KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL

MINOR DOMAIN: COMPUTATIONAL ENGINEERING IN **M**ECHANICAL **E**NGINEERING (**MDME**)

MINOR DOMAIN: COMPUTATIONAL ENGINEERING CURRICULUM

S.No	Course Type	Course Code	Course Name (NPTEL Course Id)	Course Duration (weeks)	Credits
-	Core Courses	**Core Courses (any 3 courses)**			
1		U18MDME1001	Engineering Mechanics-112106286	12	6-10
2		U18MDME1002	Numerical Methods for Engineers-127106019	12	
3		U18MDME1003	Basics of Finite Element Analysis – I-112104193	8	
4		U18MDME1004	Finite Element Method: Variational Methods to Computer Programming-112103295	12	
-	Elective Courses	**Elective Courses (any 3 courses)**			
5		U18MDME1005	Foundations of Computational Materials Modelling- 112106289	12	6-10
6		U18MDME1006	Fundamentals of Compressible Flow-112103294	12	
7		U18MDME1007	High Performance Computing for Scientists and Engineers-112105293	8	
8		U18MDME1008	Fundamentals of Convective Heat Transfer- 112103297	12	
9		U18MDME1009	Computational Fluid Dynamics using Finite Volume Method-112106294	12	
10		U18MDME1010	Optimization from Fundamentals-112101298	12	
11		U18MDME1011	Evolutionary Computation For Single And Multi-Objective Optimization-112103301	8	
12		U18MDME1012	Tools in Scientific Computing-112105299	8	
13		U18MDME1013	Machine Learning for Core Engineering Disciplines-127108778	12	
-	Laboratory Courses	**Laboratory Courses (any 2 courses)**			
14		U18MDME1014	Computational Fluid Dynamics Laboratory		2
15		U18MDME1015	Heat Transfer Laboratory		
16		U18MDME1016	Finite Element Analysis Laboratory		
17	Mini-project (Optional)	U18MDME1017	Mini-project **(Optional)**		2
				Total Credits	18

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL

MINOR DOMAIN: COMPUTATIONAL THERMO FLUIDS IN **M**ECHANICAL **E**NGINEERING (**MDME**)

MINOR DOMAIN: COMPUTATIONAL THERMO FLUIDS CURRICULUM

S.No	Course Type	Course Code	Course Name (NPTEL Course Id)	Course Duration (weeks)	Credits
-	Core Courses	**Core Courses (any 3 courses)**			
1		U18MDME1001	Introduction to Fluid Mechanics-12105269	12	6-10
2		U18MDME1002	Fundamentals of Heat Transfer-112105771	12	
3		U18MDME1003	Numerical Methods- 111107105	8	
4		U18MDME1004	Computational Fluid Dynamics-103106119	12	
-	Elective Courses	**Elective Courses (any 3 courses)**			
5		U18MDME1005	Turbulent Combustion: Theory and Modelling- 112104272	12	6-10
6		U18MDME1006	Fundamentals of Compressible Flow-112103294	12	
7		U18MDME1007	Fundamentals of Convective Heat Transfer- 112103297	12	
8		U18MDME1008	Computational Continuum Mechanics-112103296	12	
9		U18MDME1009	Optimization from Fundamentals-112101298	12	
10		U18MDME1010	Evolutionary Computation For Single And Multi-Objective Optimization-112103301	8	
11		U18MDME1011	Fundamentals of Combustion- 12106299	12	
12		U18MDME1012	Interfacial Fluid Mechanics- 112106312	12	
13		U18MDME1013	Basics of Mechanical Engineering -3 -112104769	12	
14		U18MDME1014	Machine Learning for Core Engineering Disciplines-127108778	12	
-	Laboratory Courses	**Laboratory Courses (any 2 courses)**			
15		U18MDME1015	Computational Fluid Dynamics Laboratory		2
16		U18MDME1016	Heat Transfer Laboratory		
17		U18MDME1017	Fluid Mechanics Laboratory		
18	Mini-project (Optional)	U18MDME1018	Mini-project **(Optional)**		2
				Total Credits	18

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL

MINOR DOMAIN: ADVANCED MECHANICS IN **M**ECHANICAL **E**NGINEERING (**MDME**)

MINOR DOMAIN: ADVANCED MECHANICS CURRICULUM

S.No	Course Type	Course Code	Course Name (NPTEL Course Id)	Course Duration (weeks)	Credits
-	Core Courses	**Core Courses (any 3 courses)**			
1		U18MDME1001	Engineering Mechanics-112106286	12	6-10
2		U18MDME1002	Solid Mechanics-112102284	12	
3		U18MDME1003	Introduction to Mechanical Vibration-112107212	8	
4		U18MDME1004	Basics of Finite Element Analysis– I-112104193	8	
5		U18MDME1005	Basics of Materials Engineering- 112106293	12	
-	Elective Courses	**Elective Courses (any 3 courses)**			
6		U18MDME1006	Numerical Methods for Engineers-127106019	12	6-10
7		U18MDME1007	Foundations of Computational Materials Modelling- 112106289	12	
8		U18MDME1008	Dynamic Behaviour of Materials- 112103278	12	
9		U18MDME1009	Theory of Elasticity- 105105177	12	
10		U18MDME1010	Computational Continuum Mechanics-112103296	12	
11		U18MDME1011	Theory of Composite Shells- 112103298	8	
12		U18MDME1012	Finite Element Modeling of Welding Processes- 112103299	12	
13		U18MDME1013	Advanced Dynamics- 112105304	12	
14		U18MDME1014	Mechanics and Control of Robotic Manipulators- 112106304	8	
15		U18MDME1015	Engineering Fracture Mechanics- 112106065	12	
16		U18MDME1016	Experimental Stress Analysis-112106247	12	
17		U18MDME1017	Vibrations of Plates and Shells- 112108312	12	
18		U18MDME1018	Dynamics and Control of Mechanical Systems- 112108313	12	
19		U18MDME1019	Nonlinear Adaptive Control- 112101312	12	
20		U18MDME1020	Applied Elasticity- 112105770	12	
21		U18MDME1021	Machine Learning for Core Engineering Disciplines-127108778	12	
-	Laboratory Courses	**Laboratory Courses (any 2 courses)**			
22		U18MDME1022	Theory of Machines Laboratory		2
23		U18MDME1023	Modeling Laboratory		
24		U18MDME1024	Finite Element Analysis Laboratory		
25	Mini-project (Optional)	U18MDME1025	Mini-project **(Optional)**		2
				Total Credits	18

S.No	Course Type	Course Code	Course Name (NPTEL Course Id)	Course Duration (weeks)	Credits
-	Core Courses	**Core Courses (any 4 courses)**			
1		U18MDME1001	Thermodynamics-27106135	12	8-10
2		U18MDME1002	Fundamentals of combustion for propulsion-112106290	8	
3		U18MDME1003	Aircraft Propulsion-112103281	12	
4		U18MDME1004	Rocket Propulsion-101106082	12	
5		U18MDME1005	Applied Thermodynamics- 112103307	12	
6		U18MDME1006	Fluid Mechanics-105103192	12	
-	Elective Courses	**Elective Courses (any 2 courses)**			
7		U18MDME1007	Advanced Measurement Techniques in Fluid Mechanics and Heat Transfer-112108615	12	6-8
8		U18MDME1008	Engine system and performance-112103617	12	
9		U18MDME1009	Machine Learning for Core Engineering Disciplines-127108778	12	
-	Laboratory Courses	**Laboratory Courses (any 2 courses)**			
10		U18MDME1010	Heat Transfer Laboratory		2
11		U18MDME1011	Thermal Engineering Laboratory		
12		U18MDME1012	Fluid Mechanics Laboratory		
13	Mini-project (Optional)	U18MDME1013	Mini-project **(Optional)**		2
				Total Credits	18

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL

MINOR DOMAIN: ENERGY SYSTEMS IN MECHANICAL ENGINEERING (MDME)

MINOR DOMAIN: ENERGY SYSTEMS CURRICULUM

S.No	Course Type	Course Code	Course Name (NPTEL Course Id)	Course Duration (weeks)	Credits
-	Core Courses	**Core Courses (any 4 courses)**			
1		U18MDME1001	Thermodynamics-27106135	12	8-12
2		U18MDME1002	Applied Thermodynamics for Engineers-112103275	12	
3		U18MDME1003	Fluid Dynamics and Turbomachines-112106200	8	
4		U18MDME1004	Heat Transfer-103101137	12	
5		U18MDME1005	Power Plant Engineering- 112107291	8	
-	Elective Courses	**Elective Courses (any 2 courses)**			
6		U18MDME1006	Energy Conservation and Waste Heat Recovery-112105221	12	4-6
7		U18MDME1007	Waste to Energy Conversion-103107125	8	
8		U18MDME1008	Energy Economics and Policy-109106161	8	
9		U18MDME1009	Non-conventional energy Resources-121106014	12	
10		U18MDME1010	Aircraft Propulsion-112103281	12	
11		U18MDME1011	Steam Power Engineering-112103277	8	
12		U18MDME1012	Elements of Solar Energy Conversion-112104300	12	
13		U18MDME1013	Fundamentals of Convective Heat Transfer- 112103297	12	
14		U18MDME1014	Advanced Thermodynamics and Combustion-112103313	12	
15		U18MDME1015	Advanced Measurement Techniques in Fluid Mechanics and Heat Transfer-112108615	12	
16		U18MDME1016	Engineering Aspects of Biofuels and Biomass Conversion Technologies-103105680	12	
17		U18MDME1017	Basics of Mechanical Engineering– 3 - 112104769	12	
18		U18MDME1018	Machine Learning for Core Engineering Disciplines-127108778	12	
-	Laboratory Courses	**Laboratory Courses (any 2 courses)**			
19		U18MDME1019	Computational Fluid Dynamics Laboratory		2
20		U18MDME1020	Heat Transfer Laboratory		
21		U18MDME1021	Thermal Engineering Laboratory		
22	Mini-project (Optional)	U18MDME1022	Mini-project **(Optional)**		2
				Total Credits	18

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL

MINOR DOMAIN: MANUFACTURING PROCESSES AND TECHNOLOGY IN MECHANICAL ENGINEERING (MDME)

MINOR DOMAIN: MANUFACTURING PROCESSES AND TECHNOLOGY CURRICULUM

S.No	Course Type	Course Code	Course Name (NPTEL Course Id)	Course Duration (weeks)	Credits
-	Core Courses	**Core Courses (any 4 courses)**			
1		U18MDME1001	Manufacturing Process Technology I & II-112104195, 112104204	12	8-12
2		U18MDME1002	Manufacturing Systems Technology I & II-112104188, 112104189	12	
3		U18MDME1003	Mechanics of Machining- 112103248	8	
4		U18MDME1004	Automation in Manufacturing- 112103293	12	
-	Elective Courses	**Elective Courses (any 2 courses)**			
5		U18MDME1005	Introduction To Mechanical Micro Machining- 112105231	12	4-8
6		U18MDME1006	Machinery Fault Diagnosis And Signal Processing- 112105232	12	
7		U18MDME1007	Sustainability through Green Manufacturing Systems: An Applied Approach-	8	
8		U18MDME1008	Rapid Manufacturing- 112104265	12	
9		U18MDME1009	Theory and Practice of Non Destructive Testing- 113106070	8	
10		U18MDME1010	Operations Management- 112107238	12	
11		U18MDME1011	Mathematical Modeling of Manufacturing Processes- 112103273	12	
12		U18MDME1012	Design for Quality, Manufacturing and Assembly-	8	
13		U18MDME1013	Principles of Industrial Engineering-112107292	12	
14		U18MDME1014	Computer Integrated Manufacturing-112104289	12	
15		U18MDME1015	Plastic Working of Metallic Materials-112103279	12	
16		U18MDME1016	Engineering Drawing and Computer Graphics- 112105294	12	
17		U18MDME1017	Mechatronics- 112107298	8	
18		U18MDME1018	Finite Element Modeling of Welding Processes-112103299	12	
19		U18MDME1019	Wheeled Mobile Robots-112106298	8	
20		U18MDME1020	Oil Hydraulics and Pneumatics-112106300	12	
21		U18MDME1021	Introduction to Robotics- 112104298	12	
22		U18MDME1022	Welding Application Technology-112103305	8	

23		U18MDME1023	Fundamentals of Additive Manufacturing Technologies-	12	
24		U18MDME1024	Design of Mechatronic Systems- 112101304	12	
25		U18MDME1025	Laser Based Manufacturing- 112103312	8	
26		U18MDME1026	Metal Additive Manufacturing- 112104312	12	
27		U18MDME1027	Basics of Mechanical Engineering – 2- 112104616	12	
28		U18MDME1028	Fundamentals of thermo-mechanical & fatigue analysis of welded structure- 112103618	12	
29		U18MDME1029	Manufacturing of turbines (gas, steam, hydro and wind)- 112106622	8	
30		U18MDME1030	Advances in Additive Manufacturing of Materials: Current status and emerging opportunities-113108632	12	
31		U18MDME1031	Industrial Engineering and Operations Research-112103774	12	
32		U18MDME1032	Machine Learning for Core Engineering Disciplines-127108778	12	
-	**Laboratory Courses**	**Laboratory Courses (any 2 courses)**			
33		U18MDME1033	Simulation Laboratory		**2**
34		U18MDME1034	Advanced Manufacturing Laboratory		
35		U18MDME1035	Additive Manufacturing Laboratory		
36	**Mini-project (Optional)**	U18MDME1036	Mini-project **(Optional)**		**2**
				Total Credits	**18**

S.No	Course Type	Course Code	Course Name (NPTEL Course Id)	Course Duration (weeks)	Credits
-	Core Courses	**Core Courses (any 4 courses)**			
1		U18MDME1001	Manufacturing Guidelines For Product Design-112107258	8	8-10
2		U18MDME1002	Product Design and Manufacturing-112104230	12	
3		U18MDME1003	Design Practice-112104228	8	
4		U18MDME1004	Basics of Materials Engineering- 112106293	12	
5		U18MDME1005	Production Technology: Theory and Practice- 112104304	12	
-	Elective Courses	**Elective Courses (any 3 courses)**			
6		U18MDME1006	Design Practice–II-112104252	8	6-8
7		U18MDME1007	System Design for Sustainability- 107103081	12	
8		U18MDME1008	Digital Human Modeling and Simulation for Virtual Ergonomics Evaluation-109103101	8	
9		U18MDME1009	Gear And Gear Unit Design: Theory and Practice- 12105234	8	
10		U18MDME1010	Design for Quality, Manufacturing and Assembly- 112106249	8	
11		U18MDME1011	Robotics: Basics and Selected Advanced Concepts-112108298	12	
12		U18MDME1012	Turbulent Combustion: Theory and Modelling- 112104272	12	
13		U18MDME1013	Engineering Drawing and Computer Graphics- 112105294	12	
14		U18MDME1014	Mechatronics- 112107298	8	
15		U18MDME1015	Wheeled Mobile Robots- 112106298	8	
16		U18MDME1016	Welding Application Technology-112103305	8	
17		U18MDME1017	Fundamentals of Additive Manufacturing Technologies-112103306	12	
18		U18MDME1018	Design of Mechatronic Systems- 112101304	12	
19		U18MDME1019	Design of Farm Machinery- 126105547	12	
20		U18MDME1020	Design of Precision Machines- 112102773	12	
21		U18MDME1021	Machine Learning for Core Engineering Disciplines-127108778	12	
-	Laboratory Courses	**Laboratory Courses (any 2 courses)**			
22		U18MDME1022	Simulation Laboratory		2
23		U18MDME1023	Advanced Manufacturing Laboratory		
24		U18MDME1024	Additive Manufacturing Laboratory		
25	Mini-project (Optional)	U18MDME1025	Mini-project **(Optional)**		2
				Total Credits	18

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL

MINOR DOMAIN: ADVANCED DYNAMICS AND VIBRATION IN **M**ECHANICAL **E**NGINEERING (**MDME**)

MINOR DOMAIN: ADVANCED DYNAMICS AND VIBRATION CURRICULUM

S.No	Course Type	Course Code	Course Name (NPTEL Course Id)	Course Duration (weeks)	Credits
-	Core Courses	**Core Courses (any 3 courses)**			
1		U18MDME1001	Engineering Mechanics-112106286	12	6-10
2		U18MDME1002	Introduction to Mechanical Vibration-112107212	8	
3		U18MDME1003	Advanced Dynamics-112105304	12	
4		U18MDME1004	Nonlinear Vibration-112103300	12	
-	Elective Courses	**Elective Courses (any 3 courses)**			
5		U18MDME1005	Robotics and Control : Theory and Practice-112107289	8	6-10
6		U18MDME1006	Fundamentals of Acoustics-112104212	12	
7		U18MDME1007	Acoustic Materials And Metamaterials-112107290	8	
8		U18MDME1008	Computational Continuum Mechanics-112103296	12	
9		U18MDME1009	Muffler Acoustics-Application to Automotive Exhaust Noise Control-112104299	12	
10		U18MDME1010	Mechanics and Control of Robotic Manipulators-112106304	8	
11		U18MDME1011	Vibrations of Plates and Shells- 112108312	12	
12		U18MDME1012	Dynamics and Control of Mechanical Systems- 112108313	12	
13		U18MDME1013	Nonlinear Adaptive Control- 112101312	12	
14		U18MDME1014	Noise Control in Mechanical Systems-112107619	12	
15		U18MDME1015	Machine Learning for Core Engineering Disciplines-127108778	12	
-	Laboratory Courses	**Laboratory Courses (any 2 courses)**			
16		U18MDME1016	Theory of Machines Laboratory		2
17		U18MDME1017	Modeling Laboratory		
18		U18MDME1018	Finite Element Analysis Laboratory		
19	Mini-project (Optional)	U18MDME1019	Mini-project **(Optional)**		2
				Total Credits	18

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL

MINOR DOMAIN: COMPUTATIONAL MECHANICS IN **M**ECHANICAL **E**NGINEERING (**MDME**)

MINOR DOMAIN: COMPUTATIONAL MECHANICS CURRICULUM

S.No	Course Type	Course Code	Course Name (NPTEL Course Id)	Course Duration (weeks)	Credits
-	Core Courses	**Core Courses (any 3 courses)**			
1		U18MDME1001	Engineering Mechanics-112106286	12	6-10
2		U18MDME1002	Numerical Methods for Engineers-127106019	12	
3		U18MDME1003	Finite Element Method-112105308	12	
4		U18MDME1004	Finite Element Method: Variational Methods to Computer Programming-112103295	12	
-	Elective Courses	**Elective Courses (any 3 courses)**			
5		U18MDME1005	Foundations of Computational Materials Modelling- 112106289	12	6-10
6		U18MDME1006	Optimization from fundamentals-112101298	12	
7		U18MDME1007	Computational Continuum Mechanics-112103296	12	
8		U18MDME1008	Finite Element Modeling of Welding Processes- 112103299	12	
9		U18MDME1009	Evolutionary Computation For Single And Multi-Objective Optimization-112103301	8	
10		U18MDME1010	Tools in Scientific Computing- 112105299	8	
11		U18MDME1011	Advanced Dynamics- 112105304	12	
12		U18MDME1012	Dynamics and Control of Mechanical Systems- 112108313	12	
13		U18MDME1013	Nonlinear Adaptive Control- 112101312	12	
14		U18MDME1014	Machine Learning for Core Engineering Disciplines-127108778	12	
-	Laboratory Courses	**Laboratory Courses (any 2 courses)**			
15		U18MDME1015	Theory of Machines Laboratory		2
16		U18MDME1016	Modeling Laboratory		
17		U18MDME1017	Finite Element Analysis Laboratory		
18	Mini-project (Optional)	U18MDME1018	Mini-project **(Optional)**		2
				Total Credits	18

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL

MINOR DOMAIN: ROBOTICS IN MECHANICAL ENGINEERING (MDME)
MINOR DOMAIN: ROBOTICS CURRICULUM

S.No	Course Type	Course Code	Course Name (NPTEL Course Id)	Course Duration (weeks)	Credits
-	Core Courses	**Core Courses (any 2 courses)**			
1		U18MDME1001	Robotics- 112105249	12	4-6
2		U18MDME1002	Wheeled Mobile Robots-112106298	8	
-	Elective Courses	**Elective Courses (any 5 courses)**			
3		U18MDME1003	Sensors and Actuators-108108147	12	10-12
4		U18MDME1004	Microprocessors and Microcontrollers-108105102	12	
5		U18MDME1005	Digital Image Processing- 117105135	12	
6		U18MDME1006	Fundamental of Power Electronics-108101126	12	
7		U18MDME1007	Embedded Systems Design- 106105159	12	
8		U18MDME1008	Industrial Automation and Control-108105088	12	
9		U18MDME1009	Kinematics of Mechanisms and Machines-112105268	8	
10		U18MDME1010	Modelling And Simulation of Dynamic Systems-112107214	8	
11		U18MDME1011	Design of Mechatronic Systems-112101304	12	
12		U18MDME1012	Fundamentals of Artificial Intelligence-112103280	12	
13		U18MDME1013	Introduction to Machine Learning-106106139	12	
14		U18MDME1014	Reinforcement Learning- 106106143	12	
15		U18MDME1015	Deep Learning- 106105215	12	
16		U18MDME1016	Robot Motion Planning-112104308	8	
17		U18MDME1017	Collaborative Robots (COBOTS): Theory and Practice-112105621	8	
18		U18MDME1018	Microrobotics-112106772	12	
19		U18MDME1019	Machine Learning for Core Engineering Disciplines-127108778	12	
-	Laboratory Courses	**Laboratory Courses (any 2 courses)**			
20		U18MDME1020	Theory of Machines Laboratory		2
21		U18MDME1021	Modeling Laboratory		
22		U18MDME1022	MATLAB		
23	Mini-project (Optional)	U18MDME1023	Mini-project **(Optional)**		2
				Total Credits	18