ADVANCED MANUFACTURING TECHNOLOGY

Course Code: 15ME2112

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Course Outcomes: At the end of the course, the student will be able to

CO1: Identify the mechanism of metal removal

CO2: Explain the applications of special machining and high speed machining processes

CO3: Identify features and applications of non-traditional machining

CO4: Explain various micro machining processes

CO5: Discuss material addition process and its importance.

UNIT I (10-Lectures)

Fundamentals of machining: Introduction - mechanics of cutting - cutting forces and power - temperatures in cutting, Tool life, wear and failure, surface finish, integrity and Machinability

UNIT II (10-Lectures)

Special machining: Deep hole drilling – gun drills – gun boring – trepanning – honing – lapping – super finishing – AFM – MAF – burnishing – broaching

High speed machining, application of HSM – tools for HSM - design of tools for HSM – high speed and high performance grinding – ultra precision machining

UNIT III (10-Lectures)

Non-traditional machining: Introduction – USM, WJM, AJM, LBM, EBM, plasma machining ,hybrid machining processes, electro-discharge machining (EDM) and electro-chemical machining (ECM) – mechanism of metal removal, characteristic features and applications

UNIT IV (10-Lectures)

Micro machining: various micro machining processes, application of

micro machining in semiconductor IC technology, micro actuator and micro sensors-CVD, PVD and Ion implantation.

UNIT V (10-Lectures)

Rapid prototyping processes: Fused deposition modelling, Stereo-lithography, Multi jet modelling, Selective laser sintering, Three-dimensional printing, Laminated object modelling, Solid ground curing, Laser engineered net shaping, virtual prototyping, rapid tooling.

TEXT BOOK:

1. S.Kalpakjian and S.R.Schmid, "*Manufacturing Engineering and Technology*", 4e, Pearson Education, 2001.

REFERENCES:

1. Boothroyd G. and Knight W.A., "*Fundamentals of Metal Machining and Machine Tools*", 1e, Marcel Dekker, 1989.
2. P.C.Pandey and Shaw, "*Modern Machining Process*", TMH, 1980.
3. Gunashekaran A, "*Agile Manufacturing*", Elsevier, 2001.