ADVANCED MANUFACTURING TECHNOLOGY

Subject Code: 13ME2113

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Course Outcomes :

At the end of the course, the student will be able to

CO1: Select appropriate cutting tool materials and cutting fluids in machining operations

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

CO3: Explain various non-traditional and micro machining processes

CO4: Identify the mechanism of metal removal

CO5: Identify features and applications of non-traditional machining

UNIT I

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

Cutting tool materials and cutting fluids: Introduction - High-Speed Steels - cast-cobalt alloys - carbides - coated tools - alumina-based ceramics - cubic boron nitride – silicon nitride based ceramics - diamond – whisker reinforced tool materials - reconditioning of tools - cutting fluids

UNIT III

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 IV

Non-traditional machining: Introduction – USM, WJM, AWJM, 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 V

Micro machining: various micro machining processes, application of micro machining in semi conductor IC technology, micro actuator and micro sensors – CVD, PVD and Ion implantation

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.