14.09.22
FoMS Approved
Copy I

J. C. BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY
YMCA, FARIDABAD

MBA (with specialization in Power Management & Sustainability/Data Science and Data Analytics/Cyber Security and Cloud)

W.E.F. BATCH 2022-2023

DEPARTMENT OF MANAGEMENT STUDIES

NATIONAL POWER TRAINING INSTITUTE, FARIDABAD
Centre for Advanced Management and Power Studies (CAMPS)

Vision

To be the Global Centre of Excellence for Training and Skill Development in Power and Energy Sectors.

Mission

Enhancing human and organizational excellence in Power and Energy sectors by blending frontier clean energy technologies to achieve economy and energy security.

J.C. Bose University of Science & Technology, YMCA, Faridabad
(A Haryana State Government University)
(Established by Haryana State Legislative Act No. 21 of 2009 & Recognized by UGC Act 1956 u/s 22 to Confer Degrees)
Accredited 'A' Grade by NAAC

CERTIFICATE

This is to certify that the scheme & syllabi of MBA(with specialization in Power Management & Sustainability / Data Science and Data Analytics / Cyber security and Cloud) (course name & scheme) is duly approved by the competent body/authority and to the best of my knowledge the contents of the same, are correct in all respect.

Date: 24-11-22

For
29/11/22
(Dr. Sapna)
syllabus Co-ordinator

Signature & Stamp of Chairperson 28/11/22
Name: Dr Rachna Agrawal
Deptt. Name Management Studies
Department of Management Studies
J.C. Bose University of Science & Technology
YMCA, Faridabad (Haryana)

Student Grades

The academic performance of a student shall be graded on a TEN – POINT SCALE and the award of grades based upon marks obtained out of 100 shall be made as follows:-

Marks percentage	Grade	Grade points	Category
90-100	O	10	Outstanding
80≤ marks<90	A+	9	Excellent
70≤ marks<80	A	8	Very Good
60≤ marks<70	B+	7	Good
50≤ marks<60	B	6	Above Average
45≤ marks<50	C	5	Average
40≤ marks<45	P	4	Pass
<40	F	0	Fail
.....	Ab	0	Absent

Cumulative Grade Point Average (CGPA)

A student is required to maintain a Cumulative Grade Point Average (CGPA) which is the weighted average of all the Letter Grade obtained by the student since his/her entry into the Institute upto and including the latest semester and computed as follows:

$$CGPA = \sum(C_i G_i)/ \sum C_i$$

Where C_i denotes credits assigned to i^{th} course and G_i indicates the Grade point equivalent to the Letter Grade obtained by the students to the i^{th} course. Provided that when a student re-appears in/repeats a course, the new Grade will replace the earlier one in the calculations of the CGPA.

Note:

i. At the end semester (i.e. after End Semester Examination), students will be supplied a DMC indicating the grades secured in each course, Semester Grade Point Average (SGPA) and up-to-date CGPA.

ii. Multiplication factor for converting the CGPA in percentage will be provided on the respective Detailed Marks Certificate (DMC).

MBA (with specialization in Power Management & Sustainability/Data Science and Data Analytics/Cyber Security and Cloud)

About the program:

The program is targeted towards fresh and practicing engineers and is a unique golden opportunity for the Management of Industry to groom bright executives with engineering background who are expected to move to key positions in the near future. In addition to the inputs provided in regular MBA programs, this Program with a Difference lends special emphasis on specific Power Sector issues, Sustainability, Data analytics and data sciences, Cyber security and cloud management. The curriculum design and the learning process emphasize the development of students' skills and abilities to apply management theories and concepts to live problems of industry. The course is duly recognized by AICTE and affiliated to J.C Bose University of Science and Technology (YMCA), Faridabad.

Objective

I. To create a pool of committed and competent professionals equipped with the appropriate managerial and technical skills to steer the industry and run it on commercial lines.

II. To develop future world class business leaders and decision makers who can think innovatively, duly sensitized to social and environmental interface and are capable of searching for alternative solutions.

III. To imbibe basic values and ethos with in-depth understanding of Indian realities

Program Structure:

This is a two-year program spread over four Semesters. In the first year, students take courses in major functional general management areas like Human Resources Operations, Finance & Accounting, Marketing Information Technology and core Power Sector areas. In the second year, students take core courses with elective courses in their respective specialization viz. Sustainability, Data Science and Data Analytics, Cyber security and Cloud. To provide the industrial exposure, students will undergo 6-8 weeks of internship/training. They are also given major projects based on current industry scenarios.

STUDY SCHEME

	Semester I		Semester II		Semester III		Semester IV		
Type of Course	**No. of courses**	**Credits**	**No. of courses**	**Credits**	**No. of courses**	**Credits**	**No. of courses**	**Credits**	**Total Credits**
Core/ Power Management	8	26	9	30	7	24	1	3	83
Discipline-centric Electives	-	-	-	-	-	--	3	9	9
Open Elective	-	-	-	-	1	3	-	-	3
Mandatory Audit Course	1	0	-	-	-	-	-	-	0
Skill Enhancement Lab	-	-	-	-	-	-	-	-	0
Industry Internship/ Field work	-	-	-	-	1	9	1	3	12
MOOCs	ΨOne MOOC/NPTEL course of 12 weeks in any semester								3
Value added course	Students must undergo at-least one value added course of minimum 30 hours duration during the program.								0
TOTAL CREDITS									**110**

ΨNote: The selected MOOC course should not be same as the subjects/courses offered in MBA program

- Value Added courses are offered additionally

Semester – I						
S. No	Course Type	Course Code	Course	Credits	Marks	
					Int.	Ext./ Prac
1	Core	MPM- 101	Management Principles and Organisational Behaviour	3	25	75
2		MPM- 102	Accounting for Decision making	3	25	75
3		MPM- 103	Managerial Economics and Energy Modeling	3	25	75
4		MPM- 104	Business Communication	3	25	75
5		MPM- 105	Business Environment	3	25	75
6		MPM- 106	Business Statistics and Analytics for Decision making	3	25	75
7	Core /Power Management	MPM- 107	Electrical Industry Structure and Regulations	4	25	75
8		MPM- 108	Renewable Energy Management	4	25	75
9	Mandatory Audit course	MPM- 109	Value Education	-	25	75
Total				26	900	

Semester – II						
S. No	Course Type	Course Code	Course	Credits	Marks	
					Int.	Ext./ Prac
1	Core	MPM -201	Human Resource Management	3	25	75
2		MPM- 202	Entrepreneurship Development	3	25	75
3		MPM- 203	Corporate Finance	3	25	75
4		MPM- 204	Operations and Supply Chain Management	3	25	75
5		MPM- 205	Business Research Methods	3	25	75
6		MPM -206	Marketing Management	3	25	75
7	Core/Power Management	MPM-207	Tariff Determination & Financial Modeling of Power Projects	4	25	75
8		MPM-208	Smart Grid Management	4	25	75
9		MPM-209	Energy and Environment	4	25	75
Total				30	900	

Semester – III						
S. No	CourseType	Course Code	Course	Credits	Marks	
					Int.	Ext./ Prac
1	Core	MPM-301	Strategic Management	3	25	75
2		MPM-302	Business Laws	3	25	75
3		MPM-303	Introduction to Sustainability, Data science and Cyber security in power sector	3	25	75
4		MPM-304	Project Management	3	25	75
5	Core / Power Management	MPM-305	Rural Energy Management	4	25	75
6		MPM-306	Power Market Economics and Operations	4	25	75
7		MPM-307	Energy Conservation and Energy Audit	4	25	75
8	Open elective	MPM-308/ MPM-309/ MPM-310	Open Elective * (Under open elective, student needs to opt any one course)	3	25	75
9	Internship/Field work	MPM–311	Internship/ Training (6-8 Weeks)	9	100	150
Total				36	1050	

*** Open electives (Sem-III)**

S.No.	1	2	3
Open Electives	E-Commerce (MPM–308)	Operations Research (MPM-309)	Digital and Social Media Marketing (MPM–310)

Semester – IV						
S. No	CourseType	Course Code	Course	Credits	Marks	
					Int.	Ext./ Prac
1	Core	MPM -401	Natural Resource Management	3	25	75
2	Specialization -centric elective	MPM-C-402/ MPM-D-402/ MPM-S-402	Elective 1 ** (Specialization)	3	25	75
3		MPM-C-403/ MPM-D-403/ MPM-S-403	Elective 2 ** (Specialization)	3	25	75
4		MPM-C-404/ MPM-D-404/ MPM-S-404	Elective 3 ** (Specialization)	3	25	75
5	Project work	MPM 405	Major Project	3	100	100
Total				15	600	

**** Specialization electives (Sem-IV) (student needs to opt any one specialization and corresponding electives)**

S.No.	For MBA with Specialization in Power Management & *Cyber Security and cloud (MPM-C)*	For MBA with Specialization in Power Management & *Data Science and Data Analytics (MPM-D)*	For MBA with Specialization in Power Management & *Sustainability (MPM-S)*
1	Cyber Laws, Regulation & Audit (MPM-C-402)	Big Data Analytics and Data Science for Power Utility (MPM-D-402)	Energy Sustainability and Circular economy (MPM-S-402)
2	Malware Analysis and Incident Response (MPM-C-403)	Data Science Tools (MPM-D-403)	Energy Economic Modelling (MPM-S-403)
3	Vulnerability Assessment and Penetration Testing (MPM-C-404)	Data Analytics for Power Loss Management (MPM-D-404)	Power Environment Interface & Carbon Finance (MPM-S-404)

DETAILED SYLLABI

SEMESTER -1

MANAGEMENT PRINCIPLES AND ORGANISATIONAL BEHAVIOUR

MPM-101

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to

1. Understand the principles and practices of management and contemporary issues related to managing an organisation.
2. Analyse the behaviour of individual employees and its implications for the organisation.
3. Developing a critical insight into group and team dynamics.
4. Interpret the influence of various organisational development and change on the behaviourof the employees.

Unit-I

Nature and evolution of management; managerial levels, skills and roles in an organisation; functions of management - planning, organising, staffing, directing, controlling, problem solving and decision making; management control; Management Information System (MIS).

Unit-II

organisational behaviour: concept, importance and contemporary challenges; foundations of individual behaviour differences; personality - concept, determinants and applications; values, ability, attitudes and emotions; perception - concept, process and applications; learning and reinforcement; motivation theories and applications; job satisfaction; stress management.

Unit-III

Types of groups; stages of group development; group properties - roles, norms, status, size and cohesiveness; group decision making; work teams and team building; conflict management; power and political behaviour; leadership functions and styles.

Unit-IV

Organisational structure and designs and behavioural implications; organisational climate and culture; organisational change and its management; organisational development.

Suggested readings:

1. Robbins, S.P. and Decenzo, D.A. Essentials of Management, Pearson Education.
2. Stoner, J., Freeman, R. Gilbert, R. Management, Pearson.
3. Robbins, S.P. and Judge, T. Organisational Behaviour, Pearson Education.
4. Newstorm, J. and Keith Davis, Organisational Behaviour, TMH.
5. Pareek, Udai, Understanding Organisational Behaviour, Oxford University Press.

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

ACCOUNTING FOR DECISION-MAKING
MPM-102

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Gain critical understanding of various forms of accounting and management accounting practices in an organization.
2. Analyse the financial position of a company through financial statements.
3. Develop operational understanding of cost accounting and cost sheet preparation.
4. Apply the concepts of cost control technique to facilitate managerial decision making.

Unit-I

Nature and scope of various forms of accounting; accounting principles and conventions; Indianaccounting standards; IFRS; final accounts of company with basic adjustments.

Unit-II

Financial statement analysis - importance and techniques; ratio analysis; cash flow analysis;difference between cash flow and fund flow analysis; applications in financial decision-making.

Unit-III

Cost accounting – classification of costs, elements of costing; marginal costing; standard costing;cost sheet preparation.

Unit-IV

Cost control techniques; budgetary control; material and labour variance analysis; BEP; decisionmaking through make/buy, expand/ contract and accept/reject proposals.

Suggested readings:

1. Horngreen, Sundem and Stratton, Introduction to Management Accounting, PearsonEducation, New Delhi.
2. Maheshwari S. N., Maheshwari S. K., A Textbook of Accounting for Management, VikasPublishing, New Delhi.
3. Pandey, I. M., Management Accounting, Vikas Publishing House, New Delhi.
4. Khan, M.Y. and Jain, P.K., Management Accounting, TMH, New Delhi.
5. Jain, S.P and Narang, K.L., Advanced Cost Accounting, Kalyani Publishers, Ludhiana.

Note:

1. Only latest editions of the above books are recommended.
2. In each unit, content will be covered with suitable practical problems and case studies.

MANAGERIAL ECONOMICS AND ENERGY MODELING

MPM-103

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Develop a critical understanding of different economic theories.
2. Take decisions about optimum production quantity which will minimize costs andmaximize returns.
3. Understand different market structures and apply decisions methodologies to decide thebest price of the product of the business.
4. Integrate economic theories with managerial practices to solve business problems.

Unit-I

Nature and scope of managerial economics; objectives of business firms; cardinal utility theory; indifference curve technique; consumer surplus; price effect combination of income effect and substitution effects.

Unit-II

Law of demand, demand elasticities, demand estimation and forecasting; production analysis, law of variable proportions, laws of return to scale; isoquants, optimal combination of inputs. Models and Modeling Approaches - Definition of a Model, Characteristics of a Good Model, Classifications of Energy-Economic Models- Bottom-Up and Top-Down Models, Optimization and Techno-Economic Accounting Models.

Unit-III

Theory of cost: traditional and modern theory of cost in short and long runs; economies and diseconomies of scale, revenue curves; market structures, price-output decisions under perfect competition, monopoly, monopolistic competition and oligopoly, shut down point.

Unit-IV

Determinants of economic development, recent developments in Indian economy; business cycles; inflation, types and control methods; monetary policy; fiscal policy; balance of payment of India; trade deficit and remedies.

Suggested readings:

1. Hirschey, Mark, Managerial Economics, Thomson Learning, Bangalore
2. Monroe, Kent B., Pricing-Making Profitable Decisions, McGraw-Hill, New York
3. Keat, Paul B., and Philip K.Y. Young, Managerial Economics – Economic Tools for Today's Decision Makers, Pearson Education, Delhi
4. Salvatore, Dominick, Managerial Economics in a Global Economy, Thomson Learning,Hyderabad
5. T.R. Jain, Managerial Economics, V.K. Publication.

Note:

1. Only latest editions of the above books are recommended.
   At least four cases will be discussed, one from each unit.

BUSINESS COMMUNICATION
MPM-104

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the critical importance of business communication from view point ofmanagerial efficiency.
2. Assess the different communication requirements and develop a suitable communicationstrategy for enhancing efficiency.
3. Identify communication barriers and design suitable communication systems to eliminate communication gaps.
4. Develop and strategize communication networks within and outside the organization.

Unit-I

Importance and role of communication in business organizations; 7 C's of communication; process of communication; barriers in communication.

Unit-II

Principles of effective written communication; types of business letters - commercial letters, sale letter, routine letter; enquiries; inter-office memos; report writing; speech writing; preparing agenda of meeting and minutes of meetings; writing positive, negative, persuasive and electronic messages; non-verbal communication; oral communication: art of public speaking; listening skills; team communication.

Unit-III

Cross-cultural dimensions of business communication; business etiquettes across cultures; communication using technology; video conferencing; ethical & legal issues in business communication; mass communication - advertisements, publicity and press releases; media mix; public relations; newsletters.

Unit-IV

Negotiation process & its management; principles of designing presentations using audio- visual aids; creating and delivering online presentations; writing a summer project report; writing CVs & application letters; group discussions & interviews.

Suggested readings:

1. Chaturvedi P.D. & Chaturvedi M., Business Communication skills, concepts andapplications, Pearson education.
2. Lesikar, R. V., Flatley, M. E., Rentz, K. Business Communication: Making Connectionsin a Digital World. Tata McGraw Hill Publishing Company.
3. Boove, C.L., Thill, J.V. & Chaturvedi, M. Business Communication Today, Pearsoneducation.
4. Krizan, A.C.B., Merrier, P., Logan, J. P. and Williams, K.S. Effective BusinessCommunication, Cengage Learning.
5. Scot, O. Contemporary Business Communication, Biztantra.
6. Chaney & Martin. Intercultural Business Communication, Pearson education

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

BUSINESS ENVIRONMENT
MPM-105

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the dynamics of business environment in context of current economic situation.
2. Develop a critical understanding of changes in business environment and assess threats and opportunities emerging out of it.
3. Suggest strategic adjustments for an organisation needed in changing business scenarios.
4. Assess the risks flowing from different business environment scenarios and develop suitable adjustment and response strategies.

Unit-I

Nature and structure of business environment; macro and micro indicators; emerging sectors of Indian economy; relative size and growth of public and private sectors.

Unit-II

Design and strategy of economic reforms; current state of growth and investment; interest rate structure and present monetary policy; fiscal environment; current inflationary position and its impact on business sector; legislation for anti-competitive and unfair trade practices.

Unit-III

Current industrialization trends and industrial policy; environment for the SME sector; infrastructure development and policy; public sector reforms and performance; public -private partnership; trends in service sector growth; business opportunities in the rural sector.

Unit-IV

Balance of payments trends; overview of GST; India's competitiveness in the world economy, Methods of environmental scanning: SWOT and ETOP.

Suggested readings:

1. Bedi S.K., Business Environment, Excel Books, New Delhi
2. Aswathpa, K., Business Environment, Excel Books, New Delhi.
3. Cherunelm, Francis, Business Environment, Himalya Publishing House, New Delhi.
4. Fernando A.C., Business Environment, Pearson Education.

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

BUSINESS STATISTICS AND ANALYTICS FOR DECISION MAKING
MPM-106

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Apply application of quantitative techniques in business decision making
2. Analyse data using statistical techniques and able forecast under uncertain business environment
3. Examine normality and apply its concepts in different sampling techniques
4. Apply quantitative techniques to business situations and optimize resources under constraints.

Unit–I

Measures of central tendency and variations; types of measures; Karl Pearson's coefficient of correlation and spearman's rank correlation.

Unit–II

Correlation analysis; regression analysis -meaning and two lines of regression; relationshipbetween correlation and regression coefficients; time series analysis - measurement of trend and seasonal variations; forecasting.

Unit–III

Basic rules for probability, conditional probability; Bayes' theorem; probability distributions – types and applications of Binomial Poisson and Normal distributions.

Unit–IV

Tests of significance; hypothesis testing- large samples, small samples; chi-square test; analysisof variance

Suggested readings:

1. Levin & Rubin. Statistics for Business, Prentice Hall of India, New Delhi.
2. Gupta S.P. & Gupta M.P. Business Statistics, Sultan Chand & Sons, Delhi.
3. Anderson. Quantitative Methods in Business, Thomson Learning, Mumbai.
4. Naval Bajpai. Business Statistics, Pearson Education India,

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

ELECTRICITY INDUSTRY STRUCTURE AND REGULATIONS

MPM-107

Total credits: 4
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the structure of Indian Power Sector.
2. Develop awareness about the reform measures and Regulatory Institutions in Indian Power Sector.
3. Understand the Policy & Regulatory initiatives undertaken by the Government.
4. Appreciate the effectiveness of Regulatory Institutions and their relationship with Government.

Unit-I

Electricity & development, Overview of Electrical Sector – Brief History & Major Players, Restructuring and Reforms in Indian Power Sector, Significance of Regulatory framework.

Unit-II

Regulatory Institutions in Indian Power Sector, Objectives & their functioning, Constitution & Function of CERC & SERC's, Role of APTEL & Forum of Regulators (FOR), Salient features & Regulatory provisions under Electricity Act 2003 and Amendments.

Unit-III

National Electricity Policy & National Tariff Policy, Renewable Energy Policy and Regulations, Open access in Power sector, Open access Regulations, Availability Based Tariff, Concept of DSM, Trading regulations, Indian Electricity Grid Code Regulations.

Unit-IV

Performance report of State Power utilities, Regulatory Institution independence & effectiveness, Institutional framework & Process, Determinants of Regulatory effectiveness, Relationship between Government & Regulator.

Suggested readings:

1. Electricity Law Raj Singh Niranjan , Universal Publishing
2. Governing Power by S.L . Rao, TERI Publication
3. Commentary on "Electricity Law" by S.K. Chatterjee, Delhi Law House
4. R.V. Shahi "Indian Power Sector Challenges and Response", EXCEL Books Law of Electricity in India, by Sarkar and Bhatnagar , revised by justice L.P.Singh, Orient Publishing Company
5. Law of Electricity in India, by Sarkar and Bhatnagar , revised by justice L.P.Singh, Orient Publishing Company
6. Shivagopal's Guide to Electricity by , V.K. Mehrotra
7. Guide to Electricity Law, Bharucha, Wadhwa, Nagpur
8. Law relating to Electricity with special reference to Consumer Protection Law, R.M. Vats, Universal Law Publishing Company
9. Indian Electricity Act, 1910
10. Indian Electricity (Supply) Act, 1948
11. Electricity Act 2003
12. Central Regulatory Commission Act, 1998
13. Energy Conservation Act 2001

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

RENEWABLE ENERGY MANAGEMENT
MPM-108

Total credits: 4
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the basics of renewable energy resources economics.
2. Examine the energy potential of different renewable energy options
3. Develop critical understanding of human resource management, industrial relations in context of renewable energy industry.
4. Understand the knowledge management processes and corporate social responsibilities

Unit-I

Renewable energy sources and key elements, Wind energy technology, wind energy potential measurement and economics, Systems and regional strategies for grid integration.

Unit-II

Solar thermal power, photovoltaic technology, Biomass Power, Dual fuel cycles, CO2 reduction potential of Renewable Energy.

Unit-III

Ocean power, geothermal energy, Fuel Cell, Green hydrogen and energy storage, Mini and Micro Hydel Projects.

Unit-IV

Social Considerations, Economics and Financing of Renewable Energy systems -Economic Growth, characteristics of developing countries, structural changes in the process of development, relationship between agriculture and Industry, energy planning, input output model, financial and economic evaluation of non-conventional energy systems.

Suggested readings:

1. Biomass Energy Projects Louis J. Godman, Pergamon Press
2. R.H. Taylor, Alternative Energy Sources, Adam Hilger Ltd. Bristol
3. G.D. Rai, Non Conventional Energy Sources, Dhanpat Rai and sons

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

MANDATORY AUDIT COURSE

VALUE EDUCATION
MPM 109

Total credits- 0
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the significance of values in human life
2. Recognize and appreciate ethical considerations and values relevant to business activity
3. Maintain balance in their personal and professional life
4. Understand the rationale of social responsibility

Unit-I

Purpose of value education and its importance in the modern world, The role of culture and civilization in the realm of values, Salient values for life- Truth, commitment, honesty and integrity, empathy, unity and inclusiveness, Self-esteem and punctuality. Interdependence of all beings – Environment enrichment and conservation

Unit-II

Time, task and resource management – Problem solving and decision making skills- Interpersonal and Intra personal relationship – Team work – Positive and creative thinking.

Unit-III

Human Rights – Universal Declaration of Human Rights – Human Rights violations – National Integration – Peace and non-violence – Dr. A P J Kalam's ten points for enlightened citizenship – Social Values and Welfare of the citizen – The role of media in value building.

Unit-IV

Social Evils – Corruption, Cybercrime, Terrorism – Alcoholism, Drug addiction – Dowry – Domestic violence – untouchability – female infanticide – atrocities against women – ways to tackle these issues

Suggested readings:

1. John, R. Boatright. Ethics and the Conduct of Business, Pearson Education, New Delhi.
2. Edmund, G. Seebauer and Robert L Barry, Fundamentals of Ethics for Scientists andEngineers, Oxford University Press, Oxford.
3. Hartman, Laura P. and Joe Des Jardins, Business Ethics: Decision-Making for PersonalIntegrity & Social Responsibility. McGraw-Hill/Irwin
4. Arthur, John. Studying Philosophy: A Guide for the Perplexed. Pearson/Prentice Hall
5. M.G.Chitakra: Education and Human Values, A.P.H.Publishing Corporation, New Delhi, 2003
6. Chakravarthy, S.K.: Values and ethics for Organizations: Theory and Practice, Oxford University Press, New Delhi, 1999

Note:

1. Only latest editions of the above books are recommended.
2. Content will be covered with suitable practical problems and case studies.

SEMESTER -2

HUMAN RESOURCE MANAGEMENT
MPM-201

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the basics of human resource management with roles and responsibilities of a human resource manager.
2. Analyse the human resource challenges in present scenario.
3. Know the essentials of employing, maintaining and promoting a motivated workforce in an organisation.
4. Develop critical understanding of contemporary issues of human resource management.

Unit-I

Human resource management - concept, evolution, scope, challenges and strategic objectives; line and staff responsibilities of HR manager; human resource planning & forecasting - significance and process; human resource information system.

Unit-II

HR sourcing and recruitment; selection process; job analysis - job description and job specification; job design approaches; job evaluation - concept & methods; employee compensation management & determinants of wage/salary fixation; incentives, bonus, ESOPs, fringe Benefits.

Unit-III

Performance appraisal methods - limitations and problems; Performance management process; performance management and strategic planning; identifying KRAs (Key Result Areas) and KPIs (Key Performance Indicators); interactive goal setting process; human resource development; training- process, methods and evaluation; capacity building; career planning and development; potentialappraisal and succession planning.

Unit-IV

Industrial relations; grievance handling; employee welfare; employee separations, downsizing & outplacement; dispute resolution; international human resource management; contemporary issues in HRM - knowledge management, HR audit & accounting, HR in virtual organizations, ethics &corporate social responsibility.

Suggested readings:

1. Aswathapa,K. Human resource management: Text and cases, Tata McGraw Hill Education.
2. Haldar, U. and Sarkar Juthika, Human Resource Management, Oxford University Press.
3. Decenzo, D. & Robbins S.P., Human Resource Management, Wiley India Private Limited.
4. Gary, Dessler, Essentials of Human Resource Management, Pearson.
5. Tanuja, Agarwala, Strategic Human resource Management, Oxford University Press
6. Rao,V.S.P., Human Resource Management, Cengage Learning India

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

ENTREPRENEURSHIP DEVELOPMENT
MPM-202

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the dynamics of entrepreneurship to develop proper perspective of current entrepreneurial practices.
2. Develop a clear understanding about business plan formulation
3. Analyse economic, technical, financial and managerial aspect of feasibility study.
4. Suggest suitable entrepreneurship development programmes for improvement ofentrepreneurial skills.

Unit-I

Concept of entrepreneur; characteristics, qualities of entrepreneur, difference between entrepreneur, manager and leader; entrepreneurial motivation; barriers to entrepreneurship.

Unit-II

Definition of project, types and importance, phases of project; procedure to set up a small businessenterprise: identifying the business opportunity, stages for setting up of a small enterprise Businessplan; opportunities in various sectors.

Unit-III

Feasibility study; preparation of feasibility reports: economic, technical, financial and managerialfeasibility of project; methods and procedures to start and expand one's own business.

Unit-IV

Government support to new enterprise; entrepreneurship development programmes, role of various institutions in developing entrepreneurship in India.

Suggested readings:

1. Khanka, S.S., Entrepreneurship Development. S. Chand.
2. Desai, A N. Entrepreneur & Environment. Ashish, New Delhi.
3. Drucker, Peter. Innovation and Entrepreneurship. Heinemann, London.
4. Jain, Rajiv. Planning a Small-Scale Industry: A Guide to Entrepreneurs. S.S. Books, Delhi.
5. Kumar, S A. Entrepreneurship in Small Industry. Discovery, New Delhi.
6. McClelland, D. C. and Winter, W G. Motivating Economic Achievement. Free Press, New York.

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

CORPORATE FINANCE
MPM-203

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand key decisions like Investment, Financing and dividend in financial Management.
2. Use their best knowledge in long term investment decision towards the value creation for theorganization
3. Understand the value creation through capital structure its decisions, dividend policy andapplications of leverages in financing decisions.
4. Aware about working capital and its management in business

Unit-I

Financial management scope finance functions and its organization, objectives of financialmanagement; time value of money; sources of long-term finance.

Unit-II

Investment decisions importance, difficulties, determining cash flows, methods of capital budgeting, risk analysis (risk adjusted discount rate method and certainty equivalent method); cost of different sources of raising capital, weighted average cost of capital.

Unit-III

Capital structure decisions, financial and operating leverage; capital structure theories- NI, NOI, traditional and M-M theories; determinants of dividend policy and dividend models - Walter, Gordon & M.M. models.

Unit-IV

Working Capital meaning, need, determinants, estimation of working capital need; management of cash; inventory management; receivables management, financial restructuring and debt management.

Suggested readings:

1. Pandey, I.M., Financial Management, Vikas Publishing House, New Delhi
2. Khan M.Y, and Jain P.K., Financial Management, Tata McGraw Hill, New Delhi
3. Chandra, Prasanna, Financial Management, TMH, New Delhi
4. Van Horne, James C., Financial Management and Policy, Prentice Hall of India
5. Brigham & Houston, Fundamentals of Financial Management, Thomson Learning,Bombay.
6. Kishore, R., Financial Management, Taxman's Publishing House, New Delhi.

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

OPERATIONS AND SUPPLY CHAIN MANAGEMENT
MPM-204

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Gain a conceptual understanding of the manufacturing and services Operations
2. Apply best practices for managing operations and supply chain management
3. Measure and manage quality of manufacturing and services operations
4. Utilize resources in optimum manner by using various techniques

Unit-I

Introduction: operations management and supply chain management; cross-functional and inter-organizational linkages in operations and SCM; operations and supply chain strategies; business processes; mapping business processes; measuring process performance; quality control

Unit-II

Product design and development process; operations and supply chain perspectives on design; the development process; organizational role in product and service development; types of manufacturing processes and their characteristics; product customization within the supply chain; service processes; layout decision models; methods of evaluating capacity alternatives

Unit-III

Importance of purchasing; sourcing decision; sourcing strategy; purchasing process; multi-criteria decision models in sourcing and purchasing; trends in purchasing models; importance of logistics; logistics decision models; sales and operations planning (S&OP) strategy

Unit-IV

Role of Inventory – its types, drivers and dependent demand inventory; review system; economic order quantity, reorder points, safety stock and quantity discounts; inventory in supply chain; master scheduling; material requirement planning; production activity control; just-in-time perspective on waste and inventory

Suggested readings:

1. Bozarth, Cecil C. & Handfield, Robert B.; Introduction to Operations and Supply Chain Management; Pearson Education; New Delhi
2. Wisner, Joel D., Leong, G. Keong & Tan, Keah-Choon; Principles of Supply Chain Management – A balanced approach; Thomson Learning; New Delhi
3. Gaither, Norman & Frazier, Greg; Operations Management; Thomson Learning; New Delhi
4. Mahadevan, B.; Operations Management – Theory and Practice; Pearson Education; New Delhi
5. Krajewski, Lee J. & Ritzman, Larry P.; Operations Management – Processes and Value Chains; Pearson Education; New Delhi

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

BUSINESS RESEARCH METHODS
MPM-205

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Design a quantitative survey for business problems
2. Evaluate qualitative and quantitative research approaches to business decision making.
3. Relate ethical and philosophical consideration in business research.
4. Explain the role of research in business decision making and business performance

Unit-I

Managerial value of business research; theoretical framework; hypothesis development; literatureSurvey; process of research and structure of research proposal.

Unit-II

Research design: exploratory; descriptive; diagnostic; experimental; sampling design and techniques; measurement scales types and construction of scales and reliability and validity aspects in measurement; ethics in research.

Unit-III

Methods of data collection; data analysis and interpretation; editing; coding; tabulation; hypothesis testing: an overview of parametric and non-parametric tests- ANOVA, Wilcoxon Matched pair signed; rank test; Mann Whitney test.

Unit-IV

An overview of dependent and interdependent methods -multiple regression; factor analysis; cluster analysis; ingredients and constructions of research report; procedure of preparation of reference and bibliography.

Suggested readings:

1. Zikmund, Millian G., Business Research Methods, Thomson Learning, Bombay
2. Cooper, Donald R- and Pamels Schindler, Business Research Methods, Tata McGraw Hills,New Delhi
3. Sekran, Uma, Business Research Method, Miley Education, Singapore
4. Kothari, C.R., Research Methodology

Note:

1. Only latest editions of the above books are recommended.
2. In each unit, content will be covered with suitable practical problems and case studies.

MARKETING MANAGEMENT
MPM-206

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the process of marketing by which companies create value for customers andcapture value from customers in return
2. Make the strategies related to 4Ps and understand the significance of consumer behaviour
3. Know the contemporary issues of marketing
4. Face the challenges in the market and ways to tackle them in an effective manner

Unit-I

Nature and scope of marketing; philosophies of marketing management; attracting, retaining and developing relationship with customers; marketing environment; marketing research and marketing information system; ethical issues in marketing

Unit-II

Understanding consumer behaviour; factors influencing consumer buying behaviour and organizational buying behaviour; market segmentation, targeting and positioning; marketingstrategies at the different stages of the product life cycle; new product development process

Unit-III

Marketing mix; product classification, product mix and product line decisions; branding and packaging decisions; pricing strategies and practices; factors affecting selection of marketing channels; introduction to wholesaling and retailing; promotion mix: advertising, sales promotion,public relations, personal selling

Unit-IV

Marketing organization structures; implementation and control of the marketing program; sales forecasting methods; green Marketing; event marketing; direct marketing; network marketing; holistic marketing; permission marketing; social marketing

Suggested readings:

1. Kotler, P. and Armstrong, G., Principles of Marketing, Pearson Publication, India
2. .Kotler, P., Keller K., Koshy A. and Jha, M., Marketing Management in South Asian Perspective, Pearson Education, India
3. Etzel M., Walker B., Stanton W., and Pandit A., Marketing, TMH, India
4. Panda T., Marketing management: Text and cases Indian context, Excel Books, India.
5. Kumar, A. and Meenakshi, N., Marketing Management, Vikas Publication, India

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

TARIFF DETERMINATION AND FINANCIAL MODELING OF POWER PROJECTS
MPM-207

Total credits: 4
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand key decisions like Investment and Financing for Power Projects.
2. Understand the Cost break-up of components that go into the determination of Tariff for Power projects.
3. Develop awareness about Competitive bidding of Power projects and subsidy related to Power Tariff.
4. Aware about the actual determination of Tariff for a Power project.

Unit-I

Economic and financial concepts, Understanding investment concepts, Economics of Power project, Making investment decision for Power sector, Project Finance, Financing Power projects, Lending by financial institutions.

Unit-II

Classification of costs in the power sector, Capital cost, Costs of operation, Methods of cost and tariff determination, Cost-plus method, Performance based regulation, Market determined tariff.

Unit-III

Multi-year tariff, Role of competitive bidding for Power procurement, Tariff process for distribution, transmission and generation, Consumer tariff, Reduction in cross-subsidy, Agricultural tariff, Industrial tariffs.

Unit-IV

Filing of ARR, Tariff determination methodology, Section 62 Section 63 of Electricity Act, Regulatory norms for computation of Tariff of Thermal Power Project, Regulatory norms for computation of Tariff of Renewable energy Project, Tariff determination exercise & Financial modelling.

Suggested readings:

1. Terms and Conditions of Tariff – CERC Regulations
2. Managerial Economics by G.S. Gupta, Tata McGraw Hill publishing Co. Ltd.
3. Energy Pricing in India by Herry Sarkar and Gopal K. Kadekodi – Publisher - United National Development Program & Economic Commission for Asia & Pacific.
4. Energy Economics, Demand Management and Conservation policy. By Mohan Munasinghe and Bunter Schramm – Publisher Van Nustrand Reinhold Company, New York

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

SMART GRID MANAGEMENT
MPM-208

Total credits: 4
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the components of smart grid
2. Examine the various distributed generation technologies and their impacts
3. Understand the consumer indexing and relationship management in the smart grid context
4. Comprehend the critical links between advanced metering infrastructure and smart grid implementation

Unit-I

Introduction to Smart Grid, definition and need of smart grid, Essential components of smart grid, regulatory challenges, smart grid activities in India- Overview of RDSS (Revamped Distribution System Scheme), India Smart Grid Task Force (ISGF).

Unit-II

Introduction Distributed energy sources, overview of renewable energy technologies, microgrids and electric vehicles, Flexible AC Transmission System (FACTS), Smart Meters and its product chain from consumer to utility, AMI and Smart Meters Integration, Distribution network automation, EMS and SCADA, Relevant IEEE standards.

Unit-III

Restructuring Consumer indexing, GPS, GIS mapping, GIS facility management, GIS Asset management system, outage management system.

Unit-IV

Metering and billing, Revenue collection, AT&C losses and remedial measures, Demand response and Demand Side Management, Emerging trends in metering technology, Overview of Meter Data Acquisition System (MDMS), Consumer care and customer relationship management.

Suggested readings:

1. Sturt Bortase, Smart grid: Infrastructure, Technology and solutions, CRC press, 2012
2. James A. Momoh, Smart Grid: Fundamentals of Design and Analysis, Wiley-IEEE Press, 2012
3. Salman K. Salman, Introduction to the Smart Grid: Concepts, Technologies and Evolution, IET Digital library, 2017.

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

ENERGY AND ENVIRONMENT
MPM-209

Total credits: 4
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the energy transfer and nutrient cycling
2. Understand the effects of air pollution and mitigation options
3. Examine the causes and effects of water and soil pollution
4. Critically analyse the effect of human activities on climate and their solutions

Unit-1

Introduction, elementary definitions, connection of energy with ecology, classification of resources, transfer of energy and nutrients in the environment, impact of conventional sources on the environment.

Unit-2

Air pollution- its stationary and mobile sources, types of pollutants, impact of pollutants, temperature effects, plume models for assessment, mitigation aspects through adoption of non-conventional energy sources.

Unit-3

Water pollution- sources and types, BOD (Biochemical oxygen demand), water quality and treatment, Soil pollution, types and sources of pollutants, causative factors and effects of soil degradation, remedies and solutions.

Unit-4

Greenhouse gases, Global warming phenomenon, Depletion of ozone layer, climate change and its associated factors, Effects of climate change on land and oceans.

Suggested readings:

1. Sustainability, Green Energy and Climate Change: Revisited, Behari J, Capital Publishing Company.
2. Power Plant Engineering, Nag P. K., Tata McGraw Hill
3. Introduction Environmental Engineering and Science, Gilbert M. M., Wendell P. E., Prentice Hall of India.

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

SEMESTER -3

STRATEGIC MANAGEMENT
MPM-301

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Get clear understanding of basic concept of strategy and its relationship with the firm's vision, mission and objectives for the organizations' success.
2. Identify different strategic options available and their relation with dynamic environment.
3. Sketch the strategy to be followed by the organization and to effectively implement thestrategy that will help the organization to become successful in the market.
4. Evaluate strategies in an effective manner by applying different techniques.

Unit-I

Strategy-levels of strategy; strategic planning; strategic management; process of strategic management; strategic indent: company's vision, mission and objectives.

Unit-II

Strategic formulation - environmental and organizational appraisal; types of strategies; strategic analysis and choice, BCG matrix, general electric matrix and balance score card approach, value chain analysis.

Unit-III

Strategy implementation - designing organizational structure; structural, behavioral, functional and operational implementation.

Unit-IV

Strategy evaluation and control - strategic and operational control; techniques of evaluation and control.

Suggested readings:

1. Kazmi A., Business Policy and Strategic Management, TMH publication.
2. Jauch L. R. & Glueck W.F., Business Policy and Strategic Management, TMH publication.
3. Thompson A. A. and Strickland A. J., Strategic Management - Concept and cases, TMH publication.
4. David, Fred R. Strategic Management – Concept and Cases, Pearson Education.
5. Kenneth, A. Andrews, Concepts of corporate Strategy, Dow Jones-Irwin
6. John A. Pearce II and R.B. Robinson, Strategic Management - Strategy Formulation and Implementation, McGraw-Hill Education.

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

BUSINESS LAWS
MPM-302

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the legal framework regulating business, from the point of view of making theoperations of the organization legally compliant.
2. Develop a critical understanding of the implications of the changes in the provisions ofdifferent business law and assess their impact.
3. Develop suitable adjustment strategies according to business law.
4. Identify non-compliant practices and operations, and replace them with legally compliantsystem.

Unit–I

The Indian Contract Act - essentials of a valid contract, void agreements, kinds of contracts, performance of contracts, breach of contract and its remedies, quasi-contracts; The Sale of Goods Act - contract of sale of goods, conditions and warranties, transfer of property, rights of an unpaidseller.

Unit–II

Negotiable Instruments Act - nature and types of negotiable instruments, parties to negotiable instruments, negotiation and assignment, dishonour and discharge of a negotiable instrument, crossing and bouncing of cheques; Consumer Protection Act 1986.

Unit–III

The Companies Act, 2013 - characteristics and types of companies; incorporation of a company, memorandum and articles of association; director's powers and duties, meetings prospectus, winding up; Indian Partnership Act, 1932 - essential elements, formation of partnership, registration, types of partners and partnership, rights and duties of partners.

Unit–IV

Competition Act 2002 - objectives, competition commission of India; Information Technology Act 2000; Right to Information Act; overview of Foreign Exchange Management Act.

Suggested readings:

1. Kuchhal, M.C. and Kuchhal Vivek, Business Legislation Management, Vikas Publishing, New Delhi.
2. Pathak, Legal Aspects of Business, McGraw Hill, New Delhi.
3. Kapoor, N. D. (2009). Elements of Mercantile Law, Sultan Chand & Sons, New Delhi.

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

INTRODUCTION TO SUSTAINABILITY, DATA SCIENCE, CYBER SECURITY IN POWER SECTOR

MPM-303

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the concept of sustainability and circular economy.
2. Develop an understanding of the emerging trends for energy transition
3. Examine the data science tools used for drawing inferences from data.
4. Understand the basic principles of cyber security and its application

Unit–I

Sustainable development – evolution, approaches, interpretations, Labor markets in the energy sector, Introduction to circular economy, Role of consumers to influence circular economy.

Unit–II

Smart grid and the potential of smart cities for future sustainability, role of emerging technologies in energy transition: Electric vehicles, green hydrogen, energy storage units. Usage of data analysis for enabling the transition.

Unit–III

Fundamentals of Data science: Inferential statistics– basics of probability discrete distributions, continuous distributions, central limit theorem, data science tools.

Unit–IV

Introduction to Cyber Security – definition and need; 3 principles of cyber security, Basics of Network Security – computer network; layers in OSI model; network protocols, Cyber Attacks/Threats – brute force attack; phishing; vishing; smishing; DOS & DDOS; SQL Injection; MMA; malware, Cyber Defenses – introduction; firewalls; encryption; anti-virus; honey pots; password management; switch port security, Back ups & Disaster Recovery.

Suggested readings:

1. Salman K. Salman, Introduction to the Smart Grid: Concepts, Technologies and Evolution, IET Digital library.
2. Raworth, K.; Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist. Random House.
3. Eric J. Grus; Data Science from Scratch; O'reillly.
4. Anand Shinde; Introduction to Cyber Security: Guide to the World of Cyber Security; Notion Press 1st Edition (5th Feb 2021).
5. Chuck Easttom; Computer Security Fundamentals; Pearson IT Certification 3rd edition (June 28, 2016)

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

PROJECT MANAGEMENT

MPM-304

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand about the various aspects related to planning and analysis of the projects.
2. Analyse project ideas
3. Apply various financial applications in project appraisal.
4. Check the feasibility of project ideas.

Unit-I

Project Identification analysis - concept of project, search for business idea, project identification, project planning formulation and analysis, project screening and presentation of projects for decision making; socio-economic consideration in project formulation; project management cycle.

Unit-II

Market and technical analysis - market and demand analysis; market survey, demand forecasting,uncertainties in demand forecasting; technical analysis; product mix, plant capacity, materials and inputs, machinery and equipment; financial analysis; cost of project, projected cash flow, means of financing project in India, role of financial institution in project finance, Break Even Analysis.

Unit-III

Project appraisal - methods; economic analysis, financial analysis, technical feasibility, management competence, project appraisal techniques; payback period, accounting rate of return,net present value, internal rate of return, benefit cost ratio; social cost benefit analysis, risk analysis; measures of risk, sensitivity analysis, stimulation analysis, decision tree analysis.

Unit-IV

Project Scheduling/Network Techniques in project management: CPM and PERT analysis; float times; crashing of activities; multiple projects; constraints in selection of projects; project dependence - capital rationing; project indivisibility; project completion report.

Suggested readings:

1. Chandra. P. Projects, Tata McGraw Hill
2. Pinto, Project Management, Pearson Education.
3. Panneerselvam. R. and Senthilkumar. P,Project Management PHI Learning.
4. Choudhury, S, (2007). Project Management, Tata McGraw Hill Publishing.
5. Bhavesh, M. Patel (2009). Project Management: Strategic Financial Planning Evaluation and Control, Vikas Publishing.

Note:

1. Only latest editions of the above books are recommended.
2. In each unit, content will be covered with suitable practical problems and case studies.

RURAL ENERGY MANAGEMENT

MPM-305

Total credits: 4
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the rural energy situation and ecological effects of energy use.
2. Examining emerging practices and policies for effective implementation
3. Understand the options and choices cost effective rural electrification
4. Develop a critical understanding of the regulatory aspects of rural electrification

Unit–I

The Rural Energy Situation: Effects of Bio fuel use in rural India, Pollution and Health Ecological damage, Energy efficiency, the transition to modern energy, Rural Electrification Policy.

Unit–II

Emerging practices and Policies: Enabling People to choose from among Alternative forms of Energy, Avoiding unnecessary subsidies, addressing market failures High Start -up Costs and Risks, External Costs and Benefits, Emphasizing Participation and Institutional Development, Participation, Local Institution Development, Decentralization

Unit–III

Options for Rural electrification: Cost Effectiveness and choice of options, Costs of Grid Supplies , Reducing initial investment costs by using appropriate design standards, Micro -grids supplied by diesel generators, Electricity Supplies from Renewable Energy Sources

Unit–IV

Regulatory and Price Reforms, Unbundling, and Privatization, Implications for Rural Electrification, Approaches to Distribution Franchisee & Entrepreneurship, Innovations in Rural Energy, Rural Electrification and World Bank, Different Programs of Rural Energy Development.

Suggested readings:

1. Wayne C. Turner, Steve Doty; Energy Management Handbook; Fairmont Press.
2. M.A.Masillamani & S. Ramaswamy; Rural Energy Management

Note:

1. Only latest editions of the above books are recommended.
2. In each unit, content will be covered with suitable practical problems and case studies.

POWER MARKET ECONOMICS AND OPERATIONS

MPM-306

Total credits: 4
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the characteristics of Natural monopoly & Power markets.
2. Develop awareness about Power Market transactions.
3. Appreciate the basic concepts that go into a Power Purchase agreement.
4. Draft a Power Purchase agreement between Power Utilities addressing all the issues that may get involved.

Unit-I

Economic characteristics of Power Market, Perfect competition, Monopoly, Natural Monopoly, Economic characteristics of Natural Monopoly, Basic theory of energy pricing, Present Energy pricing Scenario in India.

Unit-II

Power Market transactions, Single Buyer vs Multi Buyer Multi Seller Model, Different approach to Power transactions – Long term, Medium term, Short term, Concept of Power Trading, Grant of Trading License, Trading margin, Power Market Regulations, Power Exchange mechanism.

Unit-III

Power Purchase agreement, PPA obligations, Power procurement & Tariff considerations, Requirements of PPA, Risks and responsibilities in a power purchase agreement, Desirable Principles of power purchase agreements, Scope of the PPA, Articles and schedules of a model PPA.

Unit-IV

Drafting Power purchase agreement, Definition and interpretation of terms of a model PPA, Negotiating Power purchase agreements, Resolving disputes in PPA, Expiration of PPA, Buyer default, Seller default, Lender rights, PPA - Financial and legal issues, Study and Analysis of a sample PPA between a Generation and Distribution Utility.

Suggested readings:

1. Terms and Conditions of Tariff – CERC Regulations
2. Managerial Economics by G.S. Gupta, Tata McGraw Hill publishing Co. Ltd.
3. Energy Pricing in India by Herry Sarkar and Gopal K. Kadekodi – Publisher - United National Development Program & Economic Commission for Asia & Pacific.
4. Energy Economics, Demand Management and Conservation policy. By Mohan Munasinghe and Bunter Schramm – Publisher Van Nustrand Reinhold Company, New York

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

ENERGY CONSERVATION AND ENERGY AUDIT
MPM-307

Total credits: 4
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the patterns of energy consumption and potential for conservation.
2. Examine the relevant regulations and demand side management options
3. Develop a critical understanding of the audit and accounting process for buildings, industries and power utilities.
4. Identify the incentives and technologies to enable effective conservation strategy

Unit–I

Energy Conservation Act 2001, Objectives and implementation Strategy, Study of Energy consumption patterns in various sectors, Comparison of consumption pattern with developed and other developing countries and identifying basic potential of conservation.

Unit–II

Thermal Energy System, Electrical Energy System, Energy Balancing, Maintenance standards, Demand side Management.

Unit–III

Energy management, Scope, Energy Audit, Energy Accounting, Audit for Buildings and Commercial Complexes, Industrial Energy Audit, Tools and Methodologies for Energy audit, analysis and decision making on the basis of energy audit Report, Energy audit Case studies in various sectors of economy, Energy Audit for Generation, Transmission, and Distribution Utilities.

Unit–IV

Incentives for Energy Conservation, Energy Efficient equipment and technologies, Stakeholders awareness program, Development of Energy audit personnel, Target setting and implementation Strategy, Managerial aspects of energy conservation.

Suggested readings:

1. Energy Conservation Handbook, Mc Graw Hill
2. Energy Conservation Act 2001
3. Energy Conservation in selected Govt. Firms, Energy Management Centre
4. S. David, Handbook of Industrial Energy Conservation Van Nostrand, Reind Company
5. Course Material of Bureau of Energy Efficiency for National Energy Auditor/ Manager Exam

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

OPEN ELECTIVES

E-COMMERCE
MPM–308

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the types of e-commerce and factors affecting them
2. Explore the process and financial instruments involved in e-commerce
3. Examine the tools and channels for implementing e-commerce
4. Understand the technological and marketing aspects for online commerce

Unit–I

Introduction to Electronic Commerce: origin and need; Framework, applications; network infrastructure (including internet), internet commercialization; factors affecting e-commerce; business and technological dimensions of e-commerce.

Unit–II

Electronic payment system, inter-organizational commerce & intra-organizational commerce, EDI, value-added network; digital library; smart card, credit card and emerging financial instruments.

Unit–III

B2B e-commerce; e-procurement, supply -chain coordination; on-line research; organizing for online marketing. Internet retailing; multi channel retailing, channel design; selling through online intermediaries. Mobile commerce: Introduction to mobile commerce; benefits of mobile commerce; mobile commerce framework; Internet advertising;.

Unit–IV

Security; advertising & marketing in the internet, introduction to marketing & CRM, consumer search & resource discovery, computer-based education & training, digital copyrights. Search engines & directory services; Agents in electronic commerce.

Suggested readings:

1. Schneider P. Gary, Perry T.James, E-Commerce, Thomson Learning, Bombay.
2. Hanson & Kalyanam, Internet Marketing & e-commerce, Thomson Learning, Bombay.
3. Bharat Bhasker, Electronic Commerce, TMH, N Delhi.
4. Kosiur, Understanding E-Commerce, Prentice Hall of India, Delhi.
5. Kalakota, Whinston , Frontiers of Electronic Commerce, Addison Wesley.
6. Shurety, E-business with Net Commerce (with CD), Addison Wesley.
7. Napier, Creating a winning E-business, Vikas Publishing House, New Delhi
8. Efraim Turban, Jay Lee, David King & H.Michael Chang, Electronic Commerce: A Managerial Perspective , Pearson Education, Delhi

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

OPERATIONS RESEARCH
MPM–309

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the fundamentals for problem formulation in operations research
2. Understand and solve transport and assignment problems.
3. Assess the probability considerations and trade-offs in various tasks.
4. Understand the service time models and apply optimal strategies for outcomes.

UNIT- I

Operations Research: Evolution, methodology and role in managerial decision making; Linear programming: Meaning, assumptions, advantages, scope and limitations; Formulation of problem and its solution by graphical and simplex methods; special cases in simplex method: infeasibility, degeneracy, unboundedness and multiple optimal solutions; duality.

UNIT – II

Transportation problems including trans-shipment problems; Special cases in transportation problems: unbalanced problems, degeneracy, maximization objective and multiple optimal solutions; assignment problems including travelling salesman's problem. Special cases in assignment problems: unbalanced problems, maximization objective and multiple optimal solutions.

UNIT – III

PERT/CPM: Difference between PERT and CPM, network construction, calculating EST, EFT, LST, LFT and floats, probability considerations in PERT, time-cost trade-off. Decision theory: decision making under uncertainty and risk, Bayesian analysis, decision trees.

UNIT – IV

Game theory, pure and mixed strategy games; principle of dominance; two person zero sum game; Queuing theory: concept, assumptions and applications; analysis of queue system, Poisson distributed arrivals and exponentially distributed service time models (MM1 and MMK); Simulation; meaning, process, advantages, limitations and applications.

Suggested readings:

1. Paneerselvam, Operations Research, Prentice Hall of India, N.Delhi.
2. Taha, Operations Research: An Introduction, Prentice Hall of India, N.Delhi.
3. Vohra, N.D.; Quantitative Techniques in Management; Tata McGraw Hill Publishing Company Ltd., New Delhi.
4. Kapoor, V.K., Operations Research; Sultan Chand & Sons, New Delhi.
5. Sharma, J.K., Operations Research: Theory and Applications, Macmillan India Ltd, New Delhi.
6. Kalavathy, Operations Research, Vikas Publishing House, New Delhi

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

DIGITAL AND SOCIAL MEDIA MARKETING
MPM–310

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the fundamentals of digital marketing and customer lifecycle
2. Learn optimization strategies to increase website search engine results rankings to increase traffic and sales.
3. Learn foundational and advanced social media marketing strategies
4. Learn about different digital marketing tools
5. Learn about social media marketing using all of the most popular social media platforms in order to bring growth in the business

UNIT- I

Fundamental Concepts of Digital Marketing, Customer lifecycle, Marketing technology, the future of digital marketing.

UNIT – II

Introduction to SEO, on page optimization, off site optimization and link building, keyword search and competitive analysis, changing state of SEO, Integrating SEO with other disciplines, advanced search engine optimization.

UNIT – III

Psychology of search, pay-per-click, search ads and keyword targeting, reaching target audiences, the buying funnel, setting and measuring marketing goals. Introduction to social media, social media strategy and planning, social media channel management and its tools, measurement and reporting, social advertising.

UNIT – IV

Introduction to digital analytics, managerial perspectives of digital analytics, key performance indicators, segmentation, reports and dashboards, digital analytics stack.

Suggested readings:

1. Corey Rabazinski, Google AdWords for Beginners: A Do-It-Yourself Guide to PPC Advertising, Penguin Publ.
2. Gabriel Weinberg, Traction: How Any Startup Can Achieve Explosive Customer Growth, CreateSpace Independent Publishing Platform.

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

SEMESTER -4

NATURAL RESOURCE MANAGEMENT
MPM-401

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Gain an overview of key concepts and approaches related to natural resource governance.
2. Critically evaluate the governance regimes under different ecological contexts
3. Understand the market mechanisms for resource management
4. Develop a critical understanding collective management process

Unit-1

Developing a rationale for Natural Resource Management (NRM) regimes: Concepts such as carrying capacity, ecological footprint, resilience, sustainability, property rights, externalities, power, and politics are introduced. Deep ecology, ecofeminism, ecological pragmatism, political economy, and political ecology.

Unit-2

Types of property, the emergence of the concept of common property resources (CPRs), and institutional arrangements for managing common property resources. Natural resource issues in collective management recognizing the conditions for collective action. Understanding communities and social, power, and gender relationships in Natural Resource Management through collective action as a socially embedded process.

Unit-3

Markets as a means of allocating natural resources Implications for equity, efficiency, and sustainability Issues and perspectives on market creation as a reform strategy. Perspectives on ecosystem goods and services, in addition to market creation (payment for ecosystem services).

Unit-4

The Role of Non-Governmental Organizations and Civil Society in Natural Resource Management The emergence of civil society organizations (including environmental non-governmental organizations) and the typology of NGOs Partnerships for sustainable development.

Suggested readings:

1. The Political Economy of Global Environmental Governance, Newell, P., Review of International Studies
2. Common Property Institutions and Sustainable Governance of Resources, A. Agrawal, *World Development*.
3. Collective Action, Property Rights and Decentralization in Resource Use in India and Nepal, Politics and Society, Agrawal A. and Ostrom E., *Politics and Society*

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

CYBER SECURITY and CLOUD ELECTIVES

CYBER LAWS, REGULATIONS & AUDIT
MPM-C-402

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Gain knowledge about the cyber security law program applicable to any public or private organization,
2. Learn the rules of criminal procedure applicable to cyber crimes as well as the legal aspect of IT.
3. Understand how cyber privacy and data protection laws affect the protection of information.
4. Understand the branches of law, jurisdictional boundaries and cyber security law enforcement

UNIT- I

Introduction to information security – Authentication, Confidentiality, Integrity & Availability, Basic concept of Data Encryption Techniques and Hashing, Cyber Crimes against Individuals; Institution and State; Identity Theft & Fraud, Cyber Terrorism, Cyber Defamation

UNIT – II

Salient Features of IT Act 2000, Legal Provisions under the Information Technology Act 2000, Recent Amendments by IT Act Amendment Act 2008, Introduction to Information Security Management System – Security, Risk Management & Access Control; Policies.

UNIT – III

Cyber law – Overview, International Cyber Law, Cyber Law in India, Need for Cyber Law, Different types of Cyber Law.

UNIT – IV

Information Security Audit & Monitoring – Digital Asset Protection, Roles of Audit, Audit Objectives, Audit Scope.

Suggested readings:

1. Dr. Jyoti Rattan, Dr. Vijay Rattan; Cyber laws & Information Technology; Bharat law House Pvt Ltd.
2. Satish Chandra; Cyber laws in India; ABS Books publisher
3. Robert E Davis; Auditing Information and Cyber Security Governance; CRC Press.
4. Pavan Duggal; Textbook on Cyber Law; Universal Law Publishing – An imprint of LexisNexis

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

MALWARE ANALYSIS AND INCIDENT RESPONSE
MPM-C-403

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Gain knowledge about different classes of Malwares based on their characteristics.
2. Learn about types and techniques of Malware Analysis and tools used for it.
3. Know about various types of cyber incidents and how to manage and respond to those incidents.
4. Learn about the Incident Response Team in India and in different power sectors

UNIT- I

Introduction to Malwares, Types of Malwares and Terminologies – topology based on its characteristics.

UNIT – II

Malware Analysis, Types of Malware Analysis – Static Malware Analysis; Dynamic Malware Analysis, Tools used for Malware Analysis, History of malwares (From Brain.A to Stuxnet and beyond)

UNIT – III

Introduction to NIST framework; Cyber Security Framework, Introduction to Incident Response, Incident Response Team in India for Critical Infrastructure and different power sectors

UNIT – IV

Categories of Incidents, Methods of detecting incidents, Cyber Security Response Plan and situational awareness, Incident Tracking and Reporting

Suggested readings:

1. KA Monappa; Learning Malware Analysis; Packt Publishing.
2. Abhijit Mohanta; Malware Analysis and Detection Engineering; Apress
3. Barker Dylan; Malware Analysis Techniques: : Tricks for the triage of adversarial software; Packt Publishing Ltd.
4. Jithin Alex; Incident Handling and Response: A Holistic Approach for an efficient Security Incident Management,

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

VULNERABILITY ASSESSMENT AND PENETRATION TESTING
MPM-C-404

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Explain basic principles and techniques of how attackers can enter computer system.
2. Evaluate the strength and weakness of various information technology solutions in terms of data security.
3. Learn about penetration testing and practice by performing ethical hacking and penetration testing
4. Implement vulnerability management planning methods to mitigate cyber attacks in enterprises
5. Learn about how to protect enterprise website against attacks

UNIT- I

Introduction to cyber security and web application security, General concepts of different internet protocols, firewalling a server browser, Concept of Vulnerability Assessment and Penetration Testing, Introduction to IT/OT – SCADA Security vulnerabilities in power sector, ICS (Industrial control System).

UNIT – II

Introduction to ethical hacking, hacking concept – phases of hacking; vulnerability research; social engineering, vulnerability scanning – overview; different types of vulnerability scanning.

UNIT – III

Penetration testing concepts – what, why & how we do pen test, methods involved for penetration testing, types of penetration testing, basic tools and techniques used in penetration testing, Limitations.

UNIT – IV

Concept of SQL injection attack, Introduction to Linux file system, Basic Linux Commands, usage of Linux Editors and file searching techniques, Data Exfiltration and its prevention

Suggested readings:

1. Zaid Sabih ; Learn Ethical Hacking from Scratch; Packt Publishing Ltd
2. Linux Basics for Hackers, Occupy The Web,
3. Josh More; Breaking Into Information Security; Syngress Media, US
4. Andrew Ginter; SCADA Security: What's Broken and How to Fix it

Note:.

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

DATA SCIENCE and DATA ANALYTICS

ELECTIVES

BIG DATA ANALYTICS AND DATA SCIENCE FOR POWER UTILITIES

MPM-D-402

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Awareness of the challenges of modern data rich power system
2. Understanding the big data architecture and ecosystem
3. Examining predictive analytics and revenue recognition for power utilities
4. Understanding utility forecasting and its accuracy

Unit-I

Introduction to big data analytics for power industry, Data Lake vs data warehouse, Big data infra challenges of power utilities, Big Data Eco System.

Unit-II

Hadoop big data architecture system and data integration flume, SQOOP, Restful API framework, Role of descriptive analytics in power sector, Data visualization

Unit-III

Role of revenue recognition for utility from billing information, Working on data to apply revenue recognition approach on the tool, Predictive analytics in power sector–power system and power markets.

Unit-IV

Introduction to machine learning, Predictive modelling in power scenarios, Utility forecasting with time series analysis– Basic techniques - averages, smoothening, etc, Understanding forecasting accuracy- MAPE, MAD, MSE, RMSE

Suggested readings:

1. An Introduction To Statistical Learning With Applications In R : G. James, D. Witten, T. Hastie, R. Tibshirani; Springer.
2. Python for Data Analysis, W. McKinney; O'Reilly.
3. Introduction to Machine Learning with Python, A.C Muller, S. Guido; O'Reilly
4. Big Data Analytics in Future power System, A.F. Zobaa, T.J. Bihl; CRC Press.

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

DATA SCIENCE TOOLS
MPM-D-403

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Draw inferences based on the statistical data
2. Solve logical problems using programming
3. Manipulate datasets in python for data preparation and analysis
4. Understand the fundamentals of database and extract information from them

Unit-I

Inferential statistics– basics of probability discrete distributions, continuous distributions, central limit theorem, Hypothesis Testing– concepts of hypothesis testing I- null and alternate hypothesis making a decision, Concepts of hypothesis II- testing p-value method and types of errors.

Unit-II

Introduction to Python, Data structures in Python, Control structure and functions, logical syntax building searching and sorting, python libraries NUMPY, MATPLOTLIB. PANDAS,

Unit-III

Introduction to R and SPSS for statistical analysis, Introduction to data visualization, data sourcing, process of data cleaning.

Unit-IV

Database design, database creation in MYSQL workbench, Querying MYSQL, Case statements, stored routines, Query optimization and best practices.

Suggested readings:

1. Eric J. Grus; Data Science from Scratch; O'reillly.
2. C. N. Knaflic; Storytelling with Data; Wiley.
3. M. Shron; Thinking with Data,; O'reilly.

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

DATA ANALYTICS FOR POWER LOSS MANAGEMENT

MPM-D-404

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the models to assess power theft
2. Statistical analysis and visualization of data using python
3. Data cleaning and transformation for model assessment
4. Generating business insights using data modeling

Unit-I

Current Scenario and Challenges, Road Map, Power Theft vs Utility, Introduction to loss reduction / power theft, Two Stage Modelling - Heuristic based, Statistical based.

Unit-II

Due diligence of current technology, Role of Cutting-Edge Technology, Demystifying Data Science for Power Theft/Pilferage, Data management for Power Theft/Pilferage, Data preparation using Python -Merging Data Visualization using Python, Statistical Analysis using Python.

Unit-III

Data Quality Checks for Power Theft/Pilferage, Outlier Treatment, Missing Value Treatment, Data Transformation, Feature Engineering, Input Data for Model.

Unit-IV

Introduction to Model, Model vs Data Science, Selection of Model Theft/Pilferage Model – Decision Tree, Random Forest, Xgboost, Model Evaluation, Model Improvement, Business Insights.

Suggested readings:

1. Eric Seigel ; Predictive Analytics; Wiley.
2. Q. Chen, H. Guo, K. Zheng, Y. Wang ; Data Analytics in Power Markets; Springer.
3. A.F. Zobaa, T.J. Bihl ; Big Data Analytics in Future power System; CRC Press.

Note:.

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

SUSTAINABILITY

ELECTIVES

ENERGY SUSTAINABILITY AND CIRCULAR ECONOMY

MPM-S-402

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the standards and evolution of sustainable energy management practices
2. Analyze the effect of techno-economic trends on the energy transition and conduct investment appraisal
3. Understand the policy considerations for circular economy and the key drivers of consumer behavior
4. Develop a critical understanding of the flows in the circular economy and the implementation of transition to such systems

Unit-I

Sustainable development – evolution, approaches, interpretations, what drives business; Social Role; Philanthropy, Corporate Social Responsibility, Creating Shared Value. The evolution of the carbon economy and energy markets, Energy management standards.

Unit-II

Labor markets in the energy sector and basic macro and microeconomic concepts, including the impact of digitalization, decentralization and automation on demand side driven net-zero transition. cost analysis of renewable energy investments, cost comparison of alternative energy sources and development of alternative business models considering the energy storage. Analysis of net present value and investment appraisal.

Unit-III

Fundamentals of circular economy, Measures of prosperity: GDP vs. Human development, General fundamentals of consumer behavior, Key drivers of change in consumer behavior, Role of consumers to influence circular economy: barriers and opportunities.

Unit-IV

Define and outline Flows in a circular economy (Energy, Material, Waste, Effluents), impacts of flows beyond raw materials such as transportation, energy, How can various types of flows be measured and managed, Introduction to the policy considerations and incentives for circular economies, transition to circular models and methods for implementing them.

Suggested readings:

1. Oliver Salzman; Corporate Sustainability Management in the Energy Sector, Gabler Verlag.
2. Fereidoon P. Sioshansi et. al.; Energy, Sustainability and the Environment: Technology, Incentives, Behavior, Butterworth-Heinemann.
3. Webster, K. Circular Economy: A Wealth of Flows. Ellen MacArthur Foundation, 2nd Edition, 2016.
4. Raworth, K.; Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist. Random House, 2017.
5. Ellen MacArthur Foundation, "Delivering the Circular Economy: A Toolkit for Policymakers" Ellen MacArthur Foundation. 2015.

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

ENERGY ECONOMIC MODELING
MPM-S-403

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the basics of Energy Economics
2. Understand the role of Energy in economy.
3. Understand economic principles for decision making involved in Power projects.
4. Analyze time value of money and evaluation of investments for Projects.
5. Examine the economics of energy production and consumption.

Unit-I

Macroeconomic Concepts- Consumption and Investment- Determinants of Consumption, Consumption Function, Determinants of Investment Demand, Investment Demand Curve, Real and Nominal Interest Rates.

Unit-II

Input-Output Analysis- Basic Input-Output (I/O) Model, Multiplier Analysis, Aggregation of I/O tables, Energy Input-Output Analysis, Environmental Input-Output Analyses, Applications.

Unit-III

Energy system models- Reference Energy Systems (RES), RES based optimization models, Energy Modeling with Learning Effects.

Unit-IV

Modeling Energy, Economic and Environmental Interactions: Linking I/O and RES models, Computable General Equilibrium Modeling for Energy Policy Assessment - An Introduction, Integrated assessment models – An introduction, Modeling with Technological Change, Typical Energy-Economic models.

Suggested readings:

1. Energy Economics: Subhes C. Bhattacharya, Springer
2. Energy Policy Modeling in the 21st Century , Hassan Qudrat Ullah, Springer
3. Energy Modelling, Taylor & Francis Ltd.

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.

POWER ENVIRONMENT INTERFACE & CARBON FINANCE

MPM-S-404

Total credits: 3
External marks: 75
Internal marks: 25

Course outcomes:

After the successful completion of the course, students will be able to:

1. Understand the global scenario and environmental guidelines
2. Examine the carbon footprint and strategies to manage it
3. Assess the environmental impact thermal power projects
4. Understand the effect of hydro projects on the nearby areas

Unit-I

Environment policies and regulatory framework, Global perspectives and environmental guidelines, Regulatory framework and acts, Interface with govt., regulating agencies, public, academic and research institutions, ISO 14000.

Unit-II

Environmental concerns, Greenhouse effect, Water pollution, Air Pollution, Ecological imbalances, Deforestation, Environmental impact assessment, Investment decisions concerning environmental protection, Environmental economics, Carbon credits, Carbon management strategies and Options for reducing emissions.

Unit-III

Thermal Environment Interface: Pollutants in power plants, particulate and gaseous pollutants, thermal pollution, solid gas pollutants, strategies to control pollutants from coal-based power plants Pollution control methods, Ash handling and utilization.

Unit-IV

Hydro Environment Interface: Submergence, Soil erosion, Deforestation, Loss of flora and fauna, Riverine ecology, Social impact Landscape, Resettlement and rehabilitation. Clean Development Mechanism, OHSAS

Suggested readings:

1. Energy : J S Doolittle, Matrix Publishers
2. Energy and Environment: J H Fowler, McGraw -Hill
3. Energy and Environment: Carter, Grandis, Universal Press
4. Protecting our Environment : Mclennan, Wilson Company
5. Carbon Finance: Sonia Labatt, Rodney R. White, Wiley & Sons, Inc

Note:

1. Only latest editions of the above books are recommended.
2. At least four cases will be discussed, one from each unit.