SCHEME AND SYLLABI FOR

FIFTH SEMESTER

OF

BACHELOR OF TECHNOLOGY IN

PRODUCTION ENGINEERING

FROM 2009 ADMISSION ONWARDS

CALICUT UNIVERSITY (P.O), THENHIPALAM

5th Semester

Code	Subject	Hours/week			Marks		Sem- end duration-hours	Credits
		L	T	P/D	Inte-rnal	Sem-end		
PE09 501	Industrial Automation	4	1	-	30	70	3	5
PE09 502	Computational Methods in Engineering	3	1	-	30	70	3	4
PE09 503	Welding and Allied Processes	3	1	-	30	70	3	4
PE09 504	Metal Casting	3	1	-	30	70	3	4
PE09 505	Machining of Materials	3	1	-	30	70	3	4
PE09 506	Engineering Economics and Principles of Management	3	0	-	30	70	3	3
PE09 507(P)	*Machine Tool Lab II*	-	-	3	50	50	3	2
PE09 508(P)	*Material Testing Lab*	-	-	3	50	50	3	2
	Total	**19**	**5**	**6**				**28**

Syllabus - B.Tech. Production Engg.

PE09 504: Metal Casting

Teaching scheme   **Credits:** 4
3 hours lecture and 1 hour tutorial per week

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 1 (14 hours)
Melting - Melting and Pouring of Metals - Crucible, Cupola, Oil Fired Furnaces – Electrical Furnaces – Induction Furnaces - Arc Fired Furnaces - Calculation of Cupola Charges - Temperature Control and Measurements in Furnaces - Degasification of Metals - Inoculation.

Module II (14 Hours)
Solidification - Freezing of Metals and Alloys - Properties Related to Freezing Mechanisms - Effect of Composition and Rate of Cooling on The Structure of Cast Iron - Metallurgical advantages of Casting - Metallurgy of Non-Ferrous Casting Alloys.

Module III (13 Hours)
Moulding: Pattern Making, Moulding Methods - Processes, Materials and Equipments, Cores and Core Making - Moulding Sands - Properties, Control and Testing, Casting Design - Pouring and Feeding of Castings - Simple Examples of Riser Design for Steel Castings.

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
2. Howard - *Modern Foundry Practice*, Asia Pub.
3. Ekey and Winter - *Foundry Technology*, Mcgraw Hill
4. Dhanpatrai and M.Lal. - *A Textbook of Foundry Technology*.

---

5. Serope Kalpakjian Steve.R.Schmid, *Manufacturing Process for Engineering Materials,* Pearson Education
6. P N Rao, *Manufacturing Technology*, Vol I, Tata Mc Graw Hill Publishers

---

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   **Credits:** 4
3 hours lecture and 1 hour tutorial per week

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)
Mechanics of metal cutting- mechanism of chip formation – forces on cutting tool- merchant's circle – tool dynamometers- tool force measurements- friction in metal cutting. - Simple problems.

Module III (13 hours)
Temperature in machining – temperature distribution - effect of machining variables on temperature – measurement of temperature.
Tool life and tool wear – effect of machining parameters on tool wear- selection, properties and application of cutting fluids. Simple problems.

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

1. Geoffrey Boothroyd, *Fundamentals of metal machining and machine tools*., Tata Mc Graw hill
2. Sen and Bhattacharya, *Principles of metal cutting*, New central publishers.

3. Venkatesh and Chandrasekharan, *Experimental technics in metal cutting.*, Prentice hall India.
4. G R Nagpal, *Tool Engineering & Design*, Khanna Publishers
5. P N Rao, *Manufacturing Technolgoy, Vol II*, Tata McGraw Hill Publishers

---

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

PE 09 506: Engineering Economics & Principles of Management

Teaching scheme   **Credits: 3**
3 hours lecture per week

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)
Basic Economics – Economic reasoning, Fundamental economic problems, Circular Flow in an economy, Law of supply and demand, Demand forecasting, Concepts of elasticity, Economic efficiency. Money and Banking. Inflation and deflation: concepts and regulatory
measures. Economic Policy Reforms in India since 1991: Industrial policy, Foreign Trade policy, Monetary and fiscal policy, Impact on Industry.

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)
Introduction to Management – definition – Principles – Philosophy and development of management thought – Functions of management – Planning - Organizing – staffing – leading – controlling – Different types of Organizational structures and relationships -
Decision making – Types of Decisions – Decision making under uncertainties,risk and certainty – criteria.

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

Syllabus - B.Tech. Production Engg.

Human relations – Leadership and management – theories of leadership – leadership functions and qualities – Motivation and behaviour – Theories of Maslow, McGregor, Herzberg and McClleland – Management by Objecties and Exception.

Text Books
1. PaneerSelvam, R, *Engineering Economics*, Prentice Hall of India, New Delhi, 2002.
2. Koontz & Weirich, *Management*, McGraw-Hill Publishers.

Reference Books
1. Koutsoyiannis A, *Modern Micro economics*, McMiklllan, 2004
2. Barthwal, R.R *Industrial Economics*, Himalaya publishers, Mumbai, 2005.
3. Vohra, *Quantitative techniques in management*, McGraw hill Publishers.
4. Hersey Paul and Blanchard, *Management of Organisational behaviour*, Prentice Hall.
5. Luthans, *Organisational Behaviour*, Mc Graw Hill Publishers.
6. Jit S Chandran, *Organisational Behaviour*, Vikas Publishing.

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   **Credits:** 2
3 hours laboratory classes per week

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
Grinding and Drilling: - Types of grinding machines, surfaces, cylindrical, universal, selection of grinding wheels, - tool and cutter grinders – live and dead centre grinding – taper grinding.
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]

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

PE09 508(P): Material Testing Lab

Teaching scheme   **Credits:** 2
 3 hours laboratory classes per week

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