AC 14/07/2016
Item No. 4.8

UNIVERSITY OF MUMBAI

Revised Syllabus for the

M.E. Electrical Engineering
(Power Electronics and Drives)

(As per Choice Based Credit and Grading System with effect from the academic year 2016-2017)

From Co-ordinator's Desk:

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited. In line with this Faculty of Technology of University of Mumbai has taken a lead in incorporating philosophy of outcome based education in the process of curriculum development.

Faculty of Technology, University of Mumbai, in one of its meeting unanimously resolved that, each Board of Studies shall prepare some Program Educational Objectives (PEO's) and give freedom to affiliated Institutes to add few (PEO's) and course objectives and course outcomes to be clearly defined for each course, so that all faculty members in affiliated institutes understand the depth and approach of course to be taught, which will enhance learner's learning process. It was also resolved that, maximum senior faculty from colleges and experts from industry to be involved while revising the curriculum. I am happy to state that, each Board of studies has adhered to the resolutions passed by Faculty of Technology, and developed curriculum accordingly. In addition to outcome based education, **Choice Based Credit and Grading System** is also introduced to ensure quality of engineering education.

Choice Based Credit and Grading System enables a much-required shift in focus from teacher-centric to learner-centric education since the workload estimated is based on the investment of time in learning not in teaching. It also focuses on continuous evaluation which will enhance the quality of education. University of Mumbai has taken a lead in implementing the system through its affiliated Institutes Faculty of Technology has devised a transparent credit assignment policy adopted ten points scale to grade learner's performance. Choice Based Credit and Grading System were implemented for First Year Master of Engineering from the academic year 2016-2017. Subsequently this system will be carried forward for Second Year Master of Engineering in the academic year 2017-2018.

Dr. Suresh K. Ukarande
Co-ordinator,
Faculty of Technology,
Member - Academic Council
University of Mumbai, Mumbai

Preamble:

The overall technical education in our country is changing rapidly in manifolds. Now it is very much challenging to maintain the quality of education with its rate of expansion. To meet present requirement a systematic approach is necessary to build the strong technical base with the quality. Accreditation will provide the quality assurance in higher education and also to achieve recognition of the institution or program meeting certain specified standards. The main focus of an accreditation process is to measure the program outcomes, essentially a range of skills and knowledge that a student will have at the time of graduation from the program that is being accredited. Faculty of Technology of University of Mumbai has taken a lead in incorporating philosophy of outcome based education in the process of curriculum development.

I, as Chairman, Board of Studies in Electrical Engineering of University of Mumbai, happy to state here that, Program Educational Objectives (PEOs) were finalized for post-graduate program in Electrical Engineering (Power Electronics and Drives), more than ten senior faculty members from the different institutes affiliated to University of Mumbai were actively participated in this process. Few PEOs were finalized for post-graduate program in Electrical Engineering (Power Electronics and Drives) are listed below;

Program Educational Objectives (PEOs)

- To create the competent & skilled engineers to ensure them the careers and employment and in this way fulfill the requirement of Multinational industries.
- To develop the strong ability in data analysis & their report towards an application for design and development power electronic systems.
- Expose them by giving an opportunity as an individual as well as team.
- Inculcate professional and ethical attitude and ability to relate power system issues to society at large.
- Facilitate strong base of basic scientific & engineering knowledge with professional ethics, lifelong learning attitude society globally.
- Be successful innovative and entrepreneur in the power electronics field via consultancy work.

Program Outcomes (POs)

- Able to demonstrate & competent enough in basic knowledge in Mathematics, Engineering and Technology to obtain the solution of engineering problem.
- Have ability to formulate the engineering problem, design the setup for experimentation, analysis and interpretation of the result data, report preparation.

- Develop the competency to design power electronic converters and drives, control systems, engineering software's, simulated model and solutions etc as per desired specification & requirement as applicable/useful to public/society.
- Demonstrate the ability to work on basic engineering discipline as well as multi-disciplinary engineering teams to achieve the solution of engineering problem.
- Strong competency in using modern engineering tools like MATLAB / Simulink, for solution of electrical engineering problems.
- Able to use the acquired knowledge and professional skill and project as well as budget management towards betterment of the society.
- Understand the needs of the society worldwide in the context of his professional knowledge to ensure environmental safety and better sustainability.
- Capable to apply ethical principles with committed professional ethics and duties towards the solution of complex engineering problems.
- Motivate to work independently as well as a member of team or team leader in multi functionaries and diversified knowledge platforms.
- Develop an effective inter personnel communication skill at large with public and professional bodies. They will be able to comprehend the data and accordingly will prepare technical design details, datasheets, reports, documentation etc.
- Inculcate the lifelong learning in the purview of updates /upgrade in engineering and technology.
- Investigate the complex engineering problems using acquired knowledge in electrical engineering to develop industrial level solutions in the interest of society.

Dr. S. R. Deore,
Chairman,
Board of Studies in Electrical Engineering,
Member - Academic Council
University of Mumbai

Program Structure for
M.E. Electrical Engineering (Power Electronics and Drives)
University of Mumbai
(With Effect from 2016-2017)

Semester I

Subject Code	Subject Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total
PEDC101	Applied Linear Algebra*	04	--	--	04	--	--	04
PEDC102	Power Electronic Technologies	04	--	--	04	--	--	04
PEDC103	Electrical Machine Modeling and Analysis	04	--	--	04	--	--	04
PEDDLO101X	Department Level Optional Course-I	04	--	--	04	--	--	04
ILO101X	Institute Level Optional Course-I	03	--	--	03	--	--	03
PEDL101	Laboratory - I	--	02	--	--	02	--	01
PEDL102	Laboratory - II	--	02	--	--	02	--	01
Total		**19**	**04**	**--**	**19**	**04**	**--**	**21**

Subject Code	Subject Name	Examination Scheme							
		Theory					Term Work	Pract /Oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test1	Test 2	Avg.					
PEDC101	Applied Linear Algebra*	20	20	20	80	03	--	--	100
PEDC102	Power Electronic Technologies	20	20	20	80	03	--	--	100
PEDC103	Electrical Machine Modeling and Analysis	20	20	20	80	03	--	--	100
PEDDLO101X	Department Level Optional Course-I	20	20	20	80	03	--	--	100
ILO101X	Institute Level Optional Course-I	20	20	20	80	03	--	--	100
PEDL101	Laboratory - I	--	--	--	--	--	25	25	50
PEDL102	Laboratory - II	--	--	--	--	--	25	25	50
Total		**100**	**100**	**100**	**400**	**--**	**50**	**50**	**600**

*** Common for M.E. Electrical Engineering in Power System Engineering and Power Electronics and Drives**

Program Structure for
M.E. Electrical Engineering (Power Electronics and Drives)
University of Mumbai
(With Effect from 2016-2017)

Semester II

Subject Code	Subject Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total
PEDC201	Power Quality Issues and Mitigation**	04	--	--	04	--	--	04
PEDC202	Advanced Power Electronic Converters	04	--	--	04	--	--	04
PEDC203	Electrical Drives and Control	04	--	--	04	--	--	04
PEDDLO202X	Department Level Optional Course-II	04	--	--	04	--	--	04
ILO202X	Institute Level Optional Course-II	03	--	--	03	--	--	03
PEDL201	Laboratory – III	--	02	--	--	02	--	01
PEDL202	Laboratory - IV	--	02	--	--	02	--	01
Total		**19**	**04**	**--**	**19**	**04**	**--**	**21**

Subject Code	Subject Name	Examination Scheme							
		Theory					Term Work	Pract. /oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test1	Test 2	Avg.					
PEDC201	Power Quality Issues and Mitigation**	20	20	20	80	03	--	--	100
PEDC202	Advanced Power Electronic Converters	20	20	20	80	03	--	--	100
PEDC-203	Electrical Drives and Control	20	20	20	80	03	--	--	100
PEDDLO202X	Department Level Optional Course-II	20	20	20	80	03	--	--	100
ILO202X	Institute Level Optional Course-II	20	20	20	80	03	--	--	100
PEDL201	Laboratory – III	--	--	--	--	--	25	25	50
PEDL202	Laboratory - IV	--	--	--	--	--	25	25	50
Total		**100**	**100**	**100**	**400**	--	**50**	**50**	**600**

** **Common for M.E. Electrical Engineering in Power System Engineering and Power Electronics & Drives**

Program Structure for
M.E. Electrical Engineering (Power Electronics and Drives)
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Semester III

Subject Code	Subject Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theor	Pract.	Tut.	Theory	Pract.	Tut.	Total
PEDS301	Special Topic Seminar	-	06	-	-	03	-	03
PEDD301	Dissertation–I	-	24	-	-	12	-	12
Total		-	30	-	-	15	-	15

Subject Code	Subject Name	Examination Scheme						
		Theory						
		Internal Assessment			End Sem. Exam.	Term Work	Pract. /Oral	Total
		Test1	Test 2	Avg.				
PEDS301	Special Topic Seminar	-	-	-	-	50	50	100
PEDD301	Dissertation–I	-	-	-	-	100	-	100
Total		-	-	-	-	**150**	**50**	**200**

Semester IV

Subject Code	Subject Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theor	Pract.	Tut.	Theory	Pract.	Tut.	Total
PEDD401	Dissertation–II	-	30	-	-	15	-	15
Total		-	30	-	-	15	-	15

Subject Code	Subject Name	Examination Scheme						
		Theory						
		Internal Assessment			End Sem. Exam.	Term Work	Pract. /Oral	Total
		Test1	Test 2	Avg.				
PEDD401	Dissertation–II	-	-	-	-	100	100	200
Total		-	-	-	-	**100**	**100**	**200**

Note:

- In case of Seminar, 01 Hour / week / student should be considered for the calculation of load of a teacher
- In case of Dissertation I, 02 Hour / week / student should be considered for the calculation of load of a teacher
- In case of Dissertation II, 02 Hour / week / student should be considered for the calculation of load of a teacher
- **End Semester Examination:** In all six questions to be set, each of 20 marks, out of these any four questions to be attempted by students. Each question will comprise of mixed questions from different units of the subjects.

Subject Code	Department Level Optional Course-I	Subject Code	Department Level Optional Course-II
PEDDLO1011	Power Electronics in Power System#	PEDDLO2021	Digital Signal Processors for Control and Power Applications
PEDDLO1012	Renewable Energy Systems and Energy Storage#	PEDDLO2022	Advanced Control System#
PEDDLO1013	Electrical and Hybrid Vehicle Technology	PEDDLO2023	Power Conditioning Systems for Renewable Energy#
PEDDLO1014	Microgrid and Smart Grid	PEDDLO2024	EHV AC Transmission System#
PEDDLO1015	Dynamic Analysis of Synchronous Machine	PEDDLO2025	Electromagnetic Interference & Compatibility in Power Electronic

 # Common for M. E. Electrical Engineering in Power System Engineering and Power Electronics & Drives

Subject Code	Institute Level Optional Course-I	Subject Code	Institute Level Optional Course-II
ILO1011	Product Lifecycle Management	ILO2021	Project Management
ILO1012	Reliability Engineering	ILO2022	Finance Management
ILO1013	Management Information System	ILO2023	Entrepreneurship Development and Management
ILO1014	Design of Experiments	ILO2024	Human Resource Management
ILO1015	Operation Research	ILO2025	Professional Ethics and Corporate Social Responsibility(CSR)
ILO1016	Cyber Security and Laws	ILO2026	Research Methodology
ILO1017	Disaster Management and Mitigation Measures	ILO2027	IPR and Patenting
ILO1018	Energy Audit and Management	ILO2028	Digital Business Management
		ILO2029	Environmental Management