

OPR751 BASICS IN MANUFACTURING AND METAL CUTTING

PROCESS

DETAILED SYLLABUS

OBJECTIVES:

- To impart the knowledge on basic concepts of various machining processes and machine tools.
- To impart the knowledge on basic concepts of mechanics in metal cutting process.
- To impart the mechanism involved in tool wear.

UNIT I LATHE

Introduction to production processes – types of production (job, batch and mass) – production processes – Lathe – Engine Lathe – block diagram – sketch – functions of each part – work holding devices in lathe various operations performed in Lathe – facing, turning, chamfering and knurling – relative positions of tool and job – Taper turning operations – Method of thread cutting – selection and arrangement of tool and work.

UNIT II SHAPER

Purpose of shaping – block diagram – functions of each part, work holding devices in shaper - Quick return mechanism in shaper – mechanical and hydraulic – cross feed mechanism – simple problems to calculate the velocity – speed, feed and depth of cut.

UNIT III DRILLING

Purpose of drilling – block diagram and function – types of drilling machines – portable drilling – bench type – sensitive drilling – radial arm drilling. Work holding devices – specification torque calculation – speed, feed and depth of cut.

UNIT IV MECHANICS OF METAL CUTTING

Cutting tool angles – tool signature – orthogonal & oblique cutting – cutting forces, Merchant circle diagram – force & velocity relation.

UNIT V TOOL MATERIAL, TOOL WEAR, TOOL LIFE AND MACHINABILITY

Requirement of tool materials – types of tool materials – Tool wear – Types, mechanism – Tool life - Machinability - types of chips – Types of cutting fluids.

OUTCOMES:

At the end of the course, the students will be able to:

1. Understand the constructional features and working principles of Lathe, work holding devices and also understands the concepts of mechanics of metal cutting.

SSLC, HSE, DIPLOMA, B.E/B.TECH, M.E/M.TECH, MBA, MCA

Notes

Syllabus

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2. Understand the constructional features and working principles of shaper, work holding devices and various machining operations performed.
3. Understand the constructional features and working principles of drilling machine and its types.
4. To apply the principles of metal cutting and mechanics in machining process.
5. To select tool materials based on requirement.

TEXT BOOKS

1. HMT Bangalore, "Production Technology", Tata McGraw Hill Publishing Company Limited, New Delhi, 2001.
2. Sharma. P.C., "A Text Book of Production Technology", S. Chand and Company, 2001.
3. Nagpal G.R., "Machine Tool Engineering", Khanna Publishers, 2002

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1. Hajra Choudhury C.J., "Elements of Workshop Technology", Vol.I and Vol.II, Asia Publishing House, 1992.
2. Jain. R.K., "Production Technology", Khanna Publishers, New Delhi, 2001.
3. Hajra Choudhary etal, "Elements of Production Technology –Vol.II", Asia Publishing House, 2000.
4. Kumar. B., "Manufacturing Technology", Khanna Publishers, New Delhi 2000.
5. Radhakrishnan. P., "Manufacturing Technology, Vol.I", Scitech Publications, 2002.