

UNIVERSITY OF MUMBAI



Bachelor of Engineering **Electronics Engineering**

Final Year Engineering
(Sem. VII and VIII), Revised course
(REV- 2012) effective from Academic Year 2015 -16

Under
FACULTY OF TECHNOLOGY
(As per Semester Based Credit and Grading System)

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:

In the process of change in the curriculum there is a limited scope to have major changes in the fundamental subjects which are mainly part of second year of engineering. The exposure to the latest technology and tools used all over the world is given by properly selecting subjects and their hierarchy in pre-final and final year. Thus this syllabus is made to groom the undergraduate students best suited and competent in all respect with best possible efforts put in by the experts in framing detail contents of individual subjects.

The engineering education in India is expanding in manifolds and the main challenge is the quality education. All the stakeholders are very much concerned about it.

The institution or program of study is committed and open to external review to meet certain minimum specified standards. The major emphasis of this process is to measure the outcomes of the program. Program outcomes are essentially a range of skills and knowledge that a student will have at the time of graduation.

So the curriculum must be constantly refined and updated to ensure that the defined objectives and outcomes are achieved. Students must be encouraged to comment on the objectives and outcomes and the role played by the individual courses in achieving them. 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.

I, as Chairman, Board of Studies in Electronics Engineering University of Mumbai, happy to state here that, heads of the department and senior faculty from various institute took timely and valuable initiative to frame Program Educational Objectives as listed below.

1. To provide students with a strong foundation in the mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyze engineering problems and to prepare them for graduate studies.
2. To prepare students to demonstrate an ability to identify, formulate and solve electronics engineering problems.
3. To prepare students to demonstrate ability to design electrical and electronics systems and conduct experiments, analyze and interpret data.
4. To prepare students to demonstrate for successful career in industry to meet needs of Indian and multi-national companies.
5. To develop the ability among students to synthesize data and technical concepts from applications to product design.
6. To provide opportunity for students to work as part of teams on multidisciplinary projects.
7. To promote awareness among students for the life-long learning and to introduce them to professional ethics and codes of professional practice.

These are the suggested and expected main objectives and individual affiliated institute may add further in the list. In addition to Program Educational Objectives, for each course of undergraduate program, objectives and expected outcomes from learner's point of view are also included in the curriculum to support the philosophy of outcome based education. I believe strongly that small step taken in right direction will definitely help in providing quality education to the stake holders.

The subjects offered to undergraduate students in final year are at par to the requirement of industry. The students are also made competent to appear for various competitive examination conducted in India and abroad. The subjects offered are at enough level to

prepare a base of the students to understand and learn latest state of technology. The students are trained in such a way that they become versatile in hardware and software simulation. Some subjects offered upgrades them in the field of information and technology which is a need of today's era.

At the end I must outset extend my gratitude to all experts who contributed to make curriculum competent at par with latest technological development in the field of electronics engineering.

Dr. D. G. Borse
Chairman, Board of Studies (Electronics Engineering)

Semester -VIII

Sub Code	Subject Name	Teaching Scheme(Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Practical	Tutorial	Total
EXC801	CMOS VLSI Design	04	--	--	04	--	--	04
EXC802	Advanced Networking Technologies	04	--	--	04	--	--	04
EXC803	MEMS Technology	04	--	--	04	--	--	04
EXC804X	Elective -II	04	--	--	04	--	--	04
EXC806	Project - II		04			04	--	04
EXL801	CMOS VLSI Design Laboratory	--	02	--	--	01	--	01
EXL802	Advanced Networking Technologies Laboratory	--	02	--	--	01	--	01
EXL803	MEMS Laboratory	--	02	--	--	01	--	01
EXL804X	Elective –II Laboratory	--	02	--	--	01	--	01
Total		16	12	--	16	08	--	24

Subject Code	Subject Name	Examination Scheme								
		Theory Marks				End Sem. Exam	Term Work	Practical & Oral.	Oral	Total
		Internal assessment								
		Test 1	Test 2	Ave. Of Test 1 and Test 2						
EXC801	CMOS VLSI Design	20	20	20	80	-	--	--	100	
EXC802	Advanced Networking Technologies	20	20	20	80	--	--	--	100	
EXC803	MEMS Technology	20	20	20	80	--	--	--	100	
EXC804X	Elective -II	20	20	20	80	--	--	--	100	
EXC806	Project - II	--	--	--	--	50	--	50	100	
EXL801	CMOS VLSI Design Laboratory	--	--	--	--	25	--	25	50	
EXL802	Advanced Networking Technologies Laboratory	--	--	--	--	25	--	25	50	
EXL803	MEMS Technology Laboratory	--	--	--	--	25	--	25	50	
EXL804X	Elective –II Laboratory	--	--	--	--	25	--	25	50	
Total		--	--	80	320	150	--	150	700	

Elective –II

Code	Name of Elective
EXC8041	Robotics
EXC8042	Mobile Communication
EXC8043	Digital Control System
EXC8044	Biomedical Electronics

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
EXL 801	CMOS VLSI Design Laboratory	--	02	--	--	01	--	01

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical and Oral	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test 2	Ave. Of Test 1 and Test 2					
EXL801	CMOS VLSI Design Laboratory	--	--	--	--	25	--	25	50

Term Work:

At least 10 experiments based on the entire syllabus of Subject **EXC801** should be set to have well predefined inference and conclusion. Computation/simulation based experiments are encouraged. The attempt should be made to make experiments more meaningful, interesting and innovative. Term work assessment must be based on the **overall performance** of the student with **every experiment graded from time to time**. The grades should be converted into marks as per the **Credit and Grading System** manual and should be **added and averaged**. The grading and term work assessment should be done based on this scheme.

The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work.

Practical and oral exam will be based on the entire syllabus of **EXC801**.

Course Code	Course Name	Teaching Scheme			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
EXL 802	Advanced Networking Technologies Laboratory	--	02	--	--	01	--	01

Course Code	Course Name	Examination Scheme								
		Theory Marks					Term Work	Practical and Oral	Oral	Total
		Internal assessment			End Sem. Exam					
		Test 1	Test 2	Ave. Of Test 1 and Test 2						
EXL802	Advanced Networking Technologies Laboratory	--	--	--	--	25	--	25	50	

Term Work:

At least 10 experiments based on the entire syllabus of Subject **EXC802** should be set to have well predefined inference and conclusion. Computation/simulation based experiments are encouraged. The attempt should be made to make experiments more meaningful, interesting and innovative. Term work assessment must be based on the **overall performance** of the student with **every experiment graded from time to time**. The grades should be converted into marks as per the **Credit and Grading System** manual and should be **added and averaged**. The grading and term work assessment should be done based on this scheme.

The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work.

Practical and oral exam will be based on the entire syllabus of **EXC802**.

Course Code	Course Name	Teaching Scheme			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
EXL 803	MEMS Technology Laboratory	--	02	--	--	01	--	01

Course Code	Course Name	Examination Scheme								
		Theory Marks					Term Work	Practical and Oral	Oral	Total
		Internal assessment			End Sem. Exam					
		Test 1	Test 2	Ave. Of Test 1 and Test 2						
EXL803	MEMS Technology Laboratory	--	--	--	--	25	--	25	50	

Term Work:

At least 10 experiments based on the entire syllabus of Subject **EXC803** should be set to have well predefined inference and conclusion. Computation/simulation based experiments are encouraged. The attempt should be made to make experiments more meaningful, interesting and innovative. Term work assessment must be based on the **overall performance** of the student with **every experiment graded from time to time**. The grades should be converted into marks as per the **Credit and Grading System** manual and should be **added and averaged**. The grading and term work assessment should be done based on this scheme.

The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work.

Practical and oral exam will be based on the entire syllabus of **EXC803**.

Course Code	Course Name	Teaching Scheme			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
EXL 804X	Elective –II Laboratory	--	02	--	--	01	--	01

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical and Oral	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test 2	Ave. Of Test 1 and Test 2					
EXL 804X	Elective –II Laboratory	--	--	--	--	25	--	25	50

Term Work:

At least 10 experiments based on the entire syllabus of Subject **EXE804X** should be set to have well predefined inference and conclusion. Computation/simulation based experiments are encouraged. The attempt should be made to make experiments more meaningful, interesting and innovative. Term work assessment must be based on the **overall performance** of the student with **every experiment graded from time to time**. The grades should be converted into marks as per the **Credit and Grading System** manual and should be **added and averaged**. The grading and term work assessment should be done based on this scheme.

The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work.

Practical and oral exam will be based on the entire syllabus of **EXE804X**.

Elective –II

Code	Name of Elective
EXC8041	Robotics
EXC8042	Mobile Communication
EXC8043	Digital Control System
EXC8044	Biomedical Electronics

Course Code	Course Name	Teaching Scheme			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
EXC806	Project - II	--	04	--	--	02	--	02

Course Code	Course Name	Examination Scheme								
		Theory Marks					Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam					
		Test 1	Test 2	Ave. Of Test 1 and Test 2						
EXC806	Project - II	--	--	--	--	50	-	50	100	

Term Work:

The final year students have already under gone project assignment in their seventh semester and in this semester the students are expected to continue the project work of stage I.

The college should keep proper assessment record of the progress of project and at the end of the semester it should be assessed for awarding TW marks. The TW should be examined by approved internal faculty appointed by the head of the institute on the basis of following:

- Scope and objective of the project work.
- Extensive Literature survey.
- Progress of the work (Continuous assessment)
- Design, implementation, and analysis of the project work.
- Results, conclusions and future scope.
- Report in prescribed University format.

An approved external examiner and internal examiner appointed by the head of the institute together will assess during oral examination. The oral examination is a presentation by the group members on the project along with demonstration of the work done. In the examination each individual student should be assessed for his/her contribution, understanding and knowledge gained.