MB491 MANAGEMENT CONCEPTS AND PRACTICES

L	T	P	C
3	0	0	3

Course Objectives:

- To familiarize the students with the concepts of management.
- To facilitate with the basic concepts of marketing.
- To enrich the learners with fundamentals of financial management.
- To select a methodology for technology and production management.
- To impart the importance of Human Resources in the organizational context.

Prerequisites: Overview of organisation structure and functions, Basic understanding of technology and operation adopted in the industry, Fundamentals of the capital employed and the risks involved.

Introduction to management, evolution of scientific management, modern management. Principles. Elements of management .Planning, organizing, staffing, directing, coordinating, reporting, budgeting.

Core concepts of marketing. Need, want, demand, product, value, satisfaction, marketing mix- product, price, place, promotion.

Financial management, objectives, scope, techniques of investment analysis, payback period, accounting rate of return, working capital, cost of capital. Sources of financing.

Technology management. Product design. Types of production system. Plant location-factors to be considered. Plant layout. Types of layout. Inventory management.

Significance of HRM. HR planning job evaluation. Recruitment and selection. Placement and induction. Training. Performance appraisal. Compensation. Industrial relations.

Text Books:

1. *L.M.Prasad, 'Priciples and Practice of Management', S.Chand & Sons.*
2. *P.Kotler, 'Marketing Management', Pearson, 12th edition, 2005*
3. *P.Chandra, 'Financial Management Theory and Practice', TMH, 3rd edition, 2004*
4. *K.Ashwathappa, 'Human Resources and Personnel Management', TMH, 3rd edition, 2005*
5. *E.S.Buffa & R.K.Sarin, 'Modern Production/Operation Management', Wiley,8th edition, 1994.*

Reference Books:

1. *Harlod Koontz and Heinz Weihrich ,'Essentials of Management', Tata Mc Graw-Hill, 1998*
2. *Stephen Robbins, 'Organizational Behaviour', Pearson Education, New Delhi*

COURSE OUTCOMES:

Upon completion of this course

1. The learners get equipped with the nuances of management functions
2. The learners understand the framework of a business organization.
3. The learners gain expertise in analyzing the risk and return of an investment.
4. The learners would become better people managers.

EE401 POWER SYSTEM ECONOMICS AND CONTROL TECHNIQUES	**L**	**T**	**P**	**C**
	3	0	0	3

Course Objectives:

- To understand the economics of power system operation
- To realize the requirements and methods of real and reactive power control in power system
- To recognize the recent advancements in power system operation

Prerequisites: Optimization Methods, Operating Principle of Synchronous Machines, Voltage drop and power loss calculation in Transmission lines and Fundamentals of Load flow analysis.

Types of load –components of system loads- load curves – load factor, demand factor, diversity factor, capacity factor, utilization factor, base load and peak load stations- Reserve Capacity and requirements - Load Forecasting-Electrical Tariff-types of tariff

Economic Load Dispatch-characteristics of generation unit, Co-ordination equations with and without transmission loss, General problem formulation and common constraints-Unit Commitment-Constraints in unit commitment- Solution methods

Load frequency control-Generator, Prime mover, Governor & Load models – LFC of a single area and two area systems-Tie line bias control-steady state and transient response- Automatic Voltage Regulator – Exciter and Generator models-steady state and transient response

Reactive power and Voltage control – Load Compensation- power factor correction, voltage regulation, load balancing-Maximum load ability of transmission lines-Line Compensation-Static shunt capacitor/inductor-tap changing transformer, VAR compensators

Recent trends in real time control of power systems - Power system control centers with SCADA/EMS – Restructuring of power system – fundamentals and operational restrictions – Introduction to Smart Grid

Text Books:

1. *Allen J. Wood, Bruce F. Wollenberg, 'Power Generation Operation and Control', Wiley India 2nd Edition, 2009.*
2. *Abhijit Chakrabarti & Sunita Halder, 'Power system Analysis-Operation & Control', PHI New Delhi, 3rd Edition, 2010.*

Reference Books:

1. *Robert H. Miller, James H. Malinowski, 'Power system operation', Tata McGraw-Hill, 2nd Edition, 2009.*

COURSE OUTCOMES:

Upon completion of this course , students will be able to

1. Calculate various factors (such as load factor and demand factor, etc.) and interpret different tariff structures
2. Develop generation dispatching schemes for thermal units
3. Apply frequency control schemes on power system
4. Employ reactive power compensation systems
5. Adopt engineering innovations for improved power system operation

EE403 WIND AND SOLAR ELECTRICAL SYSTEMS

L	T	P	C
3	0	0	3

Course Objectives: To familiarize the students with basics of solar and wind energy systems and various techniques for the conversion of solar and wind energy into electrical energy.

Prerequisites: Basics on solar systems, Electron devices, Electrical machines and Power electronics

Basic characteristics of sunlight – solar spectrum – isolation specifics – irradiance and irradiation - pyranometer - solar energy statics - Solar PV cell – I-V characteristics – P-V characteristics – fill factor-Modeling of solar cell – maximum power point tracking.

PV module – blocking diode and bypass diodes – composite characteristics of PV module – PV array – PV system – PV- powered fan – PV fan with battery backup – PV-powered pumping system – PV powered lighting systems – grid- connected PV systems

Wind source – wind statistics - energy in the wind – turbine power characteristics - aerodynamics - rotor types – parts of wind turbines – braking systems – tower - control and monitoring system.

General characteristics of induction generators – grid-connected and self-excited systems – steady-state equivalent circuit - performance predetermination–permanent magnet alternators – steady-state performance.

Power electronic converters for interfacing wind electric generators – power quality issues - hybrid systems-wind-diesel systems – wind-solar systems.

Text Books:

1. *S N Bhadra, S Banerjee and D Kastha, 'Wind Electrical Systems', Oxford University Press, 1st Edition, 2005.*
2. *Chetan Singh Solanki, 'Solar Photovoltaic's: Fundamentals, Technologies and Applications' PHI Learning Publications, 2nd Edition, 2011.*

References:

1. *Roger A. Messenger and Jerry Ventre, 'Photovoltaic systems engineering', Taylor and Francis Group Publications, 2nd Edition, 2003.*
2. *M.Godoy Simoes and Felix A. Farret, 'Alternative Energy Systems: Design and Analysis with Induction Generators', CRC press, 2nd, 2008.*
3. *Ion Boldea, 'The electric generators hand book - Variable speed generators', CRC press, 2010.*

COURSE OUTCOMES:

Upon completion of this course students will be able to

1. Describe the solar radiation, measurements and characteristics of solar PV cell
2. Develop the model of a PV system and its applications
3. Describe the basic types and mechanical characteristics and model of wind turbine
4. Analyze the electrical characteristics and operation of various wind-driven electrical generators
5. Understand various power electronic converters used for hybrid system

EE405 CONTROL AND RENEWABLE ENERGY SYSTEMS LABORATORY	**L**	**T**	**P**	**C**
	0	**0**	**3**	**2**

Course Objectives: To give an insight to the design of various application based controllers and fundamental operation and control of solar PV and induction generators.

Prerequisites: Fundamentals of control systems, electronics and machines

List of Experiments

1. Stabilization of Inverted pendulum on a cart system using PID controller
2. Closed – loop control of Ball and Beam system
3. Speed control of a BLDC motor drive
4. Water-level controller with data acquisition system
5. Closed-loop temperature control system
6. Identifying and measuring parameters of solar PV module in the field
7. Efficiency measurement of stand-alone PV System
8. I-V characteristics of Solar cell under different illumination and temperature condition
9. Rotor resistance control of WRIG
10. Voltage control of SEIG

COURSE OUTCOMES:

Upon completion of the course, the students will be able

1. To design and implement a suitable controller for a practical system.
2. Estimate or test the performance of a solar PV system and induction generators under different operating conditions.
3. Develop simulation models and prototype modules in view of implementing any control technique upon any renewable energy applications.
4. Analyze and prepare the technical report on the experiments carried out.

EE407 POWER SYSTEMS SIMULATION LABORATORY

L	T	P	C
0	0	3	2

Course Objectives: To enhance the analyzing and problem solving skills of the students in the area of power system and power electronics through computer programming and simulation.

Prerequisites: Fundamentals of power system , Fundamentals of power electronics

List of Experiments

1. Real and Reactive Power Computation
2. Transmission Line Parameter Calculation
3. Power Circle Diagrams
4. Bus Admittance Matrix Formulation
5. Graph Theory Matrices
6. Load Flow Analysis
7. Z bus Formation
8. Short Circuit Analysis
9. Simulation of AC DC Converters
10. Power Electronic Applications in Power Systems

Mini project

COURSE OUTCOMES:

Upon completion of the course students will be able to

1. Develop computer programs for power system studies
2. Design, simulate and analyze power electronics circuits using simulation packages.
3. Prepare laboratory reports that clearly communicate experimental information in a logical and scientific manner