M.Tech. Specialization: Materials, Manufacturing and Modelling

DETAILED PROGRAMME 2023-24

First Semester (Autumn)					Second Semester (Spring)				
Courses	**L**	**T**	**P**	**C**	Courses	**L**	**T**	**P**	**C**
MM 621	3	0	0	6	Electives I (MM)	3	0	0	6
MM 732 + MM 733	3	0	0	6	Electives I (ME)	3	0	0	6
ME 785 OR 787[#]	3	1	0	4	Electives III (MM/ME/SI)	3	0	0	6
ME 786 OR 788[#]	3	1	0	4	Electives IV (MM/ME/SI)	3	0	0	6
ME 663 and / or ME601*	3	0	0	6	Electives V (Inst. Elec.)	3	0	0	6
Restricted Elective	3	0	0	6	MMM 694 Seminar	0	0	4	4
MM 611 Lab Course	0	0.5	3	4					
ME899 Communication Skills course	1	2	0	P/NP					
		Total Credits		36	Total Credits				34

	Core Courses 1. MM621: Advanced Physical and Mechanical Metallurgy 2 MM 732 + MM 733 3. ME649: Advanced Manufacturing Processes I (Machining + Forming) 4. ME785: Machining Processes, 5. ME787: Deformation Processes 6. ME786: Welding Processes, 7. ME788: Liquid Material Processing 8. ME663: Advanced Heat Transfer 9. ME601: Stress Analysis ME 899 Communication Skills will be offered to MMM students in Autumn Semester.	**Suggested Elective Courses (more course than this list are available to the student)** 1. MM622: Advanced Concepts in Iron Making 2. MM624: Advanced Concepts in Steel Making 3. MM626: Thermomechanical Processing and Forming of steel 4. MM655: Modelling and Analysis 5. MM658: Fracture Mechanics and Failure Analysis 6. MM680: Welding Science and Technology 7. MM670: Powders and Sintered Products 8. MM632: Surface Engineering 9. MM677: Diffussion and Kinetics 10. MM684: X- Ray Diffraction and Electron Microscopy		

	Laboratory Course 1. MM 611: Processing and Characterization of Steel \# half semester courses * Any one of the ME663/601 with the restriction **Restricted Elective (new)** ME673: Mathematical Methods in Engineering ME773: Reliability Modelling and Analysis for Engineering Systems ME781: Engineering Data Mining and Applications	11. ME794: Statistical Design of Experiments 12. SI530: Statistical Quality Control 13. ME601 Stress Analysis 14. ME662: Convective Heat Transfer & Mass Transfer 15. ME680: Two Phase Flow and Heat Transfer 16. ME 415. Computational Fluid Dynamics & Heat Transfer 17. ME602: Fatigue, Fracture and Failure Analysis 18. ME616: Fracture Mechanics 19. ME664: Advanced Finite and Boundary Element Methods 20. ME756: Numerical Modeling of Manufacturing Processes 21. ME714: Computer Integrated Manufacturing 22. ME730: Ultra-Precision Machining 23. ME617: Rapid Product Development 24. ME735: Computer Graphics & Product Modeling 25. ME613: Finite Element and Boundary Element Methods 26. ME662: Convective Heat Transfer & Mass Transfer 27. ME401: Microprocessors and Automatic Control 28. MA 540 Numerical methods for PDE 29. ME 761 Advanced Stereology and Microstructural Analysis 30. ME 6110 Nanomanufacturing Processes 31. ME 769 Combustion in Automobile and Gas Turbine Engines 32. ME 768 Introduction to Microsystems Packaging 33. ME 778 Moving Boundary Problems in Solidification 34. ME 6106 Computational Structural Dynamics 35. ME 751 Mechanics of Deformable Bodies 36. CE 620 Finite Element Methods

		37. EE 769 Introduction to Machine Learning
		38. ME 681 Thermal Environmental Engg
		39. ME 712 Computer Numerical Control and Programming
		40. ME 785 Machining Process
		41. ME 786 Welding Process
		42. MM 749 Statistics and Probability for Materials Engineers
		43. MM 656 Simulation and Optimization
		44. ME645 MEMS
		45. ME768 Introduction to Microsystems Packaging
		This is not the complete list of electives.

Third Semester (Autumn)					Fourth Semester (Spring)				
Courses	L	T	P	C	Courses	L	T	P	C
MMM 697	Project Stage - I			50	MMM 698	Project Stage - II			40
Total Credits				50	Total Credits				40

Note: The symbols ZZ are placeholders and would be replaced by appropriate department labels subsequently.

Features: 1. All core courses + 1 Restricted elective in the first semester.

2. Second semester – 4 electives from the three departments (minimum 1 from each list) seminar and 1 Institute elective (from the list of approved Institute electives).

The minimum credits for the proposed programme now works out to 160 depending on the restricted elective chosen by the student in the first semester.