UNIVERSITY OF MUMBAI

Bachelor of Engineering

First Year Engineering (Semester I & II), Revised course (REV- 2012) from Academic Year 2012 -13, (Common for All Branches of Engineering)

(As per Credit Based Semester and Grading System with effect from the academic year 2012–2013)

First Year Engineering (Semester I & II), Revised course from Academic Year 2012 -13, (REV- 2012),

Sub Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut.	Total
FEC101	Applied Mathematics-I	04	-	01	04		01	05
FEC102	Applied Physics-I	03	01	-	03	0.5	-	3.5
FEC103	Applied Chemistry -I	03	01	-	03	0.5	-	3.5
FEC104	Engineering Mechanics	05	02	-	05	01	-	06
FEC105	Basic Electrical & Electronics Engineering	04	02	-	04	01	-	05
FEC106	Environmental studies	02	-	-	02	-	-	02
FEL101	Basic Workshop Practice-I	-	04	-	-	02	-	02
		21	10	01	21	05	01	27

(Common for all branches of Engineering)

Scheme for FE - Semester - I

Sub. Code	Subject Name	Examination Scheme							
		Theory Marks				Term Work	Pract.	Oral	Total
		Internal Assessment			End sem. exam				
		Test 1	Test 2	Average of Test 1 and Test 2					
FEC101	Applied Mathematics-I	20	20	20	80	25	-	-	125
FEC102	Applied Physics-I	15	15	15	60	25	-	-	100
FEC103	Applied Chemistry -I	15	15	15	60	25	-	-	100
FEC104	Engineering Mechanics	20	20	20	80	25	-	25	150
FEC105	Basic Electrical & Electronics Engineering	20	20	20	80	25	-	25	150
FEC106	Environmental studies	15	15	15	60	-	-	-	75
FEL101	Basic Workshop Practice-I	-	-	-	-	50	-	-	50
				105	420	175		50	750

First Year Engineering (Semester I & II), Revised course from Academic Year 2012 -13, (REV- 2012), (Common for all branches)

Subject Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut.	Total
FEC201	Applied Mathematics-II	04	-	01	04		01	05
FEC202	Applied Physics-II	03	01	-	03	0.5	-	3.5
FEC203	Applied Chemistry -II	03	01	-	03	0.5		3.5
FEC204	Engineering Drawing	03	04	-	03	02	-	05
FEC205	Structured Programming Approach	04	02	-	04	01	-	05
FEC206	Communication Skills	02	02	-	02	01	-	03
FEL201	Basic Workshop Practice -II	-	04	-	-	02	-	02
		19	14	01	19	07	01	27

Scheme for Semester - II

Sub. Code	Subject Name	Examination Scheme							
		Theory marks				Term Work	Pract.	Oral	Total
		Internal Assessment			End sem. exam				
		Test 1	Test 2	Av. of Test 1 & 2					
FEC201	Applied Mathematics-II	20	20	20	80	25	-	-	125
FEC202	Applied Physics-II	15	15	15	60	25	-	-	100
FEC203	Applied Chemistry -II	15	15	15	60	25	-	-	100
FEC204	Engineering Drawing	15	15	15	60	25	50	-	150
FEC205	Structured Programming Approach	20	20	20	80	25	25	-	150
FEC206	Communication Skills	10	10	10	40	25	-	-	75
FEL201	Basic Workshop Practice-II	-	-	-	-	50	-	-	50
				95	380	200	75		750

UNIVERSITY OF MUMBAI

Revised Syllabus

Program- Bachelor of Engineering

Course- Electrical Engineering

(Second Year – Sem. III & IV)

Under

FACULTY OF TECHNOLOGY

(As per Credit Based Semester and Grading System from 2013-14)

From Dean'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, semester based credit and grading system is also introduced to ensure quality of engineering education.

Semester 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 and 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 and Faculty of Technology has devised a transparent credit assignment policy and adopted ten points scale to grade learner's performance.Credit assignment for courses is based on 15 weeks teaching learning process, however content of courses is to be taught in 12-13 weeks and remaining 3-2 weeks to be utilized for revision, guest lectures, coverage of content beyond syllabus etc.

Credit and grading based system was implemented for First Year of Engineering from the academic year 2012-2013. Subsequently this system will be carried forward for Second Year Engineering in the academic year 2013-2014, for Third Year and Final Year Engineering in the academic years 2014-2015 and 2015-2016 respectively.

Dr. S. K. Ukarande
Dean,
Faculty of Technology,
Member - Management Council, Senate, 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 undergraduate program in Electrical Engineering, more than twenty senior faculty members from the different institutes affiliated to University of Mumbai were actively participated in this process. Few PEOs were finalized for undergraduate program in Electrical Engineering are listed below;

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- To prepare students for successful career in industry, research and development.
- To develop the ability among students for supervisory control and data acquisition for power system application.
- To provide opportunity for students to handle the multidisciplinary projects.
- To create the awareness of the life-long learning and to introduce them to professional ethics and codes of professional practice.

The affiliated institutes may include their own PEOs in addition to the above list

To support the philosophy of outcome based education, in addition to stated PEOs, objectives and expected outcomes are also included in the curriculum. I know, this is a small step taken to enhance and provide the quality education to the stake holders.

Dr.M.V.Bhatlkar
Chairman,
Board of Studies in Electrical Engineering,
University of Mumbai

Syllabus Scheme for Second Year Electrical Engineering
(Semester III & IV)
Revised course (Rev 2012) from Academic Year 2012 -13
(Electrical Engineering)

Scheme for Semester III

Sub Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
EEC301	Applied Mathematics – III*	4	--	1	4	--	1	5
EEC302	Electronic Devices and Circuits	4	2	--	4	1	--	5
EEC303	Conventional and Non-conventional Power Generation	4	1	--	4	1	--	5
EEC304	Electrical Networks	4	2	--	4	1	--	5
EEC305	Electrical and Electronic Measurements	4	2	--	4	1	--	5
EEC306	Object Oriented Programming and Methodology*	-	4#	--	--	2	--	2
	Total	20	11	1	20	6	1	27

Subject Code	Subject Name	Examination Scheme							
		Theory Marks				Term Work	Practical and Oral	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test 2	Avg. of Test 1 & Test 2					
EEC301	Applied Mathematics – III*	20	20	20	80	25	--	--	125
EEC302	Electronic Devices and Circuits	20	20	20	80	25	25*	--	150
EEC303	Conventional and Non-conventional Power Generation	20	20	20	80	25	--	--	125
EEC304	Electrical Networks	20	20	20	80	25	--	--	125
EEC305	Electrical and Electronic Measurements	20	20	20	80	25	--	--	125
EEC306	Object Oriented Programming and Methodology*	--	--	--	--	25	50*	--	75
Total		--	--	100	400	150	75	--	725

Out of four hours, 2 hours theory shall be taught to entire class followed by 2 hrs. practical in batches.

*Common for Electrical, Bio-medical Engineering, Instrumentation, Electronics and

Electronics & Telecommunication branches.

Scheme for Semester IV

Sub Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
EEC401	Applied Mathematics – IV*	4	--	1	4	--	1	5
EEC402	Elements of Power System	3	2	--	3	1	--	4
EEC403	Electrical Machines –I	4	2	--	4	1	---	5
EEC404	Signal Processing	4	2	--	4	1	--	5
EEC405	Analog and Digital Integrated Circuits	4	2	--	4	1	--	5
EEC406	Numerical Methods and Optimization Techniques	3	2	--	3	1	--	4
		22	10	1	22	5	1	28

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Subject Code	Subject Name	Examination Scheme							
		Theory Marks				Term Work	Practical and Oral	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test 2	Avg. of Test 1 & Test 2					
EEC401	Applied Mathematics – IV*	20	20	20	80	25		--	125
EEC402	Elements of Power System	20	20	20	80	25		25	150
EEC403	Electrical Machines –I	20	20	20	80	25	25	--	150
EEC404	Signal Processing	20	20	20	80	25	--	-	125
EEC405	Analog and Digital Integrated Circuits	20	20	20	80	25	25	--	150
EEC406	Numerical Methods and Optimization Techniques	20	20	20	80	25	--	--	125
Total		--	--	120	480	150	50	25	825

*Common for Electrical, Bio-medical Engineering, Instrumentation, Electronics and Electronics & Telecommunication branches.

UNIVERSITY OF MUMBAI

Bachelor of Engineering

Electrical Engineering (Sem. V to VIII), Revised course

(REV- 2012) from Academic Year 2014 -15,

Under

FACULTY OF TECHNOLOGY

(As per Semester Based Credit and Grading System)

Preamble

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, semester based credit and grading system is also introduced to ensure quality of engineering education.

Semester 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 and 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 and Faculty of Technology has devised a transparent credit assignment policy and adopted ten points scale to grade learner's performance. Credit and grading based system was implemented for First Year of Engineering from the academic year 2012-2013. Subsequently this system will be carried forward for Second Year Engineering in the academic year 2013-2014, for Third Year and Final Year Engineering in the academic years 2014-2015 and 2015-2016 respectively.

Dr. S. K. Ukarande
Dean,
Faculty of Technology,
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Chairman,
Board of Studies in Electrical Engineering,
University of Mumbai

Third Year Electrical Engineering (Semester V to VIII), Revised course (Rev 2012) from Academic Year 2014 -15

(Electrical Engineering)

Scheme for Semester V

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned		
		Theory	**Pract./ Tut.**	**Theory**	**Pract./Tut.**	**Total**
EEC501	Protection and Switchgear Engineering	4	2	4	1	5
EEC502	Electrical Machines - II	4	2	4	1	5
EEC503	Electromagnetic Fields and Waves	3	2	3	2	5
EEC504	Power Electronics	4	2	4	1	5
EEC505	Communication Engineering	3	2	3	1	4
EEC506	Business Communication and Ethics	-	2**+ 2	-	2	2
Total		**18**	**14**	**18**	**10**	**26**

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. / oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg.					
EEC501	Protection and Switchgear Engineering	20	20	20	80	03	25	25	150
EEC502	Electrical Machines - II	20	20	20	80	03	25	25*	150
EEC503	Electromagnetic Fields and Waves	20	20	20	80	03	25	--	125
EEC504	Power Electronics	20	20	20	80	03	25	25	150
EEC505	Communication Engineering	20	20	20	80	03	25	-	125
EEC506	Business Communication and Ethics	--	--	--	--	-	25	--	25
Total		**--**	**--**	**100**	**400**	**--**	**150**	**75**	**725**

* Includes both Practical and Oral examination

**Theory for entire class to be conducted (common for all program)

Scheme for Semester VI

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned		
		Theory	Pract./Tut.	Theory	Pract./Tut.	Total
EEC601	Power System Analysis	4	2	4	1	5
EEC602	Electrical Machines – III	4	2	4	1	5
EEC603	Utilization of Electrical Energy	3	1	3	1	4
EEC604	Control System – I	4	2	4	1	5
EEC605	Microcontroller and its Applications	4	2	4	1	5
EEC606	Project Management	3	1	3	1	4
Total		**22**	**10**	**22**	**6**	**28**

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. / oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg.					
EEC601	Power System Analysis	20	20	20	80	03	25	--	125
EEC602	Electrical Machines – III	20	20	20	80	03	25	25*	150
EEC603	Utilization of Electrical Energy	20	20	20	80	03	25	25	150
EEC604	Control System – I	20	20	20	80	03	25	--	125
EEC605	Microcontroller and its Applications	20	20	20	80	03	25	25	150
EEC606	Project Management	20	20	20	80	03	25	-	125
Total		**--**	**--**	**120**	**480**	**--**	**150**	**75**	**825**

* Includes both Practical and Oral examination

UNIVERSITY OF MUMBAI

Bachelor of Engineering

Electrical Engineering (Sem. V to VIII), Revised course

(REV- 2012) TE from A.Y. 2014 -15 and BE 2015-16,

Under

FACULTY OF TECHNOLOGY

(As per Semester Based Credit and Grading System)

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Chairman,
Board of Studies in Electrical Engineering,
University of Mumbai

Scheme for Semester VII

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned		
		Theory	Pract./Tut.	Theory	Pract./Tut.	Total
EEC701	Power System Operation and Control	4	2	4	1	5
EEC702	High Voltage DC Transmission	3	2	3	1	4
EEC703	Electrical Machine Design	4	2	4	1	5
EEC704	Control System – II	4	2	4	1	5
EEE70X	Elective I	4	2	4	1	5
EEC706	Project- I	--	6#	--	3	3
Total		**19**	**16**	**19**	**8**	**27**

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. / oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg.					
EEC701	Power System Operation and Control	20	20	20	80	03	25	--	125
EEC702	High Voltage Transmission	20	20	20	80	03	25	—	125
EEC703	Electrical Machine Design	20	20	20	80	03	25	25	150
EEC704	Control System – II	20	20	20	80	03	25	25*	150
EEE70X	Elective I	20	20	20	80	03	25	—	125
EEC706	Project- I	--	--	--	--	--	50	--	50
Total		**--**	**--**	**100**	**400**	**--**	**175**	**50**	**725**

* Includes both Practical and Oral examination

X- **Indicates elective one to seven**

 # workload of learner in sem-VII is equivalent to 6 hrs/wk

Scheme for Semester VIII

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned		
		Theory	Pract./Tut.	Theory	Pract./Tut.	Total
EEC801	Design, Management and Auditing of Electrical Systems	4	2	4	1	5
EEC802	Drives and Control	4	2	4	1	5
EEC803	Power System Planning and Reliability	3	2	4	1	5
EEE80X	Elective- II	4	2	4	1	5
EEC805	Project- II	--	12 ##	--	6	6
Total		**15**	**20**	**16**	**10**	**26**

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. / oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test 1	Test 2	Avg.					
EEC801	Design, Management and Auditing of Electrical Systems	20	20	20	80	03	25	─	125
EEC802	Drives and Control	20	20	20	80	03	25	25*	150
EEC803	Power System Planning and Reliability	20	20	20	80	03	25	─	125
EEE80X	Elective- II	20	20	20	80	03	25	--	150
EEC805	Project- II	--	--	--	--	--	50	100	150
Total		**--**	**--**	**80**	**320**	**--**	**150**	**125**	**700**

* **Includes both Practical and Oral examination**

X- **Indicates elective one to seven**

Work load of learner in Semester-VII is equivalent to 12 hrs / wk

Course Code	Elective I	Course Code	Elective II
EEE701	High Voltage Engineering	EEE801	Flexible AC Transmission Systems
EEE702	Analysis and Design of Power Switching Converters	EEE802	Electric and Hybrid Electric Vehicle Technology
EEE703	Power System Modelling	EEE803	Power Quality
EEE704	Digital Signal Controllers and its Application	EEE804	Smart Grid Technology
EEE705	Advanced Lighting Systems	EEE805	Power System Dynamics and Control
EEE706	Renewable Energy and Energy Storage Systems	EEE806	Non-linear Control System
EEE707	Optimization Techniques and its Applications	EEE807	Entrepreneurship Development

Project Guidelines

Project –I and II: Students groups and load of faculty per week

Project Groups: (Four)   Students can form groups with minimum 3 (Three) and not more than 4

Faculty Load: In semester VII - 1 (one) period of 1/2 hour per week per project group

In semester VIII - 2 (Two) period of 1 hour each per week per project group

Each faculty is permitted to take (guide) maximum 4 (Four) project groups.

- **Project oral must be conducted by appointing external examiner**

Note: This aspect is discussed in FOT, where project load for students in VII semester is 3 hrs and in VIII semester it is 6 hrs