

# SETHU INSTITUTE OF TECHNOLOGY

PULLOOR, KARIAPATTI – 626 115.

(AN AUTONOMOUS INSTITUTION)



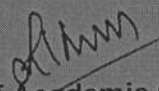
## REGULATION – 2015

M.E POWER ELECTRONICS AND DRIVES

CURRICULUM & SYLLABUS

Approved in the Academic Council Meeting held on  
06.10.2016

  
Chairman of Board of Studies  
Chairperson  
Board of Studies  
Electrical & Electronics Engineering  
Sethu Institute of Technology  
Kariapatti - 626 115

  
Chairman of Academic Council

**CHAIRMAN**  
**ACADEMIC COUNCIL**  
Sethu Institute of Technology  
Pulloor, Kariapatti - 625 115

## **Vision of the Department**

To achieve Excellence in Education and Research in the field of Electrical and Electronics Engineering and provide knowledge based contribution for the development of economy and society

## **Mission of the Department**

- ❖ Providing comprehensive and value based education in Electrical and Electronics engineering and related fields to meet intellectual, ethical and career challenges
- ❖ Providing state-of- the-art infrastructure and resources to promote teaching-learning and research activities
- ❖ Enriching the skills to enhance employability and entrepreneurship
- ❖ Strengthening the collaboration with academia, industry and research organizations
- ❖ Fostering Research and Development activities leading to innovation and technological growth in the overall ambit of electrical and electronics engineering
- ❖ Offering services to the society through education, science and technology

**CORE VALUES:** Ethics | Quality | Innovation | Teamwork | Social Responsibility

## **Program Educational Objectives (PEOs)**

| <b>The graduates of Electrical and Electronics Engineering are expected to:</b> |                                                                                           |
|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>PEO I<br/>(Core Competency)</b>                                              | Exhibit technical competency in Electrical and Electronics Engineering and related fields |
| <b>PEO II<br/>(Life Long Learning)</b>                                          | Engage in life-long learning for professional development and research                    |
| <b>PEO III<br/>(Professional and Ethical Skills)</b>                            | Exhibit effective communication skills, team work and lead their profession with ethics   |

## **Program Outcomes**

**PO1. Engineering knowledge:** Apply the knowledge of mathematics, science, electrical and electronics engineering fundamentals to the solution of complex engineering problems.

**PO2. Problem analysis:** Identify, formulate, review research literature, and analyze complex electrical and electronics engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3. Design/Development of solutions:** Design and develop electrical and electronic systems that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.

**PO4. Investigation of complex problems:** Investigate and analyze complex electrical and electronics engineering problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

**PO5. Modern tool usage:** Select and apply modern engineering and IT tools for simulation and modeling of electrical and electronic systems.

**PO6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities to the professional engineering practice.

**PO7. Environment and sustainability:** Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

**PO8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

**PO9. Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

**PO10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.

**PO11. Project management and Finance:** Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12. Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

# SETHU INSTITUTE OF TECHNOLOGY

Pulloor, Kariapatti - 626 115

**M.E. Degree Programme (Full Time)**

## CURRICULUM

**Regulation 2015**

**Master of Engineering in Power Electronics and Drives**

### OVERALL COURSE STRUCTURE

| Category            | Total No. of Courses | Credits | Percentage |
|---------------------|----------------------|---------|------------|
| Basic Science       | 1                    | 4       | 6          |
| Programme-CORE      | 11                   | 28      | 41         |
| Programme- ELECTIVE | 5                    | 15      | 22         |
| Open Elective       | 1                    | 3       | 4          |
| Project Work        | 2                    | 18      | 27         |
| TOTAL               | 20                   | 68      | 100        |

### COURSE CREDITS – SEMESTER WISE

Employability Courses

Skill Development Courses

Entrepreneurship Development Courses

Any two or all of the above

| Branch | I  | II | III | IV | TOTAL |
|--------|----|----|-----|----|-------|
| ME-PED | 18 | 17 | 18  | 15 | 68    |

## M.E POWER ELECTRONICS AND DRIVES

# REGULATION – 2015

(Applicable to the students admitted from the Academic Year 2015 – 2016 onwards)

## CURRICULUM I TO IV SEMESTERS (FULL TIME)

### SEMESTER I

| SL. No.                     | COURSE CODE | COURSE TITLE                                 | L  | T | P | C  |
|-----------------------------|-------------|----------------------------------------------|----|---|---|----|
| THEORY                      |             |                                              |    |   |   |    |
| 1.                          | 15PMA126    | Applied Mathematics for Electrical Engineers | 3  | 1 | 0 | 4  |
| 2.                          | 15PPE101    | Analysis of Electrical Machines              | 3  | 1 | 0 | 4  |
| 3.                          | 15PPE102    | Analysis of Power Converters                 | 3  | 0 | 0 | 3  |
| 4.                          | 15PPE103    | Modern Power Semiconductor Devices           | 3  | 0 | 0 | 3  |
| 5.                          | -           | Elective-I                                   | 3  | 0 | 0 | 3  |
| PRACTICAL                   |             |                                              |    |   |   |    |
| 6.                          | 15PPE104    | Power Electronics & Drives Laboratory -I     | 0  | 0 | 3 | 1  |
| Total                       |             |                                              | 15 | 2 | 3 | 18 |
| Total Number of Credits: 18 |             |                                              |    |   |   |    |

## SEMESTER II

| SL. No.                            | COURSE CODE | COURSE TITLE                             | L  | T | P | C  |
|------------------------------------|-------------|------------------------------------------|----|---|---|----|
| <b>THEORY</b>                      |             |                                          |    |   |   |    |
| 1.                                 | 15PPE201    | Analysis of Inverters                    | 3  | 0 | 0 | 3  |
| 2.                                 | 15PPE202    | DC Drives and Control                    | 3  | 0 | 0 | 3  |
| 3.                                 | 15PPE203    | AC Drives and Control                    | 3  | 0 | 0 | 3  |
| 4.                                 | -           | Elective-II                              | 3  | 0 | 0 | 3  |
| 5.                                 | -           | Elective-III                             | 3  | 0 | 0 | 3  |
| <b>PRACTICAL</b>                   |             |                                          |    |   |   |    |
| 6.                                 | 15PPE204    | Power Electronics & Drives Laboratory-II | 0  | 0 | 3 | 1  |
| 7.                                 | 15PPE205    | Internship/Industrial Training*          | 0  | 0 | 2 | 1  |
| <b>Total</b>                       |             |                                          | 15 | 0 | 5 | 17 |
| <b>Total Number of Credits: 17</b> |             |                                          |    |   |   |    |

\* (The students should attend the internship/industrial training at industry or reputed institution or any other research centre of 1 week or 2 week during vacation period of first semester. (OR) The students should accommodate in the UG programme laboratory for internship training in second semester. The internship/industrial training will be evaluated based on the presentation in the seminar and reports.)

### SEMESTER III

| SL. No.                            | COURSE CODE | COURSE TITLE                                         | L  | T | P | C  |
|------------------------------------|-------------|------------------------------------------------------|----|---|---|----|
| <b>THEORY</b>                      |             |                                                      |    |   |   |    |
| 1.                                 | 15PPE301    | Special Electrical Machines and Controllers          | 3  | 0 | 0 | 3  |
| 2.                                 | 15PPE302    | Digital Controllers in Power Electronics Application | 3  | 0 | 0 | 3  |
| 3.                                 | -           | Elective-IV                                          | 3  | 0 | 0 | 3  |
| 4.                                 | -           | Elective-V                                           | 3  | 0 | 0 | 3  |
| 5.                                 | -           | Open Elective                                        | 3  | 0 | 0 | 3  |
| <b>PRACTICAL</b>                   |             |                                                      |    |   |   |    |
| 6.                                 | 15PPE303    | Project Work (Phase-I)                               | 0  | 0 | 6 | 3  |
| <b>Total</b>                       |             |                                                      | 15 | 0 | 6 | 18 |
| <b>Total Number of Credits: 18</b> |             |                                                      |    |   |   |    |

## SEMESTER IV

| SL. No.                     | COURSE CODE | COURSE TITLE            | L | T | P  | C  |
|-----------------------------|-------------|-------------------------|---|---|----|----|
| PRACTICAL                   |             |                         |   |   |    |    |
| 1.                          | 15PPE401    | Project Work (Phase-II) | 0 | 0 | 30 | 15 |
| Total                       |             |                         | 0 | 0 | 30 | 15 |
| Total Number of Credits: 15 |             |                         |   |   |    |    |

**TOTAL NO. OF CREDITS: 68**

# SETHU INSTITUTE OF TECHNOLOGY

Pulloor, Kariapatti - 626 115

**M.E. Degree Programme (Part-Time)**

## CURRICULUM

**Regulation 2015**

**Master of Engineering in Power Electronics and Drives**

### OVERALL COURSE STRUCTURE

| Category            | Total No. of Courses | Credits   | Percentage |
|---------------------|----------------------|-----------|------------|
| Basic Science       | 1                    | 4         | 6          |
| Programme-CORE      | 11                   | 28        | 41         |
| Programme- ELECTIVE | 5                    | 15        | 22         |
| Open Elective       | 1                    | 3         | 4          |
| Project Work        | 2                    | 18        | 27         |
| <b>TOTAL</b>        | <b>20</b>            | <b>68</b> | <b>100</b> |

### COURSE CREDITS – SEMESTER WISE

| Branch        | I         | II        | III       | IV        | V         | VI        | TOTAL     |
|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>ME-PED</b> | <b>11</b> | <b>09</b> | <b>10</b> | <b>11</b> | <b>12</b> | <b>15</b> | <b>68</b> |

**M.E POWER ELECTRONICS AND DRIVES****REGULATION – 2015**

(Applicable to the students admitted from the Academic Year 2015 – 2016 onwards)

**CURRICULUM I TO VI SEMESTERS (PART-TIME)****SEMESTER I**

| SL. No.                     | COURSE CODE | COURSE TITLE                                 | L | T | P | C  |
|-----------------------------|-------------|----------------------------------------------|---|---|---|----|
| THEORY                      |             |                                              |   |   |   |    |
| 1.                          | 15PMA126    | Applied Mathematics for Electrical Engineers | 3 | 1 | 0 | 4  |
| 2.                          | 15PPE101    | Analysis of Electrical Machines              | 3 | 1 | 0 | 4  |
| 3.                          | -           | Elective -I                                  | 3 | 0 | 0 | 3  |
| Total                       |             |                                              | 9 | 2 | 0 | 11 |
| Total Number of Credits: 11 |             |                                              |   |   |   |    |

**SEMESTER II**

| SL. No.                     | COURSE CODE | COURSE TITLE          | L | T | P | C |
|-----------------------------|-------------|-----------------------|---|---|---|---|
| THEORY                      |             |                       |   |   |   |   |
| 1.                          | 15PPE201    | Analysis of Inverters | 3 | 0 | 0 | 3 |
| 2.                          | 15PPE202    | DC Drives and Control | 3 | 0 | 0 | 3 |
| 3.                          | -           | Elective -II          | 3 | 0 | 0 | 3 |
| Total                       |             |                       | 9 | 0 | 0 | 9 |
| Total Number of Credits: 09 |             |                       |   |   |   |   |

### SEMESTER III

| SL. No.                            | COURSE CODE | COURSE TITLE                             | L | T | P | C  |
|------------------------------------|-------------|------------------------------------------|---|---|---|----|
| <b>THEORY</b>                      |             |                                          |   |   |   |    |
| 1.                                 | 15PPE102    | Analysis of Power Converters             | 3 | 0 | 0 | 3  |
| 2.                                 | 15PPE103    | Modern Power Semi Conductor Devices      | 3 | 0 | 0 | 3  |
| 3.                                 | -           | Elective-III                             | 3 | 0 | 0 | 3  |
| <b>PRACTICAL</b>                   |             |                                          |   |   |   |    |
| 4.                                 | 15PPE104    | Power Electronics & Drives Laboratory -I | 0 | 0 | 3 | 1  |
| <b>Total</b>                       |             |                                          | 9 | 0 | 3 | 10 |
| <b>Total Number of Credits: 10</b> |             |                                          |   |   |   |    |

### SEMESTER IV

| SL. No.                            | COURSE CODE | COURSE TITLE                                 | L | T | P | C  |
|------------------------------------|-------------|----------------------------------------------|---|---|---|----|
| <b>THEORY</b>                      |             |                                              |   |   |   |    |
| 1.                                 | 15PPE203    | AC Drives and Control                        | 3 | 0 | 0 | 3  |
| 2.                                 | -           | Elective-IV                                  | 3 | 0 | 0 | 3  |
| 3.                                 | -           | Elective-V                                   | 3 | 0 | 0 | 3  |
| <b>PRACTICAL</b>                   |             |                                              |   |   |   |    |
| 4.                                 | 15PPE204    | Power Electronics and Drives Laboratory - II | 0 | 0 | 3 | 1  |
| 5.                                 | 15PPE205    | Internship /Industrial Training*             | 0 | 0 | 2 | 1  |
| <b>Total</b>                       |             |                                              | 9 | 0 | 5 | 11 |
| <b>Total Number of Credits: 11</b> |             |                                              |   |   |   |    |

\* (The students should attend the internship/industrial training at industry or reputed institution or any other research centre of 1 week or 2 week during vacation period of first semester. (OR) The students should accommodate in the UG programme laboratory for internship training in second semester. The internship/industrial training will be evaluated based on the presentation in the seminar and reports.)

## SEMESTER V

| SL. No.                     | COURSE CODE | COURSE TITLE                                         | L | T | P | C  |
|-----------------------------|-------------|------------------------------------------------------|---|---|---|----|
| THEORY                      |             |                                                      |   |   |   |    |
| 1.                          | 15PPE301    | Special Electrical Machines and Controllers          | 3 | 0 | 0 | 3  |
| 2.                          | 15PPE302    | Digital Controllers in Power Electronics Application | 3 | 0 | 0 | 3  |
| 3.                          | -           | Open Elective                                        | 3 | 0 | 0 | 3  |
| PRACTICAL                   |             |                                                      |   |   |   |    |
| 4.                          | 15PPE303    | Project Work (Phase-I)                               | 0 | 0 | 6 | 3  |
| Total                       |             |                                                      | 9 | 0 | 6 | 12 |
| Total Number of Credits: 12 |             |                                                      |   |   |   |    |

## SEMESTER VI

| SL. No.                     | COURSE CODE | COURSE TITLE            | L | T | P  | C  |
|-----------------------------|-------------|-------------------------|---|---|----|----|
| PRACTICAL                   |             |                         |   |   |    |    |
| 1.                          | 15PPE401    | Project Work (Phase-II) | 0 | 0 | 30 | 15 |
| Total                       |             |                         | 0 | 0 | 30 | 15 |
| Total Number Of Credits: 15 |             |                         |   |   |    |    |

**TOTAL NO. OF CREDITS: 68**

## LIST OF ELECTIVES

| SL.NO | COURSE CODE | COURSE TITLE                                                   |
|-------|-------------|----------------------------------------------------------------|
| 1.    | 15PPE501    | Power Electronics for PV and Wind Energy Systems               |
| 2.    | 15PPE502    | Digital Simulation of Power Electronic Systems                 |
| 3.    | 15PPE503    | HVDC Systems and Control                                       |
| 4.    | 15PPE504    | Electromagnetic Field Computation and Modeling                 |
| 5.    | 15PPE505    | Computer aided design of Power Electronics Circuits            |
| 6.    | 15PPE506    | Electric Vehicles and Power Management                         |
| 7.    | 15PPE507    | Power Controllers in Power Systems                             |
| 8.    | 15PPE508    | Electric Power Quality                                         |
| 9.    | 15PPE509    | Linear and Non-Linear System Theory                            |
| 10.   | 15PPE510    | Solar and Energy Storage System                                |
| 11.   | 15PPE511    | Microcontroller Application in Power Converters                |
| 12.   | 15PPE512    | Switched Mode Power Conversion                                 |
| 13.   | 15PPE513    | Modern Rectifiers and Resonant Converters                      |
| 14.   | 15PPE514    | Micro Electro Mechanical Systems                               |
| 15.   | 15PPE515    | Wind Energy Conversion Systems                                 |
| 16.   | 15PPE516    | VLSI Architecture and Design Methodologies                     |
| 17.   | 15PPE517    | Nanomaterials and Energy Systems                               |
| 18.   | 15PPE518    | Non Linear Dynamics of Power Electronic Circuits               |
| 19.   | 15PPE519    | Electromagnetic Interference and Electromagnetic Compatibility |
| 20.   | 15PPE520    | Smart Grid                                                     |
| 21.   | 15PPE521    | Distributed Generation and Micro Grid                          |
| 22.   | 15PPE522    | Transient Over Voltages in Power Systems                       |
| 23.   | 15PPE523    | Restructured Power System                                      |
| 24.   | 15PPE524    | Optimization Techniques in Power Electronics                   |

### LIST OF OPEN ELECTIVES

| SL.NO | COURSE CODE | COURSE TITLE                         |
|-------|-------------|--------------------------------------|
| 1.    | 15PSE601    | Research Methodology                 |
| 2.    | 15PEN602    | Pedagogy                             |
| 3.    | 15PEN603    | Professional and Communication Skill |
| 4.    | 15PPE604    | Soft Computing                       |
| 5.    | 15PCD605    | Industrial Safety                    |
| 6.    | 15PCD606    | Business Management and Leadership   |
| 7.    | 15PCS607    | Management Information System        |

### LIST OF ELECTIVES (for Ph.D.Scholars)

| SL.NO | COURSE CODE | COURSE TITLE                                                                  |
|-------|-------------|-------------------------------------------------------------------------------|
| 1.    | 15PPE525    | Energy Management and Auditing                                                |
| 2.    | 15PPE526    | Analysis and Modeling of Digital System using VHDL                            |
| 3.    | 15PPE527    | Design and Control of Switched Reluctance Machine for Automotive Applications |
| 4.    | 15PPE528    | Recent techniques for Reliable Distribution System                            |
| 5.    | 15PPE529    | Application of Intelligent Controllers for Power Quality Improvement          |