

VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E. Mechanic

Semester - VIII

SYLLABUS OF EIGHTH SEMESTER

Teaching Scheme			Theory Examinations		Practical / Term work / Sketching / Viva / Quiz			
Subject	Subject Code	L T P (Hrs)	Duration (Hrs)	Marks	Tutorial	Cont. Evaluation	Exam. (Pract)	Total Marks
Foundry Technology	MED 801P	3 0 0	3	100	00	00	00	00
Computer Integrated Manufacturing-II	MED 802P	3 1 2	3	100	25	20	30	75
Welding Technology	MED 803P	3 1 0	3	100	25	00	00	25
Production Planning & Operations Management	MED 804P	3 1 0	3	100	25	00	00	25
Seminar	MED 805P	0 0 2	0	000	00	20	30	50
Project	MED 806P	0 0 8	0	000	00	80	120	200
Elective-II	MED 82*P	3 1 0	3	100	25	00	00	25
TOTAL		15412		500	100	120	180	400
Total Contact Hours = 31			Total Mark = 900					

Subject Code	Name of Subject
MED 821P	Total Quality Management
MED 822P	Planning and Management of a small scale Enterprise
MED 823P	Maintenance Engineering and Safety
MED 824P	Mechanical Cost Estimation
MED 825P	Ergonomics

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MED 801 P Foundry Technology			
	Lectures	Tutorial	Practical
Teaching Hours	3	0	
Examination Scheme Marks	100	00	Continuous Evaluations 40 Examination 60

1. Casting processes – sand moulding – shell moulding – investment moulding – centrifugal – Die casting – pit furnace – Oil fired furnace – tilting furnace – cupola – Electrical are furnace – induction furnace – principle of cupola – melt control – chill control – coke bed – coke & air supply – charge calculation – metal loss in cupola – jamming in cupola – Trouble shooting – cupola design.
2. Casting Technology: Mould strength – ingredients of moulding materials and their effects on mould strength – Testing of mould strength – Testing of mould sands – Thermal aspect of mould sand – Coves and cove materials – coating of moulds – parting compounds.
3. Metal Pouring: Gating system – Design of gating system – fluidity – Method of measuring fluidity by spiral technique – Mathematical approach for fluidity measurement – Gases in metals - Riser of casting – Shrinkage method – Solidification time – Riser design – Pouring basin & its efficiency – thermal gradient – chills – High conductivity sand moulding – Exothermic feeder.
4. Casting Formation: Heat processes in solidification – cooling of casting in mathematical approach – convection in Heat transfer – method of manipulation of Heat transfer – Experimental technique – thermodynamics of solidification – solid liquid interface – Growth of crystals – Rapid Quenching.
5. Casting Design: Value engineering considerations – surface treatment of casting – Design of moulds – Dimensional tolerances – Surface finish of casting – patterns – dimensional tolerance – Designing of pattern – surface finish of pattern – Design of core – Mould box – core box – selection of chaplets – calculation for load & mould clamping.
6. Casting Defects: Defects – inspection – Analysis of casting defects – Quality control.

REFERENCES:

1. P. N. Rao, "Manufacturing Technology", Tata McGraw Hill (1990).
2. Malik & Ghosh, "Manufacturing Technology", A ffiliated East-West Press Pvt. Ltd. (1991).
3. P. L. Jain, "Principal of Foundry Technology", Tata McGraw Hill (1970).
4. P. C. Mukharjee, "Fundamental of Metal Casting Technology", Tata McGrew Hill (1970).
5. Taylor, Flaming, Woolf, "Foundry Engineering" ,Wiley, New York (1966).

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MED 802 P Computer Integrated Manufacturing-II			
	Lectures	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	25	Continuous Evaluations 20 Examination 30

1. Fundamentals of Manufacturing, Automation and C. I. M., Production operations and automation strategies.
2. Production economics & Break-Even-Analysis.
3. N.C. Production systems. Introduction to N.C., N.C. Machine tools. Machine control units. Tooling for N.C. machines. N.C. part programming. Computer automated part programming DNC, CNC and adaptive control.
4. Automated Guided Vehicle system and automated storage Retrieval systems.
5. Computer aided process planning
6. Shop floor control & automatic identification techniques.
7. Introduction to FMS. Sequencing & scheduling in FMS. Group technology. Production flow analysis.

REFERENCES:

1. Mikell P. Groover, "Automation, Production systems and computer Integrated Manufacturing" Prentice Hall of India (1991).
2. Mikell P. Groover & Emory W. Zimmers, Jr., "CAD – CAM : Computer Aided Design & Manufacturing", Prentice Hall of India (1991).
3. T. K. Kundra, P. N. Rao and N. K. Tewari, "Numerical Control & Computer Aided Manufacturing", Tata McGraw Hill Publishing Co. Ltd. (1990).

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MED 803 Welding Technology			
	Lectures	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Continuous Evaluations 00 Examination 00

1. Introduction: Classification of welding – welding processes – Basic electrical – Electrodes – coding of electrodes – Electrode efficiency.
2. Physics of welding: Arc structure, characteristics & power – Chemical Heat source – contact Resistance Heat source – Heat flow characteristics – cooling of weld.
3. Welding symbols & Estimation of welding cost: Welding symbols – Numerical indication of processes – American welding symbols – consumable cost – power cost – costing procedure.
4. Inspection & Testing of Welding: Inspection during & after welding – Visual inspection – Magnetic – xray - Gamma ray – Ultra sonic – Application of load – Destruction tests – workshop – Laboratory – Microscopic – Microscopic – Tensile – Bending – Impact – Fatigue – Cracking.
5. Protection & Safety in welding: Protection of Body – Physical Hazards – Radiation – Heat – Toxic Hazards – Noise – fire.

REFERENCES:

1. Little R.L., "Welding Technology", Tata McGraw Hill, New Delhi, (1994).
2. A.Ghosh & Mallik, " Manufacturing Science", Affiliated East-West press P. Ltd., (1985).
3. A.C. Davies, "The Science & Practice of Welding Vol-I & II", Cambridge University, New York, (1989).
4. N.C. Balchin, "Healthy & safety in welding & Allied Processes", Jaico Publishing House, Bombay, (1989).

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MED 804 P Production Planning and Operations Management			
	Lectures	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Continuous Evaluations 00 Examination 00

1. Production and Operations Management – Introduction history, Production system, functions of production planning and control, production and process planning, production control.
2. Routing, sequencing, loading, scheduling – master scheduling – short term scheduling – Jhonson method.
3. Demand forecasting – product life cycle, demand forecasting techniques : judgmental, Delphi, time series analysis, regression & correlation, exponential smoothing.
4. Inventory management – inventory costs, inventory management systems, inventory models-classical EOQ model, EOQ with price breaks, EOQ model for production runs, EOQ with shortage stock, ABC analysis.
5. Network analysis – drawing of network, errors in network critical path, cost aspects in network, crashing, PERT analysis.
6. Japanese management techniques – IIT manufacturing, total quality emphasis TQM waste reduction, value – added manufacturing, KANBAN, push v/s pule systems, flexible manufacturing.
7. Patents & copyright : Introduction to patent laws; GATT, IPR, TRIPS etc. Forms of IPR patents global perspective in general & Indian context in particular – invention, modification, product and process patent Intellectual property rights. Copyright, limit, moral copyrights.

REFERENCES:

1. E. E. Adam & R. J. Ebert, "Production & Operations management", Prentice Hall of India Pvt. Ltd., New Delhi, (1993).
2. Dr. K. C. Jain & Dr. L. N. Agarwal, "Production Planning control & Industrial Management", Khanna Publishers, Delhi, (1990).
3. N. D. Vohra, "Quantitative Techniques in Management", Tata McGraw Publishing Co. Ltd., (1992).
4. R. R. Mayer, "Production & Operations Management", McGraw Hill International Book Co., (1982).
5. James B. Dilworth, "Operations Management", Tata McGraw Hill Publishing Co. Ltd., New Delhi, (1992).
6. Narayanan, "Patents",
7. Gopal Krishnan, N. S, "Intellectual Property",

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MED 805 P Seminar			
	Lectures	Tutorial	Practical
Teaching Hours	0	0	2
Examination Scheme Marks	0	0	Continuous Evaluations 20 Examination 30

This shell consists of work carried out by the student during the period of final and pre-final semester with the main purpose of developing the ability of applying the knowledge gained in the undergraduate studies to some practical problem. The work may consist of one or many of the activities such as design analysis, fabrication, experimentation, product design and development design and development of laboratory equipment/test rig, developing computer programs/soft-wares, industry based projects etc.

Each student should submit a detailed project report at the end of the final semester along with a certificate from the H.O.D. for examination.

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MED 822 P (Elective-II), Planning and Management of a Small Scale Enterprise			
	Lectures	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Continuous Evaluations 00 Examination 00

1. Introduction: Objectives of Entrepreneurship - Scope, risks and rewards – Characteristics of an entrepreneur.
2. Economic & Industrial Requirements: Current economic and Industrial environment – Linkages among small, medium and large Industrial Sectors – Entrepreneurial Ventures and economic growth – Business opportunity identification – ancillaries, subcontracting, demand based, resources based, service based, industries- Import substitution.
3. Setting up an Industry: Forms of business organization – Formation of a company – procedures and formalities for setting up of new industry – sources of information – incentives, subsidies and concessions – Industrial development agencies and their functions – State level and national level Institution for small industry promotion.
4. Marketing: Component of marketing – Market survey and analysis – Marketing arrangements – Strategies and assistance to small industry – Consumer behavior – Market feedback – projections – Forecast.
5. Product Development: Creative Thinking and Organizing for Product Innovation – Functional Design and Cost optimization – Factors affecting product design – stages of product design – process analysis – Selection of Plant and Machinery – Reliability & Quality Control – Patents.
6. Project Planning: Techno – economic feasibility studies and economic analysis – payback periods – average rate of return – net present value – internal rate of return and cost benefit – Financial viability – sources of finance – Financial Ratio analysis.
7. Project Finance: Detailed assessment of Fixed capital and working capital factors affecting working capital – operating cycle – methods of calculating working capital – sources of finance for working capital.
8. Project Report: Preparation of detailed project report – Project implementation Programme evaluation and Review technique – Critical Path Method.

REFERENCES:

1. Vasant Desai, "Dynamics of Entrepreneurial Development and Management", Himalaya Publishing House, Mumbai.
2. Prasanna Chandra, "Projects", Tata McGraw-Hill Publishing Company Limited, New Delhi.
3. Vasant Desai Volume-II, "Entrepreneurial Development", Himalaya Publishing House, Mumbai.
4. James L. Riggs, "Production systems", John Wiley & Sons, New York.
5. Benjamin W. Niebel, "Product Design and Process Engineering", McGraw – Hill Kogakusha Ltd. Tokyo.
6. Desai, A. N. "Environment and Entrepreneur", Ashish Publishing House, New Delhi.
7. I. M. Pandey, "Financial Management", Vikash Publishing House Pvt. Ltd. New Delhi.

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MED 821P (Elective-II) Total Quality Management			
	Lectures	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Continuous Evaluations 00 Examination 00

1. Quality concepts & functions various definitions such as quality function, quality measurement, quality costs. Quality in Production, design, marketing etc. Quality audit, SQC, quality assurance, total quality control.
2. TQM – Introduction, history, principles. Quality policy, quality system, quality management, TQM system & models. Essentials of TQM.
3. Organizing for TQM – Organizing for quality implementation, TQM organization structure, employee involvement, quality circles.
4. The costs of quality - benefits of costs of quality control, measuring quality costs, use of quality cost information.
5. Tools and techniques for TQM – Taguchi & poka-yoke technique, kaizen, PDCA cycle, flow diagram, 5 S compaign, 7 QC tools, cause & effect diagram, FMEA & FTA etc.
6. ISO 9000 quality management system – ISO 9000 – elements, applications & benefits. Zero defect Implementation, registration & certification for ISO 9000.
7. Just – In – Time and TQM – JIT Production system, KANBAN, JIT techniques such as waste & its implementation total productive maintenance (TPM), push versus pull systems.
8. Case studies on TQM.

REFERENCES:

1. N. Logo thetis, "Managing for Total Quality", Prentice Hall of India Pvt. Ltd. – (1997).
2. Joel E. Ross , "Total Quality Management", Vanity Book International, New Delhi – (1995).
3. Mohamed Zaivi, "Total Quality Management for Engineers", Aditya Books Pvt. Ltd. New Delhi – (1992).
4. K. C. Jain & A. K. Chitale, " Quality Assurance & TQM", Khanna Publishers, New Delhi – (1998).
5. S. M. Sundare Raju, "Total Quality Management", Tata McGraw Hill Publishing Co. Pvt. Ltd., New Delhi – (1995)
6. A. N. Sigh, "Preparation, Implementation & Registration of ISO 9000 Quality system", Dolphin Book, New Delhi – (1993).

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MED 823 P (Elective-II) Maintenance Engineering and Safety			
	Lectures	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Continuous Evaluations 00 Examination 00

1. Introduction to maintenance concepts, maintenance systems, maintenance management.
2. Condition based maintenance.
3. Quantitative techniques in maintenance resources. Replacement strategies, PERT, CPM....., Operation Research in maintenance.
4. Concept of safety and safety Psychology, Statistics of safety.
5. Appraisal – Analysis, Inspection, Investigation and Control Techniques.
6. Light, colour, ventilation and Temperature.
7. Safety in Engineering Industries.
8. Safety in Textile Industries.
9. Safety in Chemical Industry.
10. Safety in other Industries.

REFERENCES:

1. L. C. C. Morrow, "Maintenance Engineering Handbook", McGraw Hill U.S.A.
2. Anthony A. Kelly, "Maintenance, Planning and control", Prentice Hall, U.S.A.
3. S. Sundaram, Maintenance Management Vol. 2, Terotech systems approach to India maintenance management.
4. National Productivity Council, "Maintenance management a monogram", New Delhi.
5. A. K. Gupta, "Reliability Engineering and Terotechnology", Mcmillan India Limited.
6. K.U. Mistry, "A course in Industrial Safety.
7. S. K. Hajra Choudhary & Nirjhar Roy, "Production management – An Integrated Approach to Industrial Engineering", Media promoters & publishers (1990).
8. A.K. Gupta & J. K. Sharma, "Management systems", Mcmillan India Ltd. (1997).
9. L. N. Agarwal & K. C. Jain, "Production Management", Khanna Publishers (1995).
10. N. D. Vohra, "Quantitative techniques in management", Tata McGraw Hill (1992).
11. T. R. Banga & N. K. Agarwal & S. C. Sharma, "Industrial Engineering & Management", Khanna Publishers, (1995).

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MED 824 P (Elective-II) Mechanical Cost Estimation			
	Lectures	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Continuous Evaluations 00 Examination 00

1. Importance of estimating - objectives of estimating - constituents of estimate.
2. Difference between estimating & costing - Advantage of costing - elements of costing classification of cost elements - Methods of calculating depreciation - Methods of allocating overheads.
3. Estimation of machined components.
 4. Estimation of rough casting.
 5. Estimation of forged parts.
 6. Estimation of welded jobs.
 7. Machining time calculations for turning, shaping, milling.
 8. Estimation of wood work.
 9. Estimation of sheet metal work.

REFERENCE :

1. B. P. Sinha, " Mechanical Estimation & Costing", Tata McGraw Hill, 1995.
2. Banga T. R. & Sharma S. C. "Mechanical Estimating ", Khanna Publishers, 1996.
3. G.H. Saha, "Elements of Estimating & Costing",
4. D. M. Mukharjee, "Estimating & Costing",
5. Jayantiprasad, "Mechanical Estimating & Costing",

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MED 825 P (Elective-II) Ergonomics			
	Lectures	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Continuous Evaluations 00 Examination 00

1. Introduction - anthropology - Physiology - Psychology - Machines and aids.
2. Work place Design - Workspace design - anthropometry - seating - Design of chair - arrangement of components within physical space - use of work study in work place design.
3. Environmental condition - Illumination - climate - noise - motion.
4. Controls, knobs and their design - Hand tools and their use.
5. Human error, Accidents and safety - Factors contributing to accidents - evaluation of risk - Warnings : Purpose & design.
6. Human factors & the Automobile - Vehicle design - Cab design - Lighting - Driving environment.

REFERENCE :

1. M. S. Sandevs & E. J. McCormick, "Human Factors in Engineering And Design", Mc Graw Hill INC, 1992.
2. P. K. Nag, "Ergonomics And Work - Design", New Age International", 1996.
3. H. S. Shan, "Work study & Ergonomics", Dhanpat Rai & Sons, 1992.
4. Hywel Marrell, "Ergonomics", Chapman & Hall Publishers, 1979.