## SEMESTER S5

## INDUSTRIAL ENGINEERING

| Course Code | PCPET501 | CIE Marks | 40 |
|---|---|---|---|
| Teaching Hours/Week (L: T:P: R) | 3:1:0:0 | ESE Marks | 60 |
| Credits | 4 | Exam Hours | 2 Hrs. 30 Min. |
| Prerequisites (if any) | None | Course Type | Theory |

**Course Objectives:**

1. To enable students to understand industrial engineering and productivity concepts.
2. To enable students to furnish adequate background for applying concepts of work study, industrial relations and industrial safety.

## SYLLABUS

| Module No. | Syllabus Description | Contact Hours |
|---|---|---|
| 1 | Introduction to industrial engineering: Modern concepts in industrial engineering, functions of industrial engineer, applications of industrial engineering.<br>Productivity: Definition and concepts, input output model, factors affecting productivity, productivity ratios, measurement of productivity, productivity improvement, productivity in Indian industries, productivity and product design process. | 11 |
| 2 | Productivity and work study: Role of work study in improving productivity, specific contributions of method study and work measurement.<br>Method study: Procedure of method study - selection, recording and representation of work and activities, critical analysis, developing best method, installation and maintenance of standard method. | 11 |
| 3 | Work measurement: Purpose of work measurement, basic procedure, performance rating, concept of normal time, allowances. Work sampling technique of work measurement, introduction to predetermined motion time systems.<br>Motion Study: Memo motion and micro motion study, therbligs, SIMO chart, principles of motion economy related to worker, workplace and tools. | 11 |

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| | | |
|---|---|---|
| **4** | Industrial relations: Objectives, factors affecting industrial relations, psychological attitudes to work and working conditions, Causes and effects of industrial disputes, methods to settle industrial disputes.<br>Industrial fatigue: Factors contributing to industrial fatigue, effect of fatigue, methods to eliminate industrial fatigue.<br>Industrial safety: Objectives, measures for ensuring industrial safety. | **11** |

**Course Assessment Method**
**(CIE: 40 marks, ESE: 60 marks)**

**Continuous Internal Evaluation Marks (CIE):**

| Attendance | Assignment/ Microproject | Internal Examination-1 (Written) | Internal Examination- 2 (Written ) | Total |
|---|---|---|---|---|
| **5** | **15** | **10** | **10** | **40** |

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**End Semester Examination Marks (ESE)**

*In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions*

| Part A | Part B | Total |
|---|---|---|
| • 2 Questions from each module.<br>• Total of 8 Questions, each carrying 3 marks<br><br>**(8x3 =24 marks)** | • Each question carries 9 marks.<br>• Two questions will be given from each module, out of which 1 question should be answered.<br>• Each question can have a maximum of 3 subdivisions.<br>**(4x9 = 36 marks)** | **60** |

## Course Outcomes (COs)

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

| Course Outcome | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Apply the principles of industrial engineering and concepts of productivity. | **K3** |
| **CO2** | Make use of the concepts of work study for improving productivity and to develop methods for accomplishing work tasks. | **K3** |
| **CO3** | Apply work measurement techniques in organizations and to establish the standard time. | **K3** |
| **CO4** | Identify the concepts of industrial relations and industrial safety in the real world. | **K3** |

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

## CO-PO Mapping Table (Mapping of Course Outcomes to Program Outcomes)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | - | 2 | - | - | - | - | - | - | - | - | 2 |
| **CO2** | 2 | - | 2 | - | - | - | - | - | - | - | - | 2 |
| **CO3** | 2 | 2 | 2 | - | 2 | - | - | - | - | - | - | 2 |
| **CO4** | 2 | - | 2 | - | - | 2 | - | - | - | - | - | 2 |

Note: *1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation*

| Text Books | | | | |
|---|---|---|---|---|
| **Sl. No** | **Title of the Book** | **Name of the Author/s** | **Name of the Publisher** | **Edition and Year** |
| 1 | Industrial Engineering and Management | B Kumar | Khanna Publishers | 10th Ed., 2004 |
| 2 | Industrial Engineering and management | O P Khanna | Danpat Rai publication | 5th Ed., 2018 |

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| Reference Books | | | | |
|---|---|---|---|---|
| **Sl. No** | **Title of the Book** | **Name of the Author/s** | **Name of the Publisher** | **Edition and Year** |
| 1 | Introduction to Industrial Engineering | Avraham Shtub, Yuval Cohen | Taylor and Francis | 2nd Ed., 2017 |
| 2 | Introduction to Work study | ILO | Oxford and IBH Publishing | 3rd Ed., 2015 |
| 3 | Reliability Engineering | L S Srinath | East west Press | 4th Ed., 2005 |
| 4 | Statistical Quality Control | Eugene L Grant, Richard S, Leavenworth | McGraw Hill | 7th Ed., 2006 |

| Video Links (NPTEL, SWAYAM…) | |
|---|---|
| **Link ID** | https://archive.nptel.ac.in/courses/112/107/112107249/ |
| | https://archive.nptel.ac.in/courses/112/107/112107142/ |

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