Advanced Manufacturing Processes

Swayam Prabha Course Code: M45

PROFESSOR'S NAME	Prof. A. K. Sharma
DEPARTMENT	Department of Mechanical Engineering
INSTITUTE	Indian Institute Of Technology Roorkee
COURSE OUTLINE	The course covers the details of the advanced machining theory and practices, advanced machining processes, advanced metal forming processes, advanced welding processes and advanced foundry processes.

COURSE DETAILS

S. No	Module ID/ Lecture ID	Lecture Title/Topic
1.	Module1_L1	Manufacturing and Manufacturing Systems
2.	Module 1_L2	Manufacturing Trends and Challenges
3.	Module 1_L3	Manufacturing Aspects, Selection and Classification
4.	Module 1_L4	Description and Taxonomy of the Mfg. Processes
5.	Module 2_L5	Metal Casting basics, Gating and Risering Design
6.	Module 2_L6	Evaporative Pattern Casting Process (EPC)
7.	Module 2_L7	Continuous, Permanent Mold, Centrifugal and Pressure Die Casting
8.	Module 2_L8	Hybrid EPC Processes and Vacuum EPC Process
9.	Module 2_L9	Set-up of VEPC and Investment Casting Processes
10.	Module 2_L10	Ceramic Shell Investment Casting Process
11.	Module 2_L11	Shell Molding Process

12.	**Module 3_L12**	Abrasive Flow Machining
13.	**Module 3_L13**	Mechanism of Material Removal in AFM and Variant Processes in AFM
14.	**Module 3_L14**	Abrasive Jet Machining (AJM)
15.	**Module 3_L15**	Water Jet and Abrasive Water Jet Machining
16.	**Module 3_L16**	Ultrasonic Machining Process (USM)
17.	**Module 3_L17**	Mechanism, Processes Variants and Applications of USM
18.	**Module 3_L18**	Micro USM and Advances in USM
19.	**Module 3_L19**	Micro USM and Advances in USM - I
20.	**Module 3_L20**	Die-Sinker EDM and Wire Cut Electric Discharge Machining (WEDM)
21.	**Module 3_L21**	Variant Processes in EDM
22.	**Module 3_L22**	Electro Chemical Discharge Machining (ECDM)
23.	**Module 3_L23**	Laser Beam Machining (LBM)
24.	**Module 3_L24**	Equipment and Process Parameters in LBM
25.	**Module 3_L25**	Electrochemical Machining (ECM)
26.	**Module 3_L26**	ECM Kinematics and Tool Design
27.	**Module 3_L27**	The Subsystems in ECM, Advantages and Applications
28.	**Module 3_L28**	Variant Processes in ECM: ECG, ECH, ECDe and STEM
29.	**Module 3_L29**	Electron Beam, Plasma Beam and Ion Beam Machining
30.	**Module 4_L30**	Submerged Arc Welding (SAW)
31.	**Module 4_L31**	Resistance Welding Process
32.	**Module 4_L32**	Solid State Welding processes
33.	**Module 4_L33**	Friction Welding process
34.	**Module 4_L34**	Electron Beam and Plasma Welding Processes
35.	**Module 4_L35**	Laser Beam welding and Diffusion Welding Process
36.	**Module 5_L36**	High Energy Rate Forming Processes

37.	**Module 5_L37**	Rapid Prototyping Technology (RPT)
38.	**Module 5_L38**	Rapid Manufacturing, Applications and Advancements
39.	**Module 5_L39**	Microwave Processing of Materials
40.	**Module 5_L40**	Applications and New Trends in Microwave Material Processing

List of reference material/ books:

"Materials and Processes in Manufacturing" (8th Edition), E.P. DeGarmo, J. T Black, R.A.Kohser,Prentice Hall of India, New Delhi (ISBN 0-02-978760).

"Manufacturing Science" A. Ghosh, and A.K. Mallik, Affiliated East-West Press Pvt. Ltd. New Delhi.

"Nontraditional Manufacturing Processes", G.F.Benedict, Marcel Dekker, Inc. New York (ISBN 0-8247-7352-7).

Name and contact details of two referees for the course: