



**RAMAIAH**  
Institute of Technology

# **CURRICULUM**

**for the Academic year 2021 – 2022**

## **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 17 UG programs and 15 PG programs. All these programs are approved by AICTE. All eligible UG and PG programs are accredited by National Board of Accreditation (NBA). The institute is accredited with ‘A+’ **grade by NAAC in March 2021** for 5 years. University Grants Commission (UGC) & Visvesvaraya Technological University (VTU) have conferred Autonomous Status to MSRIT for both UG and PG Programs since 2007. 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 for 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, Centre for Antennas and Radio Frequency systems (CARFS), Center for Cyber Physical Systems & 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 Entrepreneurship Development Cell (EDC) and Section 8 company “Ramaiah Evolute” have been set up on campus to incubate startups. **M S Ramaiah Institute of Technology secured All India Rank 8<sup>th</sup> for the year 2020 for Atal Ranking of Institutions on Innovation Achievements (ARIIA), by MoE, 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. The institute 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 (NIRF), MoE, Government of India, M S Ramaiah Institute of Technology has achieved 65<sup>th</sup> rank among 1143 top Engineering institutions of India for the year 2021 and is 1<sup>st</sup> amongst the Engineering colleges affiliated to VTU, 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.

**Semester wise Credit Breakdown for B E Degree Curriculum**  
**Batch 2018-22**

<b>Semester</b>	<b>First</b>	<b>Second</b>	<b>Third</b>	<b>Fourth</b>	<b>Fifth</b>	<b>Sixth</b>	<b>Seventh</b>	<b>Eighth</b>	<b>Total Credits</b>
<b>Basic Sciences (BSC)</b>	9	8	4	4					<b>25</b>
<b>Engineering Science (ESC)</b>	11	10							<b>21</b>
<b>Humanities, Social Sciences and Management (HSMS)</b>		2			3		3		<b>8</b>
<b>Professional Courses- Core (PCC)</b>			21	21	15	11	10		<b>78</b>
<b>Professional Courses - Electives (PCE)</b>					3	6	6		<b>15</b>
<b>Other Open Electives Courses (OEC)</b>					3	3			<b>6</b>
<b>Project Work (PROJ), Internship (IN)</b>						4	1	17	<b>22</b>
<b>Total Credits</b>	<b>20</b>	<b>20</b>	<b>25</b>	<b>25</b>	<b>24</b>	<b>24</b>	<b>20</b>	<b>17</b>	<b>175</b>

# SCHEME OF TEACHING

## VII SEMESTER

Sl. No.	Subject Code	Subject	Teaching Department	Credits				Contact Hours
				L*	T*	P*	Total	
1	IM71	Supply Chain Management	Industrial Engineering & Management	3	1	0	4	5
2	IM72	Financial Accounting and Management	Industrial Engineering & Management	3	1	0	4	5
3	IM73	Management and Entrepreneurship	Industrial Engineering & Management	3	0	0	3	3
<b>Professional Elective -4 (Any one)</b>								
4	IME741	Robust Design	Industrial Engineering & Management	3	0	0	3	3
	IME742	Management Information Systems						
	IME743	Product Design and Manufacturing						
	IME744	Innovation and Technology Management						
<b>Professional Elective -5 (Any one)</b>								
5	IME751	Human Resource Management	Industrial Engineering & Management	3	0	0	3	3
	IME752	Big data analytics						
	IME753	Total quality management						
	IME754	Organizational behavior						
6	IML74	Optimization Lab	Industrial Engineering & Management	0	0	1	1	2
7	IML75	Financial Accounting Lab	Industrial Engineering & Management	0	0	1	1	2
8	IMSE	Seminar	Industrial Engineering & Management	0	0	1	1	2
<b>Total</b>				<b>15</b>	<b>2</b>	<b>3</b>	<b>20</b>	<b>25</b>

\* L: Lecture

\*T: Tutorial

\*P: Practical



**SCHEME OF TEACHING**  
**VIII SEMESTER**

Sl. No.	Subject Code	Subject	Teaching Department	Credits				Contact Hours
				L*	T*	P*	Total	
1	IMIN	Internship	Industrial Engineering & Management	0	0	3	3	-
2	IMP	Project work	Industrial Engineering & Management	0	0	14	14	-
<b>Total</b>				0	0	17	17	

\* L: Lecture

\*T: Tutorial

\*P: Practical

## VII Semester

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### SUPPLY CHAIN MANAGEMENT

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**Course Code: IM71**

**Credit: 3:1:0**

**Prerequisite: Nil**

**Contact Hours: 42+14T**

**Course Coordinator(s): Deepak Kumar**

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#### 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, evaluating network design 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.

Supply Chain 4.0: Industry 4.0 innovations, the Internet of Things, advanced robotics, analytics, and big data—to jump-start performance, and customer satisfaction.

### Text Book

1. Sunil Chopra & Peter Meindl-Supply Chain Management – Strategy, Planning & Operation, 3<sup>rd</sup> 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. 3<sup>rd</sup> 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.
6. Narendra Jadhav, New Age Technology and Industrial Revolution 4.0, Konark Publishers Pvt. Ltd., 2019

### 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)

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# FINANCIAL ACCOUNTING AND MANAGEMENT

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**Course Code: IM72**

**Credit: 3:1:0**

**Prerequisite: Nil**

**Contact Hours: 42+14T**

**Course Coordinator(s): Dr. N V R Naidu/ Dr. R Shobha**

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## Course Content

### Unit I

**Financial management an overview:** Introduction to financial management, evolution of financial management, financial decisions in a firm, goal of financial management, fundamental principle of finance

**Financial Accounting:** Introduction to Book keeping: Double-entry accounting, Journal & Ledger posting. Financial Statements & Analysis: Trial balance, preparation of Trading account, Profit & Loss account and Balance Sheet without adjustment

### Unit II

Financial Statements & Analysis: Trial balance, preparation of Trading account, Profit & Loss account and Balance Sheet with adjustments Ratio Analysis: Balance sheet ratio's, profit – loss account ratio's and combined ratio's.

### Unit III

**Costing,** Costing: Objectives of costing, Elements of costing, methods of costing, preparation of cost sheet (job costing).Marginal costing, absorption costing, Process costing and Standard Costing - Material, labour, overhead cost variance.

### Unit IV

**Working Capital Management:** Factors influencing working capital requirement, determination of operating cycle and Cash cycle. Determination of net working capital requirement. Risk and Required Return: Risk and return relationship, methods of measuring the risk.

### 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. Financial management : Theory and Practice by Prasanna Chandra, 6<sup>th</sup> edition - Tata McGraw-Hill
2. James. C Vanhorne -Financial Management and Policy, Person education - 12<sup>th</sup> edition

3. Khan M Y and Jain P K -Cost Accounting, Tata McGraw-Hill - 4<sup>th</sup> Edition.
4. Ambrish Gupta –Financial Accounting for Management – Analytical Perspective, Pearson publication – 5<sup>th</sup> 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)

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## MANAGEMENT & ENTREPRENEURSHIP

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**Course Code: IM73**

**Credit: 3:0:0**

**Prerequisite: Nil**

**Contact Hours: 42**

**Course Coordinator(s): Deepak Kumar**

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### Course Content

#### Unit I

**Introduction to Entrepreneurship:** The Foundations of Entrepreneurship; Ethics and Social Responsibility; Doing the Right Thing; Inside the Entrepreneurial Mind: From Ideas to Reality. Case Studies.

#### Unit II

**The Entrepreneurial Journey:** Conducting a Feasibility Analysis and Designing a Business Model; Crafting a Business Plan and Building a Solid Strategic Plan; Forms of Business Ownership and Buying an Existing Business. Case Studies.

#### Unit III

**Launching the Business:** Franchising and the Entrepreneur; Building a Powerful Bootstrap Marketing Plan; E-Commerce and the Entrepreneur. Case Studies.

#### Unit IV

**Putting the Business Plan to Work:** Pricing and Credit Strategies; Creating a Successful Financial Plan; Managing Cash Flow. Case Studies.

#### Unit V

**Sources of Funds:** Sources of Financing: Equity and Debt; Choosing the Right Location and Layout; Global Aspects of Entrepreneurship. Case Studies.

#### Textbooks

1. Essentials of Entrepreneurship and Small Business Management – Norman Scarborough & Jeffrey Cornwall (Pearson, 2016)
2. Poornima M Charantimath, Entrepreneurship Development and Small Business Enterprises, Pearson Education, 2006.

#### References

1. Innovation & Entrepreneurship – Peter Drucker (Harper, 2006)
2. Entrepreneurship: The Art, Science, and Process for Success – Charles Bamford & Garry Bruton (McGraw-Hill, 2015)

## **Course Outcomes (COs):**

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

1. Understand the fundamentals of entrepreneurship with the goal of fulfilling the requirements of the industries and holding the responsibilities towards the society. (PO-1,3 & PSO 2&3)
2. Design a basic business plan by considering case studies and show the involvement of ownership in Business. (PO-8,9&PSO 2&3)
3. Start a new small business with the help of E-Commerce and the current available technologies. (PO-5,9&PSO 2&3)
4. Manage a new small business and create a Successful Financial Plan. (PO-9,11&PSO 2&3)
5. Identify the Sources of Funds and Choose the Right Location and Layout. (PO-6,11&PSO 2&3)

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## ROBUST DESIGN

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**Course Code: IME741**

**Credit: 3:0: 0**

**Pre requisite: IM61 Quality Assurance and Reliability**

**Contact Hours: 42**

**Course Coordinator(s): Dr. M. Shilpa**

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### Course Content

#### Unit I

**Introduction:** Historical Perspective, Taguchi Definition of quality, Elements of cost, fundamental principle, Tools used in Robust Design, applications and benefits of robust design, Taguchi's Quality philosophy, Quality loss function, quadratic loss function, Noise factors, average quality loss, Exploiting non-linearity, P-diagram, Optimization of Product and process design, Taguchi's Quality loss function for static cases (numerical problems) off-line and on-line quality control.

#### Unit II

**Steps in Robust Design:** Noise factors and testing conditions, Quality characteristics and objective functions, Control factors and their levels, Matrix experiment and data analysis plan, Conducting the matrix experiment, data analysis, verification experiment and future plan. Quality Loss Function for static cases.

**Achieving Additivity:** Guidelines for selecting quality characteristics, Examples of quality characteristics, Introduction to Signal – to – noise ratio, Examples of SN Ratios, Selection of control factors.

#### Unit III

**Signal – to – noise ratio:** Comparing the quality of two process conditions, Identification of scaling factor, Evaluation of sensitivity to noise.

**S/N ratio for static cases** – Smaller-the-better, Nominal-the-best, Larger-the-better and Asymmetric cases (numerical problems)

**S/N ratio for dynamic cases** – Continuous to Continuous, Continuous to Digital, Digital to Digital, Digital to Continuous (No analytical treatment)

#### Unit IV

**Constructing Orthogonal Arrays:** Counting degrees of freedom, selecting a standard orthogonal array, dummy level technique, and compound factor method, Linear graphs and interaction assignment, Modification of linear graphs. Strategy for constructing an orthogonal array, Problems (selection of OA, Data analysis, SN ratio calculations, selection of optimum levels from the SN ratio graph)



## Unit V

**Computer Aided Robust Design:** Description of noise factors, methods of simulating the variation in noise factors, Orthogonal array based simulation of variation in noise factors, Quality characteristic and SN ratio, Tolerance Design  
Comparison of Taguchi's robust design with the classical statistical experimental design.

### Text Books

1. Robert H. Lochner and Joseph E. Matar-Designing for Quality, an Introduction Best of Taguchi and Western Methods or Statistical Experimental Design - Chapman and Hall Madras - 2nd edition.
2. Madhav S. Phadke -Quality Engineering Using Robust Design, Prentice Hall PTR, Englewood Cliffs, New Jersey 07632.

### Reference

1. D.C. Montgomery -Design and Analysis of Experiments, John Wiley and Sons , 8<sup>th</sup> edition, 2012
2. Jiju Anthony, "Design of Experiments for Engineers and Scientists", Elsevier, 2<sup>nd</sup> edition, 2014
3. Thomas B. Barker , "Quality By Experimental Design" , 3<sup>rd</sup> Edition, 2005

### Course outcomes (COs):

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

1. Apply Taguchi's philosophy to real life problems and analyze the quality loss through Taguchi quadratic loss function (PO- 2,3&PSO-2)
2. Apply robust design methodology for real life situation after checking for additivity of the model (PO-2&PSO-2)
3. Determine and analyze the S/N ratio for static and dynamic cases. (PO- 2,4&PSO- 2)
4. Select the right orthogonal array for the given experimental situation. (PO- 2,4&PSO-1)
5. Analyze how robust design experiments can be conducted using computers (PO- 2,4&PSO-3)

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# MANAGEMENT INFORMATION SYSTEMS

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**Course Code: IME742**

**Credit: 3:0:0**

**Pre requisite: Nil**

**Contact Hours:42**

**Course Coordinator(s): Dr. Shilpa / Dr Rajesh**

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## Course Content

### Unit I

**Foundations of Information Systems in Business:** Information Systems in Business; Real World of Information Systems; Fundamental Roles of IS in Business; Trends in Information Systems; Role of e-Business in Business; Types of Information Systems; Managerial Challenges of Information Technology; Components of Information Systems; System Concepts: A Foundation; Components of Information Systems; Information System Resources; Information System Activities; Recognizing Information Systems.

**Competing with Information Technology:** Fundamentals of Strategic Advantage; Strategic IT; Competitive Strategy Concepts; Strategic Uses of Information Technology; Other Strategic Initiatives; Building a Customer-Focused Business; Value Chain and Strategic IS; Using Information Technology for Strategic Advantage; Strategic Uses of IT; Reengineering Business Processes; Becoming an Agile Company; Creating a Virtual Company; Building a Knowledge-Creating Company; Knowledge Management Systems.

### Unit II

**E-Business Systems:** Cross-Functional Enterprise Applications; Enterprise Application Integration; Transaction Processing Systems; Enterprise Collaboration Systems; Functional Business Systems; Marketing Systems; Manufacturing Systems; Human Resource Systems; Accounting Systems; Financial Management Systems.

**Enterprise Business Systems:** Managing at the Enterprise Level; Customer Relationship Management: The Business; Three Phases of CRM; Benefits and Challenges of CRM; Trends in CRM; Enterprise Resource Planning; Benefits and Challenges of ERP; Trends in ERP; Supply Chain Management; Role of SCM; Benefits and Challenges of SCM; Trends in SCM.

### Unit III

**E-Commerce Systems:** E-Commerce Fundamentals; Introduction to e-Commerce; Scope of e-Commerce; Essential e-Commerce Processes; Electronic Payment Processes; e-Commerce Applications and Issues; Business-to-Consumer e-Commerce; Web Store Requirements; Business-to-Business e-Commerce; e-Commerce Marketplaces; Clicks and Bricks in e-Commerce.

**Supporting Decision Making:** Decision Support in Business; Decision Support Trends; Decision Support Systems; Management Information Systems; Online Analytical Processing; Using Design Support Systems; Executive Information Systems;

Enterprise Portals and Decision Support; Knowledge Management Systems; Artificial Intelligence Technologies in Business; Business and AI; Overview of Artificial Intelligence; Expert Systems; Developing Expert Systems; Neural Networks; Fuzzy Logic Systems; Genetic Algorithms; Virtual Reality; Intelligent Agents.

#### Unit IV

**Developing Business/IT Strategies:** Planning Fundamentals; Organizational Planning; Scenario Approach; Planning for Competitive Advantage; Business Models and Planning; Business/IT Architecture Planning; Identifying Business/IT Strategies; Business Application Planning; Implementation Challenges; Implementation; Implementing Information Technology; End-User Resistance and Involvement; Change Management.

**Developing Business/IT Solutions:** Developing Business Systems; IS Development; Systems Approach; Systems Analysis and Design; Systems Development Life Cycle; Starting the Systems Development Process; Systems Analysis; Systems Design; End-User Development; Object-Oriented Analysis and Design; Implementing Business Systems; Implementation; Implementing New Systems; Project Management; Evaluating Hardware, Software, and Services; Other Implementation Activities.

#### Unit V

**Security and Ethical Challenges:** Security, Ethical, and Societal Challenges of IT; Ethical Responsibility of Business Professionals; Computer Crime; Privacy Issues; Current State of Cyber Law; Other Challenges; Health Issues; Societal Solutions; Security Management of Information; Technology; Tools of Security Management; Inter-Networked Security Defenses; Other Security Measures; System Controls and Audits.

**Enterprise and Global Management of Information Technology:** Managing Information Technology; Business and IT; Managing Information Technology; Business/IT Planning Managing the IT Function; Organizing IT; Outsourcing and Offshoring IT and IS; Failures in IT Management; Management Involvement; Managing Global IT; International Dimension; Global IT Management; Cultural, Political, and Geo-economic Challenges; Global Business/IT Strategies; Global Business/IT Applications; Global IT Platforms; Global Data Access Issues; Global Systems Development.

#### Text Books

1. Management Information Systems – James O 'Brien & George Marakas (McGraw-Hill, 2011)

#### Reference

1. Management Information Systems – Kenneth Laudon & Jane Laudon (Pearson, 2017)
2. Management Information Systems – Ken Sousa & Effy Oz (Cengage, 2014)

**Course outcomes (COs):**

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

1. Understand the foundation concepts of MIS. (PO-1& PSO1)
2. Analyze simple business applications. (PO-3&PSO2)
3. Design complex business applications. (PO-3&PSO2)
4. Design development processes for MIS. (PO-5&PSO2)
5. Solve the management challenges of MIS. (PO-5&PSO2)

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# PRODUCT DESIGN AND MANUFACTURING

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**Course Code: IME743**

**Credit: 3:0:0**

**Prerequisite: Nil**

**Contact Hours: 42**

**Course Coordinator(s): Dr. G S Prakash / Dr. M R Shivakumar**

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## 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.

### 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,

### Unit III

**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.

## 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.

**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.

### Text books

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

### References

1. Tim Jones, Butterworth Heinmann-New Product Development, Oxford, UIC1997.
2. Roland Engen Kinetovicz-New Product Development: Design & Analysis, John Wiley and Sons Inc., N.Y.1990.
3. GeofferyBoothroyd, Peter Dew Hurst and Winston Knight - Product Design for Manufacture and Assembly -3<sup>rd</sup> Edition, 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)

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# INNOVATION AND TECHNOLOGY MANAGEMENT

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**Course Code: IME744**

**Credit: 3:0:0**

**Prerequisite: Nil**

**Contact Hours: 42**

**Course Coordinator(s): Dr. M Rajesh/Deepak Kumar**

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## Course Content

### Unit I

**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, Relationship between Business strategy and technology strategy, To Innovate or Not to Innovate. Innovation Planning Process, Factors that aid Innovation Planning, Dynamics of innovation process.

### Unit II

New R&D strategies, Core competencies and business strategy, Building innovation culture in organizations, Key Initial Questions for Implementation, Organizational roles for innovation, Facilitators and impediments of innovation, Strategic issues in innovation management, developing a Climate for Innovation, Management of technological innovation, Case study.

### Unit III

**The concept of technology:** Introduction, concept and meaning of technology, the nature of technology change, life cycle. Economics of technology: Introduction, meaning, engineering economics, concept of optimum size, corporate technological strategy, business mission, competitive technology, technology crisis, Technology Forecasting, technological convergence.

### Unit IV

**The adoption of new manufacturing technology:** Introduction, strategy, challenges and opportunities, yield of technology forecasting, realization of new technology, concept of R& D, effectiveness of R& D, Analysis for technology strategy: Introduction, technology assessment, forecasting, techniques.

### Unit V

**Project management for new technology:** Introduction, project preparation, risks, project planning, cost management, technology: an instrument of competition, technology competition analysis (TCA), technology leadership, adoption of new technology, change management, work structure. Stages of factory automation, FMS, CIM, CAD/CAM, IMS, Case Study.

## **Text Books**

1. P.N. Rastogi, Management of Technology and Innovation, Sage Publications, New Delhi, 1995.
2. Paul Lowe - The Management of Technology, perception & opportunities, Chapman & Hall, London, 1995.

## **Reference Books**

1. M. White and G.D. Bruton, The Management of Technology and Innovation, Cengage learning, 2007
2. Frederick Betz - Strategic Management of Technology, Mc Graw Hill inc 1993

## **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, engineering economics strategies to build innovation culture to strengthen the activities of employees. (PO: 4,7) (PSO: 2,3)
4. Evaluate, adapt and select new manufacturing technologies. (PO: 7,8) (PSO: 2,3)
5. Develop skills to setting up a small business enterprise and implement projects for new technologies. (PO: 9,11) (PSO: 2,3)



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## HUMAN RESOURCE MANAGEMENT

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**Course Code:** IME751

**Credit:** 3:0:0

**Prerequisite:** Nil

**Contact Hours:** 42

**Course Coordinator(s):** Dr. S. Appaiah / Dr. R. Shobha

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### Course Content

#### Unit –I

**Introduction to HRM:** Evolution of HRM, Objectives, Functions and Policies.

**Man Power Planning:** Uses and benefits, Man Power Inventory, Man Power Forecasting, Methods of Man Power Forecasting.

#### Unit –II

**Recruitment and Selection:** Sources of man power, advertisement, short listing of candidates for Selection procedure – Written Test, Group Discussion, Interview – Different methods, advantages and Limitations, Psychological testing – Advantages and limitations.

#### Unit –III

**Training And Development :** Identification of Training needs, Training Evaluation, Training Budget, Executive Development – Different Approaches, Non-executive development – Different methods, Training as a tool for continuous growth of Individual and Organizers.

#### Unit –IV

**Induction & communication:** Induction procedure, transfers, promotion exit interview, (Written test, Group Discussion, Interviews). Communication function, communication process, effective communication.

#### Unit –V

**Performance Appraisal:** Components (all round performance appraisal) Methods, Advantages and limitations of different methods, Personal counseling based on Annual confidential reports, competency mapping, CSR

#### Text Books

1. Dr. K Ashwathappa – Human Resource Management, Tata McGraw Hill, 5<sup>th</sup> Edition, 2005.
2. Hersey and Blanchard -Management of Organization's Behavior, Prentice Hall of India, 10th Edition –2012.
3. Arun Monappa -Industrial Relations, TMH, ISBN – 0-07-451710-8,2007

## References

1. Decenzo and Robbins -Personnel / Human Resource Management, PHI, 2002.
2. CB Mamoria -Management of Human Resources, Himalaya Publication House, 2003.
3. Jain -Industrial Acts, TMH Publications, 2004.

## Course outcomes (COs):

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

1. Plan and organize for the manpower in the given type of organization (PO- 6,9&PSO-1)
2. Analyze and select the right recruitment / rights strategy for a given organization (PO- 6,10&PSO-1)
3. Design the appropriate training and development programme to the employee after analyzing the training needs (PO- 6,10&PSO-3)
4. Identify the procedure for transfer, promotion with various. Interviews types with checking effective communication (PO-6,9& PSO-3)
5. Identify the performance appraisal method depending on the type of organization. (PO- 6,10&PSO- 3)

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# BIG DATA ANALYTICS

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**Course Code: IME752**

**Credit: 3:0:0**

**Prerequisite: Nil**

**Contact Hours: 42**

**Course Coordinator(s): V. Vivekanand**

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## 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: Effective Design Techniques (Data-Ink ratio), Tables: Table Design Principles, Cross Tabulation, Bubble Chart Word cloud, Heat Maps, Multiple Scatter Plot, Growth Curves, Stars, Chernoff Faces, Advanced Charts (Non Analytical treatment): Parallel Coordinates Plot, Tree maps, Geographic Information Systems Charts, Data Dashboard

### Unit II

**Sample Geometry, Random Sampling, Multivariate Normal distribution:** 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, mahalanobis Distance, properties of Multivariate normal density function

### 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(Non analytical)

### 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, Logistic Regression (Non Analytical): Introduction (Non Analytical), Logit model (Non Analytical)

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

### 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), BarryJ. 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, CRCPress 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 analysis 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)

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# TOTAL QUALITY MANAGEMENT

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**Course Code: IME753**

**Credit: 3:0:0**

**Prerequisite: Nil**

**Contact Hours: 42**

**Course Coordinator(s): V. Vivekanand /Sudheer D Kulkarni**

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## Course Content

### Unit I

#### **Principles and Practices:**

**Basics of TQM:** Definition, Basic Approach, Gurus of TQM, TQM Framework, Awareness, Defining Quality, Historical Review, Quality Movement in India, Obstacles, Benefits of TQM.

**Customer Satisfaction:** Introduction, Who is the customer?, Customer Perception of Quality, Feedback, Using Customer Complaints, Service Quality, Translating Needs into Requirements, Customer Retention.

### Unit II

**Continuous Process Improvement:** Introduction, Process, the Juran Trilogy, Improvement Strategies, Types of Problems, the PDSA Cycle, Problem-Solving Method, Kaizen, Reengineering, Six-Sigma.

**Performance Measures:** Introduction, Basic Concepts, Strategy, Performance Measure Presentation, Cost of Quality, Analysis, Improvement Action Strategy and Plan, Limitations of Quality Cost, Quality Awards.

### Unit III

#### **Tools and Techniques:**

**Benchmarking:** Introduction, Benchmarking Defined, Reasons to Benchmark, Process, Deciding What to Benchmark, Understanding Current Performance, Planning, Studying Others, Learning from the Data, Using the Findings, Pitfalls and Criticisms of Benchmarking.

**Information Technology:** Introduction, History, Computers and the Quality Function, The Internet and Other Electronic Communication, Information Quality Issues, Industry 4.0.

### Unit IV

**Quality Management Systems:** Introduction, Benefits of ISO Registration, ISO 9000 Series of Standards, Sector Specific Standards, ISO 9001 Requirements, Quality Management Systems - Requirements, Implementation, Documentation, Internal Audits, Registration.

**Quality Function Deployment:** Introduction, The QFD Team, Benefits of QFD, The Voice of the Customer, Organization of Information, House of Quality, Building a House of Quality, QFD Process.

## Unit V

**Total Productive Maintenance:** Introduction, The Plan, Learning the New Philosophy, Promoting the Philosophy, Training, Improvement Needs, Goal, Developing Plans, Autonomous Work Groups.

**Management Tools:** Introduction, Why, Why, Forced Field Analysis, Nominal Group Technique, Affinity Diagram, Interrelationship Digraph, Tree Diagram Matrix Diagram Prioritization Matrices, Process Decision Program Chart, Activity Network Diagram.

### Text books

1. **Total Quality Management (TQM), 5<sup>th</sup> Edition**, Besterfield Dale H., Besterfield Carol, Besterfield Glen H., Besterfield Mary, Urdhwareshe Hemant, Urdhwareshe Rashmi; Pearson.

### References

2. N Logothetis -**Management for Total Quality**, Prentice Hall of India, New Delhi - 2002.
3. Roger C Swanson - **The Quality Improvement Hand Book**, Publisher Vanity Books International, New Delhi, 9<sup>th</sup> Edition, 1995
4. William C Johnson and Richard J Chavla, -**Encyclopaedia of Total Quality Management**, New Delhi, 1995
5. N.V.R Naidu, K.M.Babu, G. Rajendra - **Total Quality Management**, New Age International Publishers-2008 edition, **ISBN-10: 812241799X**

### Course outcomes (COs):

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

1. Understand the basics of TQM and interpret customer needs (PO:3,6 ; PSO:2)
2. Analyze the scope for improvement and measure the performance of quality improvement (PO:3,5 ; PSO:2)
3. Apply benchmarking techniques and information technology to implement TQM in work place. (PO:3,5 ; PSO:2)
4. Develop systems to manage and deploy quality in organizations. (PO:3,5,10; PSO:2)
5. Develop and execute TPM plans and apply management tools of TQM sustainability (PO:3,5 ; PSO:2)

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## ORGANIZATIONAL BEHAVIOR

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**Course Code: IME754**

**Credit: 3:0:0**

**Pre requisite: Principles of Management**

**Contact Hours: 42**

**Course Coordinator(s): Dr. S Appaiah / Deepak Kumar**

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### Course Content

#### Unit I

**Introduction;** Definition of Organization Behavior and Historical development, Environmental context Information Technology and Globalization, Diversity and Ethics, Design and Cultural

**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,

#### 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.

#### 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.

#### Unit V

**Leadership:** Definition, Behavioural theories – Blake and Mouton managerial grid, Contingency theories – Hersey - Blanchard's situational theory, Leadership styles – characteristics.

**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, 9<sup>th</sup> Edn. 2012.
2. Fred Luthans-Organizational Behaviour, Mc Graw Hill International Edition, ISBN–0–07– 20412–1, 11<sup>th</sup> Edn. 2006.

## **References**

1. Hellriegel, Srocum and woodman, Thompson Learning -Organization Behaviour, Prentice Hall India, 9<sup>th</sup> 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 9<sup>th</sup> 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 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)



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## OPTIMIZATION LAB

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**Course Code: IML76**

**Credit: 0:0:1**

**Prerequisites: Nil**

**Contact Hours: 14**

**Course Coordinator (s): Smt. Hamritha S. / Vivekanand**

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### Course Content

#### List of Experiments

1. Introduction to optimization problems and software.
2. Formulation of LPP and solving LPP using software (Minimization problem)
3. Formulation of LPP and solving LPP using software (Maximization problem)
4. Formulation of Transportation problems and solving.
5. To solve an assignment problems.
6. To solve traveling salesman problems
7. To solve an EOQ problems with replenishment.
8. To solve an EOQ problems without replenishment.
9. To solve Network problems (PERT).
10. To solve Network problems (CPM).
11. Introduction to Forecasting problems and use of software to solve Forecasting problems (Moving average method).
12. To solve forecasting problems (Exponential Smoothing Method)

Software's: Microsoft Excel; TORA; LINDO; QSA, MATLAB;

#### Textbook:

1. Operations Research – Hamdy Taha (Pearson, 2018)
2. P Gopalakrishna & M Sundaresan – Materials Management: An Integrated Approach, PHI, 2012.

#### References:

1. Operations Research – Frederick Hillier & Gerald Lieberman (McGraw-Hill, 2009)
2. Operations Research – Wayne Winston (Cengage, 2003)
3. A K Dutta – Materials Management: Procedures, Text and Cases, PHI, 2009.

#### Course Outcomes (COs):

Students will be able to:

1. Formulate and Solve optimization problems. (PO-1 &PSO2)
2. Solve inventory problems using software package (PO-5 &PSO3)
3. Formulate and solve project network problems using software package (PO-11 &PSO2, 3)
4. Provide accurate forecast for the product demand using software (PO-1&PSO2)

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## **FINANCIAL ACCOUNTING LAB**

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**Course Code: IML77**

**Credit: 0:0:1**

**Prerequisite: Nil**

**Contact Sessions: 14**

**Course Coordinator(s): Dr. N V R Naidu / Dr. R Shobha**

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### **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-9
2. M.S. Excel

#### **Text books**

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

#### **References**

1. B.S Raman -Elements of Accountancy, Ahuja, Pandey, Khanna and Arora - Practical Costing, S. Chand & Co. Ltd -2005.
2. 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)
2. Analyze the financial position of an organization and provide solutions (PO-1,2,11 & PSO- 1,2)
3. Evaluate the organizations effectiveness with respect to profit margins and provide solutions to improve (PO-1,2,11 & PSO- 1,2)

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## SEMINAR

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**Course Code: IMSE**

**Credit: 0:0:1**

**Prerequisite: Nil**

**Contact Sessions: 14**

**Course Coordinator(s): V. Vivekanand**

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### **Course outcomes (COs):**

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

1. Gather current trends in technology, research literature, and self-learning interests on certain topics pertaining to industry.
2. Communicate effectively on technical issues, make presentations and write a detailed document.

### **Course outcomes (COs):**

1. Identify the problems in the field of industrial engineering (PO- 1,2,3&PSO 2,3)
2. Provide a sound case study on application of industrial engineering techniques (PO- 1,2,3&PSO 1,2)
3. Demonstrate the ability and skill to present a sound industrial engineering technique and provide valuable insights (PO- 2,3, 10 &PSO 2,3)

## VIII Semester

### INTERNSHIP

**Course Code:** IMIN

**Credit:** 0:0:3

**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 4<sup>th</sup> and 5<sup>th</sup> or 6<sup>th</sup> and 7<sup>th</sup> semester. The student has to compulsorily submit a report in his/her 7<sup>th</sup> 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	Level C	Level B	Level A
		Up to 50	51-74	75-89	90-100
<b>Assessment criteria</b>					
<b>1</b>	<b>Internship Report</b>				
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/ uses 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 organization	Identified only the important positions of the organization structure	Clarity about the complete organization 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	Identified a single supply chain and the players in it	Identified all the key supply chains of the industries	Identified the information/material 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 technology	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 improvement	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

<b>2</b>	<b>Presentation</b>					
	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 communication 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
<b>3</b>	<b>Questions and Answers</b>		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: 0:0:14**

**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. Analyze the cross functional interdependencies in a project. (PO- 1, 2, 4, 6, 9, 10 & PSO 1,2)
2. Implement the concepts of Project, financial, technology and industrial management to solve productivity and competitive issues. (PO- 1, 2, 3, 4, 5, 11 & PSO- 1, 2)
3. Work as a member or leader in cross - functional teams. (PO- 6, 8, 9, 10 & PSO-3)
4. Design and develop new subsystems, structures and policies. (PO- 3, 4, 5, 7, 11, 12 & PSO-1, 2, 3)
5. Demonstrate the ability and skill to solve industrial problems within a specific timeframe.(PO- 1, 2, 3, 4, 5, 11 & PSO- 1, 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
<b>Assessment criteria</b>				
<b>1</b>	<b>Conduction of project work:</b>			
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 to 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/	Adequately suited and applicable	Well suited and clearly described methodology

			not very well suited and no justification is provided	methodology with justification	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
<b>2</b>	<b>Technical presentation:</b>				
	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
<b>3</b>	<b>Technical Report writing:</b>				
	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.