

**BHAVNAGAR UNIVERSITY**  
**B.E.SEMESTER –VI PRODUCTION ENGINEERING**  
**P- 601 QUALITY ENGINEERING & MANAGEMENT**

Teaching Scheme		Examination Scheme				
Theory Hrs.	Practical Hrs.	Marks	Theory Hrs.	Practical /Oral Marks	Term work Marks	Total Marks
<b>04</b>	<b>02</b>	<b>100</b>	<b>03</b>	<b>25</b>	<b>25</b>	<b>150</b>

**A. THEORY**

**1. Quality & Quality Control**

Definition and concept of quality, factors influencing quality, Quality characteristics and parameters, of fitness for use, Reliability concepts-calculations, need for inspection, Methods and stages of inspection, stores inspection, quality of design, manufacture and use, spiral of quality progress. Common patterns of variations- the normal, binominal and position distribution and their properties, quality control-it's introduction and benefits, manufacture process control- concepts and techniques, control charts for variables and attributes, quality planning in industries, total quality control-it's scope and application, esq. principles and their applications, quality cost concepts, economics of quality control effort, seven tools of quality control, cost reduction programmed.

**2. Designing for Quality**

Cost effectiveness concept, elements of reliability in design, factors such as availability, maintainability, human aspects, and cost and product performance.

**3. Acceptance Sampling**

Concept, sampling by attributes, single and double sampling plans, inspections by samples, acceptable quality level, lot tolerance percent defective, consumers and producer's risk, construction and use of operating characteristic curves, use of standard sampling tables and related ISI, design of experiments, sampling by variables, continues sampling plan, vendor ratings.

**4. Quality Audit and Motivation**

Purpose and need of quality audit, prerequisites and scope of QA, management related factors and worker related problems, management and operator controllable defects, quality rating, pride in product, industrial employee relations, education and training, incentive schemes, worker motivation, zero defect programme, quality circle concept- it's expectation and launching, organizing quality improving methods.

**5. Quality Information System**

Definition and scope, relation of QIS to MIS, planning computer based information system, output of information summary reports in an inspection information system, controlling quality- computer software- quality control manual.

**6. ISO-9000 Implementation and Registration**

ISO system of International standards, its Recent amendments, importance, benefits, procedure for implementation, certifying agencies, Introduction to QS-9000.

**B. TERM-WORK**

It shall consist of experiments industrial case studies and exercise problem solved by computer. Assessment of term work will be on continuous bases.

**C. PRACTICAL / ORAL**

It shall be based on term work prepared and on syllabus topics as above.

**D. REFERANCE BOOKS**

1. Quality planning and analysis by J.M. Juran & Frank M Gryna.
2. Quality and Reliability and integrated approach by Smith
3. Quality Management by I.S.T.E
4. Quality Circles by I.S.T.E
5. Statistical Methods and Inspection Techniques in Quality control. By I.S.T.E

**BHAVNAGAR UNIVERSITY**  
**B.E.SEMESTER –VI (PRODUCTION)**  
**P- 602 TOOL DESIGN**

Teaching Scheme		Examination Scheme				
Theory Hrs.	Practical Hrs.	Marks	Theory Hrs.	Practical/Oral Marks	Term work Marks	Total Marks
<b>04</b>	<b>02</b>	<b>100</b>	<b>03</b>	<b>25</b>	<b>25</b>	<b>150</b>

**A. THEORY**

1. **INTRODUCTION** Tool design practice, procedure of tool design, process planning and tool design.
2. **MECHANICS OF MACHINING** Place of machine in production, classification of material removal processes, orthogonal and oblique cutting, types of cutting tool mechanics, their characteristics and selection criteria, mechanics of metal cutting- effect of tool-geometry and other cutting parameters, types of cutting fluids, their characteristics and selection; types of chips formed, concept of specific cutting pressure, types of tool wear, factors causing wear, economical cutting speed, machinability of metals.
3. **DESIGN OF SINGLE POINT CUTTING TOOLS** Tool geometry for single point cutting tool, tool signature, Design of single point cutting tools such as solid tools, tipped tools, coated tipped tools, throw away type tools and diamond tools.
4. **DESIGN OF MULTIPOINT TOOLS** Design of milling cutters, gear milling cutters, hobs gear shaping tools, broaches, drills, reamers, taps & dies for thread cutting, boring tools, flat form tools, circular form tools. Standard tool holders & standard tooling and their design for turrets and automates.
5. **JIGS AND FIXTURE** Essential requirements of jigs & fixtures economics of jigs and fixtures, principles of location and clamping, location and clamping devices, types of drill bushes, types of jigs and types of fixtures like fixtures for milling, welding, heat treatment, grinding, assembly and inspection processes, standardization in jigs and fixtures, principle of work holders, common work holders for production like vises, chucks, arbors, mandrels & collets.

**B. TERM WORK**

Term work to be prepared by the candidate will be based on the topics of above syllabus. It will consist of following:

- (a) Practical work on area of metal cutting
- (b) Design & drawing in area of press tool and jigs and fixtures.

**C. PRACTICAL/ ORAL**

It shall be based on term work prepared and on syllabus topics as above.

**D. REFERENCE BOOKS**

1. Fundamentals of Tool Design By A.S.T.M.E\
2. Metal cutting principles By Milton C. Shaw.
3. Fundamental of Metal Machining and Machine Tools By Geoffrey Boothroyd.
4. Tool Design By Donaldson, Lecain, Goold.
5. Typical Examples and Problems in Metal cutting and Tool By N. Nefedov, K. Osipov.
6. Tool Design By Charles Bradford Cole.
7. An Introduction to Jig & Tool Design By M.H.A. Kempster.

**BHAVNAGAR UNIVERSITY**  
**B.E.SEMESTER –VI PRODUCTION ENGINEERING**  
**P- 603 MANUFACTURING PROCESSES-III**

Teaching Scheme		Examination Scheme				
Theory Hrs.	Practical Hrs.	Marks	Theory Hrs.	Practical/Oral Marks	Term work Marks	Total Marks
04	02	100	03	25	25	150

**A THEORY**

1. **SEMI-AUTOMATES & AUTOMATES** Semi Automatic Capstan and Turret Lathes, Their Working and Tooling, Tool Layouts on Semi Automates, Single Spindle and Multi-spindle Automates, Bar Type and Chucking Type Machines, Their Principle of working, Construction Details and Tool Setting, Evaluation of process time and Cam Design.
2. **THREAD MANUFACTURING**  
Thread Forming and Thread Cutting Methods such as Thread Chasing, Dye Threading, Thread Tapping, Thread Cutting on Lathe, Thread Rolling, Thread Milling and Thread Grinding, Their Constructional Details, Working Principles, Tooling and Effect of Different process parameters.
3. **GEAR MANUFACTURING**  
Selection of suitable gear materials, forming and generating methods of gear cutting, forming on Milling machine, shapers and broaching machines etc. & generation processes such as Rack Planning, Hobbing, Shaping, Bevel finishing processes such as grinding, lapping etc.
4. **UNCONVENTIONAL MACHINING PROCESSES**  
Necessity of Unconventional Machining processes, Working process variables, relative merits and field of applications of unconventional processes such as EDM, ECM, ECG, USM, EBM, LBM, PAM and WJM etc.
5. **ADVANCED CHIPLESS FORMING PROCESSES**  
Principle of working, advantages and limitations of High Velocity rate forming and High-energy rate forming techniques and their field of applications.
6. **METAL FINISHING & COATING PROCESSES:**  
Principles, working, advantages, limitations and applications of Metal finishing processes such as Honing, Lapping, Super-finishing etc., and coating processes such as Zinc plating, Chrome-plating, dull plating, cladding, blackening, powder coating etc.

**B. PRACTICAL /ORAL**

It will be based on term work prepared and on topics of subject as above

**C. TERM WORK**

It will consist of journal writing on topics of the syllabus as above, and practical applications.

**D. REFERENCE BOOKS**

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|-------------------------------|-------------------------|
| 1. Capstan & Turret Lathes    | By Durmeyer.            |
| 2. Technology of Gear Cutting | By A. Bhattacharya      |
| 3. Workshop Technology        | By Hajra Choudhary      |
| 4. Production Technology      | By O.P. Khanna & M.Lal  |
| 5. Manufacturing Technology   | By P.N. Rao TMH Edition |
| 6. Metal working Technology   | By Richard L. Little    |

**BHAVNAGAR UNIVERSITY**  
**B.E.SEMESTER –VI PRODUCTION ENGINEERING**  
**P- 604 METAL FORMING PROCESSES**

Teaching Scheme		Examination Scheme				
Theory Hrs.	Practical Hrs.	Marks	Theory Hrs.	Pract/Or al Marks	Term work Marks	Total Marks
04	02	100	03	25	25	150

**A. THEORY**

1. **INTRODUCTION** :The Nature and Purpose of Metalworking theory, Stress-Strain Curves, Hot cold and warm working , Recrystallisation , Hot working characteristics, Effect of Variables on Metal Forming Processes, Methods of Analysis of Manufacturing Processes, Elements of dislocation theory.
2. **ROLLING** : Principle, Hot Rolling, Cold Rolling Stand Arrangement, Rolling Load, Roll Passes, Breakdown Passes, Roll Pass Sequences, Rolling processes, Types of Rolling Mill, Special Rolling Mills, Calculation of Rolling load, Roll pass design, Defects in rolled product, Lubrication in practical hot rolling and cold rolling, Recent development in Rolling.
3. **FORGING** : Forging Operations, Smith Forging, Drop Forging, High Speed Forging, Press Forging, Machine Forging, open die & close die forging, Forging Design, Drop Forging Die Design , Upset Forging die Design., Determination of stock size, Trimming of flash and straightening of the forging, Forgeability, Forging & stretch forming , Structure & Properties of forging, Effects of friction in forging, Forging Defects, Cleaning and Finishing of Forging, Heat treatment of Forging, Selection of size of Forging Equipments, New Trends in Forging Technology etc
4. **EXTRUSION AND OTHER PROCESSES:** Extrusion Principle, Extrusions, Hot Extrusion Processes, Cold Extrusion, Analysis of Extrusion Processes, Tooling for Cold Extrusion, Extruding Tubes, Hydrostatic extrusion, Wire Drawing, Rod and Tube Drawing, Swaging, Tube Making. Analysis of Extrusion process, Variation of Extrusion Pressure, Extrusion of seamless pipes & tubes, Extrusion equipment.
5. **SHEET METAL OPERATIONS AND DIE DESIGN:** Introduction, Stages of cutting operations, Press Tool Operations, Press working Terminology, Shearing Action, Shearing Operations, Effect of clearances, Drawing, Draw Die Design, Spinning, Bending, Roll Forming, Stretch Forming, Embossing and Coining, Types of Dies, Die Construction, Punch Design, Pilots, Stripper and Stock Guide, Die Stops, Stock Strip Layout, Component Design for Blanking, Strip Development, Centre Line Pressure, Analysis of wire drawing processes & load calculation. Die and punch design, Design of simple, compound and progressive dies, methods of mounting punches and dies, design of drawing dies, bend allowances bending and forming dies, Dies for die-casting and forging operations.

**B. TERM WORK** : It shall consist of experiments industrial case studies and exercise problem solved by computer. Assessment of term work will be on continuous bases.

**PRACTICAL/ ORAL** : It shall be used both on term work prepared as well as on syllabus topics.

**REFERENCE BOOKS**

1. Manufacturing Technology , Foundry, Forming and Welding - P N RAO  
Tata McGraw-Hill Publishing Company Ltd.,
2. Metal forming – Modern Machines, Methods and Tolling for Engineers and Operating Personnel. by the editors of American Machinist, American Machinist.
3. Principles of Industrial Metalworking Processes – G.W.Rowe – EDWARD ARNOLD
4. Processes and Materials of Manufacture – Roy A. Lindberg - Prentice-Hall of India Pvtl Ltd.,
5. Production Engineering by P.C.Sharma

**BHAVNAGAR UNIVERSITY**  
**B.E.SEMESTER –VI PRODUCTION ENGINEERING**  
**P- 605 INDUSTRIAL MANAGEMENT**

Teaching Scheme		Examination Scheme				
Theory Hrs.	Practical Hrs.	Marks	Theory Hrs.	Practical/ Oral Marks	Term work Marks	Total Marks
<b>04</b>	<b>**</b>	<b>100</b>	<b>03</b>	<b>**</b>	<b>**</b>	<b>100</b>

**A. THEORY**

**1. Introduction to Management**

- Evolution of Management Theories
- Principles, Styles and Functions of Management
- Types/Forms of Organizations
- Relationship amongst Management, Organization and Administration
- Management by Objective

**2. Materials Management**

- Introduction, Importance & Objectives
- Relationship with other management functions
- Cost associated with MM
- Purchasing and Stores: policies and procedures
- Vendor development, selection, analysis and rating
- Make or Buy decisions, Methods of buying, Import substitution
- Legal aspects in purchasing
- Standardization, Codification and Variety Reduction
- ABC, VED, XYZ, HML, FSN analysis
- Management of Scrap, Surplus and Scrap

**3. Personal management and HRD**

- Functions
- Selection/Recruitment and Training
- Job specification, description, evaluation and merit rating
- Wage and salary policies and plans, incentive schemes,
- Wage board and statutory requirements, Employee welfare
- Employee development/ group dynamics
- Conflict and Grievance, settlements of disputes

**4. Marketing Management**

- Concept, Functions, Elements and Role of Marketing
- Nature of Demand, Market Segmentation and Types of Markets
- Role of advertisement and sales promotion in marketing
- Consumer Behavior
- Product and product-mix policy planning
- Market research

### **5. Financial Management and Control**

- Function and its objectives
- Sources of finance, factors affecting selection of sources
- Tools of financial analysis and forecasting
- Definition, concepts and considerations of Trial Balance sheet and Profit and Loss account

### **6. Engineering Economics**

- Concept, Law of Supply and Demand
- Elements of Cost and Profit and Volume Ratio
- Elementary Economic Analysis

### **7. Management Information System**

- Introduction, Need and objectives for the system
- Categories of management system and characteristics of a good MIS
- Evolution, Designing, Implementation and Applications of the MIS

### **B. Texts/References**

1. Business Organizations and management- H.C.Shukla
2. Management for Business and Industry- C.S.George
3. Industrial Engineering and Management- O.P.khanna
4. Industrial Engineering and Engineering Economics- Banga and Sharma
5. Integrated Materials management- N.M.Shah
6. Materials Management: An integrated approach- Gopalkrishnan
7. MIS- The Manager's View- Schultheis > and Sumner M; TMH, New Delhi
8. Engineering Organization and Management- Blanchard, B.L.
9. Manpower Management- Dwivedi
10. Industrial Engineering and Production Management- Mahajan M.; Dhanpatrai and Sons, New Delhi.
11. Industrial Engineering and Organization- Mansoorali and Dalela

(22/01/03)

**BHAVNAGAR UNIVERSITY**  
**B.E.SEMESTER –VI PRODUCTION ENGINEERING**  
**P- 606 SEMINAR**

Teaching Scheme		Examination Scheme				
Theory Hrs.	Practical Hrs.	Theory Marks	Theory Hrs.	Practical/Oral Marks	Term work Marks	Total Marks
**	02	**	**	25	25	50

**A. GENERAL GUIDELINES**

The student will select a topic in the area of Production Engineering or in any other relevant area in consultation with the faculty members of the Department and will work extensively to study and explore the topic, using available literature through all kind of media. The student will have to prepare a report after such study. The report should preferably address principles, practices, applications, benefits, recent innovations and advancements in the field of topic selected. Relevant case studies, live examples, analysis, original research are to be included to strengthen the work and report.

**B. TERM WORK**

Term work will consist of Report prepared on the work carried out as above on the selected topic. Report to be prepared to the satisfaction of the concerned faculty member.

**C. PRACTICAL/ ORAL**

The work done as above and report prepared thereof will have to be defended before the panel of examiners.