Course Type	CourseCode	Nameof the Course	L	T	P	Credits
DC	NMEC536	**Unconventional Manufacturing Processes**	3	1	0	4

CourseObjective
To provide a detailed understanding of advanced manufacturing processes. The prospect of future research will also be discussed in the course, which will encourage the PG students to carry out research in the advanced area.
LearningOutcomes
Upon successful completion of this course, students will: • Broad understanding of machining using different energy sources. • Students will be able to think about the possibility of combining different processes to develop a more efficient machining process • It will help the students to select the best process among various alternatives.

Unit No.	Topicsto be Covered	Lecture Hours +Tutorial Hours	LearningOutcome
1	Introduction and classification, Theory of machining by Abrasive Jet, Abrasive water Jet, Abrasive flow; Ultrasonic machining, numerical.	9 + 1	Understanding of mechanical-based unconventional processes (UMP). It will develop the ability to select the process for a particular application.
2	Electrochemical Machining- basic principles, equipment, process characteristics and applications. Electrochemical-Assisted Processes: Electrochemical Grinding, Electrochemical Superfinishing, Chemical Machining – principles and applications. Numerical.	8 + 4	Understanding of electrical and chemical-based unconventional processes (UMP).
3	Thermal energy methods of material processing (machining/welding/heat treatment) include laser, electron beam, plasma arc, and ion beam. Electro-discharge machining process - principles, equipment, process characteristics and applications.	8 + 4	Understanding of thermal-based unconventional processes (UMP). The students will learn the importance of high-pulse energy sources.
4	Hybrid Machining Processes: Electro-erosion Dissolution Machining, Abrasive Electro-discharge Grinding, Abrasive Electro-discharge Machining, EDM with Ultrasonic Assistance, Electrochemical Discharge Grinding, Ultrasonic-Assisted Electrochemical Machining, etc	8 + 4	The students will learn the principle of hybrid processes and their applications.
5	Unconventional metal forming processes: principle, working and applications, High Energy Rate Forming and Electroforming, Physical Vapour and Chemical Vapour Deposition and Plasma Spraying.	9 + 1	The students will understand the use of controlled explosive and spark energy in the deformation process. The students will also learn about coating techniques.
	TOTAL	**42L+ 14T**	

Text Books:

1. Fundamentals of Machining Processes (Conventional and Nonconventional Processes), Hassan Abdel-Gawad El-Hofy, CRC press
2. Unconventional Machining, P K Mishra

Reference Books:

1. Non-traditional manufacturing processes , Gary F. Benedict, CRC press
2. Fundamentals of modern manufacturing processes, M. P. Groover.