SCHEME AND SYLLABI FOR

FIFTH SEMESTER

OF

BACHELOR OF TECHNOLOGY IN

PRODUCTION ENGINEERING

FROM 2009 ADMISSION ONWARDS

CALICUT UNIVERSITY (P.O), THENHIPALAM
# PRODUCTION ENGINEERING

## 3rd Semester

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
<th>Hours/week</th>
<th>Marks</th>
<th>Sem-end duration-hours</th>
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<td>Humanities and Social Sciences</td>
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<td>Electrical Drives and Automation</td>
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<td>PE09 304</td>
<td>Mechanics of Solids</td>
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<td>Metallurgy and Material Science</td>
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<td>Machine Tool Lab-I</td>
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## 4th Semester

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<td>Theory of Machines</td>
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## 5th Semester

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<td>Industrial Automation</td>
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<td>Metal Casting</td>
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<td>PE09 507(P)</td>
<td>Machine Tool Lab II</td>
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PE09 504: Metal Casting

Teaching scheme
3 hours lecture and 1 hour tutorial per week

Credits: 4

Objectives
- To acquaint the student with the fundamental aspects related to metal casting viz. melting, solidification, pattern making, sand casting and special casting process

Module I (14 hours)

Module II (14 Hours)

Module III (13 Hours)

Module IV (13 Hours)
Sand Casting, Pressure Die Casting, Centrifugal Casting, Investment Casting, Shell Moulding, Carbon Dioxide Process, Continuous Casting etc. - Quality Control In Castings - Inspection and Testing in Castings - Salvaging - Mechanization of Foundries - Material Handling Equipments used in Foundry - Introduction to Casting of Non-Ferrous Metals like Aluminium, Copper etc. - Introduction to Steel Castings.

Text Book
1. Heine, Loper and Rosenthal - Principles of Metal Casting, Tata Mcgraw Hill.

Reference Books
1. Wulf, Taylor and Flemings - Foundry Engineering, Wiley Eastern
3. Ekey and Winter - Foundry Technology, Mcgraw Hill

Internal continuous assessment (maximum marks-30)

60% - tests (minimum 2)
30% - assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - regularity in the class

University Examination Pattern

PART A: Short answer questions (one/two sentences) 5 x 2 marks=10 marks
All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: Analytical/Problem solving questions 4 x 5 marks=20 marks
Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

PART C: Descriptive/Analytical/Problem solving questions 4 x 10 marks=40 marks
Two questions from each module with choice to answer one question.

Maximum Total Marks: 70
PE09 505: Machining of Materials

Teaching scheme
3 hours lecture and 1 hour tutorial per week

Credits: 4

Objectives
• To give the student basic concepts, processes and analysis of machining processes

Module I (14 hours)
History and development of tool materials - general requirements of tool materials-tool geometry-systems of cutting tool nomenclature- single point and multipoint tools- different machining processes and selection of tools. - Simple problems.

Module II (14 hours)

Module III (13 hours)
Temperature in machining – temperature distribution - effect of machining variables on temperature – measurement of temperature.

Module IV (13 hours)
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.

Text Books
1. Shaw M.C., Metal cutting principles, Oxford university press.

Reference books
2. Sen and Bhattacharya, Principles of metal cutting, New central publishers.

**Internal Continuous Assessment (Maximum Marks-30)**

- **60% - Tests (minimum 2)**
- **30% - Assignments (minimum 2)** such as homework, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
- **10% - Regularity in the class**

**University Examination Pattern**

**PART A:** *Short answer questions (one/two sentences)*

- All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

**PART B:** *Analytical/Problem solving questions*

- Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

**PART C:** *Descriptive/Analytical/Problem solving questions*

- Two questions from each module with choice to answer one question.

*Maximum Total Marks: 70*
Objectives

- To have a basic knowledge on economic theories, and their applications, management concepts, functions of management, human behaviour at work etc.

Module I (9 hours)

Module II (9 hours)
Factors of production, Concepts of Total product, average product, Marginal product. Concept of Productivity and its measurement, Laws of returns, Input-output analysis, Production function analysis (Cobb-Douglas and CES), Internal and external economies of scale Analysis of costs, Accounting and economic costs, Total/Average/Marginal costs, Sunk cost, Private and Social cost, Opportunity cost. Characteristic features of Perfect competition, Monopolistic competition and Monopoly.

Module III (9 hours)

Module IV (9 hours)
Human behaviour and management - skills of manager at various levels in an organisation-


Text Books

Reference Books

Internal Continuous Assessment (Maximum Marks-30)
60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - Regularity in the class

University Examination Pattern

**PART A:** Short answer questions (one/two sentences)  
5 x 2 marks=10 marks
All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

**PART B:** Analytical/Problem solving questions  
4 x 5 marks=20 marks
Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

**PART C:** Descriptive/Analytical/Problem solving questions  
4 x 10 marks=40 marks
Two questions from each module with choice to answer one question.

*Maximum Total Marks: 70*
PE09 507(P): Machine Tool Lab II

Teaching scheme
3 hours laboratory classes per week

Credits: 2

Objectives
• To understand the operation of equipment
• To evaluate and calibrate various equipment
• To understand how experiments shall be set up for experimental studies

Module I
Shaping, planing and slotting: - working principles of crank shapers - hydraulic shaper - speeds and feeds in shaping - planing operations - shaper and planer tools - types of planers and their relative merits - Differences between vertical shaper and slotter- description of slotting machines and types of work done.
Exercises - Shaping and planing, surfacing, T- slots, grooving, dove tail cutting and keyways in flat and cylindrical surfaces. Slotting: - Keyway cutting and grooving.

Module II
Milling: - types of milling machines - principles of milling - milling machine attachments - speeds and feeds in milling operations - grooves, splines, dove tail and cam milling, climb and conventional milling, string and gang milling.
Exercises - indexing head, simple and differential indexing, plain milling, cutting of spur and helical gears.

Module III
Drill geometry – drilling - boring and reaming – types of drilling machines
Exercises -demonstration of cylindrical and taper grinding operations and drilling operation.

[Note: - At least four models to be prepared]
Objectives

- To provide the Students an opportunity to verify the theoretical concepts they have learned and also the complexity and requirements of planning experts in this area.

1. Tension test on M.S. rod
2. Shear test on M.S. rod
3. Hardness test - Brinell, Rock well, Vickers and rebound
4. Impact test - Izod and Charpy
5. Torsion test on M.S. rod
6. Spring test
7. Torsional pendulum - determination of ‘N’ of wires
8. Compression tests - bricks, concrete cubes

Internal Continuous Assessment (Maximum Marks-50)
60%-Laboratory practical and record
30%- Test/s
10%- Regularity in the class

Semester End Examination (Maximum Marks-50)
70% - Procedure, conducting experiment, results, tabulation, and inference
20% - Viva voce
10% - Fair record