

**PROPOSED CURRICULUM
FOR
DUAL DEGREE PROGRAMME
(FROM 7th - 10th SEMESTER)**

To be adopted from the Academic Year 2006-07



**DEPARTMENT OF MECHANICAL
ENGINEERING**

I . I . T . KHARAGPUR

**DUAL DEGREE CURRICULUM
FOR
4 YEAR B.TECH IN MECHANICAL ENGINEERING
AND
M.TECH IN MANUFACTURING SCIENCE & ENGINEERING**

Course curriculum upto sixth semester is common with regular B.Tech (Hons.) in Mechanical Engineering

7th Semester

Sl. No.	Depth/ Breadth	Subject No.	Subjects	L-T-P	Credit
1	D	ME60097	Modern Manufacturing Processes	4-0-0	4
2	D	ME40601	Systems & Control	3-1-0	4
3	D		Elective - I	3-0-0	3
4	B		Breadth - V Prof / HSS / Mgmt – Dept allowed {Quality Design & Control}	3-0-0	3
5	D	ME47601	Project	0-0-6	4
6	D	ME48601	Industrial Training	0-0-0	2
Total				13-1-6	20

8th Semester

Sl. No.	Depth/ Breadth	Subject No.	Subjects	L-T-P	Credit
1	D	MF39602	Non-Traditional Manufacturing + CNC Lab	0-0-3	2
2	D	MF69002	Microprocessor Application Lab	0-0-3	2
3	D		Elective - II	3-0-0	3
4	D		Elective - III	3-0-0	3
5	D		Elective - IV	3-0-0	3
6	B		Breadth - VI Prof / HSS – Dept allowed	3-0-0	3
7	D	ME47602	Project	0-0-9	6
8	D	ME48602	Comprehensive Viva	0-0-0	2
Total				12-0-15	24

9th Semester

Sl. No.	Depth/ Breadth	Subject No.	Subjects	L-T-P	Credit
1	D		PGE – I PG Elective I	3-1/ 0-0	4/3
2	D		PGE - II PG Elective II	3-1/ 0-0	4/3
3	D		PGE - III PG Elective III	3-1/ 0-0	4/3
4	B		PGB - I PG Breadth HSS / Management	3-0-0	3
5	D	MF57001	P - III PG Project Part - I	0-0-15	10
Total				12-3/0-15	22

10th Semester

Sl. No.	Depth/ Breadth	Subject No.	Subjects	L-T-P	Credit
1	D		PGE - IV PG Elective - IV	3-1/ 0-0	4/3
2	D		PGE - V PG Elective - V	3-1/ 0-0	4/3
3	D	MF57002	P - IV PG Project Part - II	0-0-22	15
4	B	MF58002	Comprehensive Viva	0-0-0	2
Total				6-2/0-22	23

NOTE : L = Lecture T = Tutorial P = Practical

Credit Distribution:

Semester	1	2	3	4	5	6	7	8	9	10	Total
Depth	24	24	19	20	19	20	17	21	19	23	206
Breadth	00	00	03	03	03	03	03	03	03	00	021
Total Credits											227

PG Project Part - I & II should be preferably be in topics related to broad area of Manufacturing

Elective List

Elective - I

7th Semester

Sl. No.	Subject No.	Subject Name	L-T-P
1	ME41601	Computer Graphics & Solids Modelling	3-0-0
2	ME60201	Advanced Fluid Mechanics	3-1-0
3	ME41609	Air Conditioning	3-0-0
4	ME41603	Vibration & Noise Control	3-0-0
5	ME41605	Simulation of Mechanical Systems	3-0-0
6	ME41613	Design Optimisation	3-0-0
7	ME41611	Mechanical Handling Systems & Equipment	3-0-0
8	ME41607	Composite Materials	3-0-0
9	ME41615	Tribology	3-0-0
10	IM31004	Management of Inventory Systems	3-0-0
11	IM31007	Production Planning & Control	3-1-0
12	IM21001	Engineering Economy Costing & Accounting	3-1-0

Elective - II

8th Semester

Sl. No.	Subject No.	Subject Name	L-T-P
1	MF41602	Process Dynamics & Adaptive Control	3-0-0
2	MF41604	Metal Casting Technology	3-0-0
3	ME41620	Fluid Power & Control	3-0-0
4	ME60207	Environmental Pollutions & Abatement	3-1-0
5	ME60209	Nuclear Power Generations & Safety	3-1-0
6	ME41616	Micro-scale Fluid Flow & Heat Transfer	3-0-0
7	IM31006	Simulation	3-0-0

Elective - III

8th Semester

Sl. No.	Subject No.	Subject Name	L-T-P
1	MF41608	Welding Technology	3-0-0
2	MF41610	Non-destructive Evaluation & Imaging	3-0-0
3	MF41612	Quantity Production Methods	3-0-0
4	ME41606	Finite Element Methods in Engineering	3-0-0
5	ME41608	Fatigue, Creep and Fracture	3-0-0
6	ME41610	Automobile Engineering	3-0-0
7	ME60206	Advanced Engineering Thermodynamics	3-1-0
8	ME60208	Solar Energy Technology	3-1-0
9	ME60210	Theory of Combustion & Emissions	3-1-0
10	IM21008	Work Systems Design	3-0-0

Elective - IV

8th Semester

Sl. No.	Subject No.	Subject Name	L-T-P
1	MF41614	Machine Tool Engineering	3-0-0
2	MF41616	Laser Applications in Manufacturing	3-0-0
3	MF41618	Engineering Metrology	3-0-0
4	ME60212	Turbulent Flows	3-1-0
5	ME60214	Energy Conservation & Waste Heat Recovery	3-1-0
6	ME41618	Turbo Machinery	3-0-0
7	ME41612	Experimental Stress Analysis	3-0-0
8	ME41614	Modern Control Theory	3-0-0
9	IM21006	Operation Research – II	3-1-0

PG Elective List

Odd (9th) Semester PG Elective - I to III

Sl. No.	Subject No.	Subject Name	L-T-P	Credit
1	ME60033	Intelligent Machines & Systems	4-0-0	4
2	ME60075	Machine Fault Diagnosis and Signal Processing	3-1-0	4
3	ME60095	Finite and Boundary Elements Method in Manufacturing	4-0-0	4
4	ME60109	Rapid Prototyping	4-0-0	4
5	ME60115	Micro Electro Mechanical Systems	4-0-0	4
6	ME60215	Theory of Abrasive Machining	3-0-0	3
7	ME60303	Robotics	4-0-0	4
8	ME60305	CAD for Manufacturing	4-0-0	4
9	MT60035	Processing by Powder Metallurgy Techniques	4-0-0	4
10	ME60025	Metal Forming Processes	4-0-0	4
11	ME60003	Advanced Metal Casting Technology	4-0-0	4

Even (10th) Semester PG Elective - IV & V

Sl. No.	Subject No.	Subject Name	L-T-P	Credit
1	ME60004	Advanced Welding Technology	4-0-0	4
2	ME60034	Manufacturing Resource Planning	4-0-0	4
3	ME60090	Knowledge Based System in Engineering	4-0-0	4
4	ME60114	Surface Engineered Materials Technology	4-0-0	3
5	ME60106	Manufacture of Plastic Products	3-0-0	4
6	ME60118	Computer Graphics and Visualization	4-0-0	4
7	ME60130	Manufacturing Information System	4-0-0	4
8	ME60134	Numerical Modelling of Manufacturing Processes	4-0-0	4
9	ME60304	Product Development and CIM	4-0-0	4
10	ME60306	Precision & Micro Manufacturing	3-0-0	3
11	PH60050	Thin Film Technology	3-1-0	4
12	ME60044	Industrial Automation & Control	3-1-0	4
13	IM60024	Advanced Production Planning & Inventory Control	3-1-0	4
14		HSS / IEM Elective as Elective - VII		

N.B.

- ME60114 (Surface Engineered Materials Technology) and PH60050 (Thin Film Technology) cannot be taken simultaneously
- ME60034 (Manufacturing Resource Planning) and IM60024 (Advanced Production Planning & Inventory Control) cannot be taken simultaneously

**DUAL DEGREE CURRICULUM
FOR
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AND
M.TECH IN THERMAL SCIENCE & ENGINEERING**

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7th Semester

Sl. No.	Depth/ Breadth	Subject No.	Subjects	L-T-P	Credit
1	D	ME40603	Applied Thermo-Fluids - II	3-1-0	4
2	D	ME60201	Advanced Fluid Mechanics	3-1-0	4
3	D		Elective - I	3-0-0	3
4	D	ME39601	Thermo-Fluids Laboratory - II	0-0-3	2
5	B		Breadth - V Prof / Mgmt	3-0-0	3
6	D	ME47601	Project (P - 1)	0-0-6	4
7	D	ME48601	Industrial Training	0-0-0	2
Total				12-2-9	22

8th Semester

Sl. No.	Depth/ Breadth	Subject No.	Subjects	L-T-P	Credit
1	D	ME60002	Convective Heat & Mass Transfer	3-1-0	4
2	D		Elective - II	3-0-0	3
3	D		Elective - III	3-0-0	3
4	B		Breadth - VI Prof	3-0-0	3
5	D	ME47602	Project (P - II)	0-0-9	6
6	D	ME48602	Comprehensive Viva-voce	0-0-0	2
Total				12-1-9	21

9th Semester

Sl. No.	Depth/ Breadth	Subject No.	Subjects	L-T-P	Credit
1	D		Elective - IV	3-0-0	3
2	D		Elective - V	3-0-0	3
3	D		Elective - VI	3-0-0	3
4	D	ME69601	Experimental Methods in Thermal Engineering	0-0-3	2
5	B		Breadth - VII HSS	3-0-0	3
6	D	ME57201	Project (P - III)	0-0-0	10
Total				12-0-3	24

10th Semester

Sl. No.	Depth/ Breadth	Subject No.	Subjects	L-T-P	Credit
1	D		Elective - VII	3-0-0	3
2	D		Elective - VIII	3-0-0	3
3	D	ME57202	Project (P - IV)	0-0-0	15
4	D	ME58202	Comprehensive Viva-voce	0-0-0	2
Total				6-0-0	23

Credit Distribution:

Semester	1	2	3	4	5	6	7	8	9	10	Total
Depth	24	24	19	20	19	20	19	18	21	23	207
Breadth	00	00	03	03	03	03	03	03	03	00	021
Total Credits											228

Elective List

Elective - I (7th Semester)

Sl. No.	Subject No.	Subject Name	L-T-P	Credit
1	MF41601	Soft Computing	3-0-0	3
2	ME41601	Computer Graphics & Solids Modelling	3-0-0	3
3	ME41603	Vibration & Noise Control	3-0-0	3
4	ME41605	Simulation of Mechanical Systems	3-0-0	3
5	ME41607	Composite Materials	3-0-0	3
6	ME41613	Design Optimisation	3-0-0	3
7	ME40601	Systems and Control	3-1-0	4
8	ME41615	Tribology	3-0-0	3

Electives II & III (8th Semester) (Any two)

Sl. No.	Subject No.	Subject Name	L-T-P	Credit
1	ME41606	Finite Element Methods in Engineering	3-0-0	3
2	ME41608	Fatigue, Creep and Fracture	3-0-0	3
3	ME41610	Automobile Engineering	3-0-0	3
4	ME41612	Experimental Stress Analysis	3-0-0	3
5	ME41614	Modern Control Theory	3-0-0	3
6	ME41616	Micro-scale Fluid Flow & Heat Transfer	3-0-0	3
7	ME41618	Turbo-machinery	3-0-0	3
8	ME60206	Advanced Engineering Thermodynamics	3-0-0	3
9	ME60212	Turbulent Flows	3-0-0	3
10	ME60214	Energy Conservation & Waste Heat Recovery	3-0-0	3
11	MF30602	Robots and Computer-Controlled Machines	4-0-0	4
12	MF30604	Non-Traditional Manufacturing Processes	3-0-0	3
13	MF41606	Technology of Surface Coating	3-0-0	3
14	MF41608	Welding Technology	3-0-0	3
15	MF41612	Quantity Production Methods	3-0-0	3
16	MF41614	Machine Tool Engineering	3-0-0	3
17	MF41616	Laser Applications in Manufacturing	3-0-0	3
18	MF41618	Engineering Metrology	3-0-0	3
19	ME41620	Fluid Power Control		

Electives IV, V & VI (9th Semester) (Any three)

Sl. No.	Subject No.	Subject Name	L-T-P	Credit
1	ME60203	Conduction & Radiation Heat Transfer	3-0-0	3
2	ME60205	Computational Methods in Thermal Engineering	3-0-0	3
3	ME60207	Environmental Pollution & Abatement	3-0-0	3
4	ME60209	Nuclear Power Generation & Safety	3-0-0	3
5	ME60211	Thermodynamic Optimization, Energy Audit & Economy	3-0-0	3
6	ME60213	I.C. Engines	3-0-0	3
7	ME60217	Steam Engineering	3-0-0	3
8	ME60219	Atmospheric Flows	3-0-0	3
9	ME60221	Energy Planning & Management	3-0-0	3
10	ME60223	Non-Conventional Sources of Energy	3-0-0	3
11	ME60225	Clean Room technology/Indoor Environment	3-0-0	3
12	ME60227	Thermal Systems Design	3-0-0	3
13	ME60307	Refrigeration Systems	3-0-0	3

Electives - VII & VIII (10th Semester) (Any two)

Sl. No.	Subject No.	Subject Name	L-T-P	Credit
1	ME60204	Computational Fluid Dynamics	3-0-0	3
2	ME60208	Solar Energy Technology	3-0-0	3
3	ME60210	Theory of Combustion & Emission	3-0-0	3
4	ME60216	Compressible Flows	3-0-0	3
5	ME60218	Gas Turbines & Jet Propulsion	3-0-0	3
6	ME60220	Air-conditioning & Ventilation	3-0-0	3
7	ME60222	Hydel Power and Wind Energy	3-0-0	3
8	ME60224	Heat Exchanger Design	3-0-0	3
9	ME60226	Two-Phase Flows	3-0-0	3

**DUAL DEGREE CURRICULUM
FOR
B.TECH. (HONS.) IN MECHANICAL ENGINEERING
AND
M.TECH IN MECHANICAL SYSTEMS DESIGN**

Course curriculum upto sixth semester is common with regular B.Tech (Hons.) in Mechanical Engineering

7th Semester

Sl. No.	Depth/ Breadth	Subject No.	Subject Name	L-T-P	Credit
1	D	ME60023	Applied Elasticity & Plasticity	3-1-0	4
2	D	ME60071	Fatigue, Creep and Fracture	3-1-0	4
3	D		Elective - I	3-0-0	3
4	D		Elective - II	3-0-0	3
5	B		Breadth - V	3-0-0	3
6	D	ME47001	Project	0-0-6	4
7	D	ME48001	Industrial Training	0-0-0	2
Total				15-2-6	23

8th Semester

Sl. No.	Depth/ Breadth	Subject No.	Subject Name	L-T-P	Credit
1	D	ME60024	Tribology	3-0-0	3
2	D	ME60104	Composite Materials	3-1-0	4
3	D		Elective - III	3-0-0	3
4	B		Breadth - VI	3-0-0	3
5	D	ME47002	Project	0-0-9	6
6	D	ME48002	Comprehensive viva-voce	0-0-0	2
Total				12-1-9	21

9th Semester

Sl. No.	Depth/ Breadth	Subject No.	Subject Name	L-T-P	Credit
1	D		Elective - IV	3-1-0/3- 0-0	4/3
2	D		Elective - V	3-1-0/3- 0-0	4/3
3	D	ME69003	Engineering Software laboratory	0-0-3	2
4	D	ME69009	Machine Design & Analysis Laboratory	0-0-3	2
5	B		Breadth -VII (HSS)	3-0-0	3
6	D	ME57301	Project - III	0-0-15	10
Total				9-2/ 0-21	25/23

10th Semester

Sl. No.	Depth/ Breadth	Subject No.	Subject Name	L-T-P	Credit
1	D		Elective - VI	3-1-0/3-0-0	4/3
2	D		Elective - VII	3-1-0/3-0-0	4/3
3	D	ME57302	Project - IV	0-0-22	15
4	D	ME58302	Comprehensive viva-voce	0-0-0	2
Total				6-2-22	25/23

Credit Distribution:

Semester	1	2	3	4	5	6	7	8	9	10	Total
Depth	24	24	19	20	19	20	20	18	20	23	207
Breadth	00	00	03	03	03	03	03	03	03	00	021
Total Credits											228

LIST OF ELECTIVE SUBJECTS

Elective - I and II

Sl. No.	Subject No.	Subject Name	L-T-P	Credit
1	ME41605	Simulation of Mechanical Systems	3-0-0	3
2	ME41613	Design Optimization	3-0-0	3
3	ME41611	Mechanical Handling Systems & Equipment	3-0-0	3
4	ME41603	Vibration and Noise Control	3-0-0	3
5	ME41620	Fluid Power Control	3-0-0	3

Elective - III

Sl. No.	Subject No.	Subject Name	L-T-P	Credit
1	ME41606	Finite Element Methods in Engineering	3-0-0	3
2	ME41610	Automobile Engineering	3-0-0	3
3	ME41614	Modern Control Theory	3-0-0	3

Elective - IV and V

Sl. No.	Subject No.	Subject Name	L-T-P	Credit
1	ME60236	Introduction to Smart Structures	3-1-0	4
2	ME60075	Machinery Fault Diagnostics & Signal Processing	3-1-0	4
3	ME60041	Electro-Hydraulic Servo Systems in Material Handling	3-1-0	4
4	ME60091	Continuum Mechanics & Rheology	3-1-0	4
5	ME60063	Machine Vibration Analysis	3-1-0	4
6	ME60061	Automatic Control	3-1-0	4
7	ME60149	Biomechanics	3-1-0	4

Elective - VI and VII

Sl. No.	Subject No.	Subject Name	L-T-P	Credit
1	ME60072	Dynamics of Rotors	3-1-0	4
2	ME60076	Vibration and Shock Isolation	3-1-0	4
3	ME60090	Knowledge Based Systems in Mechanical Engineering	3-1-0	4
4	ME60102	Fluid Drives & Control	3-1-0	4
5	ME60022	Experimental Stress Analysis	3-1-0	4
6	ME60110	Mechanical Drives	3-1-0	4
7	ME60118	Computer Graphics and Visualization	3-1-0	4
8	ME60122	Friction & Wear in Machinery	3-1-0	4
9	ME60124	Analysis & Design of Pressure Vessels & Components	3-1-0	4
10	ME60052	Mechatronics	3-1-0	4

**DUAL DEGREE CURRICULUM
FOR
B.TECH (HONS) IN MECHANICAL ENGINEERING
AND
M.TECH IN MECHANICAL SYSTEMS, DYNAMICS AND CONTROL**

Course curriculum upto sixth semester is common with regular B.Tech (Hons.) in Mechanical Engineering

7th Semester

Sl. No.	Depth/ Breadth	Subject No.	Subject Name	L-T-P	Credit
1	D	ME 60061	Automatic Control	3-1-0	4
2	D	ME 60063	Machine Vibration Analysis	3-1-0	4
3	D		Elective - I	3-0-0/3-1-0	3/4
4	D		Elective - II	3-0-0/3-1-0	3/4
5	B		Breadth - V	3-0-0	3
6	D	ME47601	Project	0-0-6	4
7	D	ME48601	Industrial Training	0-0-0	2
Total				15-2-4-6	23/25

8th Semester

Sl. No.	Depth/ Breadth	Subject No.	Subject Name	L-T-P	Credit
1.	D	ME 60062	Vibration of Structures	3-1-0	4
2.	D	ME 69016	Microprocessor Lab	0-0-3	2
3.	D		Elective - III	3-0-0/3-1-0	3/4
4.	B		Breadth - VI	3-0-0	3
5.	D	ME47602	Project	0-0-9	6
6.	D	ME48602	Comprehensive viva-voce	0-0-0	2
Total				9-1/ 2-12	20/21

9th Semester

Sl. No.	Depth/ Breadth	Subject No.	Subject Name	L-T-P	Credit
1.	D	ME 69015	Vibration Laboratory	0-0-3	2
2.	B		Breadth - VII	3-0-0	3
3.	D		Elective - IV	3-0-0/3-1-0	3/4
4.	D		Elective - V	3-0-0/3-1-0	3/4
5.	D	ME57401	Project	0-0-15	10
Total				9-0/2-18	21/23

10th Semester

Sl. No.	Depth/ Breadth	Subject No.	Subject Name	L-T-P	Credit
1.	D	ME57402	Project	0-0-22	15
2.	D	ME58402	Comprehensive viva-voce	0-0-0	2
3.	D		Elective - VI	3-0-0/3-1-0	3/4
4.	D		Elective - VII	3-0-0/3-1-0	3/4
Total				6-0/ 2-22	23/25

Credit Distribution:

Semester	1	2	3	4	5	6	7	8	9	10	Total
Depth	24	24	19	20	19	20	20	17	18	23	204
Breadth	00	00	03	03	03	03	03	03	03	00	021
Total Credits											225

LIST OF ELECTIVE SUBJECTS

Elective - I

Sl. No.	Subject No.	Subject Name	L-T-P	Credit
1.	ME 60023	Applied Elasticity and Plasticity	3-1-0	4
2.	ME 60089	Modelling & Simulation of Dynamic Systems	3-0-0	3

Elective - II

Sl. No.	Subject No.	Subject Name	L-T-P	Credit
1	ME 60079	Engineering Design Optimization	3-1-0	4
2	ME 41611	Mechanical Handling Systems & Equipment	3-0-0	3
3	MF 41601	Soft Computing	3-0-0	3
4	ME 41603	Vibration and Noise Control	3-0-0	3

Elective - III

Sl. No.	Subject No.	Subject Name	L-T-P	Credit
1	ME 60104	Composite Materials	3-1-0	4
2	MF 41614	Machine Tool Engineering	3-0-0	3
3	ME 41610	Automobile Engineering	3-0-0	3
4	ME 60077	Finite Element Methods in Engineering*	3-1-0	4
5	ME 60903	Acoustics & Noise Control	3-1-0	4
6	ME 60064	Non-Linear Vibration**	3-1-0	4
7	ME 60024	Tribology	3-0-0	3
8	MF 30602	Robots and Computer Controlled Machines	4-0-0	4

Elective - IV

Sl. No.	Subject No.	Subject Name	L-T-P	Credit
1	ME 60075	Machinery Fault Diagnosis & Signal Processing	3-1-0	4
2	ME 60091	Continuum Mechanics and Rheology	3-1-0	4
3	ME60236	Introduction to Smart Structures	3-1-0	4

Elective - V

Sl. No.	Subject No.	Subject Name	L-T-P	Credit
1	ME 60071	Fatigue, Creep and Fracture	3-1-0	4
2	ME 60201	Advanced Fluid Mechanics	3-0-0	3
3	ME 60033	Intelligent Machines and Systems	3-1-0	4

Elective - VI

Sl. No.	Subject No.	Subject Name	L-T-P	Credit
1	ME 60072	Dynamics of Rotors	3-1-0	4
2	ME 60076	Vibration & Shock Isolation	3-1-0	4
3	ME 60126	Mechanisms & Robot Kinematics	3-1-0	4
4	ME60052	Mechatronics	3-1-0	4
5	ME 60110	Mechanical Drives	3-1-0	4

Elective - VII

Sl. No.	Subject No.	Subject Name	L-T-P	Credit
1	ME 60074	Random Vibration Theory	3-1-0	4
2	ME 60078	Stability of Elastic Systems	3-1-0	4
3	ME 60140	Modern Control Theory	3-0-0	3
4	ME60120	Chaos in Mechanical Systems	3-0-0	3
5	ME 60077	Finite Element Methods in Engineering*	3-1-0	4
6	ME 60064	Non-Linear Vibration**	3-1-0	4

* & ** not to be taken twice (offered in the 8th and 10th semester)