### BACHELOR OF ENGINEERING (ELECTRICAL & ELECTRONICS)  
**VIII SEMESTER**

#### OPTION I

<table>
<thead>
<tr>
<th>Ref No.</th>
<th>Subject</th>
<th>SCHEDULE OF TEACHING</th>
<th>SCHEME OF EXAMINATION</th>
<th>PRACTICAL</th>
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<tr>
<td>EE-801</td>
<td>Electric Power Generation</td>
<td>3</td>
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<td>EE-811</td>
<td>Elective –II</td>
<td>3</td>
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<td>EE-861</td>
<td>Elective –II Lab</td>
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<td>EC-811</td>
<td>Neural Networks and Fuzzy Logic</td>
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<td>EC-861</td>
<td>Neural Networks and Fuzzy Logic Lab</td>
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<td>EC-812</td>
<td>Embedded Systems</td>
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<td>EE-863</td>
<td>Major Project</td>
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<td>EE-864</td>
<td>General Fitness</td>
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### OPTION II

<table>
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<tr>
<th>Code</th>
<th>Paper Title</th>
<th>Duration</th>
<th>Int. Assessment</th>
<th>Marks Uni. Exam</th>
<th>Grand Total</th>
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<td>EE-812</td>
<td>Industrial Training</td>
<td>6 months</td>
<td>600</td>
<td>650</td>
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**Elective II (Theory & Practical)- one of the following subjects:**

(a) Energy Management and Auditing  
(b) Electrical Machines Design

A student can exercise option I and Option II according to the following:

A student may opt for one semester training in lieu of subjects of 8th Semester. The marks for six months training will be equal to the total marks of 8th Semester study. A student can opt for six semester training under following conditions:

a) The student got selected for job in campus placement and the employer is willing to take that student for the training.

b) The student got offer of pursuing training from reputed government research organization/govt. sponsored projects/govt. research institution provided that student should not be paying any money to get trained. For pursuing this training student needs the prior approval from the Chairperson/Coordinator of the respective branch.
EE-801

ELECTRIC POWER GENERATION

External: 100
Sessional: 50

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part-A

1. Introduction:
   Electrical energy sources, organization of power sector in India, single line diagram of thermal, hydro and nuclear power stations.

2. Loads and Load curves:
   Maximum demand, Group diversity factor, Peak diversity factor, Types of load, chronological load curves, load-duration Curve, mass curves, load factor, capacity factor, utilization factor, base load and peak load plants, load forecasting.

3. Power Plant Economics:
   Capital cost of plants, annual fixed cost, operating costs and effect of load factor on cost of energy, depreciation.

4. Tariffs and power factor improvement:

Part-B

5. Selection of plant:
   Plant location, plant size, no. and size of units in plants, economic comparison of alternatives, annual cost, rate of return, present worth and capitalized cost methods.

6. Economic operation of steam plants:
   Methods of loading turbo-generators, input-output curve, heat rate, incremental cost, method of lagrangian multiplier, effect of transmission losses, co-ordination equations, iterative procedure to solve co-ordination equations.

7. Hydro-thermal co-ordination:
   Advantages, combined working of run off river plant and steam plant, reservoir hydro plants and thermal plants-long term operational aspects, scheduling methods.

8. Pollution and environmental problems:
   Energy and environment, Air pollution, Aquatic impacts, nuclear plant and hydro plant impacts.

9. Cogeneration:
   Definition and scope, Topping and Bottoming Cycles, Benefits, cogeneration technologies.

Recommended Books:
2. Power Plant Engineering Dom Kundwar.
EE 811 (a)
Energy Management and Auditing

L T P
3 1 0

External: 100
Sessional: 50

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part-A

Energy Scenario and Basics of Energy

Energy Management and Audit

Energy Action Planning and Financial Management

Energy Monitoring and Targeting
Definition, Elements of Monitoring & Targeting System, A Rationale for Monitoring, Targeting and Reporting, Data and Information Analysis, Relating Energy Consumption and Production, CUSUM, Case Study.

Part-B

Electrical System and Motors

Lighting System
Introduction, Basic Terms in Lighting System and Features, Lamp Types and their Features, Recommended Illuminance Levels for Various Tasks/Activities/Locations,

**Energy Efficient Technologies in Electrical Systems**

**Books:**
3. Related journal and conference papers.
4. Website: www.energymanagerstraining.com
EE 861 (a)
Energy Management and Auditing Lab

External: 25
Sessional: 50

Note: Atleast four experiments and a case study are to be performed.

List of experiments:

1. To obtain polar curve of a lamp.
2. To measure harmonics and do the analysis for any 3-phase system.
3. To measure the currents, voltages and active and reactive powers in a three phase system using energy auditor.
4. To design a lighting system for any auditorium/building/hall.
5. To test a 3-phase machine of unknown rating.

Case Study:

1. To perform case study for energy audit of educational institute/industrial unit/administrative or commercial building and prepare a complete report suggesting the changes to be made.
EE 811(b)  
Electrical Machine Design  
L T P  
3 1 0  

External: 100  
Sessional: 50  

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.  

Part-A  
1. **Principles of design of Machines**: Specific magnetic and electric loadings output, Real and apparent flux densities, temperature rise calculation, Separation of main dimension for DC machines, Induction machines and synchronous machines.  
2. **Heating cooling and ventilation**: Cooling of machines, types of ventilation, continuous and intermittent rating.  
3. **Design of Transformers**: General considerations, output equation, emf per turn, choice of flux density and current density, main dimensions, leakage reactance and conductor size, design of tank and cooling tubes, calculation of losses, efficiency and regulation, forces winding during short circuit.  

Part-B  
4. **Three Phase Induction Motors**: General considerations, output equation, choice of specific electric and magnetic loadings, efficiency, power factor, number of slots in stator and rotor, elimination of harmonic torques, Design of stator and rotor winding, slot leakage flux, leakage reactance, equivalent resistance of squirrel cage rotor, magnetizing current, efficiency from design data.  
5. **Alternators**: Types of alternators, comparison, specific loadings, output coefficient, design of main dimensions.  

Books Suggested:  
2. Say M.G. The Performance and Design of A.C. Machines, PITMAN (ELBS).  
List of Practical: Perform at least five practicals.

Design of Machines

1) Transformer Design.
2) Induction Motor Design.
3) Synchronous Machine Design.
4) DC machine Design.

Design of windings

5) DC machine Lap windings design.
6) DC machine Wave windings design.
7) AC machine winding design.
EC-811
Neural Networks and Fuzzy Logic  

External: 100  
Sessional: 50  

Course Duration: 45 lectures of one hour each.  
Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part-A  
Fundamentals of Neural Networks  

Supervised Learning  
Learning and memory, Representation of perceptron, Linear separability, Perceptron Learning. Training of single layer and multi-layer, backpropagation training algorithm, Applications of backpropagation, Universal function approximation. (6)

Attractors Neural Networks  
Introduction, Associative memory, Hopfield networks, Content addressable memory, Bidirectional associative memories. (5)

Part-B  
ART Networks  
Vector quantization & simplified ART architecture, Architectures & algorithms of ART1 & ART2 networks, Applications. (4)

Self-organizing Feature Map  
Introduction, Competitive learning, Mexican Hat networks, SOFM algorithm, Applications. (5)

Fuzzy Logic  
Basic concepts of Fuzzy Logic, Fuzzy vs Crisp set, Fuzzy uncertainty & Linguistic variables, membership functions, operations on fuzzy sets, fuzzy rules for approximate reasoning, variable inference techniques, defuzzification techniques, Applications of fuzzy logic, Fuzzy system design. (5)

Books Recommended:  
1. Neural Networks – A Classroom Approach by Satish Kumar, TMH.  
2. Neural Networks, fuzzy Logic, and Genetic Algorithms by Rajasekaran & Vijayalakshmi Pai, PHI.  
5. Fuzzy Logic with engineering applications by Ross, Mc-Graw Hill.
EC-861
Neural Networks and Fuzzy Logic Lab

External: 25
Sessional: 50

Practicals related to Theory.
EC- 812
Embedded Systems

L T P
3 1 0

External: 100
Sessional: 50

Course Duration: 45 lectures of one hour each.
Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

PART-A
Introduction Review of Embedded Hardware

PART-B

Introduction to Real Time Operating Systems: Task And Task States, Tasks and Data, Semaphores and shared data

Operating System Services: Message queues, Mailboxes and Pipes, Timer Function, Events, Memory Management, Interrupt Routines in an RTOS Environment, Basic Design Using RTOS.

Book Recommended:
EC-862
Embedded Systems Lab

L T P
0 0 3

External: 25
Sessional: 50

Practicals related to Theory.