IV Year B.Tech. Mechanical Engg. II-Semester	L	T	P	To	C
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ME422 UNCONVENTIONAL MANUFACTURING PROCESSES

Course Description & Objectives:

Advanced technology demands new materials with high strength and hardness for the sophisticated products with long life and reliability. Existing conventional manufacturing techniques of traditional machining and forming are unable to cater these materials. Non contact type machining, modern machining techniques using laser beam, electron beam and water jet machining and its process parameters study is focused. New techniques to develop the product using Rapid prototyping is emphasized.

Course Outcomes:

1. *Water jet, abrasive jet machining techniques and Ultrasonic and plasma arc machining application to high end materials machining*
2. *Electrical and laser techniques like EDM, EBM and LBM and its process parameter study*
3. *Welding techniques and its characteristics using Plasma , Laser and electron beam methods*
4. *Advanced techniques of forming like explosive , electro hydraulic and magnetic forming and extrusion and rolling techniques using non contact type methods.*
5. *Product design and development advanced techniques of Rapid prototyping by various techniques exposure.*

UNIT - I Unconventional Machining Processes:

Introduction to unconventional machining Processes - classification - Abrasive jet machining, ultra sonic machining process. Plasma Arc Machining - Working principle, Equipment and Characteristics. Water Jet Machining, Abrasive Water Jet Machining.

UNIT - II EDM, ECM & LBM :

EDM Circuits, Electric discharge wire cutting, Electron Beam Machining. Electrochemical Machining - Process, Principle, Equipment, Mechanism and Applications. Introduction to laser, production of laser and laser Beam Machining.

UNIT - III Uniconventional Welding Processes:

Laser Beam Welding, Electron Beam Welding, Ultra-Sonic Welding,Plasma Arc Welding, Explosive Welding, Under Water Welding, Micro Welding Processes, Friction stir welding.

UNIT - IV Unconventional Forming Processes:

Explosive forming, Electro hydraulic forming, Electro magnetic forming, Laser Bending, Powder rolling, Spray rolling, Hydro forming, Hydrostatic and Powder extrusion, rotary and isothermal forming.

UNIT - V Rapid Prototyping:

Definition, types of prototypes, Classification of Rapid Prototyping systems. Stereolithography System, Selective laser sintering, Solid ground curing, Laminated object manufacturing.

TEXT BOOKS:

1. Benedict G.F., “Non Traditional Manufacturing Processes”, 1st ed., Marcel Dekker Publication, 1987.
2. V.K.Jain, “Advanced Machining Processes”, 2nd ed., Allied Publisher Bombay, 2010.
3. Amitabha Ghosh, “Rapid Prototyping; A brief Introduction”, 1st ed., East West Publishers, 2006.

REFERENCE BOOKS:

1. Hassan, E.L.-HOFY, ”Advanced Machining Process - Nontraditional & Hybrid Machining Process”, 1st ed., Tata Mc Graw Hill, 2005.
2. P.C.Pandey, “Modern Machining Processes”, 1st ed.,Tata Mc Graw Hill, New Delhi, 2009.
3. Ghosh and Malik, “Manufacturing Science”, 1st ed., EWP Private Ltd., 2008.