

**Cusrow Wadia Institute of Technology,
Pune - 411 001**

Mechanical Engineering Department

Multi Point Entry and Credit System 2010
(MPECS 2010)

CURRICULUM

[W.E.F. June - 2010]

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

CURRICULUM REVISION (2010)

1 Preamble :

- Cusrow Wadia Institute of Technology, Pune was granted Academic Autonomy in the year 1985 by Government of Maharashtra vide letter No. PTI 2483/119915(234)/TE-I (B) dated 27/2/1985.
- Initially the Institute adopted the Model Curriculum prepared by then TTTI, Western Region, Bhopal. Subsequently, the revisions in the curriculum were made as per the needs of the Society.
- The Institute adopted Multi Point Entry and Credit System w.e.f. June 1998.
- The earlier revision was carried out in the year 2004 . Subsequently the review of the curriculum was taken in the year 2007-2008. Necessary changes in the contents and detailing of the document as regards to the scope implementation strategy and related processes were done in the year 2008.
The present curriculum will come into force w.e.f. June 2010 .
- The feedback was taken from various stake holders and it was strongly felt that the rapid strides in the field of Information Technology, Computers and Manufacturing Processes , a dynamic curriculum need to adopt the benefits of the fast changing expectations in the contents as well as the Teaching Learning Methodology.
- The Institute has strengthened the hardware and software which is constantly consolidated and upgraded to match the needs of the society in general and the Industries in particular.
- Students should be proficient in the use of computers and related softwares irrespective of the branch of Engineering they are studying. The students shall be made to make maximum use of software packages and use Internet to derive and update their knowledge.
- The contemporary needs of the user system and overall development of the students is the governing factor in the revision of 2010 curriculum.

2 Approach for Curriculum Revision:

- Scientific system approach has been adopted in the revision of curriculum .
- A curriculum revision model showing various steps undergone is presented.
- Analysis of the existing curriculum was done by taking feedback from the faculty implementing the curriculum, Alumni, Industry / Field Personnel, Courses Committee Members and the Experts in the field of Education.
- Entry behaviour of the students was assessed. Basic entry qualification for Diploma is SSC or equivalent .However, higher entry qualification like 12th Science, 12th MCVC, ITI etc. was also considered.
- Curriculum documents of MSBTE, other Boards and other Autonomous Institutions were studied for inclusion of new courses and analysis of contents of existing and newly inducted courses and also the implementation strategy.

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- The curriculum is rationalised as per the AICTE and MSBTE norms and guidelines.
- The team members were identified for conducting Search Conference, collecting feedback from stake holders and interviews with Experts for noting the suggestions about the courses and necessary modifications. The Interactive Sessions were arranged through Search Conference attended by the Experts from Industry and Academia. The faculty members were trained by specialists in Technical Education System as regards to the Curriculum Revision Process.

3. ROLES TO BE PLAYED AND FUNCTIONS TO BE PERFORMED BY A DIPLOMA HOLDER:

- A Diploma holder may be employed in the Industry as a Technician or Supervisor for Production, Installation, Repairs and Maintenance. He also may be employed in drawing, estimation or as an Assistant in IT related activities. He may be an Entrepreneur, be assigned a job of Purchase/ Marketing Department. Diploma holder should have basic knowledge of the various subjects of his branch in Engineering and also the related Inter-disciplinary courses. He should be aware of the present technologies and be able to adopt the changes in future. He shall acquire the necessary skill sets in the Engineering courses.
- His role in the Society is that of a responsible individual and should conduct himself as regards the values and cultures. He should acquire the necessary professional, presentation and managerial Skills.

4. ANALYSING JOB FUNCTIONS AND DERIVING CURRICULUM OBJECTIVES:

- The role of a Diploma holder, as a Technician on the job, is analysed in four Domains of Professional Skills, Life Long Learning, Personal Development and Social Development.
- The curriculum should help the students to acquire professional skills and inculcate attitudes in order that the student will be able to discharge the role and functions effectively on the societal and employment front.
- Goals and objectives of each program were framed. The courses common to several programmes and the courses relevant to particular programmes were classified under various categories.
- The overall course structure and Teaching Examination Scheme was prepared.
- The contents of various courses were finalised by considering the feedback from stake holders through interviews, Search Conference and discussions.
- The course structure and the contents were validated by the Board of Studies.
- Study of the Diploma programmes offered by MSBTE , other State Boards and other Autonomous Institutions was done to widen the perspective .

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5. EVOLVING THE TEACHING LEARNING PROCESS:

The following points were considered:

- No. of weeks – 16
- Average days per week- 5.5
- No. of contact hours per day – 7
- No. of hours per week for instruction and pre-decided Co-curricular activities – 38.
- Each course shall be taught for sixteen weeks, two weeks shall be utilised for revision in that term.

6. Course Categories:

- Foundation(1)
- Core(2)
- Allied(3)
- Applied(4)
- Specialised(5)
- Number of courses for a programme – 35 – 37.
- Number of courses for award of class – 9
- Number of Elective courses - 3
- Number of credits to be earned for obtaining Diploma – 185.
- One credit = one hour of lecture / practical per week for a course.
- Ratio of theory to practical hours per week : approx. 50:50

7. EXAMINATION SCHEME:

- Theory paper – 80 marks
- Tests – 20 marks
- Term Work – 25-50 marks
- Practicals -25 – 50 marks
- Viva voce- 25 – 50 marks
- Project Work - 100 + 50 marks
- Grand total – 4500 marks
- Grand total of marks for award of class – 1400.

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8. COURSE-WISE CONTENT DETAILING:

- For finalisation of course structure from Courses Committee, Examination Committee and Board of Studies, various processes in the Curriculum Revision Model were followed. Also the documents of MSBTE and Autonomous Polytechnics were referred.
- Contents were decided by taking into consideration, the expectations of the stake holders, specific needs of Industry, Interviews, Discussions and Experts opinions.
- Every course has a unique code e.g. R10CE4101. 'R10' means the course is from the curriculum revised in 2010. CE implies Civil Engineering Department will teach this course. '4' indicates that it is Applied Course Category in the programme structure. '1' means the course is to be taught to Civil Engineering programme. '01' is the serial number of the course in Applied Courses Category.

The 7th character in the above 9 digit code is assigned for the programme, e.g. 1 – Civil, 2 – Mechanical, 3 – Electrical, 4 – Computer and 5 – Electronics & Telecommunication Engineering and 7 – Common courses for all programmes taught by Science Department.

- A rationale giving the importance of the course in the curriculum is vividly explained. The course objectives are derived indicating the purpose to teach the course / subject.
- The Practicals, Seminars are spelt out along with assessment technique.
- The input for professional practices and generic skills are included in most of the courses so that the students will be able to learn the contents beyond syllabus.
- The curriculum document prescribes learning resources for students e.g. Reference books, Textbooks, Websites, Handbooks, Printed notes etc.
- Use of Learning Management System, Audio Visual Aids be increased for enhancing the Teaching Learning Process.

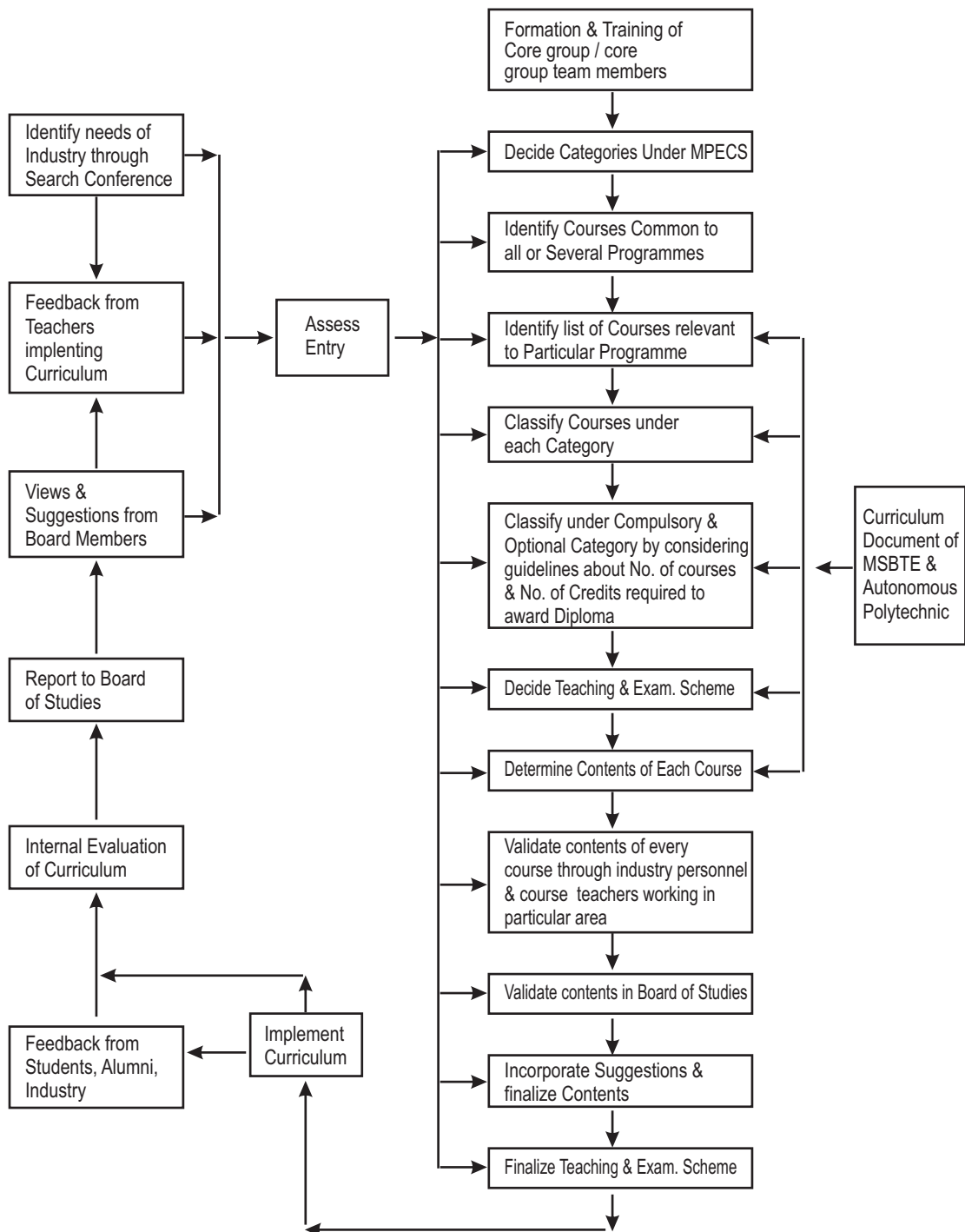
9. CURRICULUM IMPLEMENTATION STRATEGY:

- Members of the faculty shall continuously undergo Induction Training Programme, Content upgrading programme conducted by ISTE, NITTTR and other Organisations.
- The faculty members will be deputed to attend Refresher courses and Training programmes so as to help them keep abreast with latest developments and technology.
- Faculty members will be trained in respect of various aspects and methods of evaluation systems, Paper setting etc.
- Faculty will be trained for monitoring the curriculum implementation.

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- Library will be constantly modernised with additions of latest titles and books .The Library will have open access to the students. Library will be open from 10.00 a.m. to 6.00 p.m. and extended upto 8.00 p.m. generally during examination periods. The Book Bank Facility will support the demand of the students.
- The Laboratory and Field Manuals will be structured and standardised so that the students can spend more time for doing practicals, understanding the significance, discussions and result analysis rather than only writing the journals.
- The Examination rules will be revised to suit the curriculum and will have similarity as regards to principles followed by MSBTE and other Examination bodies.
- The Evaluation Systems and marking schemes will be commensurate with the input hours and importance of the topics in the course.
- 24 X 7 Internet connection is available for faculty, staff and students . Also Wi-Fi connectivity provided in all classrooms and laboratories will support the modern methods of teaching.
- Uninterrupted Power Supply and captive power is made available to take over the load shedding .
- The laboratories , equipments and computers be maintained in working conditions. The models, charts and exhibits be displayed to invite attention of the students .
- Industrial visits, Field visits, Study tours shall be arranged regularly in a preplanned and structured manner so as to have focus on technical aspects.
- Guest faculty should be invited to deliver lectures on recent trends, technology, materials and processes . These activities be planned in the beginning of the term .
- The students should imbibe various life skills, generic skills, learn stress management and adjust help and appreciate colleagues especially during group activities, study tours and visits etc.

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Curriculum Revision Model Used At CWIT - 2010

CWIT - (MECHANICAL ENGINEERING)

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What is Mechanical Engineering?

Mechanical engineers are often called the “General practitioners” of engineering because their education is extremely broad and their services span many of interdisciplinary technical, social, environmental and economic problems that face the world today.

Because of their training, mechanical engineers are in demand in practically every type of manufacturing operations as well as in research, academic and governmental organisations. Specific assignments involved research and development, design of equipment or systems, supervision of production, plant engineering, administration, sales engineering, the testing and evaluation of machines and entire plants and teaching. Their educational program also prepares them to address current and future problems in areas such as: energy storage, alternative fuels, waste disposal and management, environmental control, more efficient energy conversion methods and biomedical engineering.

Importance of Mechanical Engineering Programme :

Mechanical Engineers create machines, materials and system that satisfy a particular function. They deal with problems in areas such as energy conversion, design of mechanical components & systems, man & machine environments and instrumentation & control of process.

Mechanical engineers are typically involved with such activities as:

- Generation, distribution, and use of energy.
- Development and application of manufacturing systems and processes.
- Automation and control of mechanical and thermal systems.
- Design of various products for consumer and commercial markets.

About one-fourth of all engineers practicing today have been educated as mechanical engineers. Their activities include research, development, design, testing, production, technical sales and technical management.

Mechanical engineers are characterized by personal creativity, breadth of knowledge and versatility. For these reasons they are found to function and thrive as valuable members and leaders of multidisciplinary teams. Through clever use of analysis, modeling, design, synthesis and interpersonal skills they solve important problems to improve our world.

The overall objective of the curriculum in mechanical engineering is to prepare students for lifelong learning and growth in careers as mechanical engineers in the rapidly-changing industrial world.

Upon successfully completing the mechanical engineering curriculum, students will be prepared or immediate entry into the field or for further study at the graduate level.

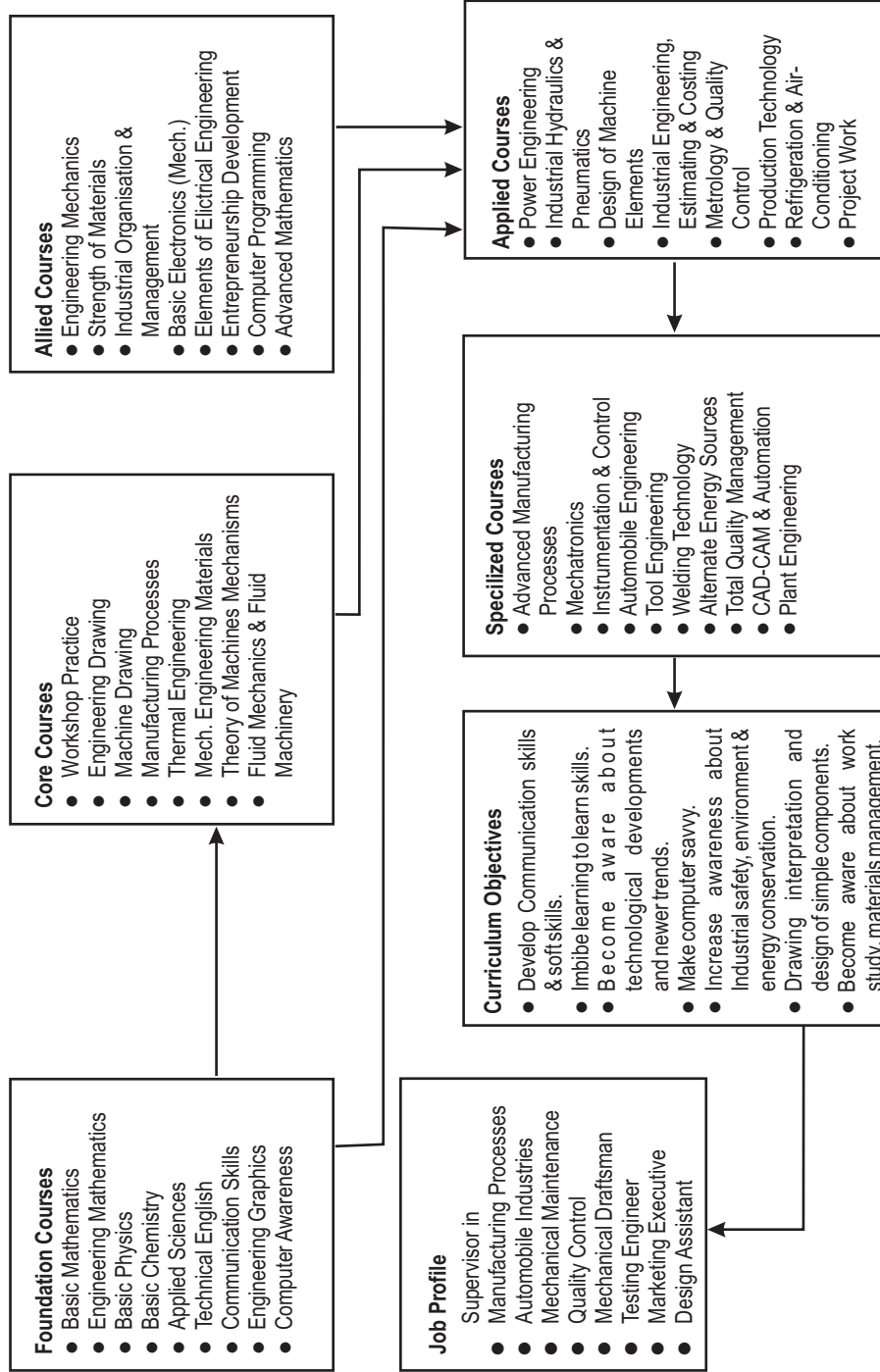
Objectives of Mechanical Engineering Programme :

The Department of Mechanical Engineering intends to provide a firm foundation in mathematics, science and design methodology applied to the disciplines of mechanical engineering in the areas of mechanical, fluid, thermal and manufacturing systems. It shall offer the most contemporary and essential tools needed in the breadth and depth of mechanical engineering. The curriculum shall incorporate analytical tools, creative thought and communication skills as offered through courses in the department and industrial exchange.

The department shall provide students the opportunities to work effectively as individuals, in teams and provide experience in leadership, management, planning, organization and real world, hands-on engineering that leads to an appreciation of the business and entrepreneurial aspects of mechanical engineering. It shall provide the broad education necessary for engaging in life-long learning.

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LINK DIAGRAM FOR MECHANICAL ENGINEERING



CWIT - (MECHANICAL ENGINEERING)

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PROGRAMME : MECHANICAL ENGINEERING

SCHEME : MPECS 2010

Sr. No.	Category	Course Code	Course Title	Pre-requisite	Comp. /Opt.	Teaching Scheme		Examination Scheme					
						L	P	TH	TT	PR	OR	TW	
01	FOUNDATION COURSES (All Compulsory)	R10SC1701	Basic Mathematics	-	C	4	-	4	80	20	-	-	-
02		R10SC1702	Engineering Mathematics	R10SC1701	C	4	-	4	80	20	-	-	-
03		R10SC1703	Basic Physics	-	C	3	2	5	80	20	-	-	25
04		R10SC1705	Basic Chemistry	-	C	3	2	5	80	20	-	-	25
05		R10SC1706	Applied Sciences	-	C	4	4	8	-	-	-	50@	50
06		R10SC1707	Technical English	-	C	2	2	4	80	20	-	-	25
07		R10SC1708	Communication Skills	-	C	1	2	3	-	-	-	-	50
08		R10ME1201	Engineering Graphics \$	-	C	3	4	7	80	20	-	-	50
09		R10ME1206	Computer Awareness	-	C	1	4	5	-	-	25@	-	-
Total						25	20	45	480	120	25	50	275
10	ALLIED COURSES (5 Compulsory) (2 Optional)	R10AM2101	Engineering Mechanics	-	C	4	2	6	80	20	-	-	25
11		R10AM2102	Strength of Materials	R10AM2101	C	4	2	6	80	20	-	-	25
12		R10ME2203	Ind. Org. & Management	-	C	3	-	3	80	20	-	-	-
13		R10EX2503	Basic Electronics (Mech.)	-	C	4	2	6	80	20	-	-	25
14		R10EE2302	Elements of Elect. Engg.	-	C	3	2	5	80	20	-	-	25
15		R10ME2205	Entrepreneurship Develop.	-	-	2	2	4	-	-	-	50@	50
16		R10ME2207	Computer Programming	R10ME1206	ANY TWO	2	2	4	-	-	50@	-	50
17		R10SC2701	Advanced Mathematics	R10SC1702	-	4	-	4	80	20	-	-	-
Total						24	10	34	480	120	50	-	150

\$ Theory examination of 4 hours duration

@ Internal Examination

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

PROGRAMME : MECHANICAL ENGINEERING SCHEME : MPECS 2010

Sr. No.	Category	Course Code	Course Title	Pre-requisite	Comp. / Opt.	Teaching Scheme			Examination Scheme				Cre dits	
						L	P	T	TH	TT	PR	OR		TW
18	CORE COURSES (All Compulsory)	R10ME3201	Workshop Practice	-	C	1	4	5	-	-	-	-	-	50
19		R10ME3202	Engineering Drawing \$	R10ME1201	C	2	4	6	80	20	-	-	-	50
20		R10ME3203	Machine Drawing \$	R10ME3202	C	2	4	6	80	20	-	25@	-	50
21		R10ME3204	Manufacturing Processes	R10ME3201	C	3	4	7	80	20	-	-	-	50
22		R10ME3205	Thermal Engineering	-	C	4	2	6	80	20	-	25	-	25
23		R10ME3206	Mech. Engg. Materials	-	C	3	-	3	80	20	-	-	-	-
24		R10ME3207	Theory of Machines & Mech.	-	C	4	2	6	80	20	-	-	-	50
25		R10ME3208	Fluid Mechanics & Fluid Machinery	-	C	4	2	6	80	20	-	25	-	25
Total						23	22	45	560	140	-	75	-	300
26	APPLIED COURSES (All Compulsory)	R10ME4201	Power Engineering	R10ME3205	C	4	2	6	80	20	-	25	-	50
27		R10ME4202	Ind. Hydraulics & Pneumatics	R10ME3208	C	3	2	5	80	20	-	25	-	50
28		R10ME4203	Design of Machine Elements	R10AM2102	C	3	4	7	80	20	-	25	-	50
29		R10ME4204	Ind. Engg. Estimating & Costing	-	C	3	2	5	80	20	-	-	-	50
30		R10ME4205	Metrology & Quality Control	R10ME3201	C	4	2	6	80	20	-	25	-	50
31		R10ME4206	Production Technology	R10ME3204	C	3	4	7	80	20	-	25	-	50
32		R10ME4207	Refrigeration & Air-Conditioning	R10ME3205	C	4	2	6	80	20	-	-	-	50
33		R10ME4208	Project Work	100CR	C	-	6	6	-	-	-	-	50	100
Total						24	24	48	560	140	-	175	-	450

\$ Theory examination of 4 hours duration

@ Internal Examination

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

PROGRAMME : MECHANICAL ENGINEERING

SCHEME : MPECS 2010

Sr. No.	Category	Course Code	Course Title	Pre-requisite	Comp. /Opt.	Teaching Scheme			Examination Scheme					
						L	P	Cre dits	TH	TT	PR	OR	TW	
34		R10ME5201	Advanced Manu. Processes	R10ME3204		3	2	5	80	20	-	-	-	50
35		R10ME5202	Mechatronics	R10EX2503	ANY ONE	3	2	5	80	20	-	-	-	50
36		R10ME5203	Instrumentation & Control	R10EE2302		3	2	5	80	20	-	-	-	50
37		R10ME5204	Automobile Engineering	R10ME4201		2	2	4	-	-	-	-	50	50
38	SPECIALIZED COURSES (3 Optional)	R10ME5205	Tool Engineering	R10ME3204		2	2	4	-	-	-	-	50	50
39		R10ME5206	Welding Technology	R10ME3204		2	2	4	-	-	-	-	50	50
40		R10ME5207	Alternate Energy Sources	R10ME3205	ANY TWO	2	2	4	-	-	-	-	50	50
41		R10ME5208	Total Quality Management	R10ME4205		2	2	4	-	-	-	-	50	50
42		R10ME5209	CAD-CAM & Automation	R10ME1206		2	2	4	-	-	-	-	50	50
43		R10ME5210	Plant Engineering			2	2	4	-	-	-	-	50	50
Total						7	6	13	80	20	-	-	100	150
Grand Total						103	82	185	2160	540	75	400	1325	

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PROGRAMME : DIPLOMA IN MECHANICAL ENGINEERING SCHEME : MPECS 2010 SUMMARY

Sr. No.	Category	No. of Courses		Teaching Scheme				Examination Scheme				
		Comp.	Opt.	L	P	Credits	TH+TT	PR	OR	TW	TOTAL	
1	Foundation	9	-	25	20	45	600	25	50	275	950	
2	Allied	5	2	24	10	34	600	50	-	150	800	
3	Core	8	-	23	22	45	700	-	75	300	1075	
4	Applied	8	-	24	24	48	700	-	175	450	1325	
5	Specialized	-	3	7	6	13	100	-	100	150	350	
		30	5	103	82	185	2700	75	350	1375	4500	

Total Credits: 185

Total Marks: 4500

Total No. of Courses to complete the Program : 35 (30 Comp. + 5 Opt.)

Total No. of Theory Exams : 27

Total No. of Practical / Oral exams : 2+ 12 = 14

Theory Credits to Non-Theory Credits Ratio: 56:44

Theory Marks to Non-Theory Marks Ratio: 60:40

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PROGRAMME : DIPLOMA IN MECHANICAL ENGINEERING (FOR CLASS DECLARATION)

NO. OF COURSES: 09 COMPULSORY COURSES: 08 OPTIONAL COURSES: 01

Category	Course Code	Course Title	Cred	Examination Scheme				
				TH	TT	PR	OR	TW
ALLIED COURSE	R10ME2203	Ind. Org. & Management	C	80	20	-	-	-
	R10ME4201	Power Engineering	C	80	20	-	25	50
	R10ME4202	Industrial Hydraulics & Pneumatics	C	80	20	-	25	50
APPLIED COURSES	R10ME4203	Design of Machine Elements	C	80	20	-	25	50
	R10ME4204	Ind. Engg., Estimating & Costing	C	80	20	-	-	50
	R10ME4205	Metrology & Quality Control	C	80	20	-	25	50
	R10ME4207	Refrigeration & Air-Conditioning	C	80	20	-	-	50
	R10ME4208	Project Work	C	-	-	-	50	100
SPECIALIZED COURSES	R10ME5201	Advanced Manu. Processes	ANY ONE	80	20	-	-	50
	R10ME5202	Mechatronics	ANY ONE	80	20	-	-	50
	R10ME5203	Instrumentation and Control	ANY ONE	80	20	-	-	50

MAX. THEORY MARKS : 800
 MAX. ORAL MARKS : 150
 MAX. TERM WORK MARKS : 450
 GRAND TOTAL : 1400
 THEORY CREDITS TO NON-THEORY CREDITS RATIO : 55:45
 THEORY MARKS TO NON-THEORY MARKS RATIO : 57:43

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PROGRAMME : DIPLOMA IN MECHANICAL ENGINEERING

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SR.NO.	CATEGORY	COURSE CODE	COURSE TITLE	PAGE NO.
01	FOUNDATION COURSES	R10SC1701	Basic Mathematics	1
02		R10SC1702	Engineering Mathematics	5
03		R10SC1703	Basic Physics	8
04		R10SC1705	Basic Chemistry	12
05		R10SC1706	Applied Science	17
06		R10SC1707	Technical English	22
07		R10SC1708	Communication Skill	25
08		R10ME1201	Engineering Graphics	28
09		R10ME1206	Computer Awareness	31
10		ALLIED COURSES	R10AM2101	Engineering Mechanics
11	R10AM2102		Strength of Materials	38
12	R10ME 2203		Industrial Organisation & Management	42
13	R10EX2503		Basic Electronics (Mech.)	45
14	R10EE2302		Elements of Electrical Engineering	49
15	R10ME2205		Entrepreneurship Development	52
16	R10ME2207		Computer Programming	55
17	R10SC2701		Advanced Mathematics	58
18	CORE COURSES	R10ME3201	Workshop Practice	61
19		R10ME3202	Engineering Drawing	63
20		R10ME3203	Machine Drawing	66
21		R10ME3204	Manufacturing Processes	69
22		R10ME3205	Thermal Engineering	73
23		R10ME3206	Mechanical Engineering Materials	77
24		R10ME3207	Theory of Machines & Mechanisms	80
25		R10ME3208	Fluid Mechanics & Fluid Machinery	83

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PROGRAMME : DIPLOMA IN MECHANICAL ENGINEERING

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SR.NO.	CATEGORY	COURSE CODE	COURSE TITLE	PAGE NO.
26	APPLIED COURSES	R10ME4201	Power Engineering	87
27		R10ME4202	Industrial Hydraulics & Pneumatics	91
28		R10ME4203	Design of Machine Elements	95
29		R10ME4204	Industrial Engineering, Estimating & Costing	99
30		R10ME4205	Metrology & Quality Control	103
31		R10ME4206	Production Technology	107
32		R10ME4207	Refrigeration & Air Conditioning	110
33		R10ME4208	Project Work	114
34		SPECIALIZED COURSES	R10ME5201	Advanced Manufacturing Processes
35	R10ME5202		Mechatronics	121
36	R10ME5203		Instrumentation & Control	124
37	R10ME5204		Automobile Engineering	127
38	R10ME5205		Tool Engineering	130
39	R10ME5206		Welding Technology	134
40	R10ME5207		Alternate Energy Sources	137
41	R10ME5208		Total Quality Management	140
42	R10ME5209		CAD-CAM & Automation	144
43	R10ME5210		Plant Engineering	147