RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Mechanical Engineering, VIII-Semester

Open Elective ME 803(A) Data Analytics

Course Objectives:

Data Analytics is the science of analyzing data to convert information to useful knowledge. This knowledge could help us understand our world better, and in many contexts enable us to make better decisions. While this is broad and grand objective, the last 20 years has seen steeply decreasing costs to gather, store, and process data, creating an even stronger motivation for the use of empirical approaches to problem solving.

This course will enable you with a wide range of data analytic techniques and is structured around the broad contours of the different types of data analytics, namely, descriptive, inferential, predictive, and prescriptive analytics.

Pre-requisites:

This course requires that you are familiar with high-school level linear algebra, and calculus.Knowledge of probability theory, statistics, and programming is desirable

UNIT-I

DESCRIPTIVE STATISTICS :Probability Distributions, Inferential Statistics ,Inferential Statistics through hypothesis tests Regression & ANOVA ,Regression ANOVA(Analysis of Variance).

UNIT-II

INTRODUCTION TO BIG DATA: Big Data and its Importance, Four V's of Big Data, Drivers for Big Data, Introduction to Big Data Analytics, Big Data Analytics applications.

BIG DATA TECHNOLOGIES: Hadoop's Parallel World, Data discovery, Open source technology for Big Data Analytics, cloud and Big Data, Predictive Analytics, Mobile Business Intelligence and Big Data, Crowd Sourcing Analytics, Inter- and Trans-Firewall Analytics, Information Management.

UNIT-III

PROCESSING BIG DATA: Integrating disparate data stores, Mapping data to the programming framework, Connecting and extracting data from storage, Transforming data for processing, subdividing data in preparation for Hadoop Map Reduce.

UNIT-IV

HADOOP MAPREDUCE: Employing Hadoop Map Reduce, Creating the components of Hadoop Map Reduce jobs, Distributing data processing across server farms, Executing Hadoop Map Reduce jobs, monitoring the progress of job flows, The Building Blocks of Hadoop Map Reduce Distinguishing Hadoop daemons, Investigating the Hadoop Distributed File System Selecting appropriate execution modes: local, pseudo-distributed, fully distributed.

UNIT-V

BIG DATA TOOLS AND TECHNIQUES: Installing and Running Pig, Comparison with Databases, Pig Latin, User- Define Functions, Data Processing Operators, Installing and Running Hive, Hive QL, Querying Data, User-Defined Functions, Oracle Big Data.

Reference Books and Study Materials:

1. Hastie, Trevor, et al.�The elements of statistical learning. Vol. 2. No. 1. New York: springer, 2009.

2. Montgomery, Douglas C., and George C. Runger.�Applied statistics and probability for engineers. John Wiley & Sons, 2010

3. NPTEL Video Course :Introduction to Data Analytics by Dr. Balaraman Ravindran Department of Computer Science and Engineering IIT Madras and Dr. Nandan Sudarsanam Department of Management Studies IIT Madras.

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Mechanical Engineering, VIII-Semester

Open Elective ME 803(B) Energy Conservation, Management & Audit

Course Objectives

After studying this course, students will be able to;

- Understand the concepts of energy management and conservation.
- Able to conduct energy audit and report.
- Concepts of Energy policy its purpose and formation.
- Able to do Electrical Energy Management in different electrical systems

UNIT-I

Energy Management: Concept of energy management, energy demand and supply, economic analysis; Duties and responsibilities of energy managers. Energy Conservation: Basic concept, energy conservation in Household, Transportation, Agricultural, service and Industrial sectors, Lighting, HAVC.

UNIT-II

Energy Audit: Definition, need and types of energy audit; Energy management (Audit) approach: Understanding energy cost, bench marking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirement; Fuel & energy substitution; Energy audit instruments; Energy conservation Act; Duties and responsibilities of energy manager and auditors.

UNIT-III

Material energy balance: Facility as an energy system; Method for preparing process flow; material and energy balance diagrams. Energy Action Planning: Key elements, force field analysis; Energy policy purpose, perspective, content, formulation, rectification

UNIT-IV

Monitoring and Targeting: Definition monitoring & targeting; Data and information analysis. Electrical Energy Management: energy conservation in motors, pumps and fan systems; energy efficient motors.

UNIT-V

Thermal energy management: Energy conservation in boilers, steam turbine and industrial heating system; Application of FBC; Cogeneration and waste heat recovery; Thermal insulation; Heat exchangers and heat pump; Building Energy Management.

References:

1. Murphy & Mckay, Energy Management, BSP Books Pvt. Ltd.

2. Smith CB; Energy Management Principle, Pergamon Press, New York.

3. Rajan GG, Optimising Energy Efficiency in Industry, TMH.

4. Callaghan P O, Energy Management, McGraw-Hill Book Company.

5. Amit Kumar Tyagi, Handbook on Energy Audit and Management, Tata Energy Research Institute. 6. Bureau of Energy Efficiency, Study material for energy Managers and Auditors: Paper I to V.

7. Hamies; Energy Auditing and Conservation: Method, Measurement, Hemisphere, Washington.

8. Witty, Larry C, Industrial Enegy Management Utilisation, Hemisphere Publishers, Washington 9.Kreith & Goswami, Energy Management and Conservation Handbook, CRC Press

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Mechanical Engineering, VIII-Semester

Open Elective ME 803(C) Entrepreneurship and Management Concepts

Course Objective:

To familiarize the students with the concepts and applications of Management, Marketing, Productivity & Entrepreneurship in competitive world.

Unit-I

System Concepts: Types, definition & characteristics; supra & subsystems, key component; boundary & interface complexity; feedback (pull) & feed forward (push) controls, open flexible-adaptive system, computer as closed system, law of requisite variety; system coupling, stresses and entropy; functional & cross functional system; Steven Alter's nine element work system model and its comparison with IPO (input-processing-output) model, structure and performance of work systems leading to customer delight.

Unit-II

Management: Importance, definition and functions; schools of theories, knowledge driven learning organization and e-business; environment, uncertainty and adaptability; corporate culture, difficulties and levels of planning, BCG matrix, SWOT analysis, steps in decision making, structured and unstructured decision; dimensions of organizations, size/specialization, behavior formalization, authority centralization, departmentalization, spam and line of control, technology and Minzberg organization typology, line, staff & matrix organization, coordination by task force, business process reengineering and process of change management, HR planning placement and training, MIS; attitudes and personality trait, overlap and differences between leader & manager, leadership grid, motivation, Maslow's need hierarchy and Herzberg two factor theory, expectation theory, learning process, team work and stress management.

Unit-III

Marketing: Importance, definition, core concepts of need want and demand, exchange & relationships, product value, cost and satisfaction (goods and services) marketing environment; selling, marketing and societal marketing concepts; four P's, product, price, placement, promotion; consumer, business and industrial market, market targeting, advertising, publicity, CRM and market research. Finance: Nature and scope, forms of business ownerships, balance sheet, profit and loss account, fund flow and cash flow statements, breakeven point (BEP) and financial ratio analysis, pay-back period, NPV and capital budgeting.

Unit-IV

Productivity and Operations: Productivity, standard of living and happiness, types of productivity, operations (goods and services) Vs project management, production processes and layouts, steps in method improvement, time measurement, rating and various allowances; standard time and its utility,

predetermined motion and time method, product and process specification, TQM, cost of quality, introduction to lean manufacturing (JIT), QFD, TPM & six sigma quality.

Unit V

Entrepreneurship : Definition and concepts, characteristics, comparison with manager, classification, theories of entrepreneur, socio, economic, cultural and psychological; entrepreneur traits and behavior, roles in economic growth, employment, social stability, export promotion and indigenization, creating a venture, opportunity analysis competitive and technical factors, sources of funds, entrepreneur development program.

Evaluation:

Evaluation will be continuous an integral part of the class followed by the final examination .

References:

1. Daft R; The new era of management; Cengage.
2. Bhat Anil, Arya kumar; Management: Principles,Processes and Practices; Oxford higheredu.
3. Mukharji R.S.,Agrawal N.K.; Entrepreneurship and Management Concepts,Technocrats Publication
4. Davis & Olson; Management Information System; TMH.
5. Steven Alter; Information systems, Pearson, www.stevenalter.com
6. Kotler P; Marketing management; 6- Khan, Jain; Financial Management; 7- ILO; Work study;ILO.
7. Mohanty SK; Fundamental of Entrepreneurship; PHI.

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Mechanical Engineering, VIII-Semester

Open Elective ME 803(D) Management Information System

Course Objectives

After studying the course, students will be able to;

- Know about MIS, MIS Theory, Systems Approach
- Understand the concept of decision making and MIS
- Learn about conceptual system design, detailed system design
- Understand implementation,evaluation and maintenance of MIS

Unit-I

Introduction of MIS

What is MIS, Decision support systems, systems approach, The systems view of business, MIS organization within the Company. Management organizational theory and the systems approach:

Development of organizational theory, Management and organizational behavior, Management information and the systems approach.

Unit-II

Information systems for decision-making:

Evolution of an information system, Basic information systems, Decision making and MIS, MIS as technique for making programmed decisions, design assisting information systems.

Strategic and project planning for MIS

General business planning, appropriate MIS response, MIS planning-general, MIS planning-details

Unit-III

Conceptual System Design

Define the problems, Systems objectives, Establish system constraints, Determine information needs, Determine information sources, Develop alternative conceptual designs and select one, Document the system concept, Prepare the conceptual design report.

Detailed System Design

Information and involve the organization, arm of detailed design, Project management of MIS detailed design. Identify dominant and trade off criteria define the subsystems, Sketch the detailed operating MIS systems and information flows, Determine the degree of automation of each operation, inform and involve the organization again, Inputs, Outputs and processing, early system testing, Software, Hardware and tools, propose an organization to operate the system, Document the detailed design., Revisit the manager user.

Unit-IV

Implementation, Evaluation and Maintenance of the MIS

Plan the implementation, Acquire floor space and plan space layouts organized for implementation, Develop procedures for implementation, Train the operating personnel, Computer related acquisitions, Develop forms for data collection and information dissemination, Develop the files, Test the system, Cut over, Document the system, Evaluate the MIS, Control and maintain the system.

Unit-V

Pitfalls in MIS Development

Fundamental weaknesses, Soft spots in planning, Design problem, Implementation the TAR PITF.

Evaluation:

Evaluation will be continuous an integral part of the class followed by the final examination

References

1.Murdick R.G., Russ J.B., Clagget J.R., Information Systems for modem management

2.Effy OZ, Management Information Systems, 3rd edition, Thomson.

3. Jawadekar W.S., Management Information System.

4. Brien J.A.O., Irwin, Management Information Systems, McGraw Hill

5. Dour's G.B., Olson M.H., Management Information Systems, 2nd edition, McGraw Hill

6. Thireramp R.J., Decision Support Systems for Effective Planning and Control, PHI.

7. Sadagopan S., Management Information Systems, 4thedition, Prentice-Hall of India

8. Kanter J., Managing with Information, 4th edition, Prentice-Hall of India.

9. Ladon K.C., Landon, J.P., Management Information Systems, 4th edition, Prentice-Hall of India.