AC /14.7.2016

Item No. 4.32

UNIVERSITYOFMUMBAI

Revised Syllabus for the M. E. Program

Program: M. E. (Mechanical)

MACHINE DESIGN

(As per **Choice Based Credit and GradingSystem** 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 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 meetings unanimously resolved that, each Board of Studies shall prepare some Program Educational Objectives (PEOs), give freedom to Affiliated Institutes to add few (PEOs), course objectives course outcomes to be clearly defined for each course, so that all faculty members in affiliated institutes understand the depth of 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 are 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 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. Faculty of Technology has devised a transparent credit assignment policy, adopting a ten point scale to grade learner's performance. Choice Based Credit and GradingSystem is implemented for Master of Engineering from the academic year 2016-2017.

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

Chairman's Preamble:

Engineering education in India is expanding and is set to increase manifold. Themajor challenge in the current scenario is to ensure quality to the stakeholders along with expansion. To meet this challenge, 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 and reflects the fact that in achieving recognition, the institution or program of study is committed and open to external review to meet certain minimum specified standards.The major emphasis of this accreditation process is to measure the outcomes of the program that is being accredited. Program outcomes are essentially a range of skills and knowledge that a student will have at the time of graduation from the program. In line with this Faculty of Technology of University of Mumbai has taken a lead in incorporating the philosophy of outcome based education in the process of curriculum development.

As the Chairman, Board of Studies in Mechanical Engineering of University of the Mumbai, I am happy to state here that, the Program Educational Objectives for Postgraduate Program were finalized in a brain storming session, which was attended by more than 20 members from different affiliated Institutes of the University. They are either Heads of Departments or their senior representatives from the Department of Mechanical Engineering. The Program Educational Objectives finalized for the postgraduate program in Mechanical Engineering are listed below;

1. To prepare the Learnerwith a sound foundation in the mathematical, scientific and engineering fundamentals.
2. To prepare the Learner to use modern tools effectively in order to solve real life problems.
3. To prepare the Learner for a successful career in Indian and Multinational Organisations
4. To encourage and motivate the Learnerin the art of self-learning.
5. To inculcate a professional and ethical attitude, good leadership qualities and commitment to social responsibilities in the Learner's thought process.

In addition to the above, 2 to3 more program educational objectives of their own may be added by affiliated Institutes.

In addition to Program Educational Objectives, for each course of postgraduate program, objectives and expected outcomes from a learner's point of view are also included in the curriculum to support the philosophy of outcome based education. I strongly believe that even a small step taken in the right direction will definitely help in providing quality education to the major stake holders.

Dr. S. M. Khot

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

Program Structure for
ME Mechanical Engineering (Machine Design)
Mumbai University
(With Effect from 2016-2017)

Semester I

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned		
		Theory	Pract	Theory	Pract	Total
MDC101	Mechanical Vibration	04	--	04	--	04
MDC102	Analysis and Synthesis of Mechanisms	04	--	04	--	04
MDC103	Advanced Stress Analysis	04	--	04	--	04
MDDLO 101X	Department Level Optional Course I	04	--	04	--	04
ILO101X	Institute Level Optional Course I	03	--	03	--	03
MDL101	Laboratory I - Finite Element Analysis	--	02	--	01	01
MDL102	Laboratory II - VibrationMeasurement and Analysis	--	02	--	01	01
Total		**19**	**04**	**19**	**02**	**21**

Course Code	Course Name	Examination Scheme							
		Theory							
		Internal Assessment			End SemExam	Exam Duration (Hrs)	Term Work	Pract /Oral	Total
		Test1	Test2	Avg					
MDC101	Mechanical Vibration	20	20	20	80	03	--	--	100
MDC102	Analysis and Synthesis of Mechanisms	20	20	20	80	03	--	--	100
MDC103	Advanced Stress Analysis	20	20	20	80	03	--	--	100
MDDLO 101X	Department Level Optional Course I	20	20	20	80	03	--	--	100
ILO101X	Institute Level Optional Course I	20	20	20	80	03	--	--	100
MDL101	Laboratory I - Finite Element Analysis	--	--	--	--	--	25	25	50
MDL102	Laboratory II - VibrationMeasurement and Analysis	--	--	--	--	--	25	25	50
Total		**100**	**100**	**100**	**400**		**50**	**50**	**600**

Course Code	Department Level Optional Course I	Course Code	Institute Level Optional Course I
MDDLO1011	Process Equipment Design	ILO1011	Product Lifecycle Management
MDDLO1012	Rapid Prototyping and Tooling	ILO1012	Reliability Engineering
MDDLO1013	Fracture Mechanics	ILO1013	Management Information System
MDDLO1014	Composite Materials	ILO1014	Design of Experiments
		ILO1015	Operation Research
		ILO1016	Cyber Security and Laws
		ILO1017	Disaster Management and Mitigation Measures
		ILO1018	Energy Audit and Management

Semester II

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned		
		Theory	Pract	Theory	Pract	Total
MDC201	System Modeling &Analysis	04	--	04	--	04
MDC202	Optimization	04	--	04	--	04
MDC203	Machine Tool Design	04	--	04	--	04
MDDLO 202X	Department Level Optional Course II	04	--	04	--	04
ILO202X	Institute Level Optional Course II	03	--	03	--	03
MDL201	Laboratory III - CAD/CAM/CIM	--	02	--	01	01
MDL202	Laboratory IV - Measurement & Virtual Instrumentation	--	02	--	01	01
Total		**19**	**04**	**19**	**02**	**21**

Course Code	Course Name	Examination Scheme							
		Theory							
		Internal Assessment			End Sem Exam	Exam Duration (Hrs)	Term Work	Pract/ Oral	Total
		Test1	Test 2	Avg					
MDC201	System Modeling &Analysis	20	20	20	80	03	--	--	100
MDC202	Optimization	20	20	20	80	03	--	--	100
MDC203	Machine Tool Design	20	20	20	80	03	--	--	100
MDDLO 202X	Department Level Optional Course II	20	20	20	80	03	--	--	100
ILO202X	Institute Level Optional Course II	20	20	20	80	03	--	--	100
MDL201	Laboratory III - CAD/CAM/CIM	--	--	--	--	--	25	25	50
MDL202	Laboratory IV - Measurement & Virtual Instrumentation	--	--	--	--	--	25	25	50
Total			**100**	**100**	**400**		**50**	**50**	**600**

Course Code	Department Level Optional Course II	Course Code	Institute Level Optional Course II
MDDLO2021	Theory of Plates	ILO2021	Project Management
MDDLO2022	Micro Electro Mechanical Systems	ILO2022	Finance Management
MDDLO2023	Smart Materials	ILO2023	Entrepreneurship Development and Management
MDDLO2024	Tribology	ILO2024	Human Resource Management
		ILO2025	Professional Ethics and CSR
		ILO2026	Research Methodology
		ILO2027	IPR and Patenting
		ILO2028	Digital Business Management
		ILO2029	Environmental Management

Semester III

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned		
		Theory	Pract	Theory	Pract	Total
MDS301	Seminar	--	06	--	03	03
MDD301	Dessertation I	--	24	--	12	12
Total		**--**	**30**	**--**	**15**	**15**

Course Code	Course Name	Examination Scheme						
		Theory				Term Work	Pract/Oral	Total
		Internal Assessment			End Sem Exam			
		Test1	Test 2	Avg				
MDS301	Seminar*	--	--	--	--	50	50	100
MDD301	Dessertation I	--	--	--	--	100	--	100
Total			**--**	**--**	**--**	**150**	**50**	**200**

Semester IV

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned		
		Theory	Pract	Theory	Pract/Oral	Total
MDD401	Dessertation II	--	30	--	15	15
Total		**--**	**30**	**--**	**15**	**15**

Course Code	Course Name	Examination Scheme						
		Theory				Term Work	Pract /Oral	Total
		Internal Assessment			End Sem Exam			
		Test1	Test 2	Avg				
MDD401	DessertationII*	--	--	--	--	100	100	200
Total		**--**	**--**	**--**	**--**	**100**	**100**	**200**

***Seminar of Semester III and Dissertation II of Semester IV should be assessed jointly by the pair of Internal and External Examiners**

Note- The Contact Hours for the calculation of load of teacher are as follows
Seminar - 01 Hour / week / student
Project I and II - 02 Hour / week / student