PT-700 ADVANCED PRINTING TECHNOLOGY

L	T	P	Internal Marks	External Marks	Credit
3	0	0	30	70	3.0

Course Objectives

- The objective of this course is to impart the basis knowledge of different printing processes along with their role, importance and applications.

Unit I

Historical development in Printing Technology. Recent trends in the field of printing and allied technologies.

Pre-Press, Press and Post press operations

Unit II

Letterpress Printing Process; Characteristics, role, importance and applications.

Offset Printing Process; Characteristics, role, importance and applications.

Unit III

Flexography Printing Process; Characteristics, role, importance and applications.

Gravure Printing Process; Characteristics, role, importance and applications.

Unit IV

Screen Printing Process; Characteristics, role, importance and applications.

Digital Printing Process; Characteristics, role, importance and applications

Course Outcomes

- The learning outcome of this course is expected that after completion of this course the students will be having the detail knowledge of various printing processes and the recent development in this industry and they will implement their knowledge for print production operations.

Books recommended

- Anjan Kumar Baral, "Sheet-Fed Offset Technology".
- C.S. Mishra, "Letterpress Printing".
- Havoed M Fenton, Frank J. Romao, "On demand printing".
- Adams Fox, "Printing Technology".

Note

In the semester examination, nine questions are to be set by the examiner. Question No. 1 will be compulsory and based on the entire syllabus (all four units). It will contain seven short answer type questions, each of two marks. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt other four questions by selecting one from each of the four units.

ME-731 OPTIMAL DESIGN OF THERMAL SYSTEMS

L	T	P	Internal Marks	External Marks	Credit
4	0	0	30	70	4.0

Course Objectives

- To know and understand the different thermal systems and to get familiar with their design, thermal modeling, objectives, simulation, and economic analysis.
- To understand the optimization, its role, and methods in the analysis and design of various types of thermal systems and equipment's.

Unit I

Engineering design: Introduction, engineering design, design as part of engineering undertaking, workable and optimum systems, Basic considerations in design: formulation of the design problem, conceptual design, steps in the design process, computer aided design.

Economic analysis: Calculation of interest, worth of money as a function of time, series of payments, depreciation.

Unit II

Modeling of thermal systems: Types of models, modeling of heat exchangers, evaporators and condensers, mathematical modeling.

Equation fitting: Method of least squares and the art of equation fitting, physical modeling and dimensional analysis.

Unit III

Numerical modeling and simulation: Numerical modeling, system simulation, methods for numerical simulation.

Acceptable design of thermal systems: Initial design, design strategies, design of systems from different application areas, additional considerations for large practical systems.

Unit IV

Optimization: Optimization in design, levels of optimization, basic concepts, practical aspects in optimal design, mathematical representation and statement of the optimization problem, practical aspects in optimal design.

Optimization methods: Lagrange multipliers, search methods, and geometric programming.

Project work

Students are required to carry out a project related to the course contents. The topic of the project will be selected in consultation with course coordinator. The project report will be submitted at the end of semester. The evaluation will be done internally by the course coordinator.

Course Outcomes

Students will be able to

- understand about the thermal interactions and its role in many like processes and to develop the means to tackle the various thermal problems.
- design and selection of the materials/equipments for a particular application based upon its thermal response and to analyze and optimize the thermal problems.

Books recommended

W. F. Stoecker, "Design of Thermal Systems", McGraw-Hill, 3rd ed. 2014.

Y. Jaluria, "Design and Optimization of Thermal Systems", CRC Press, 2nd ed. 2008.

A. Bejan, G. Tsatsaronis and M. J. Moran, "Thermal Design and Optimization", John Wiley and Sons, 2012.

N. Suryanarayana and O. Arici, "Design and Simulation of Thermal System", McGraw-Hill, 2002.

Robert F. Boehm, "Development in the Design of Thermal Systems", Cambridge University Press 2009.

C. Balaji, "Essentials of thermal system design and optimization", CRC Press, 2011.

ME-736 FLEXIBLE MANUFACTURING SYSTEMS

L	T	P	Internal Marks	External Marks	Credit
4	0	0	30	70	4.0

Course Objectives

- *Learn the concepts and technologies associated with Flexible Manufacturing System.*

Unit I

Manufacturing Systems: Introduction, Single station manufacturing cells, Manual Assembly lines, Automated Production and Assembly lines. Different types of manufacturing systems.
Manufacturing Automation: Types of Automation systems, Logic Controllers and its applications, Programming of controllers.

Unit II

Flexible Manufacturing System: FMS components, Different types of flexibility in manufacturing, , FMS compared to other manufacturing approaches, Optimization of FMS, FMS applications, FMS planning and implementation.

Unit III

Numerical Control: Fundamentals of NC technology, Computer Numerical Control, Distributed Numerical Control, Applications of NC.
Industrial Robotics: Robot Anatomy, Robot Control System, Sensors, Robot Accuracy and Repeatability.

Unit IV

Cellular Manufacturing: Part classification and coding, production flow analysis, Machine Cell design, Group Technology.
Material Handling and Identification: Material Transport Systems, Storage systems, Automatic Identification.

Project Work

Students are required to carry out a project related to the course contents. The topic of the project will be selected in consultation with course coordinator. The project report will be submitted at the end of semester. The evaluation will be done internally by the course coordinator.

Course Outcomes

Students will be able to
- *design the basic Flexible Manufacturing Systems.*

Books recommended

- Mikell P. Groover, "Fundamentals of Modern Manufacturing: Materials, Processes, and Systems", Third edition, PHI, 2009.
- Alavala Chennakesava R., "Cad/Cam: Concepts and Applications", PHI, 2008.
- Mikell P. Groover, "Automation, Production Systems, and Computer - Integrated Manufacturing", PHI, 2008
- S. Joshi , Jeffrey Smith, "Computer control of flexible manufacturing systems: Research and development", Springer; 1994.

Note

In the semester examination, nine questions are to be set by the examiner. Question No. 1 will be compulsory and based on the entire syllabus (all four units). It will contain seven short answer type questions, each of two marks. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt other four questions by selecting one from each of the four units.