Course Number	Course Name	L-T-P-Credits	Year of Introduction
MP201	MACHINE TOOL TECHNOLOGY	4-0-0-4	2016

Prerequisite : Nil

Course Objective

To develop basic knowledge of working of different machine tools and the operations associated with them

Syllabus

Basic working principle, configuration, specification and classification of machine tools like lathe, shaping, planning and slotting machine, drilling machine, milling machine and broaching. Abrasive machining process, study of different types of work holding and tool holding devices. Estimation of machining time

Expected Outcome

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

i. Select a machine tool for a process
ii. Select alternatives for machining
iii. Decide upon the cost and economics of machining

References

1. Hajra Choudhary,Elements of workshop technology, Vol. II, Media Promoters & Publications
2. Chapman Workshop technology, Vol. II, III, ELBS
3. P.N. Rao,Manufacturing Technology-Volume II,Tata McGraw Hill
4. Lindberg, Processes and materials for manufacture, Prentice Hall.
5. ASME Tool Engineering Handbook
6. H.M.T, Production Technology, Tata McGraw Hill

Course Plan

Module	Contents	Hours	Sem. exam marks
I	Lathe - Different classifications - constructional features - driving mechanisms - tool and work holding devices - operations - speed, feed, depth of cut and machining time calculations – specifications - Capstan, turret and automatic lathes - constructional features - tool layout - tool and work holding devices – operations	12	15%
II	.Milling, Drilling and boring machines - Classification - constructional features - driving mechanisms - tool and work holding devices - types of tools - operations – specifications	8	15%
	First Internal Exam		

III	Shaper, planer, slotter and broaching machines - Different types and their field of application - constructional features - driving mechanisms - tools used - tool and work holding devices - operations – specifications	8	15%
IV	Abrasives and abrasive tools - types of abrasives and their properties - manufacture of grinding wheels - types of bond, grit, grade, structure - nomenclature of a grinding wheel - selection of a grinding wheel, dressing truing and balancing of grinding wheels - Grinding machines - classification of grinding machines - constructional features - tool and work holding devices - operations - cylindrical, surface, centre-less, thread, form, tool and cutter grinding – specifications -	10	15%
Second Internal Exam			
V	Gear generation methods - Gear shaping, gear hobbing, gear shaving, gear grinding, gear lapping - bevel gear generators	10	20%
VI	Surface finishing lapping, honing, super finishing -equipments - tolerance and finish, buffing - applications	8	20%
End Semester Exam			

Question Paper Pattern

Total marks: 100, Time: 3 hours
The question paper shall consist of three parts

Part A

4 questions uniformly covering modules I and II. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part B

4 questions uniformly covering modules III and IV. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C

6 questions uniformly covering modules V and VI. Each question carries 10 marks
Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions, if needed.

Course code	Course Name	L-T-P-Credits	Year of Introduction
MP202	MACHINING OF MATERIALS	3-1-0-4	2016

Prerequisite : MP201 Machine tool technology

Course Objective

- To familiarize the student with tool geometry and cutting forces
- To enable the students to grasp the fundamental principles of the tribology of metal cutting and machinability of work materials
- To impart knowledge on tool materials, tool wear and tool life

Syllabus

History and development of tool materials, Orthogonal and oblique cutting, selection of cutting tools, Mechanism of chip formation in machining, Cutting forces and their represent them in Merchant's circle diagram, Estimation of cutting forces, Relevance of cutting temperature, estimation and its control, Concept of machinability and its improvement, Failure mechanism of cutting tools and assessment of tool life, Cutting tool materials, economics of machining, advanced machining process.

Expected Outcome

The students will be able to

i. identify the tool parameters and convert them from one system to another.
ii. determine cutting forces and temperature during machining.
iii. assess tool life for given cutting conditions.
iv. select suitable tools for different applications and identify methods to improve machinability.

References

- Chattopadhyay A.B., Chattopadhyay A. K. and Paul S. Manufacturing Processes II, NPTEL Online Lecture Series (accessed on Nov. 2015)
- Childs T., Maekawa K., Obikawa T. and Yamane Y. Metal Machining Theory and Applications, Arnold, London (2000)
- Astakhov V.P., Metal Cutting Mechanics, CRC Press (1999).
- Boothroyd G., Fundamentals of Metal Machining and Machine Tools, CRC Press (1988)
- Stephenson D. A. and Agapiou J. S. Metal Cutting Theory and Practice, CRC Press (2005)
- MC Shaw, Metal Cutting Principles, Oxford and IBH Publications, New Delhi (1969)
- Cyril Donaldson, V.C.Goold, Tool design, Tata McGraw-Hill Education, 1976

Course Plan

Module	Contents	Hours	Sem. exam marks
I	History and development of tool materials - general requirements of tool materials-tool geometry-systems of cutting tool nomenclature- single point and multipoint tools-	8	15%

	Orthogonal and oblique cutting different machining processes and selection of tools. - Simple problems.		
II	Mechanism of chip formation: Mechanism of chip formation in ductile and brittle materials. Geometry and characteristics of chip forms: cutting ratio, shear angle and cutting strain Built up edge (BUE) formation and characteristics of BUE. Types of chips and conditions of their formation,	8	15%
First Internal Exam			
III	Machining forces and Merchants' Circle diagram: Cutting force components and their significance. Merchant's circle diagram and its advantageous use. Lee and Shaffer's Theory, Evaluation of cutting power consumption. Estimation of cutting forces: Development of equations for cutting forces under orthogonal and oblique turning. Direct and indirect methods of measurement of cutting forces. Dynamometers for measurement of cutting forces.	10	15%
IV	Cutting temperature: Sources and causes of heat generation and development of temperature in machining, Effects of the high cutting temperature on tool and job. Determination of cutting temperature, Role of variation of the various machining parameters on cutting temperature. Control of cutting temperature. Cutting fluids and their action, properties and heir selection of cutting fluids.	8	15%
Second Internal Exam			
V	Machinability: Concept and definition, Role of different machining parameters on machinability of work materials. Methods of improving machinability. machinability rating. Failure of cutting tools, Mechanisms and pattern (geometry) of cutting tool wear, chatter in machining, types of chatters, mechanism of chatter, Factors effecting chatter in machining. assessment of tool life, Taylor's tool life equation	10	20%
VI	Essential properties for cutting tool materials, Characteristics and applications of common cutting tool materials (HSS, carbides, ceramics and diamond). Introduction to advanced cutting tool materials and their application. Tool Coatings and their characteristics. Economics of machining – choice of parameters – metal removal rates. Advanced machining processes – introduction – operating principles – process parameters and application of USM, AJM, WJM, ECM, ECG, EDM, EBM, LBM, PAM and chemical milling.	12	20%
End Semester Exam			

Question Paper Pattern

Total marks: 100, Time: 3 hrs
The question paper should consist of three parts

Part A
4 questions uniformly covering modules I and II. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part B
4 questions uniformly covering modules III and IV. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C
6 questions uniformly covering modules V and VI. Each question carries 10 marks
Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions, if needed.

Course code	Course Name	L-T-P -Credits	Year of Introduction
MP204	Industrial Engineering	4-0-0-4	2016

Prerequisite: Nil

Course Objectives

1. To provide a basic knowledge on various industrial engineering principle and tools and need for analyzing engineering activities.
2. To familiarise the students with the design, improvement and installation of integrated systems of men, materials and equipments

Syllabus

Introduction to Industrial Engineering, productivity, work study, ergonomics

Expected outcome.

At the end of this course, students should be able to :

- Prepare the design, planning and development strategy of a new product
- Conduct the work study and determine the optimum time and space for a given work
- Apply human factors such as ergonomics in product design

References:

1. Donald R Herzog, Industrial Engineering Methods and Controls , Prentice Hall,
2. H.B. Maynard, Industrial Engineering Handbook, McGraw-Hill Publishers
3. W Grant Ireson, Eugene L Grant, Handbook of Industrial Engineering management - Prentice Hall
4. Marvin Mundel, Motion and Time Study , Prentice Hall India
5. Harold T Amrine, John A Ritchey et al., Manufacturing organization &management, Pearson Education
6. Benjamin W .Niebel, Motion and Time Study, Richard, D. Irwin Inc., Seventh Edition, 2002
7. Barnes, R.M. Motion and Time Study, John Wiley, 2002
8. Introduction to work study, ILO, 3rd edition, Oxford & IBH publishing,2001
9. Bridger R.S. Introduction to Ergonomics, McGraw Hill, 1995
10. Productivity Management- A systems approach, Prem Vrat, Narosa publishing, 1998

Course Plan

Module	Contents	Hours	Sem.ExamMarks
I	Introduction to Industrial Engineering – Definition – Functions- Historical Development of Industrial engineering – Applications of Industrial Engineering Productivity – Input output model - factors affecting Productivity – Productivity Ratios - Improving productivity – Indian Industry – Productivity of Indian industry	8	15%
II	Product design and development – Good Product Design – Product planning – Product development – Product life Cycle - Products and services	9	15%
	FIRST INTERNAL EXAMINATION		
III	Product Standardization, Simplification, Specialization and Inter changeability – Value Analysis - Value Engineering	9	15%
IV	Work Study – Scope and Objectives – Method Study Procedure – Process Charts – Flow diagram- Principles of motion economy – Micro motion study – Cycle graph- Chronocyclegraph SIMO	11	15%

	Chart		
SECOND INTERNAL EXAMINATION			
V	Work Measurement – Time study – Performance rating – standard time – allowances –Work sampling – PMTS – Standard data	10	20%
VI	Ergonomics: Human factors Engineering, human performance in physical work, anthropometry, design of workstation, design of displays and controls.	9	20%
END SEMESTER EXAM			

Question Paper Pattern

Total marks: 100, Time: 3 hours
The question paper shall consist of three parts

Part A

4 questions uniformly covering modules I and II. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part B

4 questions uniformly covering modules III and IV. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C

6 questions uniformly covering modules V and VI. Each question carries 10 marks
Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions, if needed.

Course code	Course Name	L-T-P-Credits	Year of Introduction
MP206	Foundry Technology	3-0-0-3	2016

Prerequisite : Nil

Course Objective

1. To introduce different techniques and applications of casting process.
2. To impart basic casting design principles.
3. To introduce different metal melting techniques.

Syllabus

Introduction to foundry, Pattern design and making, core making, sand moulding, casting design principles, casting techniques, Melting and pouring of metal.

Expected Outcome

At the end of the course, the students will have exposure to the different casting techniques, design principles, and application.

References

- Jain, P. L., "Principles of foundry technology", Tata McGraw-Hill Education.
- Beeley, Peter., "Foundry technology", Butterworth-Heinemann.
- Heine, Richard W., Carl R. Loper, and Philip C. Rosenthal, "Principles of metal casting", Tata McGraw-Hill Education.
- Agarwal, R. L., T. R. Banga, and Tahil Manghnani, "Foundry Engineering", Khanna Pub.
- Srinivasan, N.K., "Foundry Technology", 3rd Edition, Khanna Pub.
- Howard, E. D., ed. "Modern foundry practice", Philosophical Library.
- Taylor, Howard F., Merton C. Flemings, and John Wulff, "Foundry engineering", New York: Wiley.
- Ekey, David C., and Wesley P. Winter, "Introduction to foundry technology", McGraw-Hill.
- Kalpakjian, Serope, Steven R. Schmid, and Chi-Wah Kok, "Manufacturing processes for engineering materials", Pearson-Prentice Hall.

Course Plan

Module	Contents	Hours	Sem. exam marks
I	Introduction to foundry, Steps involved in casting, Advantages and limitations of casting process, Design and metallurgical advantages, applications of casting process.	5	15%
II	Pattern design and making, Pattern types and materials– factor effecting the choice of pattern materials, use of different types of patterns, pattern allowances, pattern materials, color coding of pattern.	7	15%
	First Internal Exam		
III	Molding: Sand moulding procedure, types of sand moulding,	7	15%

	ingredients and the properties of moulding sand, sand conditioning, sand preparation equipment. Specification and testing of moulding sands- grain size sieve analysis, green and dry strength, hardness test, permeability and moisture content. Core: types, core materials, core boxes, core sand		
IV	Casting Design: Metallurgical consideration, design consideration, economical consideration. Solidification and microstructure development of castings, mechanism of dentritic growth, solidification rate and time, Chvorinov's rule. Gating and risering: functions of gating and risering system, design of sprue, gating ratio, riser design.	8	15%
Second Internal Exam			
V	Casting techniques: types of casting processes and applications; permanent mould casting, pressure die casting, squeeze casting, centrifugal casting, continuous casting, electro-slag casting, shell moulding, CO_2 moulding, fettling, heat treatments for casting, casting defects and inspection of castings.	8	20%
VI	Modernisation and mechnisation of foundries: Need, area for mechanisation, material handling, pollution control in foundries, pollutants in a foundry, pPlant layout for foundries, steps in planning a foundry layout. Application of CAD/CAM in foundry. Casting of complicated shapes - automotive components.	7	20%
End Semester Exam			

Question Paper Pattern

Total marks: 100, Time: 3 hrs

The question paper should consist of three parts

Part A

4 questions uniformly covering modules I and II. Each question carries 10 marks

Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part B

4 questions uniformly covering modules III and IV. Each question carries 10 marks

Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C

6 questions uniformly covering modules V and VI. Each question carries 10 marks

Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions, if needed.

Course code	Course Name	L-T-P-Credits	Year of Introduction
MP208	Metal Joining Technology	3-0-0-3	2016

Prerequisite: Nil

Course Objective

- To introduce different types of welding techniques used in industry for metal joining
- To develop a skill of selecting a welding procedure for specific applications.
- To familiarize modern welding technique and machines.

Syllabus

Introduction to welding technology and welding science. Classifications of welding. Working principles of major solid state welding processes, arc welding processes and radiant energy welding processes. Introduction to modern welding techniques.

Expected Outcome

The students will be able to

i. identify the welding processes used in different types of welded joint.
ii. select a welding process for a joint
iii. recognize the techniques behind modern welding techniques/methods.

References

1. Parmar R. S., „Welding Engineering and Technology", 1st Edition, Khanna Publishers, 2008.
2. Jackson M.D . "Welding methods and metallurgy" Charles Griffin and Co. London 1967.
3. ASHE Welding Engineers Hand Book Vol I,II,II & IV
4. Amstead B.H., Phillip E Ostwald and Myron L.Begeman, "Manufacturing Processes" John Wiley & Co., New York.
5. Schwartz M M Metal joining manual, McGraw Hill Inc.

Course Plan

Module	Contents	Hours	Sem. exam marks
I	Introduction to different joining methods, Advantages of welding over other joining techniques, limitations of welding, Various types of weld joints & weld symbols , weldability, classification of welding processes as per AWS, Selection of a welding process , common welding defects and its causes, Residual stresses and distortions, cost of welding	6	15%
II	Arc welding- electrode polarity, shielding gases, use of pulsed arc welding process, mode of metal transfers, Formation of welding arc, arc stability. Carbon arc welding, Shielded metal arc welding, Submerged arc welding (Working Principles, processes parameters applications and limitations only)	8	15%

	TIG and MIG - Working Principles, equipments, selection of welding parameters, limitations and applications		
First Internal Exam			
III	Solid state welding-forge welding, friction welding, explosive welding, ultrasonic welding. Thermit welding, Resistance welding- Spot welding, Seam welding, Projection welding, Butt welding, Flash butt welding, Percussion welding (Working Principles, process parameters, applications and limitations only)	8	15%
IV	Gas welding, - equipments, gases used for welding, flame characteristics, temperature levels and limitations. Radiant Welding processes-Electron beam welding ,Laser beam welding, Plasma welding (Working Principles, process parameters, applications and limitations only)	7	15%
Second Internal Exam			
V	Adhesive bonding (General principles, equipments and different types of adhesives), diffusion welding (General principles, processes parameters and applications), Brazing and soldering, Thermal cutting, oxygen cutting and arc cutting. Metallurgy of an arc welded joint, weld quality,metal deposition rate. Pre-heating and post welding heat-treatment.	7	20%
VI	Modern welding Techniques- Hybrid welding, Double side arc welding, Orbital welding of tubes/pipes, Under water and space welding techniques, Welding safety measures, welding inspection, welding standards ,welding of dissimilar metals.	6	20%
End Semester Exam			

Question Paper Pattern

Total marks: 100, Time: 3 hours
The question paper shall consist of three parts

Part A

4 questions uniformly covering modules I and II. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part B

4 questions uniformly covering modules III and IV. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C

6 questions uniformly covering modules V and VI. Each question carries 10 marks
Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions, if needed.

Course code	Course Name	L-T-P-Credits	Year of Introduction
MP212	MACHINE TOOLS	3-1-0-4	2016

Prerequisite : Nil

Course Objective

To impart knowledge on basic concepts of various machining processes and machine tools

Syllabus

Basic working principle, configuration, specification and classification of machine tools like lathe, shaping, planing and slotting machine, drilling machine, milling machine and broaching. Abrasive machining process, study of different types of work holding and tool holding devices. Estimation of machining time

Expected Outcome

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

i. understand working of various Machine Tools
ii. understand speed and feed mechanisms of machine tools.
iii. estimate machining times for machining operations on machine tools

Text books

1. S. K. Hajra Chowdary , A. K. Hajra Chowdary and Nirjhar Roy, "*Elements of Workshop Technology"*, Vol. II, Media Promoters& publishers pvt. Ltd., Mumbay.
2. R.K. Jain, "*Production Technology*", Khanna Publishers, New Delhi.

References

1. HMT Bangalore, "*Production Technology*", Tata Mc-Graw Hill Education.
2. O. P. Khanna, "*Production Technology"*, Dhanpath Rai Publications, New Delhi.
3. Chapman W. A. J., *"Workshop Technology*", Vol: III, ELBS, London
4. Richard R. Kibbe, "*Machine Tool Practices"*, Pearson education
5. ASM Handbook, *"Machining"*

Course Plan

Module	Contents	Hours	Sem. exam marks
I	Elements of M/C Tools, M/C Tool drives, Classification of Machine Tools Lathe: Classification, Parts, Feed Mechanisms, Specifications of lathe, Lathe Operations, Accessories and Attachments, metal removal rate and machining time estimation	10	15%

II	Shaper and Planer: Types, Specifications, Shaper Vs Planer. Drilling and allied operations: Introduction, Types of Drilling machines and Drills, Drilling machine, Boring, Reaming and other operations, Types of Boring machines. Marching time estimation of drilling	8	15%
First Internal Exam			
III	Milling: Types of milling machines and milling cutters, Milling Operations, Machining time estimation, Dividing head and Indexing	10	15%
IV	Broaching: Principle of operation, Types and Specifications of broaching machine, broaching tools, operations, broaching fixtures.	8	15%
Second Internal Exam			
V	Grinding: Grinding machines, types - surface, cylindrical, internal and center-less grinder, Grinding wheel, Specification and selection of grinding wheels, Cutting speed and feeds, Dressing and Truing.	10	20%
VI	Finishing processes: Introduction, Types of finishing operations lapping, honing, super finishing and burnishing, operating parameters, accuracy, surface finish attainable by various processes. Gear Manufacturing: Gear shaping, gear hobbing, gear shaving, gear grinding, gear lapping	10	20%
End Semester Exam			

Question Paper Pattern

Total marks: 100, Time: 3 hrs

The question paper should consist of three parts

Part A

4 questions uniformly covering modules I and II. Each question carries 10 marks

Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part B

4 questions uniformly covering modules III and IV. Each question carries 10 marks

Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C

6 questions uniformly covering modules V and VI. Each question carries 10 marks

Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions, if needed.

Course Number	Course Name	L-T-P-Credits	Year of Introduction
MP231	Production Engineering Drawing	0-0-3-1	2016

Prerequisite : Nil

Course Objective

- To understand the principles and requirements of machine & production drawings.
- To enable preparation of individual and assembled parts of the machine as per the standards.

Syllabus

Introduction to production drawing, IS standards, representation of machine components as per IS code: SP-46, Limits, fits and tolerance, Standard Fasteners & Rivets
Introduction to CAD, part and assembly drawing in CAD, preparation of manufacturing Drawings.

Expected Outcome

Upon successful completion of the course the student will be able to prepare the detailed drawing of the assembled machine parts as per the standards individually.

References

1. Narayana K. L., Kannaiah P., VenkatataReaddy K., "Machine Drawing", 2ndEdition, New age international Publishers, Delhi, 2008, ISBN 81-224-1917-8.
2. Bhat N. D., Panchal , "Machine Drawing", Charotar Pub. House, 2000.ISBN: 9380358466.
3. Gill P. S., "A Text book of Machine Drawing", Revised Edition K. Kataria and Sons, New Delhi, 2008, ISBN: 81-85749-79-5.
4. PI Varghese & K C John

Course Plan

Module	Contents	Hours	Sem. exam marks
I	**Conventions in Machine Drawing** Dimensioning technique for machine components, Conventional representation of machine components as per IS code: SP-46 such as screw threads, springs, gears, bearing, tapped holes, knurling parts, splined shafts, tapers, chamfers, countersunk and counter bores, keys, & welded joints, Surface Roughness. Introduction, terminology, machining symbols with all parameters, roughness values (Ra) and roughness grade numbers, indicating surface roughness on drawing. **Limits Fits** and **Tolerances** Definitions, types of tolerance, Systems of dimensional tolerances and fits, types of fits, fit system. Geometrical tolerances – Nomenclature, tolerance frame, types of geometrical	6	40%

	tolerances & their symbols, indicating geometric tolerances on drawing, calculation of fundamental deviations and tolerances		
II	Using CAD: Introduction to part and assembly drawing. Exercise on preparation of assembly drawings of cotter joint, knuckle joint, flange joint and flexible coupling.	12	Internal
First Internal Exam			
III	**Joints:** **Threaded Fasteners** :Thread terminology, thread forms, thread designations, single and multi-start threads, right and left hand threads, types of screws , bolts and nuts, nut locking arrangements using pins, washers & screws. **Riveted joints**: types of riveted joints, symbolic representation **Foundation bolts**	12	60%
Second Internal Exam			
IV	Exercise on preparation of assembly drawings of revolving centers, machine vice, screw jack and lathe tailstock using CAD	12	Internal
End semester Exam (Internal)			

Evaluation scheme

The evaluation of the course shall be,

1. Internal evaluation for 100 marks, first internal exam is for 25 marks from module- I, second internal exam for 25 marks from Module III and 50 marks for the CAD practical exam.
2. The first and second internal quiz shall be of one hour duration. CAD practical exam shall be of 2 hours duration.

The end semester examination is of 2 hour duration for 50 marks and includes only the first and third modules.

Question Paper Pattern (End semester exam)

Total marks: 50 Time: 2 hrs
The question paper should consist of two parts

Part A

There should be 3 questions from module I
Each question carries 10 marks. Students have to answer any two questions out of 3

(2 x 10 marks =20 marks)

Part B

There should be 3 questions from module III
Each question carries 15 marks. Students have to answer any two questions out of 3

(2 x 15 marks =30 marks)

Course Number	Course Name	L-T-P-Credits	Year of Introduction
MP232	MACHINE TOOLS LAB- I	0-0-3-1	2016

Prerequisite : Nil

Course Objectives:

1. To provide fundamental knowledge of various metal cutting practices, fundamentals of machine tools and principles in material removal processes.
2. To apply the fundamentals and principles of metal cutting to practical applications using lathes, shaping machines and drilling machines etc.
3. To demonstrate the fundamentals of machining processes and machine tools.
4. To develop knowledge and importance of metal cutting parameters.
5. To develop fundamental knowledge on tool materials, cutting fluids and tool wear mechanisms.

List of Experiments

1. Study of different types of tools its angles and materials.
2. Exercises on turning and facing in lathe.
3. Step turning and thread cutting in lathe.
4. Taper turning operation in lathe.
5. Thread cutting operation in Lathe.
6. Knurling, drilling operations in lathe.
7. Study of the characteristic features of shaper machine.
8. Machining a block in shaper machine.
9. Drilling and tapping operations in drilling machine and study of twist-drill.

Expected Outcome:

Upon successful completion of this course, the students will be able to:

i. Select cutting tool materials and tool geometries for different metals.
ii. Apply cutting mechanics to metal machining based on cutting force and power consumption.
iii. Operate lathe, shaping machines, drilling machines, etc.

References

1. Technology of machine tools, S.F.Krar, A.R. Gill, Peter SMID, TMH (I)
2. Text Book of Production engineering by PC Sharma; S Chand and Company Ltd. Delhi.
3. Production Technology by H.M.T.