ADVANCED MANUFACTURING TECHNOLOGY

Subject Code: 13ME2113

L	P	C
4	0	3

Prerequisites: Manufacturing Technology

Course Educational Objectives:

To make the student understand

1. fundamentals of machining
2. various cutting tool materials and cutting fluids
3. concepts of special machining and high speed machining processes
4. principles of non-traditional and micro machining processes

Course Outcomes:

The student will be able to

1. suggest appropriate cutting tool materials and cutting fluids in machining operations
2. explain the applications of special machining and high speed machining processes
3. explain various non-traditional and micro machining processes

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.