarks
I	Introduction – Principle of operation – Performance parameters – Single phase half bridge inverters – Single phase full bridge inverter – single phase series inverter – single phase parallel inverter - Voltage control of single phase inverters	
II	Modified McMurray inverter – McMurray Bedford half bridge and full inverter – Three phase bridge inverter with 180° and 120° mode of operation– Voltage control of three phase inverters.	Shifted to Unit1 Deleted
III	Analysis of single phase and three phase auto sequential current source inverter - current source bridge inverter – Harmonic elimination techniques. Comparison with VSI and CSI-Equivalent circuit and operation – Circuit analysis and calculation. Introduction to Quasi Z- source inverter-basic topology-Extended boost quasi Z- source inverter topologies	Shifted to Unit 2 Included in Unit 3
IV	Multilevel Concept – Diode Clamped – Flying Capacitor – Cascade Type Multilevel Inverters - Comparison of Multilevel Inverters - Application of Multilevel Inverters	Shifted to Unit 5
V	Introduction – Series Resonant Inverters With Unidirectional and Bidirectional Switches – Parallel Resonant Inverters – Class E Resonant Inverter - Zero Current Switching Resonant Converter – Zero Voltage Switching Resonant Converter – Two Quadrant ZVS Resonant Converter – Resonant DC –Link Inverter.	Shifted from Unit 4

SEE1614	Industrial Instrumentation and Automation	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To study the various Components in the Industrial Automation.
- To have an adequate knowledge about different industrial instrumentation
- To get the Knowledge in PLC for various Applications
- To Study the various components in SCADA.

UNIT 1 INTRODUCTION

9 Hrs.

Need and benefits of Industrial Automation, Automation Hierarchy, Basic components of automation system, description of each component, Types of automation system: - Fixed, programmable, flexible.

UNIT 2 SENSORS AND TRANSDUCER

9 Hrs.

Piezoelectric, Photovoltaic, Hall Effect, Magneto strictive, Radio-Active Absorption, Ionic Conduction Transducers, Digital Transducers - Digital Displacement Transducer, Shaft Angle Encoder, Optical Encoders, Magnetic Encoders -Digital Speed Transducers -Variable Reluctance Type, Smart Sensors - SQUID Sensors - Film Sensors – MEMS - Basic Concept of MEMS

UNIT 3 INTRODUCTION TO PLC

9 Hrs.

Introduction to Sequence Control, PLCs - Working, Specifications of PLC Onboard/Inline/Remote IO's, Comparison of PLC & PC, Relay Ladder Logic- PLC Programming- realization of AND, OR logic, concept of latching.

UNIT 4 PLC AND ITS APPLICATIONS

9 Hrs.

Introduction to Timer/Counters, ON Delay Timer, OFF Delay Timer - Exercises based on Timers, Counters - Up Counters, Down Counters. Logical Instructions, Comparison Instruction, Arithmetic Instructions, Data Handling Instructions. PLC based applications: Motor sequence control, Traffic light control, elevator control, Tank level control, conveyor system, Stepper motor control.

UNIT 5 SCADA

9 Hrs.

Introduction to SCADA, typical SCADA block diagram, - Common System Components Supervision and Control- HMI, RTU and Supervisory Stations- Trends in SCADA, benefits of SCADA. Interfacing SCADA system with PLC: Typical connection diagram, Object linking and embedding for Process Control (OPC) architecture.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Identify Different components of an Automation System.
- CO2 - Analyze the New sensors and Transducer for the applications
- CO3 - Interface the given I/O Device with appropriate PLC Module.
- CO4 - Prepare a PLC Ladder Program for the given applications.
- CO5 - Prepare a simple SCADA Applications.
- CO6 - Design the Interfacing SCADA system with PLC

TEXT / REFERENCE BOOKS

1. Stenerson, Jon," Industrial Automation and Process Control", PHI Learning, New Delhi, ISBN 9780130618900.
2. D. Patra Nabis, 'Sensors and Transducers', Prentice Hall of India, 1999.
3. Dr. S. Renganathan, "Transducer Engineering" -Allied Publishers Limited.
4. .Jadhav, V. R., " Programmable Logic Controller", Khanna publishers, New Delhi, 2017, ISBN : 9788174092281
5. Petruzella,F.D," Programmable Logic Controller", Tata — McGraw Hill India, New Delhi, Fourth edition,2010, ISBN: 9780071067386.
6. Mitra, Madhu Chandra, Sengupta, Samarjit," Programmable Logic Controllers and Industrial Automation an Introduction", Penram International Publication, New Delhi 2015,Fifth Reprint, ISBN 9788187972174.
7. Boyar.S.A," Supervisory Control and Data Acquisition", ISA Publication, New Delhi , Fourth Edition, ISBN 978-1936007097.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks:100

Exam Duration:3 Hrs.

PART A: 10 Question of 2 marks each – No choice

20 Marks

PART B: 2 Questions from each unit of internal choice; each carrying 16 marks

80 Marks



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School of Electrical and Electronics Engineering

Minutes of Board of Studies Meeting held on 21st May, 2018

**(Venue: Conference Hall, IEC, Sathyabama Institute of Science and Technology,
Chennai 119)**

Time: 9.00 AM – 11.30 AM

In the beginning of the meeting Dr. N. M. Nandhitha, Dean, School of EEE welcomed all the members and briefed them about the progress of the Department. The BOS members expressed their highly appreciation and satisfaction about the courses and activities of the Department. After that the BOS discussed and resolved the following items:

The Agenda for the meeting was as follows:

- Discussions were held on course structure and course outcomes.
- New & Revised Syllabus
- Inclusion of branch specific and new elective subjects
- Bringing down the overall credits to 180.
- Dr M D Selvaraj. Professor, IIITDM accepted the changes suggested by Dr T.Ravi in the subject 'Programming in HDL'. Dr.Sivakumaran, Prof., NIT, Trichy suggested to include Modeling a test bench, timing and delays , Switch level modeling.
- Dr.S.Lakshmi suggested the change in 'Optical Communication'. Dr.sivakumaran accepted the change.
- The new courses introduced are RF and Microwave Engineering, Data communication and networking, Satellite Communications and Project Work (Phase - II).
- Dr.T.Ravi also presented the new course introduced for PG courses are RTOS Programming, Cloud Computing, High Performance Computing, Advanced Digital Image Processing , Big Data Technologies, RTOS Programming lab.
- The Syllabus Revision carried out in PG courses is VLSI circuit Design for Imaging Applications.
- Dr.Selvaraj suggested specific mentioning should be made in the curriculum with regard to:



- a) Program outcomes
- b) Program specific outcomes
- c) Course objectives
- d) Course outcomes

- Dr.Ramadevi suggested the inclusion of Field and HART protocol in 'Logic and Distributed Control system'. Dr.sivakumaran accepted the change.
- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Dr.Sundarsingh, Faculty/EEE to present the curriculum revisions before the board for the subject Power System Protection and Switch gear and High Voltage Engineering.
- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Dr.Rameshbabu, Faculty/EEE to present the curriculum revisions for the subject Analysis of Inverters before the board.
- They presented the old and new syllabus before the board and discussed the valid additions made in the syllabus.
- Dr.V.Sivachidambaranathan put forth the syllabus of the new courses, 'Industrial Instrumentation and Automation' for the approval of the board. Dr. A.Amalin Prince approved the Syllabus for this new course.

The next BOS meeting may be scheduled on Oct 2018 to review and finalize the syllabus revision process.



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The following internal and external members were present in the meeting.

INTERNAL MEMBERS

SIGNATURE

1. Dr.N.M.Nandhitha

2. Dr.S.Lakshmi

3. Dr.V.Vijaya Baskar

4. Dr.V.Sivachidambaranathan

5. Dr.T.Ravi

6. Dr. P. Kavipriya

7. Dr.P.Chitra

8. Dr.S.Karthikeyan

9. Mrs.K.Srilatha

10. Dr.V.Balamurugan

11. Mrs.L.Magthelin Therase

12. Mrs.I.Rexiline Sheeba

13. Dr.Ramadevi

14. Mrs.K.Sujatha

15. Dr.Susitra



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External members

Dr.N.Shivakumaran

Professor,
Dept. of I & C
NIT, Trichy

Dr. N. Shivakumaran
21/5/18

Dr.M.D.Selvaraj,

Associate Professor,
IIITDM, kancheepuram

Dr. M. D. Selvaraj
21/5/18



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School of Electrical and Electronics Engineering

Minutes of Board of Studies Meeting held on 16th NOV, 2018

Venue: Conference Hall, IEC

Date: 16-11-18

Time: 9.00 AM – 11.30 AM

- Dr. N. M. Nandhitha, Dean, School of EEE welcomed all members of Board of Studies. On the suggestions of various Experts, the contents are designed by the Board of Studies Members considering the various aspects and need of the society. The members appreciated the contents of the syllabus and it was resolved as under:
- Course outcomes for each course has been discussed and modified.
- Dr.T.Ravi put forth the introduction of new courses 'Advanced Microprocessors', 'Automatic Speech recognition', Pattern Recognition and Image Vision' and 'Advanced Electronic Test Engineering'.
- Dr M D Selvaraj. Professor, IIITDM suggested that RF and Microwave Engineering can be renamed as RF Engineering in VIII semester.
- Dr.Sivakumaran, Prof., NIT, Trichy suggested to have Optical Fibre Communication in VII semester can be replaced with visible light communication. Microprocessor Interfacing and its Applications can be modified as Microprocessor and Microcontrollers.
- Dr.Sivakumaran suggested that subject name can be changed from "Control Engineering" to "Modern Control Systems". The members Dr M D Selvaraj advised to revise the fifth unit of Electronic Devices syllabus.
- Dr.T.Ravi also presented the new course introduced for PG courses are AI and Soft Computing, Network Oriented OS, Scada Systems Applications. The Syllabus Revision carried out in PG courses is Computational Nanoelectronics.
- Dr.V.Sivachidambaranathan requested Dr.Susitra to put forth the syllabus of the new courses, 'Testing and Commissioning of Electrical Equipment' for the approval of the board. Dr. A.Amalin Prince approved the Syllabus for this new course.
- Dr.N.M Nandhitha putforth to revise the syllabus of B.E by incorporating the following



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Develop curricula with relevance to:

- Local needs
- National needs
- Regional needs
- Global needs

Develop existing courses with focus on:

- Employability
- Entrepreneurship
- Skill development.
- Note: If any collaboration is made with any organizations to facilitate the courses, MoU's should be signed with them.

Develop existing courses with focus on:

- Gender
- Environment and Sustainability
- Human Values and Professional Ethics.
- Introduce either Field Projects/research projects or Internships at the end of second and fourth semesters.
- New elective courses namely Advanced microprocessor, Automatic Speech recognition, Pattern recognition and image vision, Advanced Electronic Test Engineering has been introduced.
- The Dean reported the members about the efforts of all the members of Board of Studies to prepare the syllabus of the subject B.E for the academic year 2018-19. The next BOS meeting may be scheduled on April 2019 to review and finalize the syllabus revision process. It was resolved as under, "Resolved that the Appreciation of Board of Studies members who contributed to prepare syllabus be noted." There being no other matter, the meeting was concluded with a vote of thanks .



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The following internal and external members were present in the meeting.

INTERNAL MEMBERS

SIGNATURE

1. Dr.N.M.Nandhitha

2. Dr.S.Lakshmi

3. Dr.T.Ravi

4. Dr.V.Sivachidambaranathan

5. Dr.V.Vijaya Baskar

6. Dr. P. Kavipriya

7. Dr.P.Chitra

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14. Dr.R.Ramadevi

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EXTERNAL MEMBERS

Dr.N.Shivakumaran

Professor

Dept. of I & C

NIT, Trichy

Dr. N. Shivakumaran
16/11/18

Dr.M.D.Selvaraj,

Associate Professor,

IIITDM, kancheepuram

Dr. M. D. Selvaraj
16/11/18



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Minutes of Board of Studies Meeting held on 16-11-2018

Venue : Conference Hall IEC

- Dr.V.Sivachidambaranathan requested Dr.Susitra to put forth the syllabus of the new courses, 'Testing and Commissioning of Electrical Equipment ' for the approval of the board. Dr. A.Amalin Prince approved the Syllabus for this new course.
- Dr. Ramesh Babu put forth revised syllabus for Power Electronics Simulation lab before the committee members for the approval. Dr.M.D.Selvaraj approved the revised syllabus for PG M.E (Power Electronics and Industrial Drives).

SEE1615	TESTING AND COMMISSIONING OF ELECTRICAL EQUIPMENT	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To undertake installation, commissioning and maintenance of various electrical equipment.
- To impart knowledge on maintenance schedule of different equipment and machines.
- To trouble shoot various electrical equipment, machines and domestic appliances.
- To have familiar about electrical safety regulations and rules during maintenance.

UNIT 1 SAFETY MANAGEMENT

9Hrs.

Objectives, Safety Management during Operation and Maintenance, Clearance and Creepages, Electric Shock, need of Earthing, different methods of Earthing, factors affecting the Earth Resistance, methods of measuring the Earth Resistance, Equipment Earthing and System Grounding, Earthing Procedure - Building installation, Domestic appliances, Industrial premises, Earthing of substation, generating station and overhead line.

UNIT 2 TESTING OF TRANSFORMER, PLANT AND EQUIPMENT:

9 Hrs.

Measurement of winding resistance, voltage ratio and check of voltage vector relationship; Measurement of impedance voltage/short-circuit impedance and load loss; Measurement of no-load loss and current; Measurement of insulation resistance; Dielectric tests; Temperature-rise, insulation and HV test, dielectric absorption, switching impulse test. Drying out procedure for transformer. PI index, Commissioning steps for transformer, Troubleshooting & Maintenance of transformer.

UNIT 3 INSTALLATION AND COMMISSIONING OF ROTATING ELECTRICAL MACHINES

9 Hrs.

Degree of protection, cooling system, degree of cooling with IP- IC code (brief discussion), enclosures, rating of industrial rotating electric machine, installation, commissioning and protection of rotating electric machine, drying out of electric rotating machine, insulation resistance measurement, site testing and checking, care, services and maintenance of motors.

UNIT 4 TRANSMISSION LINE

9 Hrs.

Commissioning of A.C transmission line and HVDC transmission, galvanize steel structure, towers and insulator for transmission and distribution line, tower footing resistance, substation equipment, bus bar system, power cable, low power control cable, Contactor, GIS (gas insulated substation).

UNIT 5 SWITCH GEAR & PROTECTIVE DEVICES

9 Hrs.

Standards, Classification, specification, rating and duties of CB, installation, commissioning tests, maintenance schedule, type & routine tests. Operation of s/s (steps) for line Circuit breaker maintenance. Location of lightening arrester with reasons.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Understand the Procedure of different types of earthing for different types of electrical installations.
- CO2 - Trouble shoot and preparing the maintenance schedule of the transformers.
- CO3 - Analyze and trouble shoot various types of rotating electrical machines.
- CO4 – Estimate the commissioning of AC transmission line and HVDC transmission.
- CO5 – Prepare the maintenance schedule for switch gear and protective devices.
- CO6 – Plan the location of lightening arrester.

REFERENCES

1. Rao, S., “Testing, commissioning, operation and maintenance of electrical equipment”, 6/E., Khanna Publishers, New Delhi
2. Paul Gill, “Electrical power equipment maintenance and testing”, CRC Press, 2008.
3. Singh Tarlok, "Installation, commissioning and maintenance of Electrical equipment", S.K. Kataria and Sons, New Delhi,
4. Philip Kiamah, “Electrical Equipment Handbook: Troubleshooting and Maintenance”, McGrawHill, 2003.
5. Relevant Indian Standards (IS Code) and IEEE Standards for-Installation, maintenance and commissioning of electrical equipments/machines.

SEE6529	POWER ELECTRONICS SIMULATION LAB	L	T	P	Credits	Total Marks
		0	0	6	3	100

LIST OF EXPERIMENTS:

1. Open Loop Control of Separately Excited DC Motor.
2. Open Loop Control of DC Series Motor.
3. Closed Loop Control of Separately Excited DC Motor.
4. Thyristor Static and Dynamic Behavior
5. Simulation of Single Phase Semi Converter with motor load.
6. Simulation of Three Phase Converter with different loads.
7. Simulation of Single and Three phase PWM circuits.
8. AC – DC – AC PWM converter
9. Three Phase Matrix Converter
10. Chopper fed DC motor drive
11. Simulation of Single-Phase Half Converter with different loads.
12. Three Phase Full Controlled Rectifier with R, RL loads.
13. Simulation of Buck-Boost Converter.

SEE6531	POWER ELECTRONICS SIMULATION LAB	L	T	P	Credits	Total Marks
		0	0	6	3	100

1. Open Loop Control of Separately Excited DC Motor.
2. Open Loop Control of DC Series Motor.
3. Closed Loop Control of Separately Excited DC Motor.
4. Thyristor Static and Dynamic Behavior
5. Simulation of Single Phase Semi Converter with motor load.
6. Simulation of Three Phase Converter with different loads.
7. Simulation of Single and Three phase PWM circuits.
8. AC – DC – AC PWM converter
9. Three Phase Matrix Converter
10. Chopper fed DC motor drive
11. Simulation of Single Phase Half Converter with different loads.
12. Three Phase Full Controlled Rectifier with R, RL loads.
13. Simulation of Buck Converter.
14. Simulation of Boost Converter
15. Simulation of Buck-Boost Converter.



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School of Electrical and Electronics Engineering

Minutes of Board of Studies Meeting held on 16th NOV, 2018

Venue: Conference Hall, IEC

Date: 16-11-18

Time: 9.00 AM – 11.30 AM

- Dr. N. M. Nandhitha, Dean, School of EEE welcomed all members of Board of Studies. On the suggestions of various Experts, the contents are designed by the Board of Studies Members considering the various aspects and need of the society. The members appreciated the contents of the syllabus and it was resolved as under:
- Course outcomes for each course has been discussed and modified.
- Dr.T.Ravi put forth the introduction of new courses 'Advanced Microprocessors', 'Automatic Speech recognition', Pattern Recognition and Image Vision' and 'Advanced Electronic Test Engineering'.
- Dr M D Selvaraj. Professor, IIITDM suggested that RF and Microwave Engineering can be renamed as RF Engineering in VIII semester.
- Dr.Sivakumaran, Prof., NIT, Trichy suggested to have Optical Fibre Communication in VII semester can be replaced with visible light communication. Microprocessor Interfacing and its Applications can be modified as Microprocessor and Microcontrollers.
- Dr.Sivakumaran suggested that subject name can be changed from "Control Engineering" to "Modern Control Systems". The members Dr M D Selvaraj advised to revise the fifth unit of Electronic Devices syllabus.
- Dr.T.Ravi also presented the new course introduced for PG courses are AI and Soft Computing, Network Oriented OS, Scada Systems Applications. The Syllabus Revision carried out in PG courses is Computational Nanoelectronics.
- Dr.V.Sivachidambaranathan requested Dr.Susitra to put forth the syllabus of the new courses, 'Testing and Commissioning of Electrical Equipment' for the approval of the board. Dr. A.Amalin Prince approved the Syllabus for this new course.
- Dr.N.M Nandhitha putforth to revise the syllabus of B.E by incorporating the following



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Develop curricula with relevance to:

- Local needs
- National needs
- Regional needs
- Global needs

Develop existing courses with focus on:

- Employability
- Entrepreneurship
- Skill development.
- Note: If any collaboration is made with any organizations to facilitate the courses, MoU's should be signed with them.

Develop existing courses with focus on:

- Gender
- Environment and Sustainability
- Human Values and Professional Ethics.
- Introduce either Field Projects/research projects or Internships at the end of second and fourth semesters.
- New elective courses namely Advanced microprocessor, Automatic Speech recognition, Pattern recognition and image vision, Advanced Electronic Test Engineering has been introduced.
- The Dean reported the members about the efforts of all the members of Board of Studies to prepare the syllabus of the subject B.E for the academic year 2018-19. The next BOS meeting may be scheduled on April 2019 to review and finalize the syllabus revision process. It was resolved as under, "Resolved that the Appreciation of Board of Studies members who contributed to prepare syllabus be noted." There being no other matter, the meeting was concluded with a vote of thanks .



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The following internal and external members were present in the meeting.

INTERNAL MEMBERS

SIGNATURE

1. Dr.N.M.Nandhitha

2. Dr.S.Lakshmi

3. Dr.T.Ravi

4. Dr.V.Sivachidambaranathan

5. Dr.V.Vijaya Baskar

6. Dr. P. Kavipriya

7. Dr.P.Chitra

8. Dr.S.Karthikeyan

9. Mrs.K.Srilatha

10. Dr. V.Balamurugan

11. Mrs.L.Magthelin Therase

12. Mrs.I. Rexiline Sheeba

13. Dr.Susitra

14. Dr.R.Ramadevi

15. Mrs. K.Sujatha



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EXTERNAL MEMBERS

Dr.N.Shivakumaran

Professor

Dept. of I & C

NIT, Trichy

Dr. N. Shivakumaran
16/11/18

Dr.M.D.Selvaraj,

Associate Professor,

IIITDM, kancheepuram

Dr. M. D. Selvaraj
16/11/18



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Board of Studies

Date: 30-03-2019

Time: 3.30 P.M

Venue: Centre for Excellence in Embedded and IoT

- Dr.N.M.Nandhitha, Prof. & Dean School of Electrical and Electronics started the meeting by welcoming both the external and the internal members to the Board of Studies meeting
- 1. Dr.V.Sivachidambaramanathan, Prof.& Head, Dept. of Electrical and Electronics Engineering put forth about the Breakup of credits (15) for Project and Professional Training before the board of members.
- 2. Professional Training 1, which is to be taken up at the end of 4th semester and before commencement of 5th semester would be allotted 2 credits. This credit would be reflected in 5th sem mark sheet.
- 3. The Professional Training 2 as per Regulations 2015 would be modified as Minor Project, should be carried out during 6th semester. This would carry a credit of 3, which would be reflected in 6th semester mark sheet.
- 4. The Project would be split into two: Phase 1 and Phase 2.
- 5. The credit for Phase 1 would be 3; the project work should be carried out during 7th semester, which would be reflected in 7th semester mark sheet.
- 6. The Phase 2 would be carried out in 8th semester, allotted a credit of 7, to be reflected in 8th semester marks sheet.
- 7. The students would have to take seminar on a turn basis every week. The seminar would be evaluated and added with CAE1 and CAE2 marks. No credits for Placement training

The board of members appreciated the breakup credits given for professional training and Project phase

- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Mr.Barnabas, Faculty/EEE to put revision of the course Circuit Theory. The new syllabus presented before the board and discussed the valid additions made in the syllabus.
- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Dr.Rameshbabu, Faculty/EEE to put forth the syllabus of the new courses, 'Embedded Systems and IoT' for the approval of the board. Dr. A. Amalin Prince approved the Syllabus for this new course.

Unit	Content	Inclusion / Deletion	Reason
I	D.C.Circuits Electrical quantities, Ohm's Law, Resistors - Series and parallel combinations, Current Division rule, Voltage Division rule, Source transformation - Kirchoff's laws, Nodal and Mesh Analysis, Star Delta Transformation.	Included	To have through understanding of series and parallel circuits
II	MAGNETIC CIRCUITS Definition of MMF, Flux and Reluctance - Leakage Factor - Reluctances in Series and Parallel (Series and Parallel Magnetic Circuits) - Analogy of Electric and Magnetic Circuits. Single Phase AC Circuits Sinusoidal Functions - RMS(effective) and Average Values - Phasor Representation - J operator – Sinusoidal Excitation Applied to Purely Resistive - Inductive and Capacitive Circuits - RL - RC and RLC Series and Parallel Circuits- Power and Power Factor.	Deletion Shifted from Unit III	Magnetic circuits are introduced in DC machines and transformers Course as the basics of machines
III	Three Phase AC circuits Analysis of three phase 3-wire and 4-wire circuits with star and delta connected loads, balanced & unbalanced – Phasor diagram of voltages and currents – power measurement in three phase circuits.	Included	Better understanding of three phase is needed for Electrical Engineers

[illegible]

SEEA3016	Embedded systems and IOT	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand fundamentals of IoT and embedded system including essence, basic design strategy and process modeling.
- To develop comprehensive approach towards building small low cost embedded IoT system.
- To learn real world application scenarios of IoT along with its societal and economic impact using case studies

UNIT 1 INTRODUCTION TO EMBEDDED SYSTEM AND IOT

9 Hrs.

Introduction to embedded systems, Application Areas ,Categories of embedded systems, Overview of embedded system architecture, Specialties of embedded systems, recent trends in embedded systems, Introduction to ARM processor and its architecture. Internet Of Things Promises–Definition– Scope–Sensors, IoT Applications– Structure of IoT– IoT Map Device ; IoT Sensors-Characteristics-types. IoT Issues and Challenges, Applications.

UNIT 2 EMBEDDED IoT PLATFORM DESIGN METHODOLOGY

9 Hrs.

Purpose and requirement specification, Process specification, Domain model specification, information model specification, Service specifications, IoT level specification, Functional view specification, Operational view specification, Device and component integration, Application development.

UNIT 3 PILLARS OF EMBEDDED IoT AND PHYSICAL DEVICES

9 Hrs.

The internet of devices, The internet of objects, The internet of transducer, o The internet of controllers, Device to Connect and Manage, talk, Connect. Network, Basic building blocks of and IoT device, Exemplary device: Raspberry Pi, Raspberry Pi interfaces, Programming Raspberry Pi with Python, ▪ Beagle board and other IoT Devices.

UNIT 4 WEB OF THINGS AND CLOUD OF THINGS

9

Hrs.

Web of Things versus Internet of Things, Two Pillars of the Web, Architecture Standardization for WoT, Cloud of Things: Grid/SOA and Cloud Computing, Cloud Middleware, Cloud Standards – Cloud Providers and Systems, Mobile Cloud Computing, The Cloud of Things Architecture.

UNIT 5 IoT CLOUD OFFERINGS AND IoT CASE STUDIES

9 Hrs.

Introduction to Cloud Storage Models, Communication API, Amazon Web Services for IoT, Skynet IoT Messaging Platform. Case Studies: Home Intrusion Detection, Weather Monitoring System, Air Pollution Monitoring, Smart Irrigation, Energy Harvesting.

Max.45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Understand the basic concepts of embedded systems and IoT.
- CO2 - Apply the design methodology for embedded IoT Platform.
- CO3 - Develop programs using Python for Raspberry Pi.
- CO4 - Comprehend web of things and cloud of things.
- CO5 - Implement IoT Cloud Offerings for
- CO6 - Solve the given societal challenge using IoT

TEXT / REFERENCE BOOKS

- 1.Adrian McEwen and Hakim Cassimally, —Designing the Internet of Thingsll, John Wiley and Sons Ltd, UK, 2014.
- 2.Vijay Madiseti, Arshdeep Bahga, —Internet of Things (A Hands-on Approach), Universities Press, 2015.
- 3.Dieter Uckelmann, Mark Harrison, Florian Michahelles, —Architecting the Internet of Thingsll, Springer, New York, 2011.
- 4.John H. Davies, —MSP430 Microcontroller Basicsll, First Edition, Newnes Publication. 2010.



BOARD OF STUDIES

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

VENUE: CENTRE FOR EXCELLENCE IN EMBEDDED AND IoT

Date: 30.03.2019

Time: 3.30 PM

Minutes of Meeting

Dr. N. M. Nandhitha, Dean, School of EEE welcomed all members of Board of Studies. On the suggestions of various Experts, the contents are designed by the Board of Studies Members considering the various aspects and need of the society.

- Dr.T,Ravi, Head Department of Electronics and Communication started the meeting by welcoming both the external and the internal numbers to the Board of Studies meeting.
- The guidelines of the syllabus given by the management were explained by HOD to all the members of the BOS.
- The external members also ratified the decision to revise the syllabus under the mentioned guidelines.
- Initial discussion was started with course outcome and it has been assessed that COs could be modified slightly and need not be confined to six in number. It can also be reduced as per the content of syllabus. All the framed COs has to be matched with the PO for attainment. Engineering Graphics, Indian culture related more courses have to be included. Reference text books and edition has to be modified. It is decided to have the electives exclusively for school of EEE. Curriculum could be restricted to 3 pages. Include standard authors in references.
- Dr.M.Sumathi presented the changes incorporated in 'Digital Logic Circuits'. Dr M D Selvaraj, Professor, IIITDM accepted the changes suggested.
- Dr.Sivakumaran, Prof., NIT, Trichy accepted the changes proposed in 'Analog Communication' suggested by Dr.P.Chitra.



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4 units and 5th unit may be taken as case studies related to the course. This would enhance the student community to have a clear picture about the course opted.

- Dr.Sivakumaran suggested that have Machine learning technique could be added as replacement of Neural and Fuzzy Logic Systems and Deep Learning algorithms as replacement of Artificial Intelligence . Dr.T.Ravi putforth the introduction of new courses such as Machine Learning, Wireless sensor network, MEMS and its Applications, Optical Networks, Python Programing and Biomedical Signal Processing.
- Dr.T.Ravi also presented the new course introduced for PG courses are Industry 4.0 and Gateway Design for IoT Devices. The Syllabus Revision carried out in PG courses is Network Oriented OS.
- Dr.Sivakumaran also suggested that replacement of Fundamentals of Fuzzy logic and neural networks for EIE and also discussed to have two units of neural network, two units of Fuzzy logic and one unit of Genetic Algorithm. Followed by his suggestion Dr.R.Ramadevi suggested the course as Soft computing Techniques.
- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering put forth about the Breakup of credits (15) for Project and Professional Training before the board of members.
- Professional Training 1, which is to be taken up at the end of 4th semester and before commencement of 5th semester would be allotted 2 credits. This credit would be reflected in 5th sem mark sheet.
- The Professional Training 2 as per Regulations 2015 would be modified as Minor Project, should be carried out during 6th semester. This would carry a credit of 3, which would be reflected in 6th semester mark sheet.
- The Phase 2 would be carried out in 8th semester, allotted a credit of 7, to be reflected in 8th semester marks sheet.



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- The Phase 2 would be carried out in 8th semester, allotted a credit of 7, to be reflected in 8th semester marks sheet.
- The students would have to take seminar on a turn basis every week. The seminar would be evaluated and added with CAE1 and CAE2 marks. No credits for Placement training
- The board of members appreciated the breakup credits given for professional training and Project phase
- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Mr.Barnabas, Faculty/EEE to put revision of the courses Basic Electrical and Electronics Engineering, Circuit Theory & Network Analysis. Dr.G.T.Sundar Rajan, Faculty /EEE proposed the revision of PG "Power Electronics and Drives" courses "Embedded Systems, Power Electronics in Power Systems, Special Machines and Their controller, & Modeling and Simulation in power Electronics Systems". The new syllabus presented before the board and discussed the valid additions made in the syllabus.
- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Dr.Rameshbabu, Faculty/EEE to put forth the syllabus of the new courses, 'Embedded Systems and IoT' for the approval of the board. Dr. A. Amalin Prince approved the Syllabus for this new course.

The following internal members were present in the meeting.

INTERNAL MEMBERS

SIGNATURE

1. Dr.N.M.Nandhitha

2. Dr.T.Ravi

3. Dr.V.Sivachidambaranathan

4. Dr.V.Vijaya Baskar

5. Dr.M.Sumathy



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- The Phase 2 would be carried out in 8th semester, allotted a credit of 7, to be reflected in 8th semester marks sheet.
- The students would have to take seminar on a turn basis every week. The seminar would be evaluated and added with CAE1 and CAE2 marks. No credits for Placement training
- The board of members appreciated the breakup credits given for professional training and Project phase
- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Mr.Barnabas, Faculty/EEE to put revision of the courses Basic Electrical and Electronics Engineering, Circuit Theory & Network Analysis. Dr.G.T.Sundar Rajan, Faculty /EEE proposed the revision of PG "Power Electronics and Drives" courses "Embedded Systems, Power Electronics in Power Systems, Special Machines and Their controller, & Modeling and Simulation in power Electronics Systems". The new syllabus presented before the board and discussed the valid additions made in the syllabus.
- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Dr.Rameshbabu, Faculty/EEE to put forth the syllabus of the new courses, 'Embedded Systems and IoT' for the approval of the board. Dr. A. Amalin Prince approved the Syllabus for this new course.

The following internal members were present in the meeting.

INTERNAL MEMBERS

SIGNATURE

1. Dr.N.M.Nandhitha

2. Dr.T.Ravi

3. Dr.V.Sivachidambaranathan

4. Dr.V.Vijaya Baskar

5. Dr.M.Sumathy



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6. Dr.S.Lakshmi

S. Lakshmi

7. Dr.P.Chitra

P. Chitra

8. Dr. P. Kavipriya

P. Kavipriya

9. Dr.S.Barani

S. Barani

10. Mrs.K.Srilatha

K. Srilatha

11. Mrs.L.Magthelin Therase

L. Magthelin Therase

12. Mrs.S.Yogalakshmi

S. Yogalakshmi

13. Mrs.K.Sujatha

K. Sujatha

14. Dr.R.Ramadevi

R. Ramadevi

15. Dr.Susitra

Susitra

External Members

Dr.N.Shivakumaran

Professor

Dept. of I& C

NIT, Trichy.

Dr. N. Shivakumaran
28/3/19.

Dr.M.D.Selvaraj

Associate Professor

IIITDM, kancheepuram.

Dr. M. D. Selvaraj
30/3/19.



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Board of Studies

Date: 30-11-2019

Time: 3.30 P.M

Venue: Centre for Excellence in Embedded and IoT

- Dr.N.M.Nandhitha, Prof. & Dean School of Electrical and Electronics started the meeting by welcoming both the external and the internal members to the Board of Studies meeting.
- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Dr.Susitra, Faculty/EEE to put forth revision of the course DC Machines and Transformer . The new syllabus presented before the board and discussed the valid additions made in the syllabus.
- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Dr.Rameshbabu, Faculty/EEE to put forth the syllabus of the new courses, 'Computer Aided Electrical Drawing' for the approval of the board. Dr. A. Amalin Prince approved the Syllabus for this new course.

SEEA1202- DC MACHINES AND TRANSFORMERS

Unit	Content	Inclusion / Deletion	Reason
I	ELECTRO-MECHANICAL CONVERSION 9 Hrs. Introduction - Principles of Energy Conversion - Field Energy and Co-energy in Linear Systems - Energy Flow - Losses and Efficiency - Singly and Multiply Excited Magnetic Field Systems - Torque Production in Rotating Machines - General Analysis of Electromechanical system. Definition of MMF, Flux and Reluctance - Leakage Factor - Reluctances in Series and Parallel (Series and Parallel Magnetic Circuits) - Electromagnetic Induction - Fleming's Rule - Lenz's Law - Faraday's laws - statically and dynamically induced EMF - Self and mutual inductance - Analogy of Electric and Magnetic Circuits.	Deletion Inclusion (This content is shifted from Electricity and Magnetism)	Topics in this unit is covered in units 1-5 It is the basic fundamental in any electromagnetic energy conversion system. This content is shifted from Electricity and Magnetism.
II	D.C. GENERATORS 9 Hrs. Constructional Details - Principle of Operation - E.M.F Equation - Methods of Excitation - Types - No load & Load characteristics of Series, Shunt & Compound generators - Armature Reaction, Effects, Methods of Compensation - Commutation : Methods of Improving Commutation - Applications. Losses and Efficiency	Inclusion	It is shifted from unit I to II

III	D.C. MOTORS AND TESTING OF D.C. MACHINES 9 Hrs. Principle of Operation - Back E.M.F & Torque Equation - Characteristics of Series, Shunt & Compound Motors - Starters - Speed Control of DC Series & Shunt Motors - Electrical Braking - Testing of DC Machines - Brake Test, Swinburne's Test & Hopkinson's Test . Electrical Braking	Deletion	This topic dealt in detail in electrical drives and control.
IV	TRANSFORMERS 9 Hrs. Principle of Operation - Constructional Details - E.M.F. Equation - Transformation Ratio - Transformer on No Load - Parameters Referred to HV / LV Windings - Equivalent Circuit - Transformer On Load - Phasor diagram - Regulation - Testing of Transformer - Open Circuit and Short Circuit Test - All day Efficiency - Sumpners Test.	No Change	
V	SPECIAL TRANSFORMERS AND THEIR APPLICATIONS 9 Hrs. Auto Transformer - Saving of copper in comparison with Two winding Transformer - Parallel Operation of Single Phase Transformers - Construction of Three Phase Transformer - Transformer Connections - Scott connection - Three Phase to Single Phase Transformer conversion - Elementary Ideas on Instrument Transformers and Toroidal Transformer.	No change	

SEE1617	Computer Aided Electrical Drawing	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To discuss the basic terminology of DC and AC armature windings.
- To discuss design and procedure to draw armature winding diagrams for Transformers, DC and AC machines
- To explain development of sectional views of Transformers, DC machine and alternators using the design data

UNIT 1 WINDING DIAGRAMS

9 Hrs.

Winding Diagrams of D.C. Machines: Simplex Double Layer Lap and Wave Windings. Winding Diagrams of AC Machines. Integral and Fractional Slot Double Layer Three Phase Lap and Wave Windings. Single Layer Windings – Un-Bifurcated 2 and 3 Tier Windings, Mush Windings, Bifurcated 3 Tier Windings.

UNIT 2 SINGLE LINE DIAGRAMS

9 Hrs.

Single Line Diagrams of Generating Stations and Substations Covering Incoming Circuits, Outgoing Circuits, Busbar Arrangements (Single, Sectionalized Single, Main and Transfer, Double Bus Double Breaker, Sectionalised Double Bus, One and a Half Circuit Breaker Arrangement, Ring Main), Power Transformers, Circuit Breakers, Isolators, Earthing Switches, Instrument Transformers, Surge or Lightning Arresters, Communication Devices (Power-Line Carrier) and Line Trap.

UNIT 3 TRANSFORMERS ASSEMBLY DRAWINGS

9 Hrs.

Transformers - Sectional Views of Single and Three Phase Core And Shell Type Transformers

UNIT 4 D.C. MACHINE ASSEMBLY DRAWINGS

9

Hrs.

D.C. Machine - Sectional Views of Yoke with Poles, Armature and Commutator dealt separately.

UNIT 5 ALTERNATOR

ASSEMBLY

DRAWINGS

9 Hrs.

Alternator – sectional views of stator and rotor dealt separately battery storage and charging

Max. 45

Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Understand the basic concepts of DC and AC armature windings.
- CO2 - Develop a layout for substation using the standard symbols for substation.
- CO3 - Draw sectional views of core and shell types transformers using the design data.
- CO4 - Draw sectional views of assembled DC machine using the design data or the sketches.
- CO5 - Draw sectional views of assembled alternator using the design data or the sketches
- CO6 - Design of an electrical machine using the aid of computer.

TEXT / REFERENCE BOOKS

1. Yogesh, M., Nagaraja, B., & Nandan, N. (2014). *Computer Aided Electrical Drawing*. PHI Learning Pvt. Ltd.
2. M. G. Say, Performance & Design of Alternating Current machines, CBS publishers, E- Edition, 2017
3. A.E Clayton & N.N. Hancock, The Performance & Design of DC machines, CBS Publication, E- Edition, 2018.
4. Manuals of Auto – CAD

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks:100

Exam Duration:3

Hrs.

PART A: 10 Question of 2 marks each – No choice

20 Marks

PART B: 2 Questions from each unit of internal choice; each carrying 16 marks

80 Marks



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BOARD OF STUDIES

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

VENUE: CENTRE FOR EXCELLENCE IN EMBEDDED AND IoT

Date: 30.11.2019

Time: 3.30 PM

Minutes of Meeting

- Dr. N. M. Nandhitha, Dean, School of EEE welcomed all members of Board of Studies. On the suggestions of various Experts, the contents are designed by the Board of Studies Members considering the various aspects and need of the society. The meeting was convened by the Dr.N.Shivakumaran, Prof / NIT, Trichy. The guidelines of the syllabus given by the management were explained by HOD to all the members of the BOS. The external members also ratified the decision to revise the syllabus under the mentioned guidelines. The Board discussed the matters as per the agenda.
- Dr M D Selvaraj, Professor, IIITDM accepted the changes suggested by Dr P.Chitra in the subject Digital communication. Dr.N.Shivakumaran also accepted the inclusion of error control coding in the course.
- Dr.T.Ravi discusses the syllabus of Machine learning, Industry 4.0 are discussed with the members.
- Dr.N.Shivakumaran Suggested to include the following topics in Signal and System course such as modelling of signal, speech signal processing, analysis and modelling of system and application of Fourier Transform.
- Dr.T.Ravi also presented the new course introduced for PG courses are Advanced Wireless Sensor Networks and Security in IoT.
- The Syllabus Revision carried out in PG courses is SCADA System Application.
- Dr M D Selvaraj suggested to Remove first unit in Digital Signal Processing course and include DSP processor in the fifth unit. Since first unit is the review of signals and system and to include industrial topic. Include Signal Conditioning, generation and detection for real time applications, DSP Hardwares, FPGA, ARM Processor with DSP Extension in Digital Signal Processing.

- Dr M D Selvaraj Suggested to update the fifth unit of programming in HDL with FPGA Design Flow , Architecture of Xilinx Artix7 FPGA , Configurable Logic Blocks (CLB),
- Dr.N.Shivakumaran Suggested to include applications in FPGA and Case Study: study of protocols I2C, SPI and UART in microprocessor and microcontroller course.
- Dr.T.Ravi put forth the new courses introduced such as Artificial Intelligence, Rf IC Design, Soft Computing Techniques and Cryptography and Network security
- Dr.R.Ramadevi proposed the introduction of new Elective 'Instrumentation in Aerospace and Navigation'. Dr.Sivakumaran suggested to incorporate more topics related to instrumentation.
- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Dr.Susitra, Faculty/EEE to put forth revision of the course DC Machines and Transformer and Digital Signal Processing and its Applications. The new syllabus presented before the board and discussed the valid additions made in the syllabus.
- Dr.V.Sivachidambaranathan, Prof.& Head, Dept. of Electrical and Electronics Engineering requested Dr.Rameshbabu, Faculty/EEE to put forth the syllabus of the new courses, 'Computer Aided Electrical Drawing' for the approval of the board. Dr. A. Amalin Prince approved the Syllabus for this new course.

The next BOS meeting may be scheduled on April 2020 to review and finalize the syllabus revision process.

Faculty Head, Dr. T.Ravi proposed vote of thanks and the Board of Meeting ended by 4.30 PM on 30.11.2019.

The following internal members were present in the meeting.

INTERNAL MEMBERS

1. Dr.N.M.Nandhitha

2. Dr.T.Ravi

SIGNATURE




3. Dr.V.Sivachidambaranathan *Sivachidambaranathan*
4. Dr.V.Vijaya Baskar *Vijaya Baskar*
5. Dr.M.Sumathy *M. Sumathy*
6. Dr.S.Lakshmi *S. Lakshmi*
7. Dr.P.Chitra *P. Chitra*
8. Dr. P. Kavipriya *P. Kavipriya*
9. Dr.S.Barani *S. Barani*
10. Mrs.K.Srilatha *K. Srilatha*
11. Mrs.L.Magthelin Therase *L. Magthelin Therase*
12. Mrs.S.Yogalakshmi *S. Yogalakshmi*
13. Mrs.K.Sujatha *K. Sujatha*
14. Dr.R.Ramadevi *R. Ramadevi*
15. Dr.Susitra *Susitra*

External Members

Dr.N.Shivakumaran
Professor
Dept. of I& C
NIT, Trichy.

Dr. N. Shivakumaran
30/11/19

Dr.M.D.Selvaraj
Associate Professor
IIITDM, kancheepuram.

Dr. M. D. Selvaraj
30/11/19



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School of Electrical and Electronics

Minutes of Board of Studies Meeting held on 1st June, 2020

(Virtual Meeting conducted on Zoom Platform (Time: 10.30 a.m. to 12 noon))

- Dr.N.M.Nandhitha, Prof. & Dean School of Electrical and Electronics started the meeting by welcoming both the external and the internal numbers to the Board of Studies meeting (30.6.2020, 10.30 a.m. to 12.00 noon)
- Dr M D Selvaraj. Professor, IIITDM accepted the changes suggested by Dr S Lakshmi. However he added that “Specialized services – E-mail, Video conferencing and internet connectivity” from Unit-5 can be replaced with ‘Case studies on Weather Forecasting Satellites ‘.
- Dr.Sivakumaran, Prof., NIT, Trichy accepted the changes proposed in ‘MEMS and its Applications’ and ‘Automatic Speech Recognition’.
- Mr M Sugadev, presented the changes made in ‘Advanced Electronic Test Engineering’. He also added that this course is conducted with the infrastructure sponsored by QMAX Technologies, Chennai. Mr J Visweswaran, NI Electronics, appreciated the effort taken by the Department and the syllabus revision was accepted.
- Dr P Chitra, putforth the revisions for ‘Pattern Recognition and Image Vision’. Dr M D Selvaraj accepted the revision and added that “Classification performance measures - Risk and error probabilities” can be replaced with “Non-metric methods for pattern classification on numeric data, Decision tress, Classification and Regression Trees (CART)”.
- Dr S Lakshmi, proposed syllabus revision in ‘Mobile Adhoc Networks and Spread Spectrum Communication’. Dr M D Selvaraj, accepted the syllabus revision.
- Dr T Ravi presented the syllabus revision on Nanoelectronics to the board. MrJVisweswaran accepted the changes and added that ‘Nanoelectronics in Random Access Memory, Mass Storage devices and related topics’ can be included.
- Dr M Sumathi presented syllabus revision in ‘Integrated Services Digital Network’ and “Radar and Navigational Aids”. Dr M D Selvaraj accepted the changes.

- Dr P Chitra proposed the revisions in ‘Signals and Systems’ to the board. Dr Sivakumaran accepted the changes and he suggested that “Speech Signal Processing” can also be included.
- Dr S Barani presented the syllabus revision in ‘Digital Signal Processing’ to the board. Dr N Sivakumaran suggested that “Audio Coding Techniques and Comparison Analysis and Related Topic” can be included.
- Dr T Ravi presented the syllabus revision in “Programming in HDL”. Dr M D Selvaraj suggested that “Case Study on related topics” can be included.
- Mr M Sugadev presented syllabus revision in ‘AI and Soft Computing’ and ‘SCADA Systems Applications’ to the board. Dr M D Selvaraj readily accepted the revisions.
- Dr.N.M.Nandhitha informed the board that Dr.Krishnamoorthi of School of EE has developed software for Digital Logic Circuits Laboratory (virtual laboratory).
- Dr.R.Pandian proposed few additions in the course “Electrical and Electronic Measurements and Instrumentation”. He pointed out the topics which include Display devices, waveform generators and analyzers. Dr. Sivakumaran agreed and hesuggested that it can be added in the syllabus. He also suggested to add polyphase metering.
- Dr.Lalithakumari presented the syllabus for an elective course ‘Automotive Instrumentation’. Dr.Sivakumaran suggested to include networks, Graphical User Interface in Automotive Instrumentation
- Dr.V.Sivachidambaranathan,Prof.&Head, Dept. of Electrical and Electronics Engineering requested Dr.Vanitha, Faculty/EEE to present he curriculum revisions before the board.
- She has presented the old and new syllabus for Electrical Technology (theory and practical)before the board and discussed the valid additions made in the syllabus. Dr.Sivakumaran, Prof.,NIT, Trichy gave suggestions to include the standards, tools and grounding procedures and casestudiesinthe syllabus.
- Dr.M D Selvaraj insisted on the feasibility of conducting laboratory through Virtual Labs.Mr.J.Visweeswaran, National Instruments also welcomed the idea of virtual laboratory.
- Dr.V.Sivachidambaranathanputforth the syllabus of the new courses, ‘Industrial Drives and automation’ , ‘Computer Control of Electric Drives’for the approval of the board. Dr N Sivakumaran approved the Syllabus for these new courses.

Name of the Course : Electrical Technology Course Code : SEEA1102		
UNIT	Content	Remarks
1	MAGNETIC CIRCUITS Definition of MMF, Flux and Reluctance - Leakage Factor - Reluctances in Series and Parallel (Series and Parallel Magnetic Circuits) - Electromagnetic Induction - Fleming's Rule - Lenz's Law - Faraday's laws - statically and dynamically induced EMF- Self and mutual inductance - Analogy of Electric and Magnetic circuit. INTRODUCTION OF ELECTRICAL STANDARDS Indian Standard Electricity Rules - Domestic Wiring - Wiring Materials and Accessories - Staircase Wiring - Fluorescent Tubes- Earthing -Types of Earthing - Benefits of Earthing.	Shifted Magnetic circuit to Unit 2 Inclusion
2	DC MACHINES Construction, Principles of operation of DC Machines - Types - EMF Equation - Performance Characteristics, of Series and Shunt Generators-DC Motor-Torque-Speed-Torque Characteristics of Series and Shunt Motors - Speed Control and Applications DC GENERATORS Construction, Principles and Working operation of DC Generators - EMF Equation - Types of Generators - Performance Characteristics of Series and Shunt Generators - Applications. DC MOTORS Construction, Principles and Working of operation of DC Motors - Torque Equation - Back EMF - Types of DC Motors - Torque - Speed Characteristics of Series and Shunt Motors - Speed Control of DC Motors - Applications.	To give more exposure on DC Machines, this can be split in to DC Generators in Unit 3 and DC Motors in Unit 4.
3	TRANSFORMERS Constructional Details and Principle of operation of Single -Phase Transformer - EMF Equation - Phasor Diagram on No Load and Loaded Transformer - Equivalent Circuit - Open Circuit and Short Circuit Test on Transformer - Regulation and Efficiency- Auto Transformer	Content included in Unit 5
4	INDUCTION MOTORS (QUALITATIVE TREATMENT ONLY) Constructional Details of Three Phase Induction Motor - Slip Ring and Squirrel Cage Rotor- Principle of operation- Torque Equation - Torque / Slip Characteristics - Starters - Applications Introduction to Single Phase Induction Motors - Capacitor Start Capacitor Run Motor - Shaded Pole Motor.	Deletion DC Motor from Unit 2 has shifted to Unit 4 instead of Induction motors.
5	SYNCHRONOUS MACHINES AND SPECIAL MACHINES (QUALITATIVE TREATMENT ONLY) Principles of Alternator - Construction Details - Types Special Machines: Stepper motor- Permanent magnet Stepper motor-Variable reluctance stepper motor- AC and DC Servomotor - Stepper Motor Selection and Control : An Industrial Case Study. Universal Motor - Hysteresis Motor -Permanent Magnet Synchronous Motor - Switched Reluctance Motor - Brushless D.C Motor - Construction, Working and Applications.	Deletion Inclusion Transformers from Unit 3 has shifted in addition to special electrical machines

Name of the Course : ELECTRICAL ENGINEERINGLAB Course Code : SEEA2102		
	List of Experiments	Remarks
	1. Wiringcircuits for a. Calling bell. b. Staircase. c. Fluorescent lamp d. Basic house hold wiring using switches, fuses, Indicator–lamps etc. 2. Open circuit characteristics of separately excited dc 3. Load characteristics of self excited dc shunt generator. 4. Load characteristics of dc Compound generator. 5. Load characteristics of dc shunt motor. 6. Speed control of dc shunt motor. 7. Load characteristics of dc series motor 8. Load test on single phase transformer	Theory related Experiments are executed
	Name of the Course : ELECTRICAL ENGINEERINGLAB Course Code : SEEA2101 1. Open circuit characteristics of separately excited dc shunt generator. 2. Load characteristics of self excited dc shunt generator. 3. Load characteristics of dc Compound generator. 4. Load characteristics of dc shunt motor. 5. Speed control of dc shunt motor. 6. Load characteristics of dc series motor. 7. Open circuit and short circuit test on single phase transformer. 8. Load test on single phase transformer. 9. Brake load test on three phase squirrel cage induction motor. 10. Load test on single phase Induction motor. 11. Wiring circuits for A. Calling bell. B.Stair case. C. Fluorescent lamp. D Basic household wiring using switches, fuses, Indicator –	Experiments not related to theory are not

SEE1618	INDUSTRIAL DRIVES AND AUTOMATION	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- Provide strong foundation to solve control and instrumentation problems in continuous or batch problems.
- Technical competence through hands-on experience with industrial hardware and software.
- Systematic design approach to engineering projects through solving tutorial problems and completing the major assignment.
- To introduce basic concepts of load and drive interaction, speed control concepts of ac and dc drives, speed reversal, regenerative braking aspects, design methodology.

UNIT 1 INTRODUCTION TO ELECTRIC DRIVES AND SELECTION OF CONVERTERS

9 Hrs.

Fundamentals of Electric Drive dynamics- Stator and Rotor-Power and Torque-Efficiency-Typical Operating Conditions-Speed Control of Electrical Motors-Reversing-Torque Control-Dynamic Braking-Motor heating and Thermal monitoring. Direct Converters-Converters with Intermediate Circuit-Inverter Modulation Principles-Converter, Rating from Motor Specification-Overload Capacity-Control Range-Derating factor- Regenerative Energy.

UNIT 2 CONTROL OF DC DRIVES

9 Hrs.

Conventional methods of DC motor speed control, single phase and three phase-controlled DC drives-four quadrant operation-Chopper fed DC drives-Braking and speed reversal-Closed-loop control of DC Drives-Design of controllers

UNIT 3 SCALAR AND VECTOR CONTROL OF AC DRIVES

9 Hrs.

Scalar Control with Compensation - Servo Control – Voltage Vector Control - Standards and Legislations. Space Vector Control-Flux Vector Control – Direct torque control – Sensor less control

UNIT 4 INTRODUCTION TO PROGRAMMABLE LOGIC CONTROLLERS AND ITS PROGRAMMING METHODS

9 Hrs.

Advantages & disadvantages of PLC with respect to relay logic, PLC architecture, Input Output modules, PLC interfacing with plant, memory structure of PLC. Ladder diagram, STL, functional block diagram, SFC, Instruction List. Creating ladder diagram from process control descriptions, Introduction to IEC61131 international standard for PLC.

UNIT 5 INTRODUCTION TO SCADA AND DISTRIBUTED CONTROL SYSTEM

9 Hrs.

Data acquisition system, Evolution of SCADA, Communication Technologies, Monitoring and Supervisory Functions. DCS detail engineering, specifications, configuration and programming, functions including database management, reporting, alarm management, communication, third party interface, control, display etc. Enhanced functions viz. Advance Process Control, Batch application, Historical Data Management, OPC support, Security and Access Control etc. Performance Criteria for DCS and other automation tools.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Describe the fundamental concepts of electric drives. Identify the suitable power converters and fix its rating based on requirement.
- CO2 - Classify the different types of DC drives and construct its controller.
- CO3 - Categories the AC drives and differentiates from DC drives. Compare scalar and vector control of AC drives
- CO4 - Select and interface hardware for an automatic control system and Use PLC for an automatic control system confining to standards.
- CO5 - : Plan the hardware and software component required to constitute a SCADA system..
- CO6 - Develop code and configure DCS to handle local and distributed automation tasks

TEXT / REFERENCE BOOKS

1. Rokosh Das Begamudre, "Extra High Voltage AC Transmission Engineering" – Wiley Eastern LTD., NEW DELHI 1990.
2. S. Rao, "HVAC and HVDC Transmission, Engineering and Practice" Khanna Publisher, Delhi, 1990.
3. Subir Ray, "An Introduction to High Voltage Engineering", Prentice Hall of India Private Limited, 2013.
4. RD Begamudre, "Extra High Voltage AC Transmission Engineering"– New Academic Science Ltd; 4 edition 2011.
5. Edison, "EHV Transmission line"- Electric Institution, GEC, 1968

SEE1619	COMPUTER CONTROL OF ELECTRIC DRIVES	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand fundamentals of microcontroller and power electronic devices
- To develop comprehensive approach towards building an industrial drive system.
- To apply drive system to real world application scenarios.

UNIT 1 REVIEW OF MICRO CONTROLLERS AND POWER ELECTRONICS DEVICES 9 Hrs.

Typical Micro controller's 8bit 16 bit (only block diagram) Digital Data Acquisition system, voltage sensors, current sensors, frequency sensors and speed sensors. Power semiconductor devices used for drives control, GTO, BJT, power MOSFET, IGBT, MCT and IGCT structures, Ratings, comparison and their applications. Block diagram of power integrated circuit for D C motor drives.

UNIT 2 A C MACHINE DRIVES 9 Hrs.

General classification and National Electrical Manufacturer Association (NEMA) classification, Speed control of Induction motors with variable voltage constant frequency, constant voltage variable frequency, (v/f) constant operation, drive operating regions. Variable stator current operation. Effect of Harmonics. Principle of Vector Control of A C Drives, Phasor diagram, digital Implementation block diagram, Flux vector estimation, indirect vector control block diagram with open loop flux control, synchronous motor control with compensation.

UNIT 3 SYNCHRONOUS MACHINE DRIVES 9 Hrs.

Wound field machine, comparison of Induction and wound field synchronous machines, Torque angle characteristics of salient pole synchronous machines, synchronous reluctance permanent magnet synchronous machines (SPM), variable reluctance machines (VRM). Series Hybrid Electric Drive Train Design-Sizing of the Major Components- The Hybrid Electric Vehicle-Energy Use in Conventional Vehicles-Energy Savings Potential of Hybrid Drive trains-HEV Configurations-Series Hybrid System-Parallel Hybrid System-Series-Parallel System-Complex Hybrid System.

UNIT 4 PHASE CONTROLLED CONVERTERS AND SLIP POWER RECOVERY SCHEMES 9 Hrs.

Converter controls, Linear firing angle control, cosine wave crossing control, phase locked Oscillator principle, Electro magnetic Interference (EMI) and line power quality problems, cyclo converters, voltage fed converters, Rectifiers, Current fed converters. Static Kramer's drive system, block schematic diagram, phasor diagram and limitations, Static Scherbins scheme system using D.C link converters with cyclo converter modes of operation, modified Scherbins Drive for variable source, constant frequency (VSCF) generation.

UNIT 5 CASE STUDIES: APPLICATION TO DRIVES 9 Hrs.

Expert system shell, Design methodology, ES based P-I tuning of vector controlled drives system, Fuzzy logic control for speed controller in vector control drives, structure of fuzzy control in feedback system. Introduction to Solar and battery powered Drives; Introduction to traction Drives; Servo motor drive requirement – control and implementation.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Understand the basic concepts of microcontroller and power electronic devices pertaining to drive system.
- CO2 - Apply the vector control method for AC drives.
- CO3 - Analyze synchronous motor drives.
- CO4 - Comprehend Phase Controlled Converters and Slip Power Recovery Schemes.
- CO5 - Implement drives system using fuzzy logic controllers.
- CO6 - Solve the given societal challenge using drive system.

TEXT / REFERENCE BOOKS

1. Werner Leonhard, Control of Electrical Drives, 3e, Springer 2006
2. Gopal K. Dubey, Fundamentals of Electrical Drives, Wiley 2010
3. Robbins Mohan, Power Electronics: Converters Applications and Design, Media Enhanced, 3ed, Wiley 2007.

Recording

Dr.T.RAVI

Sivachidambaranathan V

Dr.P.CHITRA

Dr.Rameshbabu A

visweswaran j

Dr.Lalithakumari.S

Mrs.Ramya.D-EEE

Sundarsingh Jeb...

Dr.RADHIKA S-EEE

Dr.Barani.S

M.PUSHPAVALI ...

KAVITHA M/EEE

senthil

Prabhu Ramanathan

Dr.E. Annadevi

D.Susitra / EEE

J.BARNABAS PAUL G...

Nandhitha Muthu

Dr.Vijaya Baskar V

Dr.Selvaraj

Dr.M.SUMATHI...

yoga lakshmi

Bharathi.M.L

Participants (23)

Find a participant

D

Sivachidambaranathan V (Me)

D

Dr.T.RAVI (Host)

Dr.P.CHITRA (Co-host)

DA

Dr.Rameshbabu A - EEE

S

Nandhitha Muthu

Prabhu Ramanathan

JP

J.BARNABAS PAUL GLADY_EEE

Bharathi.M.L

D.Susitra / EEE

D

Dr.Barani.S

Dr.E. Annadevi

Dr.Lalithakumari.S

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Dr.M.SUMATHI -ECE

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Dr.RADHIKA S-EEE

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Minutes of Board of Studies Meeting held on 3rd June, 2021

Virtual Meeting conducted on Zoom Platform (Time 10.30 A.M to 12.00 P.M)

Agenda

- Choosing of open elective / core elective course for the 4th semester students.
- To discuss about course swapping between 5th and 6th semester
- To Review and finalize the contents of newly framed and revised courses framed for 2015 Regulation syllabus.
- Inclusion of Employability / entrepreneurship / higher studies enhancer course as credit course.
- To discuss and finalize the weightage for NPTEL/SWAYAM and professional training courses.

Members present:

The following points were discussed during the meeting and the minutes were recorded as below:

- The Dean of School of Electrical and Electronics, Dr. N.M.Nandhitha greeted and welcomed all members of Board of Studies.
- In order to facilitate the students to choose open elective / core elective course from their 4th semester, Dr. V. Sivachidambaranathan, put forth the suggestion that Engineering Science course namely, "Applied Thermodynamics" can be given as elective course for the students. The members agreed the suggestion.
- Dr. V. Sivachidambaranathan insisted that the students study about "DC machines and Transformer" in the 2nd Semester and "AC machines in 3rd Semester. Therefore it would be more beneficial to have the subject "Electrical Machine Design" earlier in 6th Semester and It will be more beneficial to have DSP in 6th semester since the students have to study about "Principles of Embedded System Design" Theory and "Embedded and DSP lab" in 7th Semester.
- The members agreed the swapping of the courses "Digital Signal Processing and its Applications" in 5th semester and "Electrical Machine Design" in 6th Semester.
- Syllabus for three course in elective were revised and the copies were put in front of the panel of Board of Studies for their approval. The courses are as follows:



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-
- ✓ Electric Vehicle (Elective / CBCS)
 - ✓ Smart Grid (Elective / CBCS)
 - ✓ Green Energy Systems (Elective / CBCS)
- Dr. V. Sivachidambaranathan informed the panel that the content of syllabus for each subject along with its objectives, course outcomes was discussed in detail, taking into consideration of the prerequisite knowledge, references of Syllabi followed in other premier universities and feedback obtained from industries, Recruiters, Alumni and other experts in that subject. The topics in each subject were carefully scrutinized to have relevance to the latest technologies.
 - Dr. Ramesh Babu explained the changes in the subject Electric vehicle. He informed that changes were made in units 4 and battery storage and charging is included in unit 5 as it meets the current trend. Dr. Prabu Ramanathan suggested to include regenerative breaking as it is the "key word" in syllabus.
 - Dr. Sundarsingh Jebaseelan explained and justified the changes made in the subject Smart Grid. Similarly Mr. Barnabas Paul Gladly explained the newly named course green energy systems. He mentioned that the earlier version of the subject was renewable energy sources. He explained that in unit 4 & 5 importance is given to hydrogen production and hybrid energy sources as it can fetch more funding and research opportunities.
 - The External Members appreciated the content as well as the depth of syllabi and it was readily accepted.
 - The process of professional training course was explained by Dr. Sivachidambaranathan in detail to the board members. Therefore, as per the suggestion received from the broad of studies members it was decided to have Employability / entrepreneurship / higher studies enhancer course as 1 credit course in 5th semester and 7th semester and Professional Training as 1 credit course in 5th semester and 4 credit course in 7th semester respectively.
 - Also as per the recommendation received by the members it was finalized to provide 50% weightage for SWAYAM / NPTEL course completion certificate (Elite) and 50% weightage to industrial training in awarding marks for Professional Training.
 - The Dean thanked the members for their suggestions and active participation in the meeting.



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Zoom Meeting You are viewing Dr.Rameshbabu A - EEE's screen View Options

Participants (23)

Q. Find a participant

Sivachidambaran V (Me)

Dr.T.RAVI (Host)

Dr.Rameshbabu A - EEE

Dr.P.CHITRA (Co-host)

Nandhitha Muthu

Prabhu Ramanathan

Bharathi.M.L

D.Susitra / EEE

Dr.Barani.S

Dr.E. Annadevi

Dr.Lalithakumari.S

Dr.M.SUMATHI -ECE

Dr.RADHIKA S-EEE

Dr.Selvaraj

Recording

AGENDA :

AGENDA FOR BOARD OF STUDIES

Agenda 3

Syllabus revision / New courses

- Electric Vehicle (Elective / CBCS)
- Smart Grid (Elective / CBCS)
- Green Energy Systems (Elective / CBCS)

Agenda 4

Employability / entrepreneurship / higher studies enhancer course I as 1 credit course in 5th semester and 7th semester and Professional Training as 1 credit course in 5th semester and 4 credit course in 7th semester.

Also to provide 50% weightage for SWAYAM / NPTEL course completion certificate (Elite) and 50% weightage to industrial training in warding marks for Professional Training.

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Name of the Course : Electric Vehicle

Course Code : SEE1611

Unit	Content	Inclusion / Deletion	Reason
I	VEHICLE FUNDAMENTALS General Description of Vehicle Movement, Vehicle Resistance, Dynamic Equation, Tire–Ground Adhesion and Maximum Tractive Effort, Power Train Tractive Effort and Vehicle Speed-Vehicle Power Plant and Transmission Characteristics- Vehicle Performance-Braking Performance-Performance of Electric Vehicles.		
II	ELECTRIC VEHICLE FUNDAMENTALS EV Types, EV Configurations, Energy Sources, Motors Used, Charging Systems, Power Conversion Techniques, Technological Problems, Control Algorithms, Trends and Future Developments		



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III	ELECTRIC TRAIN Series Hybrid Electric Drive Train Design-Sizing of the Major Components- The Hybrid Electric Vehicle-Energy Use in Conventional Vehicles-Energy Savings Potential of Hybrid Drive trains-HEV Configurations-Series Hybrid System-Parallel Hybrid System-Series-Parallel System-Complex Hybrid System.		
IV	DC CHOPPERS AND INDUCTION MOTOR DRIVES ELECTRIC PROPULSION SYSTEM DC motor drive-Chopper control of DC motor drive- multi-quadrant control of Chopper fed drive Induction motor drive-constant v/f control-power electronics control-FOC-VSI for FOC		Unit V topics are merged
V	ELECTRIC PROPULSION SYSTEM PMBLDC motor drive-basic principle – construction- classification-performance and control of PMBLDC machine. SRM drive-basic magnetic		The content are included in Unit IV.



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	structure-SRM drive converter-modes of operation-generating modes of operation.		
V	BATTERY STORAGE AND CHARGING Batteries-Overview-Types of battery-Fuel Cell-Super capacitor -Flywheel. Charging, standards and infrastructure-Wireless power transfer-Solar charging case study. Case studies-General motor EV-1 and Tesla roadster	Inclusion	As it is required for electric vehicle



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Name of the Course : **SMART GRID**

Course Code : **SEEA3006**

Unit	Content	Inclusion / Deletion	Reason
I	INTRODUCTION TO SMART GRID Evolution of Electric Grid, Concept, Definitions and Need for Smart Grid, Smart grid drivers, functions, opportunities, challenges and benefits, Difference between conventional & Smart Grid, Concept of Resilient & Self Healing Grid, Present development & International policies in Smart Grid, Diverse Prospective from experts and global Smart Grid initiatives.		
II	SMART GRID TECHNOLOGIES Technology Drivers, Smart energy resources, Smart substations, Substation Automation, Feeder Automation, Transmission systems: EMS, FACTS and HVDC, Wide area monitoring, Protection and control, Distribution systems: DMS, Volt/VAr control, Fault Detection, Isolation and service restoration, Voltage Management, High-Efficiency Distribution Transformers, Phase Shifting Transformers, Plug in Hybrid Electric Vehicles (PHEV). SMART GRID ARCHITECTURE Components and Architecture of Smart Grid Design –Review of the proposed architectures for Smart Grid. The fundamental components of Smart Grid designs – Transmission Automation – Distribution Automation –Renewable Integration	Deletion Inclusion	Some of the topics are covered in other courses and design of smart grids are included.
III	SMART METERS AND ADVANCED METERING INFRASTRUCTURE Introduction to Smart Meters, Advanced Metering		



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	infrastructure (AMI) drivers and benefits, AMI protocols, standards and initiatives, AMI needs in the smart grid, Phasor Measurement Unit(PMU), Intelligent Electronic Devices(IED) & their application for monitoring & protection.		
IV	POWER QUALITY MANAGEMENT IN SMART GRID Power Quality & EMC in Smart Grid, Power Quality issues of Grid connected Renewable Energy Sources, Power Quality Conditioners for Smart Grid, Web based Power Quality monitoring, Power Quality Audit.		
V	HIGH PERFORMANCE COMPUTING FOR SMART GRID APPLICATIONS Local Area Network (LAN), House Area Network (HAN), Wide Area Network (WAN), Broadband over Power line (BPL), IP based Protocols, Basics of Web Service and CLOUD Computing to make Smart Grids smarter, Cyber Security for Smart Grid.		



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SEEA3027	Green Energy Systems	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

To understand the need and advantages of renewable energy.

To study the performance, efficiency and the relevancy to the future energy needs.

UNIT 1 INTRODUCTION

9 Hrs.

Overview of conventional & renewable energy sources, need, potential & development of renewable energy sources, types of renewable energy systems, Future of Energy Use, Present Indian and international energy scenario of conventional and RE sources, Energy for sustainable development, Environmental Aspects of Energy, Limitations of RE sources.

UNIT 2 SOLAR ENERGY

9 Hrs

Theory of solar cells - VI and PV curves - Equivalent circuit. Concept of solar PV module, Panel, Array, Maximum Power Point tracking - Solar PV systems - Solar Collectors Classifications— Solar PV Applications- Solar Refrigeration - Solar Pond Power Plant - Solar Thermal Power Plant.

UNIT 3 WIND ENERGY

9 Hrs.

Wind Power and its Sources-Energy from Wind - Horizontal axis Wind Turbine - Vertical Axis Wind Turbine - Wind Energy Conversion Systems - Cp Vs Speed Curve.

UNIT 4 HYDROGEN PRODUCTION AND HYDROGEN STORAGE 9 Hrs.

Chemical Production of Hydrogen- Electrolytic Hydrogen- Thermolytic Hydrogen- Photolytic Hydrogen- Photobiologic Hydrogen Production- Compressed Gas- Cryogenic Hydrogen- Storage of Hydrogen - Adsorption- Chemical Compounds- Hydride Hydrogen Compressors- Hydride Heat Pumps.

UNIT 5 HYBRID RENEWABLE ENERGY SYSTEMS

9 Hrs.

Need for Hybrid Systems- Range and type of Hybrid systems - Configuration and Coordination, Electrical interface: wind-PV, Wind-PV-Fuel cell.

Max. 45 Hours



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COURSE OUTCOMES

- CO1 - Gain knowledge on the various classification of energy sources and their environmental issues
- CO2 - Analyse the limitless availability of green energy sources
- CO3 - Acquire the knowledge of the principles of solar energy conversion and their benefits
- CO4 - Enable for building a small range of wind energy conversion system
- CO5 - learn hydrogen production method and storage methods
- CO6 - understand the challenges in renewable hybrid system

TEXT / REFERENCE BOOKS

1. Aldo Vieira da Rosa , Juan Carlos Ordonez, "Fundamentals of Renewable Energy Processes" -Elsevier academic press 4th Edition 2021
2. Janaka Ekanayake and Nicholas Jenkins "Renewable Energy Engineering"- Cambridge university press-2017
3. B Khan , "Non conventional Energy resources", Tata McGrawHill, 2 nd Edition 2009.
4. Mukund R. Patel , Wind & Solar Power Systems- Design, Analysis and Operation, , Taylor and Francis, 2nd Edition 2005.
5. James Larminie & Andrew Dicks, "Fuel Cell Systems Explained", John Wiley & Sons, 2nd Edition.
6. John Twideu and Tony Weir, "Renewal Energy Resources" BSP Publications, 2006.
7. C.S. Solanki, "Renewal Energy Technologies: A Practical Guide for Beginners" PHI Learning.



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Minutes of Board of Studies Meeting held on 3rd November, 2021

Virtual Meeting conducted on Zoom Platform (Time 10.30 A.M to 12.00 P.M)

- Dr. V. Sivachidambaranathan informed the panel that the content of syllabus Industry 4.0 were revised specifically for Electrical Engineers. He also discussed the contents of the syllabus with the board members.
- Mr. Barnabas Paul Gladly explained AICTE insisted, mandatory course Universal Human Values for the Engineering students

The screenshot shows a Zoom meeting in progress. The main window displays a grid of 20 video thumbnails. Most thumbnails show participants with the Sathyabama Institute of Science and Technology logo in the background. The participants' names are visible below their thumbnails. On the right side, there is a 'Participants (23)' list with a search bar and icons for each participant. The list includes names like Sivachidambaranathan V (Me), Dr.T.RAVI (Host), Dr.P.CHITRA (Co-host), Dr.Rameshbabu A - EEE, Nanditha Muthu, Prabhu Ramanathan, J.BARNABAS PAUL GLADLY_EEE, Bharathi.M.L, D.Susitra / EEE, Dr.Barani.S, Dr.E. Annadevi, Dr.Lalithakumari.S, Dr.M.SUMATHI -EEE, and Dr.RADHIKA S-EEE. Some participants have icons indicating they are muted or have their video off.

Participant Name	Status
Sivachidambaranathan V (Me)	Active
Dr.T.RAVI (Host)	Active
Dr.P.CHITRA (Co-host)	Active
Dr.Rameshbabu A - EEE	Active
Nanditha Muthu	Active
Prabhu Ramanathan	Active
J.BARNABAS PAUL GLADLY_EEE	Active
Bharathi.M.L	Active
D.Susitra / EEE	Active
Dr.Barani.S	Active
Dr.E. Annadevi	Active
Dr.Lalithakumari.S	Active
Dr.M.SUMATHI -EEE	Active
Dr.RADHIKA S-EEE	Active
Dr.Vijaya Baskar V	Active
Dr.Selvaraj	Active
Dr.M.SUMATHI...	Active
yoga lakshmi	Active
Bharathi.M.L	Active



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Name of the Course: **INDUSTRY 4.0 FOR ELECTRICAL ENGINEERS**

Course Code : SEEA1403

Unit	Content	Inclusion / Deletion	Reason
I	ADVANCED TECHNOLOGY AND ADVANCED MATERIALS Advanced electro-optical sensing technology-active, passive multi-spectral and hyper spectral imaging; electronic beam steering; vacuum technology, surface and coating technology, health care technology, Nanotechnology-Nanomechanics, Nano optoelectronics; energy storage technology-next generation Li-based Batteries, Hydrogen storage, solar photovoltaic's, Flexible electronics. Intellectual Property Rights - case studies governing/pertaining to Materials/Technology. INTRODUCTION TO INDUSTRY 4.0 Introduction, Historical Context, General framework, Application areas, Dissemination of Industry 4.0 and the disciplines that contribute to its development, Artificial intelligence, The Internet of Things and Industrial Internet of Things, Additive manufacturing, Robotization and automation, Current situation of Industry 4.0. Introduction to Industry 4.0 to Industry 5.0 Advances	Deletion Inclusion	The subject is converged towards electrical engineering. The basics are added in unit I. Basics of all the fields is required for industry 4.0 .
II	TRANSFORMING TECHNOLOGIES IN BIOENGINEERING Establishment of smart biotechnology factory, Artificial intelligence in Bioprocess technology, Omics – Big data analysis through automation, 3D bio printing for tissue engineering. Simulation tools, RSM and Box model. Cyber physical system based telemedicine, diagnosis and therapeutics through real time biosensors. Bionanotechnology. Intellectual Property rights (IPR): Case Studies. INDUSTRY 4.0 AND CYBER PHYSICAL SYSTEM Introduction to Cyber Physical Systems (CPS), Architecture of CPS, Data science and technology for CPS, Prototypes of CPS, Emerging applications in CPS, Domain applications of CPS: Agriculture, Infrastructure, Disaster management, Energy, Transportation. Case study: Application of CPS in health care domain.	Deletion Inclusion	The subject is converged towards electrical engineering. The basics are added in unit I. The content is part of unit 6 in the existing syllabus.
III	ADVANCEMENTS IN SUSTAINABLE BUILT ENVIRONMENT Introduction – Technological developments in Architectural, Engineering and Construction (AEC) - Building Information Modelling (BIM) using Cloud computing technology and Internet of things (IoT) – Unmanned Aerial Vehicles, sensors – Additive manufacturing in construction – Concrete 3D printing - Materials used - Lightweight and functionally graded structures - Net Zero Energy buildings, Bioswales, Biofiltration pond, Ecosan systems-Recent developments in Waste water Management, Air pollution control, waste disposal - Integration of energy, water and environmental systems for a sustainable development- Emerging Technologies: Robot Highway-Vertical farming - Intellectual Property rights: Case studies.	Deletion	The subject is converged towards electrical engineering. The basics are added in unit I. The content is very much required and is the recent trend in Industry 4.0 pertaining to Electrical engineering

SAIC4003	UNIVERSAL HUMAN VALUES	L	T	P	Credits	Total Marks
		2	1	0	3	100

COURSE OBJECTIVES

- To develop a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence
- To understand (or developing clarity) the harmony in the human being, family, society and nature/existence
- To strengthen self-reflection
- To develop commitment and courage to act

MODULE 1 COURSE INTRODUCTION - NEED, BASIC GUIDELINES, CONTENT AND PROCESS FOR VALUE EDUCATION

1. Purpose and motivation for the course, recapitulation from Universal Human Values-I
 2. Self-Exploration-what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration
 3. Continuous Happiness and Prosperity- A look at basic Human Aspirations
 4. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority
 5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
 6. Method to fulfil the above human aspirations: understanding and living in harmony at various levels.
- Practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking.

MODULE 2 UNDERSTANDING HARMONY IN THE HUMAN BEING - HARMONY IN MYSELF!

7. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
 8. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility
 9. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
 10. Understanding the characteristics and activities of 'I' and harmony in 'I'
 11. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail
 12. Programs to ensure Sanyam and Health.
- Practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease.

MODULE 3 UNDERSTANDING HARMONY IN THE FAMILY AND SOCIETY- HARMONY IN HUMAN-HUMAN RELATIONSHIP

13. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship
 14. Understanding the meaning of Trust; Difference between intention and competence
 15. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship
 16. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals
 17. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.
- Practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives.

MODULE 4 UNDERSTANDING HARMONY IN THE NATURE AND EXISTENCE - WHOLE EXISTENCE AS COEXISTENCE

18. Understanding the harmony in the Nature
19. Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self regulation in nature
20. Understanding Existence as Co-existence of mutually interacting units in all-pervasive space

21. Holistic perception of harmony at all levels of existence.

Practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

MODULE 5 IMPLICATIONS OF THE ABOVE HOLISTIC UNDERSTANDING OF HARMONY ON PROFESSIONAL ETHICS

22. Natural acceptance of human values

23. Definitiveness of Ethical Human Conduct

24. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order

25. Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

26. Case studies of typical holistic technologies, management models and production systems

27. Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations

28. Sum up.

Practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.

Total: 28 Lectures And 14 Practice Sessions

COURSE OUTCOMES

On completion of the course, the student are expected

CO1: To become more aware of themselves, and their surroundings (family, society, nature)

CO2: They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind

CO3: To have better critical ability

CO4: To become sensitive to their commitment towards what they have understood (human values, human relationship and human society)

CO5: To apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction

TEXT /REFERENCE BOOKS

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010
2. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
3. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
4. The Story of Stuff (Book).
5. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
6. Small is Beautiful - E. F Schumacher.
7. Slow is Beautiful - Cecile Andrews
8. Economy of Permanence - J C Kumarappa
9. Bharat Mein Angreji Raj – PanditSunderlal
10. Rediscovering India - by Dharampal
11. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
12. India Wins Freedom - Maulana Abdul Kalam Azad
13. Vivekananda - Romain Rolland (English)
14. Gandhi - Romain Rolland (English)

ASSESSMENT:

Assessment by faculty mentor: 10 marks

Self-assessment:: 10 marks

Assessment by peers: 10 marks

Socially relevant project/Group Activities/Assignments: 20 marks

Semester End Examination: 50 marks



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Minutes of Board of Studies Meeting held on 9th April, 2022

(Virtual Meeting conducted on Zoom Platform (Time: 10.30 a.m. to 12 noon))

- Dr. Radhika.S explained and justified the changes made in Principles of Embedded System. She explained that unit I and II about 8051 micro controller were replaced with Arduino, SoC and SoM as it fetches the research opportunities. According to theory the corresponding modified Embedded System and DSP lab content were presented before the panel members.



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Subject code: SECA1706

Subject Name: Principles of Embedded System

Unit	Content	Inclusion / Deletion	Reason
I	RISC EMBEDDED CONTROLLER Comparison of CISC and RISC controllers - PIC 16F877 architecture - Memory organization - Addressing modes - Assembly language instructions. 8051 MICROCONTROLLER ARCHITECTURE Comparison of microprocessors and microcontrollers - 8051 architecture - hardware, I/O pins, ports, memory, counters, timers, serial I/O interrupts.	Inclusion Deletion	Content from third unit shifted as 1 unit
II	ARDUINO Introduction to ARDUINO, Architecture, overview of its I/O Ports, Serial Ports, PWM, ADC, Interfacing with different type of Sensors and Communication modules, Hardware timers, watchdogs and interrupt handling in Arduino. Controlling embedded system based devices using Arduino. PROGRAMMING OF 8051 Addressing modes - Instruction sets - Simple programs with 8051-I/O Programming-Timer programming-Serial communication programs- Interrupt programming- Memory programming- Delay Programs.	Inclusion Deletion	
III	ARM PROCESSOR BASED Overview of ARM 7 Architecture- ARM 7 Architecture-Register organization- Modes and states. Overview of Intel ARM based hard processor System on Chip (SoC) with an on chip FPGA - Overview of System on Module (SoM) using ARM based SoC. RISC EMBEDDED CONTROLLERS Comparison of CISC and RISC controllers - PIC 16F877 architecture - Memory organization - Addressing modes - Assembly language instructions- ARM 7 Architecture-Register organization- Modes and states.	Inclusion	
IV	EMBEDDED NETWORKING Embedded networking -RS 232 - RS485 - Inter-Integrated Circuit (I2C) - Serial Peripheral Interface (SPI) - Universal Serial Bus (USB) - Controller Area Network (CAN)- Ethernet- Distributed Embedded system EMBEDDED NETWORKING Distributed Embedded system - Embedded networking - RS 232 - RS485 - Inter-Integrated Circuit (I2C) - Serial Peripheral		



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	Interface (SPI) - Universal Serial Bus (USB) - Controller Area Network (CAN)- Ethernet.		
V	EMBEDDED SOFTWARE DEVELOPMENT TOOLS and REAL TIME OPERATING SYSTEM Introduction to assembler - Compiler -Cross compilers -Linker/ Locators - Simulators - RTOs - Desktop OS versus RTOs - Software architectures - Round Robin, Round-Robin with Interrupts, Function Queue Scheduling architecture - ISRs and Scheduling -Task management - Task scheduling - Race conditions - Priority Inversion — Inter task Communication. REAL TIME OPERATING SYSTEMS Introduction - Desktop OS versus RTOs - Task management - Task scheduling - Race conditions - Priority Inversion - ISRs and Scheduling - Intertask Communication.		

Subject code: SECA2703

Subject Name: EMBEDDED AND DSP LAB

List of Experiments

Existing	Revised	Reason
1. Basic illustration programs using arithmetic, Logical and bit-oriented instructions for AT89C51. 2. Interfacing light bulb using relay. 3. Interfacing LCD display in static display. 4. Interfacing stepper motor with ULN2003 to rotate in specific angle. 5. Interfacing DC motor with H-bridge to make it rotate in front, back, left, right. 6. Illustration of interrupts using LED on/off using timer delay. 7. Illustration of serial communication to transfer data from one microcontroller to other.	Using PICF877 1. Basic illustration programs for arithmetic operations using PIC16F877. 2. Basic illustration programs for logical operations using PIC16F877. 3. Interfacing LED. 4. Illustration of TIMER. 5. Interfacing of LDR . Using Arduino 6. Interfacing LCD for display. 7. Interfacing of sensors. 8. Interfacing with the wireless communication modules 9. Design of Stepper Motor Control System	According to theory lab experiments are modified. Deletion Inclusion



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	10. Design of Temperature Monitoring System Using RF Modem	
PROGRAMS USING MATLAB 1. Generation of Standard Signals. 2. Design of FIR filters using Windowing technique. 3. Design of IIR Filters using Butterworth filters. USING TMS320CX2407 DSP Processor 1. Single pulse fixed PWM generation using general purpose Timers. 2. Two pulse fixed PWM generation using Timer 1 and Timer 2. 3. Six pulse fixed PWM generation using full compare unit. 4. Six pulse fixed PWM generation with dead band.	DSP LAB Programs using MATLAB 1. Generation of Standard Signals. 2. Design of FIR filters using Windowing technique. 3. Design of IIR Filters using Butterworth filters	



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