RAMAIAH
Institute of Technology

CURRICULUM

for the Academic year 2020 – 2021

INDUSTRIAL ENGINEERING AND MANAGEMENT

VII & VIII SEMESTER B.E

RAMAIAH INSTITUTE OF TECHNOLOGY
(Autonomous Institute, Affiliated to VTU)
Bangalore – 560054.

About the Institute:

Dr. M. S. Ramaiah a philanthropist, founded 'Gokula Education Foundation' in 1962 with an objective of serving the society. M S Ramaiah Institute of Technology (MSRIT) was established under the aegis of this foundation in the same year, creating a landmark in technical education in India. MSRIT offers 13 UG programs and 15 PG programs. All these programs are approved by AICTE. All the UG programs & 09 PG programs are accredited by National Board of Accreditation (NBA). The institute is accredited with 'A' grade by NAAC in 2014. University Grants Commission (UGC) & Visvesvaraya Technological University (VTU) have conferred Autonomous Status to MSRIT for both UG and PG Programs till the year 2029. The institute is a participant to the Technical Education Quality Improvement Program (TEQIP), an initiative of the Government of India. The institute has 380 competent faculty out of which 60% are doctorates. Some of the distinguished features of MSRIT are: State of the art laboratories, individual computing facility to all faculty members, all research departments active with sponsored funded projects and more than 300 scholars pursuing Ph.D. To promote research culture, the institute has established Centre of Excellence for Imaging Technologies, Centre for Advanced Materials Technology & Schneider Centre of Excellence. **M S Ramaiah Institute of Technology has obtained "Scimago Institutions Rankings" All India Rank 65 & world ranking 578 for the year 2020.**

The Centre for Advanced Training and Continuing Education (CATCE), and Entrepreneurship Development Cell (EDC) have been set up on campus to incubate startups. **M S Ramaiah Institute of Technology secured All India Rank 8th for the year 2020 for Atal Ranking of Institutions on Innovation Achievements (ARIIA), an initiative of Ministry of Human Resource Development (MHRD), Govt. of India.** MSRIT has a strong Placement and Training department with a committed team, a good Mentoring/Proctorial system, a fully equipped Sports department, large air-conditioned library with good collection of book volumes and subscription to International and National Journals. The Digital Library subscribes to online e-journals from Elsevier Science Direct, IEEE, Taylor & Francis, Springer Link, etc. MSRIT is a member of DELNET, CMTI and VTU E-Library Consortium. MSRIT has a modern auditorium and several hi-tech conference halls with video conferencing facilities. It has excellent hostel facilities for boys and girls. MSRIT Alumni have distinguished themselves by occupying high positions in India and abroad and are in touch with the institute through an active Alumni Association.

As per the National Institutional Ranking Framework, MHRD, Government of India, M S Ramaiah Institute of Technology has achieved 59th rank among 1071 top Engineering institutions of India for the year 2020 and 1st rank amongst Engineering colleges (VTU) in Karnataka.

About the Department:

The department was established in the year 1979 as Industrial & Production Engineering and renamed as Industrial Engineering & Management in the year 1992, with an intake of 60 students and M.Tech program was commenced in the year 2012. The department has been recognized as R&D center by VTU with 14 scholars pursuing their Ph.D. The department has well modernized laboratories namely Industrial & Quality Engineering lab, Computer Lab and Mechanical Measurement & Metrology lab. The department is having highly qualified, motivated and result oriented faculty members. All the faculty are involved in research and technical paper publications in reputed technical journals, conferences across the world. The department was accredited by the NBA in 2001, 2004, 2010 & reaccredited in year 2015 as per the new NBA format laid down by Washington Accord. It has consistently bagged university ranks in Bangalore University & VTU. It has set a unique record of achieving 1st rank eleven times. The department has successfully conducted around 37 faculty development programs, seminars & workshops for academicians as well as industry personnel, students and technical staff. The society of Industrial Engineering and Management, "INDEMAN SOCIETY"- a student body was established in the year 1996. The activities of this society includes: Regular Industrial visits and Guest lectures are conducted twice every semester for all students. The department also has Quality Engineering Club, Materials & Manufacturing Club and Productivity Club, the students can enroll to carryout activities based on their interest. Many funded research projects are executed which are sponsored by UGC, AICTE, DST, VTU and VGST.

VISION OF THE INSTITUTE

To be an Institution of International Eminence, renowned for imparting quality technical education, cutting edge research and innovation to meet global socio-economic needs

MISSION OF THE INSTITUTE

MSRIT shall meet the global socio-economic needs through

- Imparting quality technical education by nurturing a conducive learning environment through continuous improvement and customization
- Establishing research clusters in emerging areas in collaboration with globally reputed organizations
- Establishing innovative skills development, techno entrepreneurial activities and consultancy for socio-economic needs

QUALITY POLICY

We at MS Ramaiah Institute of Technology strive to deliver comprehensive, continually enhanced, global quality technical and management education through an established Quality Management System complemented by the synergistic interaction of the stake holders concerned

VISION OF THE DEPARTMENT

To nurture engineers, entrepreneurs who develop solutions to continually improve socio-technical systems and add value to the society

MISSION OF THE DEPARTMENT

The Industrial Engineering and Management Department shall transform the entrants of the Industrial Engineering and Management program into professionally competent engineers through innovative educational curricula, balanced research program and effective collaboration with industry and academia

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

PEO1: Use the knowledge and skills of industrial engineering to model and analyze the real life problems and interpret the results.

PEO2: Effectively design, implement, improve and manage the integrated socio-technical systems.

PEO3: Build and lead cross-functional teams, upholding the professional responsibilities and ethical values.

PEO4: Engage in continuing education and life-long learning to be competitive and enterprising.

PROGRAM OUTCOMES (POs):

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being

Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs):

PSO 1: Develop Knowledge, Skills and abilities in the fields such as System design and development, Manufacturing and Research.

PSO 2: Apply the core competence in the field of industrial and systems engineering to solve real world problem and continuously improve its performance.

PSO 3: Exhibit innovative abilities and develop towards entrepreneurial careers with a focus on leadership and responsibility.

Curriculum Course Credits Distribution

Batch 2017-21

Semester	Humanities & Social Sciences (HSS)	Basic Sciences / Lab (BS)	Engineering Sciences/ Lab (ES)	Professional Courses- Core (Hard core, soft core, Lab)(PC-C)	Professional Courses - Electives (PC-E)	Other Electives (OE)	Project Work (PW)	Internship /other activities (IS/ECA)	Total semester load
First	2	9	14						25
Second	2	9	14						25
Third		4		21					25
Fourth		4	1	20					25
Fifth	2			19	4				25
Sixth				15	4		6		25
Seventh				14	8	4			26
Eighth					4		14	6	24
Total	6	26	29	89	20	4	20	6	200

SCHEME OF TEACHING

VII SEMESTER

Sl. No.	Subject Code	Subject	Category	Credits					Contact hours
				L*	T*	P*	S*	Total	
1	IM71	Simulation Modeling and Analysis	PCC	3	0	0	1	4	3
2	IM72	Supply Chain Management	PCC	3	0	0	1	4	3
3	IM73	Financial Accounting and Costing	PCC	3	1	0	0	4	5
4	**OE**	One Elective from other Department	OE	4	0	0	0	4	4
IME** Elective – C			PCE	4	0	0	0	4	4
5	IME09	Project Management							
	IME10	Product Design and Development							
	IME11	Management Information Systems							
	IME12	Marketing Management							
IME** Elective – D			PCE	4	0	0	0	4	4
6	IME13	Total Quality Management							
	IME14	Software Engineering							
	IME15	Innovations and Entrepreneurship							
	IME16	Managerial Economics							
7	IML74	Simulation Modeling and Analysis Lab	PCC	0	0	1	0	1	2
8	IML75	Financial Accounting and Costing Lab	PCC	0	0	1	0	1	2
			Total	**21**	**1**	**2**	**2**	**26**	**27**

*** L:** Lecture ***T:** Tutorial ***P:** Practical ***S:** Self Study

SCHEME OF TEACHING

VIII SEMESTER

Sl. No.	Subject Code	Subject	Category	Credits					Contact Hour
				L*	T*	P*	S*	Total	
IME** Elective – E			PCE	4	0	0	0	4	4
1	IME17	Advanced Operations Research							
	IME18	Organizational Behavior							
	IME19	Big Data Analytics							
	IME20	Business Process Reengineering							
2	IM IN	Internship	IS	0	0	4	0	4	-
3	IMP	Project Work	PW	0	0	16	0	16	-
			Total	**4**	**0**	**20**	**0**	**24**	**4**

*** L:**Lecture ***T :** Tutorial ***P:**Practical ***S** : Self Study

VII Semester

SIMULATION MODELING AND ANALYSIS

Course Code: IM71 **Credit:3:0:0 :1**

Prerequisite: Applied Probability and Statistics **Contact Hours: 42**

Course Coordinator(s): Dr. C. S. Chethan kumar/ Dr. M Shilpa

Course Content

Unit I

Introduction to Simulation: Simulation, advantages, Disadvantages, System environment, components of a system, Model of a system, types of models, steps in a simulation study.

Unit II

Simulation Examples: Simulation of Queuing systems, Simulation of Inventory System, Monte Carlo simulation, General Principles, Concepts in discrete - events simulation, event scheduling / Time advance algorithm.

Unit III

Random Numbers: Properties, Generations methods, Tests for Random number-Frequency test, Runs test, Autocorrelation test, Gap test, Poker test.

Unit IV

Random Variate Generation: Inverse Transform Technique- Exponential, Uniform, Weibull, Triangular distributions, direct transformation for Normal and lognormal distribution. Convolution method – Erlang distribution. Acceptance and Rejection technique – Poisson and Gamma distributions.

Unit V

Input Modeling - Multivariate and time series input models – covariance and correlation, multivariate input models, time series input models

Output Analysis for a single model: Types of Simulation, stochastic nature of output data, Output analysis of terminating simulation, Output analysis of steady state simulations

Optimization via simulation: What Optimization via simulation means.

Self-Study Component:

Simulation - Areas of application

Input Modeling – List of steps involved in input modeling – no analytical treatment, Selecting input models without data

Verification and Validation of simulation model – Model building, verification and validation, verification of simulation models, calibration and validation of models, Neylor and Finger's validation process

Optimization via simulation: Why is optimization so difficult? Basic GA and TS

Text books

1. Jerry Banks, John S Carson, II, Berry L Nelson, David M Nicol -Discrete Event system Simulation, 5th Edition, Pearson Education, Asia, ISBN - 81- 7808 – 505 -4.
2. Averill M Law, W David Kelton -Simulation Modeling & Analysis, McGraw Hill International Editions – Industrial Engineering series, ISBN –0-07-100803-9.

Reference

1. Narsingh Deo-Systems Simulation with Digital Computer; PHI Publication (EEE), ISBN –0-87692-028-8

Course Outcomes (COs):

At the end of the course, student will be able to

1. Apply the steps of simulation study for any real life system (PO- 2,3&PSO2)
2. Manually simulate simple queuing and inventory problems (PO- 2,3&PSO1)
3. Generate and test random numbers for simulation applications (PO- 3,4&PSO2)
4. Develop random variate generator using appropriate generation technique (PO- 2,3&PSO2)
5. Develop multivariate and time series input models and analyze the output of the simulation model (PO- 3,4&PSO2)

SUPPLY CHAIN MANAGEMENT

Course Code: IM72 **Credit:3:0:0 :1**
Prerequisite: Nil **Contact Hours: 42**
Course Coordinator(s): Dr. C S Chethan Kumar/Mr. Deepak Kumar

Course Content

Unit I

Building A Strategic Frame Work to Analyze Supply Chains : Supply chain stages and decision phases, process view of a supply chain, Supply chain flows, Examples of supply chains, Competitive and supply chain strategies, Achieving strategic fit, Expanding strategic scope, Drivers of supply chain performance, Framework for structuring drivers – Inventory, Transportation, Facilities, Information, Obstacles to achieving fit.

Unit II

Designing the Supply Chain Network: Distribution Networking – Role, Design. Supply Chain Network (SCN) – Role, Factors, Framework for Design Decisions.
Models for facility location and capacity allocation, Impact of uncertainty on SCN – discounted cash flow analysis, evaluating network design decisions using decision using decision trees, Analytical problems.

Unit III

Planning and Managing Inventories in a Supply Chain: Review of inventory concepts, Trade promotions, Managing multi-echelon cycle inventory, safety inventory determination, Impact of supply uncertainty aggregation and replenishment policies on safety inventory, Optimum level of product availability, Important factors, Managerial levers to improve supply chain profitability.

Unit VI

Sourcing, Transportation and Pricing Products: Role of transportation, Factors affecting transportation decisions, Modes of transportation and their performance characteristics, Designing transportation network, Trade-off in transportation design, Tailored transportation, Routing and scheduling in transportation, International transportation, Analytical problems, Role of sourcing, supplier – scoring & assessment, selection and contracts, Design collaboration.

Unit V

The Supply Chain IT framework: The role of IT supply Chain, The Supply Chain IT framework, CRM, Internal SCM, SRM, The role of E-business in a supply chain, The E-business framework, E-business in practice, Bullwhip effect.

Introduction to reverse logistics: Reasons, activities and role.

Self-Study Component: Logistics Management & Information System, Integrated Logistics Management, International Logistics, Marketing of Logistics, logistics problems, Case studies.

Text Book

1. Sunil Chopra & Peter Meindl-Supply Chain Management – Strategy, Planning & Operation, 3rd Edition - Pearson Education Asia - ISBN: 81-7808-272-1. – 2001.

References

1. Robert B Handfield, Ernest L Nichols -Supply Chain Redesign – Transforming Supply Chains into Integrated Value Systems, Jr. - Pearson Education Inc - ISBN: 81-297-0113- 8. -2002.
2. Jeremy F Shapiro, Duxbury -Modelling the Supply Chain, Thomson Learning – ISBN 0- 534-37363.-2002.
3. David Simchi Levi, Philip Kaminsky & Edith Simchi Levi -Designing & Managing the Supply Chain, Mc Graw Hill. 3rd edition. 2009.
4. Bowersox, Logistical Management, Mc-Graw Hill,2000
5. Reguram G, Rangaraj N, Logistics and Supply Chain Management Cases and Concepts, Macmillan India Ltd., New Delhi, 1999.

Course Outcomes (COs):

At the end of the course, student will be able to

1. Clearly distinguish the various supply chain management processes. (PO- 2 & PSO 1, 2)
2. Identify and classify key supply chain drivers. (PO- 2&PSO 1, 2)
3. Establish a set of frameworks and evaluate design distribution network and facility location. (PO- 3&PSO 1, 2)
4. Calculate the influence of appropriate level of product availability within a supply chain. (PO- 3&PSO 1, 2)
5. Evaluate sourcing strategies for interacting with suppliers and assess different options for designing transportation networks. (PO- 3&PSO 1, 2)

FINANCIAL ACCOUNTING AND COSTING

Course Code: IM73 **Credit: 3:1:0:0**
Prerequisite: Nil **Contact Hours: 42+14T**
Course Coordinator(s): Dr. N V R Naidu/ Dr. R Shobha

Course Content

Unit I

Financial Accounting: Introduction to Book keeping: Double-entry accounting, Journal & Ledger posting. Financial Statements & Analysis: Trial balance, preparation of Trading and Profit & Loss account and Balance Sheet.

Unit II

Ratio Analysis: Balance sheet ratio's, profit – loss account ratio's and combined ratio's. Costing: Objectives of costing, Elements of costing, methods of costing, preparation of cost sheet (job costing).

Unit III

Costing, Marginal costing, absorption costing, Process costing and Standard Costing - Material, labour, overhead cost variance. Activity Based Costing and Target Costing.

Unit IV

Working Capital Management: Factors influencing working capital requirement, determination of operating cycle and working capital. Risk and Required Return: Risk and return relationship, methods of measuring the risk, numerical problems. Business risk, financial risk, calculation of expected rate of return to the portfolio.

Unit V

Budget and Budgeting Control: Sales budget, production budget, raw materials purchasing budget, selling and administrative expense budget, cash budget, Flexible Budget, Master budget.

Textbooks

1. James. C Vanhorne -Financial Management andPolicy,Peerasoneducation - 12th edition 2016
2. Khan M Y and Jain P K -Cost Accounting, Tata McGraw-Hill - 4thEdition.2017
3. Ambrish Gupta –Financial Accounting for Management – Analytical Perspective,Pearson publication – 5th Edition. 2016.

References

1. B.S Raman -Elements of Accountancy, 2017
2. Ahuja, Pandey, Khanna and Arora -Practical Costing, S. Chand & Co. Ltd -2005.
3. KHAN& JAIN -Financial Management & Costing, TMH –2000.

Course Outcomes (COs):

At the end of the course, student will be able to

1. Apply the concept of various accounting principles for obtaining comprehensive solutions in accounting.(PO-1,11&PSO1)
2. Understand the accounting ratios and their implications in industry. (PO- 1,11&PSO1,2)
3. Enhance knowledge about the cost of product, process and their controlling factors.(PO- 1,11 &PSO1)
4. Understand the working capital requirement and its management. (PO- 1,11)&PSO1,2)
5. Identify the importance of finance and methods to control finance in industry. (PO- 1,11&:1, 2)

Elective – C

PROJECT MANAGEMENT

Course Code: IME09 **Credit: 4:0:0:0**
Prerequisite: Nil **Contact Hours: 56**
Course Coordinator(s): Dr. M R Shivakumar /Sudheer D Kulkarni

Course Content

Unit I

Concepts of Project Management: Concepts of projects, characteristics of project, Phases of project life cycle, Tools and techniques for project management, Computer based project management.

Project planning and estimating: Feasibility report, Preparation of cost estimation, Evaluation of the project profitability, fixing the zero date.

Unit II

Organization Human Resources and Contracting: Delegation, Skills / abilities required for project manager, Authorities and responsibilities of project manager, Project organization, Contracts, Tendering and Selection of contractors, Team Building.

Unit III

Tools and techniques of project management Bar (GANTT) chart, Networks, Critical Path Method, Project Evaluation and Review Technique (PERT), crashing of projects, Resource allocation.

Unit IV

Performance measures in Project Management: Performance indicators, Performance Improvement, Project management and environment.

Risk Analysis: Sources, measures and perspectives on risk, sensitivity analysis, scenario analysis, breakeven analysis, Hiller model, simulation analysis, decision tree analysis, managing risk, project selection under risk, and risk analysis in practice.

Unit V

Financing of Projects: Capital structure, menu of financing, equity capital, internal accruals, term loans, debentures, working capital advance, miscellaneous sources, raising of venture capital, raising capital in international markets

Venture Capital: Introduction, VC investment Appraisal Process and Management, The Indian VC industry and regulations, How to approach a VC fund.

Text books

1. Project Management: Choudhry S., Tata McGraw-Hill,2010
2. Projects: Planning, Analysis, Financing, Implementation, and Review- Prasanna Chandra, 5th edition, Tata McGraw-Hill publishing company limited,2005
3. Project management a system approach to planning scheduling and controlling- Harold Kerzner, CBS Publisher and distributors, 2002.

References

1. A management guide to PERT and CPM- WEIST and LEVY Eastern Economy of PH 2002.
2. T R Banga, N K Agarwal and S C Sharma -Industrial engineering and Management Sciences, -Khanna Publishers

Course outcomes (COs):

At the end of the course, student will be able to

1. Prepare project plan by applying the concepts of project management (PO- 6,7,10,11&PSO 2,3)
2. Organize and manage the resources of projects (PO- 6,9,11&PSO 3)
3. Apply tools and techniques used in project management (PO- 1,2,3,11 & PSO 1,2)
4. Identify, analyze, quantify and mitigate risks (PO- 11 &PSO 3)
5. Evaluate the sources of finance (PO- 11 &PSO 3)

PRODUCT DESIGN AND DEVELOPMENT

Course Code: IME10 **Credit: 4:0:0:0**
Prerequisite : Nil **Contact Hours: 56**
Course Coordinator(s): Dr. G S Prakash / Dr. M R Shivakumar

Course Content

Unit I

Introduction to Product Design: Asimow's Model: definition of Product Design, Design by Evolution, Design by Innovation, Essential Factors of Product Design, Production-Consumption Cycle, Flow and Value Addition in the Production-Consumption Cycle, The Morphology of Design (The seven phases), Primary Design Phases and flowcharting, Role of Allowance, Process Capability and Tolerance in Detailed Design and Assembly.

Characteristics of successful product development, who designs and develops products? Challenges of product development.

Unit II

Product Design Practice and Industry: Introduction, product Strategies, Time to Market, Analysis of the Product, The Three S's, standardization, Renard Series (Preferred Numbers), Simplification, The Designer and His Role, the Designer: Myth and Reality, The Industrial Design Organization, Basic Design Considerations, Problems faced by Industrial Designer, Procedure adopted by Industrial Designers, Types of Models designed by Industrial designers, What the Designer Contributes, Role of Aesthetics in Product Design, Functional Design Practice, Product development organizations.

Unit III

Industrial Design: What is industrial design? Assessing the need for industrial design, Impact of industrial design, industrial design process, Management of industrial design process.

Strength Consideration in Product Design: Principal Stress Trajectories Force – Flow Lines, Balanced Design, Criteria and Objectives of Design, Material Toughness: Resilience, Designing for Uniform Strength, Tension vis-à-vis Compression.

Design for Production – Metal Parts : Producibility Requirements in the Design of Machine Components, Forging Design, Pressed Components Design, Casting Design, Design for Machining Ease, The Role of Process Engineer, Ease of Location and Clamping, Some Additional Aspects of Production Design, Die Casting and Special Castings, Design for Powder Metallurgical Parts, Expanded Metals and Wire Forms.

Unit IV

Optimization in Design: Introduction, Siddal's Classification of Design Approaches, Optimization by Differential Calculus, Lagrange Multipliers, Geometric Programming, Johnson's Method of Optimum Design.

Prototyping: What is prototyping? Types of prototypes, what are prototypes used for, Principles of prototyping, Prototype technologies.

Unit V

Economic Factors Influencing Design: Product Value, Design for Safety, Reliability and Environmental Considerations, Manufacturing Operations in relation to Design, Economic Analysis, Profit and Competitiveness, Breakeven Analysis, Economics of a New Product Design (Samuel Eilon Model).

Value Engineering and Product Design: Introduction, Historical Perspective, What is Value? Nature and Measurement of Value, Maximum Value, Normal Degree of Value, Importance of Value, The Value Analysis Job Plan, Creativity, creative techniques.

Modern Approaches to Product Design: Concurrent Design, Quality Function Deployment (QFD)

Text books

1. A.C. Chitale and R.C. Gupta -Product Design and Manufacturing, PHI, 4th Edition, 2008.
2. Karl T. Ulrich & Steven D., Epinger -Product Design and Development –Tata Mc Graw Hill, 3rd Edition, 2003.

References

1. Tim Jones, Butterworth Heinmann-New Product Development, Oxford, UIC1997.
2. Roland Engene Kinetovicz-New Product Development: Design & Analysis, John Wiley and Sons Inc., N.Y.1990.
3. Geofferry Boothroyod, Peter Dew Hurst and Winston Knight - Product Design for Manufacture and Assembly -3rdEdition, Taylor& Francis Group, 2011.

Course outcomes (COs):

At the end of the course, student will be able to

1. Appreciate the incremental and radical approaches to product design and the steps Involved. (PO-1,2,3 &PSO 1,2)

2. Understand the organization's product strategy and designer's role. (PO- 1,2 &PSO 1,2)
3. Develop an understanding of product design problems and challenges in the strength, function, manufacturability. (PO- 1,2,3 &PSO 1,2)
4. Apply the optimization techniques in product design. (PO- 1,2,3 &PSO 1,2)
5. Analyze the economic consideration, value engineering and modern approaches in product design. (PO- 1,2,3 &PSO 1,2)

MANAGEMENT INFORMATION SYSTEMS

Course Code: IME11 **Credit: 4:0:0:0**
Prerequisite: Nil **Contact Hours: 56**
Course coordinator(s): Dr. M Shilpa / Dr. M Rajesh

Course Content

Unit I

Introduction to Information Systems in Business: Why study Information Systems? Why Businesses Need Information Technology.

Fundamentals of Information Systems: Fundamentals of Information Systems concepts, Overview of Information systems.

Solving Business Problems with Information Systems: A Systems Approach to Problem Solving, Developing Information System Solutions.

Unit II

The Internet and Electronic Commerce: The Internet Business, Fundamentals of Electronic Commerce.

Internets Extranets and Enterprise Collaboration: Internets Extranets in Business, Enterprise Collaboration Systems.

Information Systems for business Operations: Business Information Systems, Transaction Processing Systems.

Unit III

Information Systems for Managerial Decision Support: Management Information and Decision Support Systems, Artificial Intelligence Technology in Business.

Information Systems for Strategic Advantage: Fundaments of Strategic Advantage, Strategic Application and Issues in Information Technology.

Unit IV

Managing IT: Planning and Implementing Change: Planning for Business Change with IT, Implementing Business Change with IT

Managing IT: Security and Ethical Challenges: Security and Control Issues in Information Systems, Ethical and Societal Challenges of Information Technology.

Unit V

Introduction to ERP: Basic ERP concepts, Justifying ERP investments, Risks of ERP, Benefits of ERP

ERP and Technology: ERP and related technologies, Business intelligence

ERP Implementation: Implementation challenges, strategies

Text Book

1. James A O'Brien, G.M. Marakas and Ramesh Behl. Management Information Systems, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 10th edition, 2010, ISBN: 0073376817
2. Alexis Leon, ERP Demystified, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 2008, Secondedition

Reference

1. Laudon and Laudon, Essentials of Management Information Systems, Prentice Hall, 2009.
2. S. Sadagopan, Management Information Systems, PHI, second edition,2014

Course Outcomes (COs):

At the end of the course, student will be able to

1. Identify the role of Information Systems (IS) applications in business. (PO- 3,5 &PSO1)
2. Appreciate the use of e-commerce in business processes (PO- 3,5 &PSO3)
3. Analyze the output obtained from the IS to make suitable decisions (PO- 3,5 &PSO2)
4. Analyze the security and societal challenges associated with the use of IS in business (PO- 3,5 &PSO3)
5. Analyze the ERP implementation challenges (PO- 3, 5&PSO2)

MARKETING MANAGEMENT

Course Code: IME12 **Credit: 4:0:0:0**
Prerequisite: Nil **Contact Hours: 56**
Course Coordinator(s): V. Vivekanand

Course Content

Unit I

Define Marketing for the 21st Century: The importance of marketing, the scope of marketing, what is marketed? Who markets? How business and marketing are changing, Company orientations toward the marketplace.

The production concept, The product concept, The selling concept, The marketing concept, The holistic marketing concept, Fundamental marketing concepts, trends, and tasks, Core concepts, Shifts in marketing management, Marketing management tasks,

Developing marketing strategies and plans: Marketing and customer value, the value delivery process, The value chain, Core competencies, A holistic marketing orientation and customer value, The central role of strategic planning, Corporate and division strategic planning, Defining the corporate mission, Defining the business, Assessing growth opportunities, Organization and organizational culture, Business unit strategic planning, The business mission, SWOT analysis, Goal formulation, Strategy formulation, Program formulation and implementation.

Unit II

Gathering information and scanning the environment: Components of a modern marketing information system, Internal records and marketing intelligence, The order to payment cycle, Sales information systems, Databases, data warehousing and data mining, The marketing intelligence system, Analyzing the macro environment, Needs and trends, Identifying the major forces, the demographic environment, Worldwide population growth, population age mix, Economic environment, Social-cultural environment, Natural environment.

Conducting marketing research and forecasting demand: The marketing research process- Step1: Define the problem and the research objectives, Step2: Develop the research plan, Step3: Collect the information, Step4: Analyze the information, Step 5: Present the findings, Step 6: Make the decision, Measuring marketing productivity, Measuring marketing plan performance, Profitability analysis, Marketing-mix modeling, Forecasting and demand measurement, The measures of market demand, A vocabulary for demand measurement, Estimating current demand.

Unit III

Creating customer value, Satisfaction, and loyalty: Building customer value, satisfaction, and loyalty, Customer perceived value, Total customer satisfaction, Measuring satisfaction, Product and service quality, Total quality management, Maximizing customer lifetime value, customer
profitability, measuring customer lifetime value, customer equity, Cultivating customer relationships, Customer relationship management (CRM), Customer database and database marketing, customer databases, Data warehouses and data mining, The downside of database marketing and CRM.

Analyzing consumer markets: What influences consumer behavior?, Cultural factors, Social factors, Personal factors, Key psychological processes, Motivation: Freud, maslow, herzberg, Perception, Learning, Memory, The buying decision process: the five-stage model, Problem recognition, Information search, Evaluation of alternatives, purchase decisions, Other theories of consumer decision making, level of consumer involvement, Decision heuristics and biases, Mental accounting, Profiling the customer buying decision process.

Unit IV

Analyzing Business Markets: What is organizational buying?, The business market versus the consumer market, buying situations, Systems buying and selling, Participants in the business buying process, The buying center, Buying center influences, buying center targeting, The purchasing/procurement process, Purchasing orientations, Types of purchasing processes, Purchasing organization and administration, Stages in the buying process, Problem recognition, General need description and product specification, Supplier search, E-procurement, Managing business-to-business customer relationships, The benefits of vertical coordination.

Identifying market segments and targets: Levels of market segmentation, segment marketing, niche marketing, local marketing, customization, segmenting consumer markets, geographic segmentation, Demographic segmentation, psychographic segmentation, behavioral segmentation, Bases for segmenting business markets, sequential segmentation, market targeting, effective segmentation criteria, Evaluative and selecting the market segments, Additional considerations.

Unit V

Dealing with competition: Competitive forces, Identifying competitors, Industry concept of competition, Market concept of competition, Analyzing competitors, Strategies, Objectives, Strengths and weaknesses, Selecting competitors, Competitive strategies for market leaders, Expanding the total market, Defending the market share, Expanding market share, Other competitive strategies, Market challenger strategies,

market-Follower strategies, Market-Nicher strategies, Balancing customer and competitor orientations, Competitor-centered companies, Customer-centered companies.

Creating brand equity: What is brand equity?, The role of brands, The scope of branding, Defining brand equity, Brand equity as a bridge, Brand equity models, Building brand equity, Choosing brand elements, Designing holistic marketing activities, Measuring brand equity, Brand audits, Brand tracking, Brand valuation, managing brand equity, Brand reinforcement, Brand revitalization, Brand crisis, Devising a branding strategy, Branding decision: to brand or not to brand?, Brand Extensions, Brand portfolios, Product life-cycle marketing strategies, product life cycles, Style, fashion and fad lifecycles.

Marketing strategies: introduction stage and the pioneer advantage, Growth stage, Maturity stage, decline stage, The product life-cycle concept: critique. Marketing channels and value networks, the importance of channels, Channel development, Value networks, the role of marketing channels, Channel functions and flows, Channel levels. Green marketing- Case studies, Digital marketing -Case studies, Global aspects of markets- Case studies and societal marketing - Case studies.

Text books

1. Philip Kotler, Kevin Lane Keller Abraham Koshy and Mithileshwar Jha - Marketing Management: A South Asian Perspective, Pearson Education, 13th Edition, ISBN 978- 0-13-607941-5
2. Michael R Czinkota, 2nd Edition, 2010 - Marketing Management, Vikas Publishing House, ISBN9780324022032

References

1. Philip Kotler- Principles of Marketing, 3rd Edition, 2009, Prentice –Hall.
2. William J Stanton - Fundamentals of Marketing, 9th Edition, 2010, McGraw-Hill.
3. Rajagopal - Marketing Management Text & Cases, Vikas Publishing House, ISBN 81- 259-0773-4,2010

Course outcomes (COs):

At the end of the course, student will be able to

1. Design and develop of marketing solutions for current retail environments by employing appropriate marketing strategies. (PO-2&PSO1)
2. Apply knowledge of basic management skills to maximize employee productivity.(PO-3 &PSO1,2,3)

3. Evaluate and apply marketing practices to create measurable results to meet marketing objectives. (PO-6 &PSO1,2)
4. Analyze the competitors, Their Strategies, their Objectives, Strengths and weaknesses.(PO-4&PSO1,2,3)
5. Devising a branding strategy for Value networks. (PO-4,9&PSO3)

Elective - D

TOTAL QUALITY MANAGEMENT

Course Code: IME13 **Credit: 4:0:0:0**
Prerequisite: Nil **Contact Hours: 56**
Course Coordinator(s): Sudheer D Kulkarni/ V. Vivekanand

Course Content

Unit I

TQM Philosophies: Deming, Juran, Crosby, Kaizen, Shigeo Shingo, Ishikawa, Taguchi

Evolution Of Quality Concepts And Methods : Quality concepts, Development of four fitnesses, evolution of methodology, evolution of company integration, quality of conformance versus quality of design from deviations to weaknesses to opportunities, Future fitness, four revolutions in management thinking and four levels of practice.

Four Revolutions in Management Thinking: Introduction to Customer focus, Continuous Improvement, Total participation, and Societal Networking.

Focus on Customers: Change in work concept, marketing and customers.

Unit II

Continuous Improvement: Improvement as problem solving process, Management by process, WV model of continuous improvement, process control, process control and process improvement, process versus creativity. Reactive Improvement: Identifying the problem, standard steps and tools, seven steps, seven QC tools.

Unit III

Proactive Improvement: Management diagnosis of seven steps of reactive improvement, General guidelines for management diagnosis of a QI story, Discussion on case study for diagnosis of the seven steps. Proactive Improvement: Introduction to proactive improvement, standard steps for proactive improvement, semantics, example-customer visitation, Applying proactive improvement to develop new products- three stages and nine steps.

Unit IV

Total Participation: Teamwork skill. Dual function of work, teams and teamwork, principles for activating teamwork, creativity in team processes, Initiation strategies, CEO involvement, strategies for TQM introduction. Infrastructure for mobilization. Goal setting (Vision/ Mission), organization setting, training and education,

promotional activities, diffusion of success stories, awards and incentives, monitoring and diagnosis, phase-in, orientation phase, alignment phase, evolution of the parallel organization. US Strategies for Phase In, Benchmarking, Six Sigma and Cycle Time Reduction.

Unit V

Hoshin Management: Definition, phases in hosing management-strategic planning (proactive), Hoshin deployment, controlling with metrics, check and act (reactive). Hoshin management versus management by objective, Hoshin management and conventional business planning, an alternative Hoshin deployment system, Hoshin management as "Systems Engineering" for alignment.

Societal Networking: Networking and societal diffusion – Regional and nationwide networking, infrastructure for networking, openness with real cases, change agents, Center for quality Management case study, dynamics of a societal learning system. TQM as learning system, keeping pace with the need for skill, a TQM model for skill development, summary of skill development.

Text books

1. Shoji Shiba, Alan Graham and David Walden -A New American TQM Four Practical Revolutions in Management, Productivity Press, Portlans (USA)-2001.
2. N Logothetis-Management for Total Quality, Prentice Hall of India, New Delhi -2002.

References

1. Roger C Swanson - The Quality Improvement Hand Book, Publisher Vanity Books International, New Delhi, 9th Edition,1995
2. William C Johnson and Richard J Chavla, -Encyclopaedia of Total Quality Management, New Delhi,1995
3. N.V.R Naidu, K.M.Babu, G. Rajendra - Total Quality Management, New Age International Publishers-2008edition,
4. Kesavan R -Total Quality Management, I K International Publishing house Pvt. Ltd, 2nd edition, 2008.

Course outcomes (COs):

At the end of the course, student will be able to

1. Understand the various quality concepts. (PO-1,8 &PSO 2)
2. Apply continuous improvement models to satisfy customers. (PO-1,10 &PSO 2)

3. Apply proactive improvement techniques to improve quality of products. (PO-4,8 &PSO 2)
4. Develop total participation methods among employees to satisfy internal and external customers. (PO-1,9,10 &PSO 3)
5. Implementation of societal networking and Hoshin management. (PO-6,9,12 &PSO 3)

SOFTWARE ENGINEERING

Course Code: IME14 **Credit: 4:0:0:0**
Prerequisite: Nil **Contact Hours: 56**
Course Coordinator(s): Dr. C S Chethan Kumar / Dr. M Rajesh

Course Content

Unit I

The Product and the Process: The product - Evolving role of Software, Characteristics, Components, and Applications. The Process - Software process, Models - Linear, sequential, Prototype, RAD, Process Technology, Software Development Life cycle.

Software Project Management Concepts: The Management Specification, People, Problem, Process.

Unit II

Software Project Planning: Objectives, Scope, Resources, Project estimation, Decomposition Techniques, Empirical Estimation Models, Make-buy decision, automated estimation tools.

Risk Management: Reactive v/s Proactive Risk Strategies, Software Risks, Risk identification, Risk projection, Monitoring.

Unit III

Software Project Scheduling and Tracking: Basic concepts, defining a task set selection, Defining Scheduling, Project Plan.

Software Quality Assurance/Quality Control: Quality assurance concept, Cost impact of software defects, Technical review, statistical Quality assurance, software reliability, ISO 9000 Quality standards.

Unit IV

System Analysis Concept and Principles: Requirement analysis, Principles, software prototyping, specifications, Data Modeling, Functional Modeling and Information Flow, Structured Analysis, Data Dictionary.

System Design Concepts and Principles: Design Process Concept, Modular design, Documentation Design Methods, Data Design, Interface Design, Procedural Design, Design for Real Time Systems, Considerations in Real Time systems, Analysis and Simulation of Real Time Systems.

Unit V

Dependability and security specification: safety specification, reliability specification, formal specification.

Security Engineering: Security management, Design for Security, System survivability,

Dependability and security assurance: static analysis, reliability testing, security testing, process assurance, safety and dependable cases.

Text Book

1. Roger S. Pressman -Software Engineering: A Practitioner's Approach, Software Engg. Series, McGraw-Hill International Editions, 4th Ed.

Reference

1. Somerville -Software Engineering, Adison Wesley publications, 9th edition, 2012, ISBN 978-81-317-6216-5

Course outcomes (COs):

At the end of the course, student will be able to

1. Appreciate Software concepts and understand the significance of software development life cycle. (PO- 1,2 &PSO1)
2. Identify and classify key project planning steps. (PO- 2 &PSO 2)
3. Track and evaluate software quality control process. (PO-5 &PSO 2)
4. Demonstrate data modeling and functional modeling. (PO-4 &PSO 1)
5. Design security specification and handle security engineering. (PO-3 &PSO3)

INNOVATION AND ENTREPRENEURSHIP

Course Code: IME15 **Credit: 4:0:0:0**
Prerequisite: Nil **Contact Hours: 56**
Course Coordinator(s): Mr. Deepak Kumar/Mr. P R Dheeraj

Course Content

Unit I

Introduction: Innovation Concepts, Types of innovation, Linear, Cyclic and Network models of innovation, Global industrial competition: Changes in World industry, Dominant trends and issues in World business, Technology as the driving force, Definition of technology, Relationship between Business strategy and technology strategy, To Innovate or Not to Innovate

Unit II

Innovation Planning Process: Factors that aid Innovation Planning, Management of technological innovation, Dynamics of innovation process, Organizational roles for innovation, Facilitators and impediments of innovation, Strategic issues in innovation management, Developing a Climate for Innovation, Case study

Unit III

Trends in Innovation Management: Technology fusion, New R&D strategies, Core competencies and business strategy, Building innovation culture in organizations, Key Initial Questions for Implementation, Challenges and opportunities, Case study.
Entrepreneurship: Importance of entrepreneurship in an economy, Concepts of entrepreneurship, Characteristics of successful entrepreneur, Entrepreneurial development models, Serial entrepreneur VS Portfolio entrepreneur, Myths of entrepreneurship.

Unit IV

Entrepreneurship: Problems and capacity building measures, Entrepreneurship v/s Entrepreneurship, Fostering entrepreneurship in corporations, Cases of successful and unsuccessful entrepreneurs, Nature and activities of an entrepreneur, Techniques of coordination, Institutions Supporting Small Business Enterprises: Introduction, Some important central-level and State-level institutions and non-governmental agencies, Permanent registration certificate, Effect of WTO

Unit V

Setting up of an Enterprise: Business opportunities in various sectors, Business plans, Formalities for setting up a small business enterprise, Project selection, Constitution, Registration, State clearances, Requirements of land & building, plant & machinery and infrastructure, Preparation of project report, Securing financial support for project and implementation. Salient features of good project report

Text Books

1. P.N.Rastogi, Management of Technology and Innovation, Sage Publications, new Delhi, 1995
2. Poornima M Charantimath, Entrepreneurship Development and Small Business Enterprises, Pearson Education, 2006.
3. Dr. NVR Naidu and T. Krishna Rao- Management and Entrepreneurship, I K International Publishing House Pvt. Ltd, New Delhi2008

Reference Books

1. M. White and G.D. Bruton, The Management of Technology and Innovation, Cengage learning,2011
2. Cynthia L. Greene, Entrepreneurship, Cengage Learning, 2006.

Course Outcomes (COs):

At the end of the course, student will be able to

1. Understand the global industrial competition to adopt the new technology to build the relationship bridge between business strategy and technology strategy. (PO- 5,7&PSO 2,3)
2. Apply the various innovation concepts and models in organization to their strategic issues in innovation management. (PO- 5,6&PSO 2, 3)
3. Analyze the trends in Innovation Management, New R&D strategies to build innovation culture to strengthen the activities of entrepreneurs. (PO- 4,7&PSO2,3)
4. Evaluate and forecast the entrepreneurial problems to train the successful entrepreneurs and avoid upcoming unsuccessful entrepreneurs. (PO- 7,8&PSO2,3)
5. Develop the skills to setting up a small business enterprise and the opportunities in various sectors by considering the mandatory rules and regulations from the government. (PO- 9,11&PSO2,3)

MANAGERIAL ECONOMICS

Course Code: IME16 **Credit: 4:0:0:0**
Prerequisite: Nil **Contact Hours: 56**
Course Coordinator(s): Dr. C S Chethan Kumar/Dr. S Appaiah

Course Content

Unit I

Introduction: Nature, Scope and Methods, The theory of the firms, Markets. Demand Analysis: Demand theory, Individual demand, Market demand, Demand and Income, Business demand, Elasticity, Elasticity of demand, Own-price Elasticity, Estimating Elasticities, Supply, Elasticity of supply. Demand forecasting.

Unit II

Demand Estimation: Methods, Model specification, Data collection, Simple regression, Goodness of fit, Power regression, Forecasting, Multiple regression, Implications of empirical studies, Problems.

Unit III

Production Theory: Introduction, Basic terms and definitions, Factors of production- The short run and the long run, Problems.

Unit IV

Cost Theory: Introduction, Short run cost behavior, Long run cost behavior, the learning curve, Cost-volume-profit analysis, Cost estimation- Short run and long run cost estimation.

Unit V

Market Structure and Pricing: Product markets, determination under different markets, market structure, perfect competition, monopoly, monopolistic competition, duopoly, oligopoly, pricing and employment of inputs under different market structure, price discrimination, degree of price discrimination, investment analysis, cash flow analysis, risk analysis cost of capital and problems.

Text books

1. A Problem solving approach- Nick Wilkinson -Managerial Economics, Cambridge University Press, 2005.
2. Ivan Png -Managerial Economics, Blackwell Publishing, Second Edition. 2008.

References

1. Samuel Paul and G.S.Gupta -Managerial Economics. TMH 3rd edition-2008.
2. Theory and Practice by Thomas and J. Webster -Managerial Economics, 2003.
3. Michel R Bye Managerial Economics and Business Strategy, McGraw Hill International, 6th Ed.
4. Moyer and Harris – Managerial Economics Tata McGraw Hill, New Delhi, 2008.

Course outcomes (COs):

At the end of the course, student will be able to

1. Understand the roles of managers and the nature of internal and external decisions to be made by managers for demand and forecasting. (PO- 1,2,5 &PSO2,3)
2. Analyze the demand and supply conditions and assess the position of a company.(PO- 1,2 &PSO2,3)
3. Design competition strategies, including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets. (PO- 1,2 &PSO2,3)
4. Analyze real-world business problems with systematic cost estimation. (PO- 1,2,5&PSO2,3)
5. Make optimal business decisions by integrating the concepts of economics, mathematics and statistics and assess market risks. (PO- 1,2,5 &PSO2,3)

SIMULATION MODELING AND ANALYSIS LAB

Course Code: IML74 **Credit: 0:0:1:0**
Prerequisite: Applied Probability and Statistics **Contact Sessions: 14**
Course Coordinator(s): Dr. M Shilpa

Course Content

Laboratory Exercises

1. Introduction to Simulation Packages and selection.
2. Simulation of inventory model using M S Excel
3. Simulation of queuing model using M S Excel
4. Building simulation Models for Banking service (Bank teller problem – with common templates)
5. Building simulation Models for Mortgage application problem (with common templates)
6. Building simulation Models for Post office animation (with common templates)
7. Building simulation models for manufacturing operations (Electronic assembly – With Basic templates)
8. Building simulation models for manufacturing operations (Electronic assembly – With Common templates)
9. Building simulation Models for food processing problem (with basic templates)
10. Simulation of garment stitching industry (with basic templates)
11. Simulation of a supermarket (with basic templates)
12. Simulation of a health care system (with basic templates)
13. Simulation of axle manufacturing process (with basic templates)
14. Simulation of vehicle traffic system (with basic templates)
15. Building simulation models for manufacturing cell (with basic templates)
16. Building simulation model for manufacturing cell with transporter system (with basic templates)

Note: At least 12 experiments have to be conducted from the above list of experiments
Software Packages: MS Excel, ARENA simulation software package

Text books

1. Jerry Banks, John S Carson, II, Berry L Nelson, David M Nicol -Discrete Event system Simulation, 5thEdition, Pearson Education, Asia, ISBN - 81- 7808 – 505 -4.

2. Narsingh Deo -Systems Simulation with Digital Computer; PHI Publication (EEE), ISBN– 0-87692-028-8

Reference

1. Averill M Law, W David Kelton -Simulation Modeling & Analysis, McGraw Hill International Editions – Industrial Engineering series, ISBN –0-07-100803-9.
2. W. David Kelton, Randoll Sadowski, Nancy Swets, Simulation with Arena, edition 6, Mc Graw Hill,2014

Course outcomes (COs):

At the end of the course, student will be able to

1. Select the appropriate simulation software based on different criteria like model building features, graphic user interface etc. (PO- 2,3&PSO 2)
2. Build simulation model for simple manufacturing and service operations (PO- 3,4&PSO1,2)
3. Analyze and interpret the results and suggest suitable alternatives for decision making. (PO- 2,3&PSO2)

FINANCIAL ACCOUNTING AND COSTING LAB

Course Code: IML75 **Credit: 0:0:1:0**
Prerequisite: Nil **Contact Sessions: 14**
Course Coordinator(s): Dr. N V R Naidu / Dr. R Shobha

Course Content

Laboratory Exercises

1. Introduction to Accounting and Tally software
2. Preparation of double entry system of book keeping – Journal entries using Tally
3. Preparation of double entry system of book keeping – Ledger balances using Tally
4. Preparation of final accounts for a given journal problem using Tally
5. Preparation of final accounts for a given trial balance problem without adjustments using Excel
6. Preparation of final accounts for a given trial balance problem with adjustments using Excel
7. Preparation of financial ratios for a given journal problem using Tally
8. Preparation of Cost Sheet for a given job costing problem using Excel
9. Preparation of Cost Sheet and profit for a given job costing problem using Excel
10. Preparation of various process accounts for a given problem using Excel
11. Preparation of income statements for a given problem using Excel
12. Preparation of cash budget for the given expenditure using Excel
13. Preparation of flexible budget for a given level of activity using Excel

Suggested Software Packages

1. Tally or Tally ERP
2. M.S. Excel, SYSTAT

Text books

1. Khan M Y and Jain P K -Cost Accounting, Tata McGraw-Hill - 4th Edition.
2. Prasanna Chandra -Financial Management, Tata McGraw-Hill - 4th Edition.1998.
3. James. C Vanhorne -Financial Management and Policy, Peerason education - 12th edition.

References

1. B.S Raman -Elements of Accountancy,
2. Ahuja, Pandey, Khanna and Arora -Practical Costing, S. Chand & Co. Ltd -2005.
3. KHAN& JAIN -Financial Management & Costing, TMH –2000.

Course outcomes (COs):

At the end of the course, student will be able to

1. Apply the concept of various accounting principles for obtaining comprehensive solutions in accounting. (PO- 1,2,11&PSO1,2)

VIII Semester

Elective - E

ADVANCED OPERATIONS RESEARCH

Course Code: IME17 **Credit: 4:0:0:0**
Prerequisite: Operation Research **Contact Hours: 56**
Course Coordinator(s): Mr. V. Vivekanand / Mr. P R Dheeraj

Course Content

Unit I

Linear Programming: Two phase simplex technique, revised simplex techniques, Sensitivity analysis: Algebraic method

Unit II

Integer Programming- Gomory's technique

Non-Linear Programming: Kuhn – Tucker conditions, QPP Problems solution using Wolfe's algorithm.

Unit III

Queuing Theory: Queuing system and their characteristics, The M/M/1 Queuing system, Steady state performance analyzing of M/M/1 queuing model, M/M/K/ Model, M/Ek/1, M/D/1, M/M/C and MG1 models.

Unit IV

Dynamic Programming: Characteristics and DP model, Computational procedure - Simple problems only.

Discrete Markov Chains: Discrete Stochastic Process, Markovian process, Stationary Markov chains, Markov diagrams, Ergodic and Absorbing Markov chains, Steady State probabilities, stochastic matrix, transition m, matrix and their applications.

Unit V

Project Management Using Network Analysis: Network construction, determination of critical path and duration, floats. PERT- Estimation of project duration, variance and Crashing, Elements of crashing, least cost project scheduling, Resource Allocation for optimal utilization of resources.

NOTE: Numerical problems to be set starting from optimal tables for the topics – sensitivity analysis and integer programming

Textbooks

1. TahaHA-Introduction to Operation Research, Prentice Hall of India-10th edition, 2016.
2. Wayne L. Wintson - Operations Research: Application and Algorithms, Cengage Learning; 4th edition, 2003
3. A management guide to PERT and CPM- WEIST and LeVY Eastern Economy of PH 2002.

References

1. Hiller and Libermann -Introduction to Operation Research, McGraw Hill - 9th edition, 2009.
2. S.D. Sharma -Operations Research, Kedarnath, Ramnath& Co -1996
3. Philips, Ravindran and Soleberg– Theory and Practice -Principles of Operations Research theory and Practice, Wiley India Pvt Ltd. 4th edition,2001

Course outcomes (COs):

At the end of the course, student will be able to

1. Apply and Analyze LP Techniques and Conduct Sensitivity analysis for real life problems.(PO-1,2,5&PSO : 1,2)
2. Apply and Solve Non Linear Programming Techniques for various real life problems.(PO-1,2,5&PSO : 1,2)
3. Analyze complex problems by using queuing theory. (PO-1,2,5) (PSO : 1)
4. Formulate and Analyze various complex problems by using Markov Chain and Dynamic Programming approaches(PO-1,2,5&PSO : 1,2)
5. Implement and Analyze the concepts of Project Management through network techniques(PO-1,2,5,11&PSO : 1,2)

ORGANIZATIONAL BEHAVIOR

Course Code: IME18 **Credit: 4:0:0:0**
Pre requisite: Nil **Contact Hours: 56**
Course Coordinator(s): Dr. S Appaiah / Sudheer D Kulkarni

Course Content

Unit I

Introduction; Definition of Organization Behavior and Historical development, Environmental context Information Technology and Globalization, Diversity and Ethics, Design and Cultural, Reward Systems.
The Individual: Foundation of individual behavior, Ability

Unit II

Learning: Definition, Theories of Learning, Individual Decision Making, classical conditioning, operant conditioning, social Making, learning theory, continuous and intermittent reinforcement.
Perception: Definition, Factors influencing perception, attribution theory, selective perception, projection, stereotyping, Halo effect.

Unit III

Values and attitudes: Definitions – values, Attitudes: Types of values, job satisfaction, job involvement, professional Ethics, Organizational commitment, cognitive dissonance.
Motivation: Maslow's Hierarchy of Needs, Mc. Gregor's theory X and Y, Herzberg's motivation Hygiene theory, David Mc Cleland three needs theory, Victor vroom's expectancy theory of motivation.

Unit IV

The Group: Definition and classification of groups, factors affecting group formation, stages of group development, Norms, group processes, group tasks, group decision making.
Conflict Management: Definition of conflict, functional and dysfunctional conflict, stages of conflict process.

Unit V

Leadership: Definition, Behavioural theories – Blake and Mounton managerial grid, Contingency theories – Hersey - Blanchard's situational theory, Leadership styles – characteristics, Transactional, transformation leaders.

The Organization: Mechanistic and Organic structures, Minitberg's basic elements of organization, Organizational Designs and Employee behaviour, organization development – quality of work life (QWL).

Text books

1. Stephen P Robbins -Organizational Behaviour, Pearson Education Publications, ISBN– 81–7808–561-5, 9th Edn. 2012.
2. Fred Luthans-Organizational Behaviour, Mc Graw Hill International Edition, ISBN–0–07– 20412–1, 11th Edn. 2006.

References

1. Hellriegel, Srocum and woodman, Thompson Learning -Organization Behaviour, Prentice Hall India, 9th Edition-2001.
2. Aswathappa-Organizational Behavior, Himalaya Publishers.2001.
3. VSP Rao and others -Organizational Behaviour, Konark Publishers 2002.
4. Organizational Behaviour- (Human behaviour at work) John Newstron / Keith Davis 9th Edition 2002.
5. Paul Henry and Kenneth H. Blanchard -Management of Organizational Behaviour, Prentice Hall of India, 1996.

Course outcomes (COs):

At the end of the course, student will be able to

1. Manage the art of getting work in the corporate and other organization. (PO- 6,7,12 &PSO2,3)
2. Learning with different platform or areas with different views. (PO- 6,7,12 &PSO2,3)
3. Develop the values and attitudes for betterment of organizational growth and Analyze the importance of motivation and its use in industry, (PO- 8,9,10,12 &PSO2,3)
4. Identify the different groups and their values and different conflict process in an organization. (PO- 6,7,9,12 &PSO2,3)
5. Develop the structure and hierarchy of the organization and different factors affecting leadership styles which can be applied in an organization. (PO- 7,8,9,12 &PSO2,3)

BIG DATA ANALYTICS

Course Code: IME19 **Credit: 4:0:0:0**
Prerequisite: Nil **Contact Hours: 56**
Course Coordinator(s): V. Vivekanand/ P R Dheeraj

Course Content

Unit I

Introduction to Big data & Descriptive Analytics: Data Science: Definition, Skills for Data Science, Data scientist, Characteristics of BIG Data, Relationship between data science and big data, Categorization of Analytical methods

Data Visualization (no analytical treatment): Effective Design Techniques (Data-Ink ratio), Tables: Table Design Principles, Bubble Chart, Heat Maps, Stars, Chern off Faces, Advanced Charts: Parallel Coordinates Plot, Tree maps, Geographic Information Systems Charts, Data Dashboard

Sample Geometry for Multivariate data: Computing Mean Vector of Multivariate Data, Computation of Generalized variance, covariance, Sample Standard Deviation, Sample correlation matrix and Sample Covariance Multivariate Normal Density: Bivariate Normal Distribution, Multivariate Normal distribution, Mahanobolis Distance, properties of Multivariate normal density function

Unit II

Transforming data & Inferences about multivariate data: Cleaning and Transforming Data: Missing Data, Detecting and Handling of Outliers, Checking for Normality: Q-Q Plot for Multivariate Normality, KS test, Shaipro Wilks test, Homoscedastic, Data Transformation : Power Transformation, logic transformation, Fisher transformation, Transformation of multivariate observation Hotelling's T^2 test for simple multivariate data, Hotelling's T^2 test for two sample for different multivariate populations, Interval estimation of means for multivariate data: One at a time confidence interval, simultaneous confidence methods, Bonferroni method

Unit III

Data Reduction Technique : Principal components methods : Procedure for computation of principal components (Non Analytical Treatment), Summarizing Sample Variation by principal components : Variance of Components, Scree Plot; Standardization of Principal Components Factor Analysis: Assumptions of factor analysis, Orthogonal factor model : Common Factors, specific factors, factor loading, Estimation of Parameters of model using PCA (Non analytical methods (Only

Procedure), Communalities, Factor Rotation (Varimax method), Estimation of Factor Scores

Unit IV

Predictive analytics (Supervised Learning Methods):

Multiple Linear Regression Analysis for Non Categorical variables and Categorical variables: Building a regression model, multicollinearity, variable selection procedure (Non analytical): Stepwise, forward and backward regression.

Classification Accuracy, k-Nearest Neighbors (Simple Problems), Classification and Regression Trees

Unit V

Unsupervised Learning: Cluster Analysis (Simple Problems): Measures of Association for Continuous Variables (Euclidean Distance, Canberra Metric, Czekanowski Coefficient), Measures of Association for Binary Variables: Similarity coefficients for clustering items; Agglomerative Hierarchical Clustering: single linkage, complete linkage, average linkage; Cluster Description; Non Hierarchical Clustering Methods: K means method (Simple Problems)

Note: Large Multivariate Data is explained using SYSTAT/R/Minitab/Excel/SPSS Software's

Text books

1. Applied Multivariate Statistical Analysis (6th Edition) 6th Edition Richard A. Johnson (Author), Dean W. Wichern (Author), Eastern Economy Edition,2015
2. Essentials of Business Analytics 1st Edition, by Jeffrey D.Camm (Author), James J. Cochran (Author), Michael J. Fry (Author), Jeffrey W. Ohlmann (Author), David R. Anderson (Author), Jan2014.

References

1. Multivariate Data Analysis: Joseph F. Hair Jr (Author), William C. Black (Author), Barry J. Babin (Author), Rolph E. Anderson (Author), Pearson Education Limited, 2013.
2. Statistical and Machine-Learning, Data Mining Techniques for Better Predictive Modeling Techniques and Analysis of Big Data: Bruce Ratner, Second Edition, CRC Press Taylor &Francis Group.
3. The Elements of Statistical Learning, Data Mining, Inference, and Prediction, Trevor Hastie, Robert Tinsirani, Jerome Friedman.

Course outcomes (COs):

At the end of the course, student will be able to

1. Identify and visualize multivariate data and relate to various real time applications(PO-1,2,4,5&PSO1,2)
2. Conduct Statistical Testing of Multivariate Data (PO-1,2&PSO1,2)
3. Apply data reduction techniques to real time data (PO-1,2,4,5&PSO1,2)
4. Apply and Analyze predictive models to real time data (PO-1,2,4,5 &PSO1,2)
5. Develop clustering methods for real time data (PO-1,2,3,5 &PSO1,2)

BUSINESS PROCESS REENGINEERING

Course Code: IME20 **Credit: 4:0:0:0**
Prerequisite: Nil **Contact Hours: 56**
Course Coordinator(s): P R Dheeraj / Hamritha S

Course Content

Unit I

Introduction to BPR: Current situation, A tool for change, Reengineering, Business process, Business process reengineering, BPR vision, BPR and TQM, BPR and IT, Process mapping, Objectives and components, Process management.
BPR Enablers: Concept of BPR, IT as enabler, IT in BPR.

Unit II

BPR and Industrial Engineering: Challenges and evolution, IE in global context, BPR and IE, Characteristics of BPR, Need for BPR, Key elements of BPR, Performance indicators, Tools and techniques of BPR, Implementation of BPR, Evaluation of BPR.
Strategic Perspectives of BPR: Link between BPR and strategy, Strategic business processes, Classification of business processes, Migrating processes, Performance assessment.

Unit III

Major Business Processes of Reengineering: Accounting, Strategic Process, Product development, Marketing/sales, Services, Personnel, Manufacturing.
IT, Software Reengineering and ERP: Information technology, Enterprise resource planning, Software reengineering.

Unit IV

Reengineering Models: ARTEMIS, SHAMASH, Practical model, Innovation model, integrated enterprise model.
Implementation and Success Factors: Management process, five step methodology, Success factors, Failure factors.
Future Course: Indian organizations, Small and medium enterprises, Productivity scale, Implementation specifications, Realization of improvement.

Unit V

Business Process Innovation: Business process management, Innovation and business processes, Holistic approach, Benchmarking.

Process Mapping: Importance of process, Work as process, SIPOC map, Change management.

Text Book

1. "Business Process Reengineering" – R Srinivasan (McGraw Hill, 2017)

Reference Books

1. "Business Process Reengineering: Text and Cases" – R Radhakrishnan (Prentice Hall,2008)
2. "Business Process Reengineering & Change Management" – B R Dey (Dreamtech Press, 2004)

Course outcomes (COs):

At the end of the course, student will be able to

1. Understand the fundamental concepts of business process reengineering. (PO-11&PSO1, 2)
2. Identify the relationship between BPR and industrial engineering. (PO-11&PSO1, 2)
3. Analyze the major business processes of reengineering. (PO-11&PSO1,2)
4. Design a basic business process reengineering model. (PO-11&PSO1,2
5. Implement a basic business process reengineering model. (PO-11&PSO1,2)

INTERNSHIP

Course Code: IM IN **Credit: 0:0:4:0**
Prerequisite: Nil **Contact Duration: 1 Month**
Course Coordinator(s): Dr. M Rajesh / Sudheer D Kulkarni

Course Content

Students should undergo industrial training in the form of Internship for one month in reputed industries.

Assessment and Evaluation

Note: Students have to undergo one month internship in an industry between 4th and 5th or 6thand 7th semester. The student has to compulsorily submit a report in his/her 7th semester and the evaluation will be done by a committee constituted by the HOD. Each student must give a presentation for about 30 minutes, comprising of:

- Company Profile
- Recording of information/observations
- Short comings noticed during the internship
- Application of industrial engineering techniques
- Conclusions

Course outcomes (COs):

1. Identify the products of the company and its customers and draw the appropriate plant layout of the industry (PO- 1,2,3&PSO 1)
2. Construct the process map for some of the important products of the industry (PO- 1,2,3&PSO 1,2)
3. Identify some of the problems present in the industry and apply industrial engineering techniques to provide suitable suggestions to overcome them (PO-1,2,3&PSO2,3)

Rubric for Internship Evaluation

% marks to be awarded			Level D Up to 50	Level C 51-74	Level B 75-89	Level A 90-100
	Assessment criteria					
1	**Internship Report**					
	a	Report writing and Formatting	No clarity in technical contents Poor organization Poor language Formatting not as per the guidelines	Reasonably good clarity and organization of the report Formatting not complete	Very good organization of the report and flow of information Formatting meeting the guidelines	Absolutely clear explanation on technical contents Very good language Complete and correct formatting
	b	Products of the company	Mere identification of the company's products or services	Identification Of the applications/ use s of the products	Building of product tree structure for simple products	Identification of applications of the products along with its material characteristics and other features
	c	Customers of the company	Mere identification of important customers	Identification of all the customers and their geographic locations	Narration on customer relationship and customer feedback	Clarity on the efforts made by the company to retain its customers
	d	Plant layout	Identification of the existing type of plant layout	Explanation or justification on the type of plant layout	Deficiencies identified due to the plant layout	Flaws in the present layout along with simple alternatives
	e	Material / information Flow pattern	Not clear about the material flow pattern in the industry	Has an idea about the way some of the materials flow in the shop floor	Clear picture about the material flow pattern and hurdles in the flow	Sound explanation on the flow pattern on most of the materials in the industry

	f	Organization structure	Not identified the structure of the organizatio n	Identified only the important positions of the organizatio n structure	Clarity about the complete organizati on structure and span of control	Excellent description of the organization structure with the help of a chart and the roles and responsibilities of the key players
	g	Supply Chain perspective	Not identified any of the supply chains	Identifie d a single supply chain and the players in it	Identified all the key supply chains of the industries	Identified the information/m aterial al flow across the supply chain
	h	Software and technology identified	Not provided the latest software or technology available with the industry	Just aware of the latest software and technolo gy	Detailed explanation on the features of the software and technology that the industry is using	Clear understanding of the various other software packages or technological advances in that field
	i	Identification of IE techniques implemented in the company	Not able to identify any of the IE techniques used in the industry	Identified 2 or 3 IE practices but has not evaluated if they are rightly being used	Suggested additional IE techniques that could possibly be implemented for improvemet	Provided a road map for the implementation of latest IE techniques as applicable to the industry
	j	Problem identification	Not able to identify any flaws, problem domains, incorrect application of theory and techniques	Identified the flaw and described with clarity	Identified the flaw, described the flaw in detail and provided some suggestions for improvement	Conducted a simple study on the problem, collected data and analyzed it and come out with feasible solutions

	k	Photos of the product/ layout/ flaws	Not incorporated any photos of the layout / products etc.	Very minimum photos of the products / layout Very minimum tabular columns	Sufficient and clear photos of the products/ layouts/ machinery Included tabular columns wherever necessary	Ample photos of the layout/ shop floor Presented the information in as many tabular columns or graphs as possible
2	**Presentation**					
	A	Depth of coverage	Surface level explanation	Good amount of explanation	In depth coverage of all the aspects of the company	Exhibits sound knowledge on the processes and technology available in the company
	B	Charts/ slides	Plain text without charts/ tables/ figures	Reasonably good number of charts/ tables /figures	Expressed the contents with the help of charts/ figures and very little plain text	Created tables/ charts/ figures on own i.e. not merely copied from the company
	C	Communication on and presentation skills	Poor language and poor body language	Good language of expression and use of body language	Highly expressive with clarity of thoughts	Excellent communic ation skills and good presentation
	D	Time management	Running out of time to conclude	Struggling hard to meet the time dead lines	Just finished the presentation in time	Completed the presentation well in advance and provided time for queries
3	**Questions and Answers**		Not able to clarify most of the queries	Just able to answer to all the queries	Clarifying all the queries with sufficient information	Providing suitable examples and illustrations to clarifying the query

PROJECT WORK

Course Code: IMP **Credit: 0:0:16:0**
Prerequisite: Nil
Course Coordinator(s): Dr. M Shilpa / Dr. R Shobha

Note:

- Students have to form a group of four members.
- Identify the company in which project work will be carried out.
- Identify the problem area in order to carry out the project work.
- Project work evaluation will be progressively carried in three stages and finally at the end of the semester through external examination.

Course outcomes (COs):

At the end of the course, student will be able to

1. Appreciate the cross functional interdependencies in a project. (PO- 2,3,11&PSO 1,2)
2. Implement the concepts of Project, financial, technology and industrial management to solve productivity and competitive issues. (PO- 2,3,4,11& PSO 2)
3. Ability to work in cross - functional teams. (PO- 2,3,4,5&PSO 2,3)
4. Design and develop new subsystems, structures and policies. (PO- 2,3,11& PSO 2)
5. Demonstrate the ability and skill to solve industrial problems within a specific timeframe.(PO- 2,3,11&PSO 2,3)

Rubrics for VIII Semester project work evaluation

% marks to be awarded			Level C	Level B	Level A
			Up to 60	61-80	81-100
Assessment criteria					
1	**Conduction of project work:**				
	a	Project area and its significance	Remotely relevant to industry and society	Directly relevant to industry	Directly relevant to both industry and society
	b	Literature Review	Poorly structured review of literature with more of book references	Sufficiently structured review of literature with more of book and conference proceedings references. Limited journal references	Well-structured review of literature with references from refereed journals, renowned books and conferences
	c	Problem Identification	Problem not clearly identified/ inaccurate and explanation is too brief	Problem is identified and addressed in a satisfactory manner	Problem is clearly addressed and quantified
	d	Setting up of objectives	Objectives are vague and not addressing the identified problem	objectives are stated and presented in a satisfactory manner	objectives are clearly stated and strongly related to the identified problem
	e	Planning of project activities	Project activities are poorly identified and not arranged practically in a project schedule with timeline	Project activities are identified but some are not arranged practically in a project schedule with timeline	Project activities are clearly identified and arranged practically in a project schedule with timeline
	f	Data collection	Collected data is remotely relevant t o the problem identified	Relevant data is collected but is not sufficient for analysis	Relevant and complete data is collected
	g	Methodology - Use of IE tools and techniques	Project approaches/ methods are not sufficiently outlined/ not very well suited and no justification is provided	Adequately suited and applicable methodology with justification	Well suited and clearly described methodology approach with correct reference

	h	Results and conclusions	Too many or too few results presented. Not clear about the ones that are directly related to the objective	Based on the objectives improvement is clearly presented, tables and charts clearly show the variables in the study	results are clear; objectives are met; all the variables are clearly indicated; limitations and future scope are stated
2	**Technical presentation:**				
	a	Project demonstration-depth of coverage	Attempts to define the purpose and subject of the slides	Includes essential information of the topic with few factual errors	In-depth presentation of the topic with all essential information
	b	Use of charts, tables, graphs figures, diagrams etc.	Insufficient	Moderate number of charts and figures	Use of charts and figures wherever felt necessary
	c	Use of presentation aids	Use of basics of power point slides	Use of slides and videos	Use of slides, videos, physical templates, models
	d	Time management	Easily distracted, is reminded to remain on task; extra time is taken	Hurriedly finished on time	Finished within the specified time with appropriate pacing
	e	Presentation skills	Little interaction with audience; mostly reading from the slides	Eye contact with the audience; speaks with satisfactory volume and modulation	Holds audience interest; smooth delivery, emphasizes on the key points
	f	Team work	Rarely listens to, shares with and supports the efforts of others	Sometimes displays lack of interest and cooperation	Actively and respectfully listens to peers; very understanding and cooperative
	g	Response to queries	Able to answer basic questions, sentence structure is incomplete	Answers are usually complete and accurate; sentence structure varies every time	Answers are very complete and Accurate with supporting information.

					Sentence structure is detailed
3	**Technical Report writing :**				
	a	organization of the report	Poorly organized; no logical progression; beginning and ending are not clear	Organized, Some details are non-supporting to the subject. sense of beginning and ending	Good organization; points are logically ordered; sharp sense of beginning and end
	b	Originality	Use of prescribed tools and techniques with no evidence of creativity	Use of other people's ideas (with clear citations) but with little creativity	Project shows a large amount of creativity. Ideas are innovative
	c	References and referencing	Book references and hyperlinks; not sufficient in number	Book and conference references; limited reference to journal papers	Adequate amount of journal references
	d	Scope for future work	Not identified	Identified but no clarity	Identified the variables for future work and stated clearly
	e	Use of grammar, spellings	Too many grammatical errors present	Very few mistakes in spellings	Use of correct grammar with no spelling errors
	f	Formatting	Not as per the guidelines in some of the pages	Guidelines just met	Well formatted and documented with adequate table and figure titles etc.

PROJECT MANAGEMENT

Course Code: IM OE02(Open Elective) **Credit:4:0:0:0**
Prerequisite: Nil **Contact Hours:56**
Course Coordinator(s): Dr. M R Shivakumar/ Sudheer D Kulkarni

Course Content

Unit I

Concepts of Project Management: Concepts of projects, characteristics of project, Phases of project life cycle, Tools and techniques for project management, Computer based project management.

Project planning and estimating: Feasibility report, Preparation of cost estimation, Evaluation of the project profitability, fixing the zero date.

Unit II

Organization Human Resources and Contracting: Delegation, Skills / abilities required for project manager, Authorities and responsibilities of project manager, Project organization, Contracts, Tendering and Selection of contractors, Team Building.

Unit III

Tools and techniques of project management Bar (GANTT) chart, Networks, Critical Path Method, Project Evaluation and Review Technique (PERT), crashing of projects, resource allocation.

Unit IV

Performance measures in Project Management: Performance indicators, Performance Improvement, Project management and environment.

Risk Analysis: Sources, measures and perspectives on risk, sensitivity analysis, scenario analysis, breakeven analysis, Hiller model, simulation analysis, decision tree analysis, managing risk, project selection under risk, and risk analysis in practice.

Unit V

Financing of Projects: Capital structure, menu of financing, equity capital, internal accruals, term loans, debentures, working capital advance, miscellaneous sources, raising of venture capital, raising capital in international markets

Venture Capital: Introduction, VC investment Appraisal Process and Management, The Indian VC industry and regulations, How to approach a VC fund.

Text books

1. Project Management: Choudhry S., Tata McGraw-Hill,2010
2. Projects: Planning, Analysis, Financing Implementation, and Review-Prasanna Chandra, 5th edition, Tata McGraw-Hill publishing company limited,2005
3. Project management a system approach to planning scheduling and controlling-Harold Kerzner, CBS Publisher and distributors, 2002.

References

1. A management guide to PERT and CPM- WEIST and Levy Eastern Economy of PH 2002.
2. T R Banga, N K Agarwal and S C Sharma -Industrial engineering and Management Sciences, -Khanna Publisher

Course outcomes (COs):

At the end of the course, student will be able to

1. Prepare project plan by applying the concepts of project management (PO- 6,7,10,11 &PSO2,3)
2. Organize and manage the resources of projects (PO- 6,9,11 &PSO3)
3. Apply tools and techniques used in project management (PO- 1,2,3,11 &PSO1,2)
4. Identify, analyze, quantify and mitigate risks (PO- 11 &PSO3)
5. Evaluate the sources of finance (PO- 11 &PSO3)

Graduate Exit Survey Form

To be responded by the Students of the Department Please respond to the following items keeping in mind your need to acquire engineering capabilities and skills as against those being offered by the engineering program (B.E) at the department of IEM at MSRIT, Bangalore. You may use **tick mark** to indicate your response/Impression.						
Sl. No.	**Item**	**Strongly Agree**	**Agree**	**Neutral**	**Dis-agree**	**Strongly Disagree**
1.	I am being sufficiently well imparted with the necessary capability for applying mathematics and science to solve engineering problems in my field					
2.	With the inputs I am gaining in the program I feel confident of identifying and formulating engineering problems in my field					
3.	The inputs from the program are making me innovative enough to be able to design new engineering products and processes in future					
4.	With the insights from the program, I am developing capability to comprehend and analyze the real life engineering problems					
5.	The program is enabling me to design and conduct engineering experiments on my own and satisfactorily interpret the results					
6.	I am acquiring skills to handle modern machines and software to analyze engineering problems					

7.	I am being well enlightened about my professional and ethical responsibilities					
8.	The program has convinced me about the need for life-long learning					
9.	The program has been helping me to be a team player in Various academic nonacademic activities and take leadership role too.					
10.	The program is designed to see engineering problems in the backdrop of contemporary issues helping me to be able to explain the impact of their engineering solution on those issues					
11.	The program has helped me to develop good communication skills to be able to easily explain even complex engineering ideas/thoughts to my friends and teachers					
12.	In this program, I have been able to appreciate the need for multi-disciplinary approach to solve modern engineering problems					
13.	I believe that, by the time I acquire engineering degree, I would be capable of qualifying in national-level competitive exams in Engineering (For. Eg. Indian Engineering Service).					

Any Other Comments: Name of Respondent:
Affiliation:

Thank you for taking time to complete the questionnaire. Your opinions would be invaluable in improving the quality of our engineering program. Your views will be duly consider