DEPARTMENT OF MECHANICAL ENGINEERING
PUNJABI UNIVERSITY, PATIALA

SCHEME AND SYLLABI
FOR

MASTER OF TECHNOLOGY (MECHANICAL ENGINEERING)

REGULAR / PART TIME

(SEMESTER SYSTEM)

BATCH 2014
## Scheme of Courses

### Batch 2014

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Subject Title</th>
<th>Teaching</th>
<th>Sessional Awards</th>
<th>Theory Exam</th>
<th>Exam Hrs.</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SEMESTER-I</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Core Course-I</td>
<td>3 1 0</td>
<td>50</td>
<td>50</td>
<td>3 hrs.</td>
<td>100</td>
</tr>
<tr>
<td>2.</td>
<td>Core Course-II</td>
<td>3 1 0</td>
<td>50</td>
<td>50</td>
<td>3 hrs.</td>
<td>100</td>
</tr>
<tr>
<td>3.</td>
<td>Elective Course -I</td>
<td>3 1 0</td>
<td>50</td>
<td>50</td>
<td>3 hrs.</td>
<td>100</td>
</tr>
<tr>
<td>4.</td>
<td>Elective Course -II</td>
<td>3 1 0</td>
<td>50</td>
<td>50</td>
<td>3 hrs.</td>
<td>100</td>
</tr>
<tr>
<td>5.</td>
<td>MME 251 Mechanical Engineering Lab.</td>
<td>0 0 4</td>
<td>100</td>
<td>--</td>
<td>--</td>
<td>100</td>
</tr>
<tr>
<td><strong>TOTAL MARKS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>500</td>
</tr>
<tr>
<td><strong>SEMESTER-II</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Core Course-III</td>
<td>3 1 0</td>
<td>50</td>
<td>50</td>
<td>3 hrs.</td>
<td>100</td>
</tr>
<tr>
<td>2.</td>
<td>Core Course-IV</td>
<td>3 1 0</td>
<td>50</td>
<td>50</td>
<td>3 hrs.</td>
<td>100</td>
</tr>
<tr>
<td>3.</td>
<td>Elective Course -III</td>
<td>3 1 0</td>
<td>50</td>
<td>50</td>
<td>3 hrs.</td>
<td>100</td>
</tr>
<tr>
<td>4.</td>
<td>Elective Course -IV</td>
<td>3 1 0</td>
<td>50</td>
<td>50</td>
<td>3 hrs.</td>
<td>100</td>
</tr>
<tr>
<td>5.</td>
<td>MME 252 Self Study &amp; Seminar</td>
<td>0 0 6</td>
<td>100</td>
<td>----</td>
<td>----</td>
<td>100</td>
</tr>
<tr>
<td><strong>TOTAL MARKS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>500</td>
</tr>
<tr>
<td><strong>SEMESTER-III</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Core Course-V</td>
<td>3 1 0</td>
<td>50</td>
<td>50</td>
<td>3 hrs.</td>
<td>100</td>
</tr>
<tr>
<td>2.</td>
<td>Core Course-VI</td>
<td>3 1 0</td>
<td>50</td>
<td>50</td>
<td>3 hrs.</td>
<td>100</td>
</tr>
<tr>
<td>3.</td>
<td>Elective Course –V</td>
<td>3 1 0</td>
<td>50</td>
<td>50</td>
<td>3 hrs.</td>
<td>100</td>
</tr>
<tr>
<td>4.</td>
<td>Elective Course -VI</td>
<td>3 1 0</td>
<td>50</td>
<td>50</td>
<td>3 hrs.</td>
<td>100</td>
</tr>
<tr>
<td>5.</td>
<td>MME 253 Project</td>
<td>0 0 6</td>
<td>100</td>
<td>----</td>
<td>--</td>
<td>100</td>
</tr>
<tr>
<td><strong>TOTAL MARKS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>500</td>
</tr>
<tr>
<td><strong>SEMESTER-IV</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>MME 254 DISSERTATION</td>
<td>0 0 0</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>
# Scheme of Courses

## Batch 2014

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Subject Title</th>
<th>Teaching</th>
<th>Sessional Awards</th>
<th>Theory Exam</th>
<th>Exam Hrs.</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L  T  P</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SEMESTER-I</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Core Course-I</td>
<td>3  1  0</td>
<td>50</td>
<td>50</td>
<td>3hr</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Core Course-II</td>
<td>3  1  0</td>
<td>50</td>
<td>50</td>
<td>3hr</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Elective Course-I</td>
<td>3  1  0</td>
<td>50</td>
<td>50</td>
<td>3hr</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td><strong>Total Marks</strong></td>
<td></td>
<td><strong>300</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SEMESTER-II</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Core Course-III</td>
<td>3  1  0</td>
<td>50</td>
<td>50</td>
<td>3hr</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Core Course-IV</td>
<td>3  1  0</td>
<td>50</td>
<td>50</td>
<td>3hr</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Elective Course-III</td>
<td>3  1  0</td>
<td>50</td>
<td>50</td>
<td>3hr</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td><strong>Total Marks</strong></td>
<td></td>
<td><strong>300</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SEMESTER-III</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Core Course-V</td>
<td>3  1  0</td>
<td>50</td>
<td>50</td>
<td>3hr</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Elective Course-III</td>
<td>3  1  0</td>
<td>50</td>
<td>50</td>
<td>3hr</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>MME 251 Mechanical Engineering Lab</td>
<td>0  0  4</td>
<td>100</td>
<td>--</td>
<td>--</td>
<td><strong>100</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Total Marks</strong></td>
<td></td>
<td><strong>300</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SEMESTER-IV</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Core Course-VI</td>
<td>3  1  0</td>
<td>50</td>
<td>50</td>
<td>3hr</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Elective Course-IV</td>
<td>3  1  0</td>
<td>50</td>
<td>50</td>
<td>3hr</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>MME 252 Self Study &amp; Seminar</td>
<td>0  0  6</td>
<td>100</td>
<td>--</td>
<td>--</td>
<td><strong>100</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Total Marks</strong></td>
<td></td>
<td><strong>300</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SEMESTER-V</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Elective Course-V</td>
<td>3  1  0</td>
<td>50</td>
<td>50</td>
<td>3hr</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Elective Course-VI</td>
<td>3  1  0</td>
<td>50</td>
<td>50</td>
<td>3hr</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>MME 253 Project</td>
<td>0  0  6</td>
<td>100</td>
<td>--</td>
<td>--</td>
<td><strong>100</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Total Marks</strong></td>
<td></td>
<td><strong>300</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SEMESTER-VI</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>MME 254 Dissertation</td>
<td>0  0  0</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td><strong>300</strong></td>
</tr>
</tbody>
</table>
LIST OF CORE COURSES
MME 101 Materials Technology
MME 102 Computer Aided Design & Manufacturing
MME 103 Non Traditional Machining Processes
MME 104 Industrial Automation & Robotics
MME 105 Welding Technology
MME 106 Research Methodology

LIST OF ELECTIVES
MME 201 Computer Aided Manufacturing
MME 202 Computer Aided Machine Design
MME 203 Computer Aided Process Planning
MME 204 Neural Networks & Fuzzy logic
MME 205 Finite Element Analysis
MME 206 Mechatronics
MME 207 Simulation & Modelling
MME 208 Artificial Intelligence
MME 209 Design of Experiments
MME 210 Automotive Design
MME 211 System Design
MME 212 Vibration Analysis
MME 213 Product Design & Development
MME 214 Theory of Cutting & Machine Tool Design
MME 215 Foundry Technology
MME 216 Management of Production Systems
MME 217 Operations Research
MME 218 Advanced Engineering Mathematics
MME 219 Gear Design
MME 220 Facilities Planning & Design
MME 221 Total Quality Management
MME 222 Business Intelligence

SEMINAR AND MINOR PROJECT
MME 251 Mechanical Engineering Lab.
MME 252 Self Study & Seminar
MME 253 Project

DISSERTATION
MME 254 Dissertation
List of Core Courses
MME 101 Materials Technology
MME 102 Computer Aided Design & Manufacturing
MME 103 Non Traditional Machining Processes
MME 104 Industrial Automation & Robotics
MME 105 Welding Technology
MME 106 Research Methodology

Electives for specialization in Machine Design
MME 202 Computer Aided Machine Design
MME 205 Finite Element Analysis
MME 207 Simulation & Modelling
MME 209 Design of Experiments
MME 210 Automotive Design
MME 211 System Design
MME 212 Vibration Analysis
MME 219 Gear Design

Electives for specialization in Production
MME 201 Computer Aided Manufacturing
MME 203 Computer Aided Process Planning
MME 206 Mechatronics
MME 213 Product Design & Development
MME 214 Theory of Cutting & Machine Tool Design
MME 215 Foundry Technology
MME 216 Management of Production Systems
MME 217 Operations Research
MME 220 Facilities Planning & Design
MME 221 Total Quality Management
MME 222 Business Intelligence

Electives for specialization in CAD/CAM
MME 201 Computer Aided Manufacturing
MME 202 Computer Aided Machine Design
MME 203 Computer Aided Process Planning
MME 204 Neural Networks & Fuzzy logic
MME 205 Finite Element Analysis
MME 206 Mechatronics
MME 207 Simulation & Modelling
MME 208 Artificial Intelligence
Pattern of Question Paper for End Semester Exam

TITLE OF SUBJECT (CODE----)  
Master of Technology (Branch) Section: ...........
Roll. No............
TIME ALLOWED: 3 Hour
Maximum Marks: 50

Note:- Attempt any three questions from section A and any three questions from section B. All questions of Section C are compulsory.

Section-A (From Section A of the syllabus)
Q1.  
Q2.  
Q3.  
Q4.  
3x5

Section-B (From Section B of the syllabus)
Q5.  
Q6.  
Q7.  
Q8.  
3x5

SECTION-C (Ten short/objective questions) (From Whole of the Syllabus uniformly)
Q9. a)  
j)  
10x2

Note for the paper setter:

1. The maximum duration to attempt the paper is 3 Hours.
2. Numbers of questions to be set are nine (9) as per the above format.
3. Section A and B contain four questions of 5 marks each. However these questions may be divided into subparts.
4. Section C is compulsory and contains ten (10) sub-parts of two (2) mark each.
5. The maximum limit on numerical questions to be set in the paper is 35% while minimum limit is 20% except theoretical papers.
6. The paper setter shall provide detailed marking instructions and solution to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.
7. The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.
8. Log tables, charts, graphs, design data tables etc. should be specified, whenever needed. Use of Scientific calculator should be clearly specified.
MTECH (MECHANICAL ENGINEERING) REGULAR / PART TIME

MME 101 MATERIALS TECHNOLOGY

L-T-P
3-1-0

Maximum Marks: 50
Minimum Pass Marks: 40%

Lectures to be delivered: 45-55

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. INTRODUCTION: Introduction to material science & engineering, Classification of engineering materials, Determination of Crystal geometry through X-ray diffraction technique.

2. MECHANICAL PROPERTIES & TESTING OF MATERIALS: Fundamental mechanical properties, creep, fatigue and fracture processes, Factors effecting mechanical properties, destructive and non-destructive testing of materials.

3. METALS AND ALLOYS: Introduction to ferrous and non-ferrous metals and alloys, Solid solutions, Phase diagrams (One and two component systems), Iron-carbon phase diagram, Phase transformation in Fe-C system, TTT and CCT diagrams, Heat treatment of plain carbons steels, Low alloy steels, Stainless steel, Aluminum and Copper alloys (Composition and Applications of salient alloys).

SECTION-B

4. CERAMIC MATERIALS: Introduction, Classification, Structures of Simple ceramic crystal, Silicate sheet and chain structures, Mechanical properties of ceramics.


6. NANO STRUCTURAL MATERIALS: Introduction to Carbon Nano Tube (CNT), Classification of CNT, Production methods for CNT, Applications of CNT.


REFERENCES:
3. V. Raghavan, Material Science & Engineering, Prentice-Hall of India (P), New Delhi
MME 102  COMPUTER AIDED DESIGN & MANUFACTURING

L-T-P 3-1-0
Maximum Marks: 50  Maximum Time: 3 Hrs.
Minimum Pass Marks: 40%  Lectures to be delivered: 45-55

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

SECTION-B

REFERENCES:
MME 103  NON TRADITIONAL MACHINING PROCESSES

L-T-P

3- 1- 0

Maximum Marks: 50                       Maximum Time: 3 Hrs.
Minimum Pass Marks: 40%                     Lectures to be delivered: 45-55

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. Modern Machining Processes: An Overview, trends in Manufacturing machining, need for non traditional machining, classification of non traditional machining, distinction between traditional and non traditional machining, features of various non traditional machining processes, applications of non traditional machining processes.

2. Advanced Mechanical Processes: Abrasive jet machining, Ultrasonic machining, Water jet machining, Abrasive Water Jet Machining,— elements of process, equipment, process parameters, Applications and limitations

3. Electrochemical & Chemical Removal Processes: Principle of operation, elements and applications of Electrochemical Machining, process parameters, Applications and limitations, electrochemical deburring, Electrochemical honing, Chemical Machining - elements, Applications and limitations

SECTION-B

4. Electric Discharge Machining: Mechanism of metal removal, electrode feed control, die electric fluids flushing, selection of electrode material, applications. Plasma Arc Machining- Mechanism of metal removal, PAM parameters, Equipment's for unit, safety precautions and applications.

5. Laser Beam machining: types of lasers, gas laser and solid laser, limitations and advantages. Electron Beam Machining- Generation and control of electron beam, construction of electron beam gun and diffusion pump, process capabilities, advantages and limitations

6. Hybrid Machining Processes: concept, classification, applications and Advantages.

REFERENCES:

2. G.F. Benedict, Non traditional Manufacturing Processes, Marcel Dekker Inc.
4. P.K. Mishra, Nonconventional Machining, Narosa Publishing House, New Delhi
**MME 104  INDUSTRIAL AUTOMATION & ROBOTICS**

L-T-P

3- 1- 0

Maximum Marks: 50

Minimum Pass Marks: 40%

Maximum Time: 3 Hrs.

Lectures to be delivered: 45-55

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

**SECTION-A**


2. Air cylinders – their design and mounting; pneumatic and hydraulic valves- flow control valves, metering valves, direction control valves, hydraulic servo systems; pneumatic safely and remote control circuits.


4. Assembly automation, automated packaging and automatic inspection.

**SECTION-B**

5. Introduction to robot technology- robot physical configuration and basic robot motions

6. Types of manipulators- constructional features, servo and non servo manipulators.

7. Feedback systems and sensors- encoders and other feedback systems, vision, ranging systems, tactile sensors

8. Concept of spatial descritations and transformations, manipulator kinematics, Inverse manipulator, Kinematics Jacobsians, Velocity and static forces, manipulator dynamics

**REFERENCES:**

2. Saeed. B. Niku. :Introduction to Robotics PearsonEducation Asia..
4. Dudleyt, A. Pease and John J. Pippenger, Basic Fluid Power, Prentice Hall,
8. Tunnel, Industrial Robots Vol. I, SME.
MME 105 WELDING TECHNOLOGY

L-T-P
3-1-0

Maximum Marks: 50
Minimum Pass Marks: 40%

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. INTRODUCTION: Basic classification of welding processes, weldability, weld thermal cycle, metallurgy of fusion welds, solidification mechanism and micro structural products in weld metal, epitaxial, cellular and dendritic solidification, metallurgical changes in weld metal, phase transformation during cooling of weld metal in carbon and low alloy steel, prediction of microstructures and properties of weld metal. Heat affected zone, re-crystallization and grain growth of HAZ, gas metal reaction, effects of alloying elements on welding of ferrous metals.

2. WELDING POWER SOURCES: Arc welding power sources, basic characteristics of power sources for various arc welding processes, duty cycles, AC/DC welding power source, DC rectifiers, thyristor controlled rectifiers, transistorized units, inverter systems.

3. WELDING ARC: Arc efficiency, temperature distribution in the arc, arc forces, arc blow, electrical characteristics of an arc, mechanism of arc initiation and maintenance, role of electrode polarity on arc behaviour and arc stability, analysis of the arc. Arc length regulation in mechanised welding processes.

4. FUSION WELDING REVIEWS: Critical reviews of manual metal arc welding (MMAW) GTAW, GMAW, FCAW and CO welding processes, plasma arc, submerged arc welding, electro gas and electro slag welding, analysis of the process.

SECTION-B

5. COATED ELECTRODES: Electrode coatings, classification of coatings of electrodes for SMAW, SAW fluxes, role of flux gradients and shielding gases, classification of solid and flux code wires.

6. METAL TRANSFER & MELTING RATE: Mechanism and types of metal transfer, forces affecting metal transfer, modes of metal transfer, metal transfer in various welding processes, effective of polarity on metal transfer and melting rate.


REFERENCES:

MME 106 RESEARCH METHODOLOGY

L-T-P 3-1-0

Maximum Marks: 50
Minimum Pass Marks: 40%
Lectures to be delivered: 45-55

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. Nature and objectives of research.
2. Methods of Research: historical, descriptive and experimental
3. Alternative approaches to the study of the research problem and problem formulation. Formulation of hypotheses, Feasibility, preparation and presentation of research proposal
4. Introduction to statistical analysis: Probability and probability distributions; binomial, Poisson, exponential and normal distributions and their applications.
5. Sampling: Primary and secondary data, their collection and validation, methods of sampling: Simple random sampling, stratified random sampling and systematic sampling, Attitude Measurement and Scales: Issues, Scaling of attitude, deterministic attitudes, measurement models, summative models, multidimensional scaling.

SECTION-B


REFERENCES:
1. C.R Kothari, Research Methodology, Wishwa Prakashan
2. P.G Triphati, Research Methodology, Sultan Chand & Sons, New Delhi
3. Fisher, Design of Experiments, Hafner
4. Sadhu Singh, Research Methodology in Social Sciences, Himalya Publishers
7. Donald Cooper, Business Research Methods, Tata McGraw Hill, New Delhi
MME 201 COMPUTER AIDED MANUFACTURING

L-T-P
3-1-0

Maximum Marks: 50
Minimum Pass Marks: 40%
Lectures to be delivered: 45-55

Maximum Time: 3 Hrs.

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. INTRODUCTION: Historical Background, Role of Computers in Manufacturing, automation, Types of Automation, Automation Strategies.


SECTION-B


7. INTEGRATED MANUFACTURING SYSTEM: Introduction to Flexible Manufacturing Systems (FMS), different types of flexibilities in FMS, type of FMS, machining system for FMS, Tool Management systems, work piece handling system, FMS Control, Lay out considerations in FMS, Advantages of FMS. Introduction to Computer Aided Manufacturing Systems (CIMS), the future automated factory, trends in manufacturing, human factors in future automated factory, the social impact. Rapid Prototyping, Artificial Intelligence and Expert system in CIM.

REFERENCES:

MME 202 COMPUTER AIDED MACHINE DESIGN

Maximum Marks: 50
Minimum Pass Marks: 40%
L-T-P 3-1-0
Maximum Time: 3 Hrs.
Lectures to be delivered: 45-55

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A


2. CAD software and Database: Software configuration of a graphics system: functions of a graphics package, geometric modeling, Database structure and control.


SECTION-B


REFERENCES:

1. Ibrahim Zeid, CAD/CAM., McGraw Hill
MME 203 COMPUTER AIDED PROCESS PLANNING

L-T-P
3-1-0

Maximum Marks: 50
Minimum Pass Marks: 40%

Maximum Time: 3 Hrs.
Lectures to be delivered: 45-55

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. Introduction: Traditional process planning; process planning elements; product design evaluation; selection of tooling and process parameters; operation sequence evaluation.

2. Group Technology: Introduction; advantages; part families; classification and coding systems; production flow analysis; design of machine cells.

3. Production Systems at Operation Level: Manufacturing support systems and concepts at the level of production processes; computer generated time standards; machinability data system; cutting condition optimization.

4. Production Systems at Plant Level: Communication oriented production information and control system (COPICS); material requirements planning; capacity planning; shop floor control and operation scheduling.

SECTION-B

5. Automated Process Planning: Advantages of automated process planning; standardization of manufacturing process plans; variant process planning; its features; and different stages; different variant systems; advantages and limitations of variant process planning.

6. Generative process planning; its features; design strategies; planning modelling and coding scheme; decision mechanism for software; decision trees for process; process information.

7. Artificial intelligence; overview & application; search strategies for AI production systems; resolution and reduction systems; knowledge acquisition; machine selection, cutting tool selection; software; various generative process planning systems; advantages of generative process planning systems; case studies.

REFERENCES:

3. Gallagher & Knight, Group Technology; Prod. Method in Manufacturing, Ellis Hosewood.
MME 204  NEURAL NETWORKS & FUZZY LOGIC

L-T-P
3- 1- 0

Maximum Marks: 50                     Maximum Time: 3 Hrs.
Minimum Pass Marks: 40%                     Lectures to be delivered: 45-55

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. Neural Networks characteristics, History of development in Neural Networks Principles, Artificial Neural Net terminology, Model of a neuron, topology, learning, types of learning, supervised, unsupervised, re-enforcement learning.

2. Basic Hopfield Model, the perceptron, linear separability, Basic learning laws, Hebb’s rule, Delta rule, Windrow & Hoff LMS learning rule, correlation learning rule, instars and outpost learning rules.


SECTION-B


5. Applications of neural nets such as pattern recognition, optimization, associative memories, vector quantization, control, Applications in speech and decision-making.

6. Applications of Fuzzy Logic

REFERENCES:

2. YegnaNarayanan, Artificial Neutral Networks., Prentice-Hall of India Pvt Ltd
MME 205  FINITE ELEMENT ANALYSIS

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. INTRODUCTION: finite element methods, history and range of applications.

2. FINITE ELEMENTS: Definition and properties, assembly rules and general assembly procedure, features of assembled matrix, boundary conditions.

3. CONTINUUM PROBLEMS: Classification of differential equations, variational formulation approach, Ritz method, element equations from variations. Galerkin’s weighted residual approach, energy balance methods.

SECTION-B

4. ELEMENT SHAPES AND INTERPOLATION FUNCTIONS: Basic element shapes, generalized coordinates, polynomials, natural coordinates in one-, two- and three-dimensions, Lagrange and Hermite polynomials, two-D and three-D elements for C₀ and C₁ problems, Coordinate transformation, iso-parametric elements and numerical integration.

5. APPLICATIONS & CASE STUDIES: Application of finite element methods to elasticity and structural, heat transfer, fluid-flow, lubrication and general field problems.

REFERENCES:

5. George R. Buchanan, Finite Element Analysis, Schaum MGH, New York.
MME 206 MECHATRONICS

L-T-P
3- 1- 0

Maximum Marks: 50
Minimum Pass Marks: 40%

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A


SECTION-B


6. MICROPROCESSOR & COMPUTER: Computer and Interfacing, AD and DA converters, Microcomputer Structure, Microcontrollers, Application of Microcontrollers, PLC.

7. DESIGN & MECHATRONICS: Designing, Possible Design Solutions, Case Studies of Mechatronic Systems.

REFERENCES:

1. W. Bolton, Mechatronics, Pearson Education Asia, New Delhi
3. Dan Necsulescu, Mechatronics, Pearson Education Asia, New Delhi
4. A.P. Mahind, Introduction to Digital Computer Electronics, TMH, New Delhi
6. B.C. Kuo, Ogata, Automatic Control Systems, PHI, New Delhi
MME 207  SIMULATION & MODELLING

L-T-P
3- 1- 0

Maximum Marks: 50
Minimum Pass Marks: 40%

Maximum Time: 3 Hrs.
Lectures to be delivered: 45-55

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. Introduction and overview: concept of system, system environment, elements of system, Monte Carlo method, system simulation, simulation, a management laboratory, advantages limitations or system simulation, continuous and discrete systems.

2. Technique of Simulation: Monte-Carlo method, System simulation, comparison of simulation with analytical methods, experimental nature of simulation, advantages, limitations and application of system simulation.


SECTION-B

5. Simulation of discrete system: Time flow mechanisms, Discrete and continuous probability density functions. Generation of random numbers, testing of random numbers for randomness and for auto correlation, generation of random variates for discrete distribution, generation of random variates for continuous probability distributions-binomial, normal, exponential and beta distributions; combination of discrete event and continuous models. The rejection method. Simulation of reliability, queuing and inventory problems.

6. Design of Simulation experiment: Length of run, elimination of initial bias. Variance reduction techniques, stratified sampling, antipathetic sampling, common random numbers, time series analysis, spectral analysis, model validation, optimisation procedures, search methods, single variable deterministic case search, single variable non-deterministic case search, regenerative technique.

7. Simulation of PERT: Simulation of maintenance and replacement problems, capacity planning production system, reliability problems, computer time sharing problem, the elevator system.

8. Simulation Languages: Continuous and discrete simulation languages, block structured continuous languages, special purpose simulation languages, SIMSCRIPT, GESS SIMULA importance and limitations of special purpose languages.

REFERENCES:

1. Loffick, Simulation and Modelling, Tata Mc-Graw Hill.
2. Deo Narsingh, System Simulation with Digital Compute, PHI, New Delhi
4. Meeiamkavil, Computer Simulation and Modelling, John Willey.
5. Gerden, System Simulation PHI, New Delhi
MME 208       ARTIFICIAL INTELLIGENCE

L-T-P
3-1-0

Maximum Marks: 50
Minimum Pass Marks: 40%

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. Introduction to AI: Definitions, Basic concepts of AI. Problem formulation and solution techniques.


SECTION-B


4. Case studies in the application of AI in manufacturing.

REFERENCES:

MME 209  DESIGN OF EXPERIMENTS

Maximum Marks: 50  Maximum Time: 3 Hrs.
Minimum Pass Marks: 40%  Lectures to be delivered: 45-55

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. INTRODUCTION: Strategy of experimentation, some typical applications of experimental design, Basic principles, Guidelines for designing experiments, A brief history of statistical design, Using statistical design in experimentation.

2. SIMPLE COMPARATIVE EXPERIMENTS: Introduction, Basic statistical concepts, Inferences about the Differences in means, randomized designs, Inferences about the Differences in means, Paired comparison Designs, Correlation, Regression

3. RANDOMIZED BLOCK DESIGNS: Randomized complete block design, Latin square design, Balanced incomplete block design.

4. INTRODUCTION TO FACTORIAL DESIGN: Basic definition and principles, Advantages of factorials, The two factor factorial design, General factorial design, Fitting response curves and surfaces, Blocking in a factorial design.

SECTION-B

5. FITTING REGRESSION MODELS: Introduction, Linear regression models, Estimate of parameters in linear regression models, Hypothesis testing in multiple regression, Confidence intervals in multiple regression, Prediction of new response observations, Regression model diagnostics, testing for lack of fit

6. RESPONSE SURFACE METHODOLOGY: Introduction to RSM, Response Surface Design, Analysis of data from RSM Design.

7. TAGUCHI METHOD OF DESIGN OF EXPERIMENTS: Concept design, Parameter design, Tolerance design, Quality loss function, Signal-to-Noise ratio, Orthogonal array experiments, Analysis of Mean (ANOM), Quality characteristics (noise and control factors)

8. QUALITATIVE TECHNIQUES: AHP, Brief introduction of FUZZY, Brief introduction of Structural Equation Modelling (SEM), Brief introduction of TOPSIS Introduction to SPSS (PASW).

REFERENCES:

MME 210 AUTOMOTIVE DESIGN

L-T-P 3-1-0

Maximum Marks: 50
Minimum Pass Marks: 40%

Lectures to be delivered: 45-55

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A


2. Modern Materials and Manufacturing Challenge: Structure, Properties and Manufacturing technology of automotive materials, Material selection, Design to manufacture as a single process and IPPD


4. Crashworthiness and its Influence on Vehicle Design: Accident and injurt analysis, Vehicle impact (General dynamics & crush characteristics), Structural collapse and its Influence upon Safety.


SECTION-B

7. Suspension System and Components: Factors effecting design, Mobility of suspension mechanisms, Kinematic analysis, Roll center analysis, Force analysis, Vehicle ride analysis, Controllable suspensions.

8. The design of engine Characteristics for Vehicle Use


11. Control Systems in Automobiles: Automotive application of sensors, EMS, Electronic Transmission control, Integration of EMS and TCS, Chassis control system, Multiplex wiring system, Vehicle safety and security system, On-board navigation system.

12. Failure Prevention: Important aspects of failures in real engineering world, Testing and Failure prediction, Automotive technology and the importance of avoiding failures.


REFERENCES:


2. Heisler, Advanced Vehicle Technology, ISBN.

3. R. and Harding, Automobile Design: Twelve Great Designers and Their Work, SAE.


MME 211   SYSTEM DESIGN

L-T-P
3- 1- 0

Maximum Marks: 50          Maximum Time: 3 Hrs.
Minimum Pass Marks: 40%     Lectures to be delivered: 45-55

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A


2. System Design: Design, designer, qualities in a designer. System, its characteristics and system design cycle. Features and steps of inventiveness, obstacles and aids to creativity. Systematic search for new ideas. Information and information resources. Procedure to obtain information and information handling.


4. Problem Formulation: Need Analysis, identification of surrounding problems, problem formulation criterion, feasibility study, physical principles, concept formation, checking, estimations & bidding, subjective and quantitative analysis.

SECTION-B

5. Preliminary Design: Consideration of alternative models, sensitivity analysis, compatibility analysis, optimization, rechecking.


7. Revision: Prototype testing and technique, evaluation of predicted performance and generalization. Revision and report writing.

8. Case studies to be discussed involving Systems Design process

REFERENCES:

3. M. Asimow, Introduction to Design, PHI, New Delhi
MME 212 VIBRATION ANALYSIS

L-T-P
3-1-0

Maximum Marks: 50
Minimum Pass Marks: 40%

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A


SECTION-B


REFERENCES:

3. P. Srinivasan, Mechanical Vibration Analysis, McGraw-Hill Companies
5. William W. Seto, Theory and Problems of Mechanical Vibrations
7. S. S. Rao, Mechanical Vibrations, Addison Wesley
MME 213  PRODUCT DESIGN & DEVELOPMENT

L-T-P
3- 1- 0

Maximum Marks: 50
Minimum Pass Marks: 40%
Lectures to be delivered: 45-55

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. INTRODUCTION: Introduction to Product Design, Design by Evolution and Innovation, Essential factors of product design, Production consumption cycle, Introduction to various stages in design process, Generation of alternatives, Evaluation.

2. FUNCTIONAL & AESTHETICS CONSIDERATION: Basic design considerations, Role of Aesthetics in product design, Basic concept and elements of Visual design, Patents, Liability and Ethics.


4. LIFE CYCLE MANAGEMENT: Product Life Cycle, early introduction, increased product life, System Integration, QFD, House of Quality, Pugh’s and Beitz method

SECTION-B


6. DESIGN FOR MANUFACTURE AND ASSEMBLY: Design for manufacture & Assembly, Reasons for not implementing DFMA, Design features and requirements with regard to assembly and production, Design for quality, reliability, maintenance, recyclability & disposal.

7. LEGAL & ECONOMIC CONSIDERATIONS: Product value, Design for safety, reliability and Environmental considerations, Economic analysis, profit and competitiveness, break even analysis, Economics of a new product design,

8. PRODUCT DEVELOPMENT: Definition and Objective, Role of designer in product development, Manufacturing & economic aspects of product development, Product promotion & development.

REFERENCES:
1. Kail T Ulrich and Steven D Eppinger, “Product Design and Development.”, Mcgraw-hill
2. AK Chitale and Gupta, “Product Design and Engineering”, Prentice-Hall of India Pvt Ltd
MME 214  THEORY OF CUTTING & MACHINE TOOL DESIGN

L-T-P
3-1-0

Maximum Marks: 50
Minimum Pass Marks: 40%
Lectures to be delivered: 45-55

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. THEORY OF METAL CUTTING: Mechanism of metal cutting, Cutting forces, Chip formation, Merchant’s circle diagram, Calculations, System of Tool nomenclature, Tool geometry, Machinability, Tool life, Cutting tool materials, Cutting fluids. Abrasive Machining- Mechanism of grinding, lapping and honing.

2. INTRODUCTION TO MACHINE TOOL DESIGN: Introduction to Metal Cutting Machine Tools, Kinematics of machine tools, Basic Principles of machine Tool Design,

3. DESIGN OF DRIVES: Design considerations of electrical, mechanical and hydraulic drives in machine tool, Selection of speeds and feeds, stepped and stepless regulation of speed, Estimation of power requirements and selection of motor for metal cutting machine tool spindles, design of gear box.

SECTION-B


6. DESIGN OF CONTROL MECHANISMS: Basic principles of control, mechanical, electrical, hydraulic, numeric and fluid controls, Selection of standard components, Dynamic measurement of forces and vibrations in machine tools, Stability against chatter, Use of vibration dampers.


REFERENCES:

3. A.Bhattacharya, Metal Cutting Theory and Practice, New Central Book Agency( P) Ltd, Calcutta.
MME 215  FOUNDRY TECHNOLOGY

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. Foundry Metallurgy: Oxidation of liquid metals, gas dissolution in liquid metals, inoculation practice for grey and ductile cast iron, degassing, types of ladles, fluidity, factors affecting fluidity, hot tearing, shrinkage of liquid metals, directional solidification.

2. Solidification of Castings: Solidification of metals and alloys, nucleation, growth and dendritic growth. Structure of castings, Concept of progressive and directional solidification, solidification time, Chvorinov’s equation, temperature measuring instruments.

3. Risering and Gating: Requirement of a riser, general considerations of risering, riser shapes, riser size, and location, riser design, insulating and exothermic materials used for risers, internal chills, external chills, padding for directional solidification, open type and blind risers.

Gating system – components of gating system, types of gates, laws of fluid flow, turbulence in gating system, slag trap systems, need for tapered sprue, gating system design, gating ratio.

SECTION-B

4. Special Casting Methods: Hot chamber die casting, cold chamber die casting, pressure die casting, Investment casting, centrifugal casting, permanent mould casting, vacuum moulding, shell moulding.


6. Inspection and testing of casting: Cleaning of casting, Casting defects, causes and remedies, Non destructive testing (NDT) of casting (i.e. visual, mechanical, ultrasonic, dye penetration, magnetic particle and X-ray testing).

7. Modernization and Mechanization of Foundry: Need for modernization, and mechanization, moulding and core making, melting, pouring, shake out equipment and fettling, dust and fume control, material handling equipments for sand moulds and cores, molten metal and castings, Pollution control in foundries, energy saving in foundries.

REFERENCES:

2. Principal of Foundry Technology by P. L. Jain, Tata McGraw Hill
4. Castings, John Campbell, Elsevier
MME 216 MANAGEMENT OF PRODUCTION SYSTEMS

L-T-P
3- 1- 0

Maximum Marks: 50
Minimum Pass Marks: 40%

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. INTRODUCTION: Objectives of Production, Concept of Production system, relationship of production and production manager to other areas of firm, Organization of Production system, Span-of-control concept, centralization versus decentralization, horizontal versus vertical integration, production organization & information system.

2. SYSTEMS APPROACH: Principles of Management, Feedback loops, flow networks in organization, concept of PAC, Decision making and management process, approaches to decision making, break even analysis.

3. PLANT DESIGN & FACILITIES: Plant Location decision, importance in production system design, choice of site, plant location trends, basic types of plant layouts, objectives of plant layouts, factors affecting layout, principles of material handling, factors affecting materials handling decision, risk of inefficient material handling, Human factors in job.

4. PRODUCTION SYSTEMS AT PLANT & OPERATION LEVEL: Manufacturing support systems, Communication oriented production information and control system (COPICS); material requirements planning; capacity planning; shop floor control and operation scheduling.

SECTION-B

5. PRODUCT DEVELOPMENT & AUTOMATION: Product development, the developmental procedure, use of PERT in product development, cost control in R&D, Product design, project milestone schedules, introduction to automation & use of computers, advantages & disadvantages of automation.

6. PPC & PROCUREMENT: Functions of PPC, types of production control, PPC in different systems, relation of production planning to other areas of the firm, objectives of procurement department, relationship of procurement to other areas of the firm, make, buy or lease decisions, value analysis, legal & ethical aspects of procurement.

7. QUALITY MANAGEMENT: Purpose of inspection and quality, concept of quality, feedback and inspection process, variables and attributes in inspection process, sources of quality problems, statistical terms for quality, quality control charts, introduction to motion-study and time-study.


REFERENCES:
MME 217  OPERATIONS RESEARCH

L-T-P
3-1-0

Maximum Marks: 50                  Maximum Time: 3 Hrs.
Minimum Pass Marks: 40%              Lectures to be delivered: 45-55

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. Introduction: Nature and developments of operations research, characteristics of operations research, necessity of operations research in industry, scope of OR in management, objectives of OR, role of computers in OR, limitations of OR.

2. Definition of models: Classification of models, construction of models, approximations in OR models.


SECTION-B

5. Queuing Models: Characteristics of Queuing Models, waiting time and idle time costs, transient and steady states of the system. Single channel queuing theory, Model I [(M/M/1): FCFS/α/α)]. Applications of Queuing Models.


8. PERT & CPM: Network situations where PERT & CPM can be applied, planning, scheduling & control, work breakdown structure, Similarity and differences of CPM and PERT, use of crashing.

REFERENCES:

MME 218    ADVANCED ENGINEERING MATHEMATICS

L-T-P                      Maximum Marks: 50                    Maximum Time: 3 Hrs.
3-1-0                      Minimum Pass Marks: 40%                  Lectures to be delivered: 45-55

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A


SECTION-B


REFERENCES:
4. Spiegel, Vector analysis and introduction to tensor analysis, Schaum's out lines Mc-Graw Hill.
6. B.S. Grewal, Higher engineering Mathematic, Khanna Publishers, Delhi
MME 219 GEAR DESIGN

L-T-P
3-1-0

Maximum Marks: 50 Maximum Time: 3 Hrs.
Minimum Pass Marks: 40% Lectures to be delivered: 45-55

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A


SECTION-B


REFERENCES:
5. Earle Buckingham & Eliot K. Buckingham, Manual on Gear Design – Section 1,2 and 3, Industrial Press.

WEB REFERENCES:
http://wwwAGMA.org/
http://www.qtcgears.com/Q410/Q420Cat.html

APPLICABLE STANDARDS:
DIN: 3960, 3961, 3962 (Part I & II), 3963, 3967, 867, 3990
IS: 2535, 4460, 7443, 5037, 7403, 2048, 2293
MME 220 FACILITIES PLANNING & DESIGN

L-T-P
3-1-0

Maximum Marks: 50
Minimum Pass Marks: 40%

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. Introduction: Importance of plant layout in plant design, its relationship with plant layout, types of layout, classifications of production process structures, Principles of plant layout design, Importance of facilities planning


3. Plant location: Plant location factors, selection of plant site, quantitative analysis of plant location.


SECTION-B

5. Systematic Layout Planning: Introduction to Systematic Layout Planning, phases involved in SPIF.

6. Computerization Layout Planning: Need for computerized layout planning, classification of computerized layout planning algorithms, description of various algorithms for layout planning, namely CRAFT, ALDEP & CORELAP.

7. Material Handling: Significance of material handling, integrating plant layout and material handling systems, principles of material handling, systems approach to material handling, classification & selection of MH equipment.

8. Material Handling Systems: Characteristic features of various MH systems, automated guided vehicle systems and automated storage & retrieval systems.

REFERENCES:

2. Vijay Sheth, Facilities Planning and Materials Handling, Marcel Decker, New York
8. Francis White, Facility Location & Layout, PHI, New Delhi
MME 221 TOTAL QUALITY MANAGEMENT

L-T-P
3-1-0

Maximum Marks: 50
Minimum Pass Marks: 40%

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. QUALITY MANAGEMENT: Evolution of Philosophy of Quality, Quality Gurus-Crosby, Deming and Juran, Attributes of Quality, Quality Characteristics-Quality of Design, Quality of Performance and Quality of Conformance, Organization For Quality, Total Quality Management (TQM), TQM Models, 4 C’S of TQM; Barriers to Implement TQM.


3. QUALITY MEASUREMENT; TOOL AND TECHNIQUES: Seven Basic (B7) Tools – Scatter diagram, Cause & effect diagram, Pareto chart, Check sheet, Histogram, Control chart, flow chart. New Seven (S7)Tools – affinity diagram, relations diagram, tree diagram, matrix diagram, matrix data analysis, arrow diagram, Process Decision Program Chart (PDPC).

SECTION-B


5. INNOVATIVE TECHNIQUES IN QM: Quality Function Deployment (QFD)-Definition and Phases in QFD, Taguchi Approach to quality-system design, parameter design and Tolerance design, Six- Sigma - Definition & Implementation Steps, ISO-9000 and 14000, Role of Total Productive Management (TPM), Benchmarking in quality management.

REFERENCES:
1. Amrik Sohal, TQM Text with Cases
2. B. G. Pale, Managing Quality
3. John S. Oakland, TQM Text with Cases
4. Arora, TQM and ISO –14000
5. Besterfield, TQM
MME 222 BUSINESS INTELLIGENCE

L T P
3 1 0

Maximum Marks: 50 Maximum Time: 3 Hrs.
Minimum Pass Marks: 40% Lectures to be delivered: 45-55

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt three questions each from sections A and B of the question paper and the entire section C.

SECTION-A

1. Introduction to Business Intelligence


3. Basics of Data Integration (Extraction Transformation Loading)


SECTION-B

5. Introduction to Multi-Dimensional Data Modeling

6. Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi dimensional modeling, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema, introduction to business metrics and KPIs, creating cubes using Microsoft Excel.

7. Basics of Enterprise Reporting


RECOMMENDED BOOKS:

1. R.N. Prasad and Seema Acharya, Fundamentals of Business Analytics, Wiley India Ltd.
2. Mike Biere, Business Intelligence for the Enterprise, Prentice Hall Professional.
Each student will be required to complete a course on Lab Work comprising of advanced practicals related to Mechanical Engineering. The experiments in the Lab Work will be decided by the concerned teacher/section-in charge. The student will be required to complete the prescribed Lab Course and other requirements related to evaluations of the Practical Course. The evaluation will be done jointly by the committee of examiners constituted by Head of Department.
Each student will be required to prepare a Seminar Report and present a Seminar on a topic in any of the areas of modern technology related to Mechanical Engineering including interdisciplinary fields. The topic/title will be chosen by the student in consultation with the Faculty Advisor allocated to each student. The student will be required to submit the Seminar Report and present a talk to an audience of Faculty/Students in open defense in front of the Seminar Evaluation Committee having Faculty Advisor as one of its members. The Seminar Evaluation Committee will be constituted by Head of Department.
Each student will be required to complete a Project and submit a Project Report on a topic on any of the areas of modern technology related to Mechanical Engineering including interdisciplinary fields. The title and objectives of the Project will be chosen by the student in consultation with the Project Guide allocated to each student. The student will be required to present a talk to an audience of Faculty/Students in open defense in front of the Project Evaluation Committee having Project Guide as one of its members. The Project Evaluation Committee will be constituted by Head of Department for the purpose of evaluation for internal assessment.
MME 254 DISSERTATION

Each student will be required to complete a Dissertation and submit a written Report on the topic on any of the areas of modern technology related to Mechanical Engineering including interdisciplinary fields in the Final semester of M.Tech. course. The title and objectives of the Dissertation will be chosen by the student in consultation with the Supervisor(s) and the same will be required to be defended by the student in open defense in front of the Dissertation Monitoring Committee approved by the Head of Department. The title and objectives will be approved by the Dissertation Monitoring Committee having main Supervisor as one of its members. The progress will also be monitored at weekly coordination meetings with the Supervisor(s). The student will be required to present a talk to the gathering in open defense in front of the Dissertation Monitoring Committee having main Supervisor as one of its members. The Dissertation Monitoring Committee will be constituted by Head of Department for the purpose examining the suitability of the work carried out by the student in the Dissertation for its evaluation by the external examiner. The Dissertation will be sent to the External Examiner for its evaluation only after its due approval by the Dissertation Monitoring Committee. The external evaluation will be done jointly by the main Supervisor and external examiner appointed by the Head of Department. The dissertation (non-credit course) will be either approved or rejected. The external examiner will evaluate the dissertation and the viva-voce will be fixed by the Head of Department. After Viva-voce, the examiners (internal and external) will approve/reject the dissertation. In case, the dissertation is rejected, the candidate will rework and resubmit the dissertation. The dissertation will be again be evaluated jointly by the same external examiner and the Main Supervisor.