DR. A. P. J. ABDUL KALAM TECHNICAL UNIVERSITY

LUCKNOW, UTTAR PRADESH

STUDY & EVALUATION SCHEME WITH SYLLABUS

FOR

B. TECH. 4th YEAR

MANUFACTURING TECHNOLOGY

[Effective from Session: 2021-22]

B. Tech Manufacturing Technology
Evaluation Scheme
Effective in Session 2021-22 (Yet to Finalize)

SEMESTER- VII

S. No.	Code	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1		HSMC-1/HSMC-2	3	0	0	30	20	50		100		150	3
2		Departmental Elective-IV	3	0	0	30	20	50		100		150	3
3		Departmental Elective-V	3	0	0	30	20	50		100		150	3
4		Open Elective-II	3	0	0	30	20	50		100		150	3
5	KMT 751	Mould Design & Manufacturing Lab	0	0	2				25		25	50	1
6	KMT 752	Mini Project or Internship Assessment*	0	0	2				50			50	1
7	KMT 753	Project	0	0	8				150			150	4
8		MOOCs (Essential for Hons. Degree)											
		Total	**12**	**0**	**12**							**850**	**18**

*The Mini Project or internship (5 - 6 weeks) conducted during summer break after VI semester and will be assessed during VII semester.

SEMESTER- VIII

S.No.	Code	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1		HSMC-2/HSMC-1	3	0	0	30	20	50		100		150	3
2		Open Elective-III	3	0	0	30	20	50		100		150	3
3		Open Elective-IV	3	0	0	30	20	50		100		150	3
4	KMT 851	Project	0	0	18				100		300	400	9
5		MOOCs (Essential for Hons. Degree)											
		Total	**9**	**0**	**18**	**27**						**850**	**18**

Student can choose any elective horizontally from the pool of electives

Sem VII	**Code**	**KME 071**	**KPI 071**	**KPI 072**	**KMT 071**
	Departmental Elective-IV	Additive manufacturing	Flexible Manufacturing System	Facility Planning & Design	Advance Casting Process
Sem VII	**Code**	**KMT 072**	**KMT 073**	**KMT 074**	**KMT 075**
	Departmental Elective-V	Composite Materials	Manufacturing Strategies	Maintenance Engineering & Management	Process Planning and cost Estimation

Subject Code: KMT 751	Mould Design & Manufacturing Lab	L T P : 0 0 2	Credits: 1

Course outcomes: The students will be able to		Blooms Taxonomy
CO1	Apply knowledge & basics of Design and Manufacturing.	K4
CO2	Apply the concepts of various measurement systems & standards with regards to realistic applications.	K4
CO3	Use of CNC Programming for Mould Manufacturing.	K3
CO4	Apply basic principles Manufacturing Techniques & Processes	K4

Minimum 8 experiments out of following (or such experiment) are to be performed:

S.No.	Name of the Experiment
1	To study the design of hot runner mould.
2	To study the design of compression mould.
3	To study the design of blow transfer mould.
4	Two plate injection mould design for automotive components.
5	Three plate injection mould design for industrial components.
6	Manufacturing of mould base.
7	Manufacturing of mould accessories.
8	Manufacturing of 2- Plate mould.
9	Manufacturing of 3- Plate mould.
10	Manufacturing of compression mould.
11	CNC programming for manufacturing of core & cavity of mould.
12	Mould flow analysis for multi cavity mould.

Semester – VII: Departmental Elective – IV

Subject Code: KME 071	Additive manufacturing	L T P : 3 0 0	Credits: 3

Course Outcome: Student will be able to		Bloom Taxonomy
CO 1	Understanding the basics of additive manufacturing/rapid prototyping and its advantages and disadvantages	K2
CO 2	Understanding the role of additive manufacturing in the design process and the implications for design.	K2
CO 3	Understanding the processes used in additive manufacturing for a range of materials and applications	K2
CO 4	Understand the various software tools, processes and techniques that enable advanced/additive manufacturing and personal fabrication.	K2
CO 5	Apply knowledge of additive manufacturing for various real-life applications	K3

UNIT I

Introduction

History and Advantages of Additive Manufacturing, Distinction Between Additive Manufacturing and CNC Machining, Types of Additive Manufacturing Technologies, Nomenclature of AM Machines, Direct and Indirect Processes; Prototyping, Manufacturing and Tooling.

Layer Manufacturing Processes: Polymerization, Sintering and Melting, Extrusion, Powder Binder Bonding, Layer Laminate Manufacturing, Other Processes; Aerosol printing and Bio plotter.

UNIT II

Development of Additive Manufacturing Technology

Computer Aided Design Technology, Other Associated Technology, Metal and Hybrid Systems.

Generalized Additive Manufacturing Process Chain; The Eight Steps in Additive Manufacturing, Variation from one AM Machine to Another, Metal System, Maintenance of Equipment, Material Handling Issue, Design of AM.

UNIT III

Additive Manufacturing Processes

Vat Photo polymerization; Materials, Reaction Rates, Photo polymerization Process Modelling, Scan Patterns

Powder Bed Fusion Processes; Material, Powder Fusion Mechanism, Process Parameters and Modeling, powder Handling

Extrusion Based System; Basic principles, plotting and Path Control, Other Systems

Material Jetting; Materials, Material Processing Fundamentals, Material Jetting Machines

Directed Energy Deposition Processes; General DED Process Description, Material Delivery, DED systems, Process Parameters, Processing-Structure-Properties Relationships

UNIT IV: Design & Software Issues

Additive Manufacturing Design and Strategies; Potentials and Resulting Perspectives, AM based New Strategies, Material Design and Quality Aspects for Additive Manufacturing; Material for AM, Engineering Design Rules for AM.

Software Issue for Additive Manufacturing; Introduction, Preparation of CAD Models: The STL file, Problem with STL file, STL files Manipulation, Beyond the STL file, Additional Software to Assist AM

UNIT V

Material Design & Quality Aspects

Machines for Additive Manufacturing, Printers, Secondary Rapid Prototyping processes, Intellectual Property, Product Development, Commercialization, Trends and Future Directions in Additive Manufacturing, Business Opportunities

Applications

Aerospace, Automotive, Manufacturing, Architectural Engineering, Art, Jewellery, Toys, Medical, Biomedical, Dental, Bio-printing, Tissue & Organ Engineering and many others.

Books and References:

1. Additive Manufacturing Technologies: Rapid Prototyping to Direct Digital Manufacturing, by- Ian Gibson , DSavid W. Rosen , Brent Stucker, Springer.
2. Understanding Additive Manufacturing, by- Andreas Gebhardt, Hanser.
3. Additive Manufacturing, by- AmitBandyopadhyay, Susmita Bose, CRC Press.
4. Rapid Prototyping: Principles and Applications, by -Chee Kai Chua, Kah Fai Leong, Chu Sing Lim.

Semester – VII: Departmental Elective – IV

Subject Code: KPI 071	Flexible Manufacturing System	L T P : 3 0 0	Credits: 3

Course Outcomes: The students will be able to		Blooms Taxonomy
CO-1	Understand the manufacturing systems, flexibility, components of FMS	K2
CO-2	Understand production, planning, scheduling and simulation of FMS	K2
CO-3	Understand concepts of group technology and economics issues in the application of FMS	K2
CO-4	Understand the application of FMS in various operations & involvement of AI in flexible manufacturing system.	K2
CO-5	Understand the concepts of scheduling and simulation in FMS	K2
CO-6	Apply the concepts of scheduling in FMS	K3

UNIT-I: Understanding of FMS
Introduction To FMS, Evolution of Manufacturing Systems, objective and Need, Benefits, Components, Types of Flexibility, Merits, Demerits and Applications of Flexibility.

Composition of FMS, CNC machines, robots, automatic storage and retrieval, automatic material handling, computerized control, Hierarchy of Computer Control ,Computer Control of Work Centre and Assembly Lines, FMS Supervisory Computer Control.

UNIT-II: Planning, scheduling and control of flexible manufacturing systems:
Process planning, machine loading, cycle time, machine output vs cycle time, methods to reduce cycle time, machine balancing.

Scheduling, data requirement for scheduling, mater production scheduling, Gantt charts, scheduling rules, scheduling in FMS, Single Product, Single Batch, N–Batch Scheduling Problem, Knowledge Based Scheduling System.

Dispatching, Dispatch activities.

UNIT-III: **FMS simulation and data base**
Application of Simulation, Model of FMS, Simulation Software, Limitation, Manufacturing Data Systems, Data Flow, FMS Database Systems, Planning For FMS Database.

Introduction to factors affecting the Performance of FMS, Introduction to Analytical model and Simulation model of FMS.

UNIT-IV: Group technology and justification of FMS
Introduction, Matrix Formulation, Mathematical Programming Formulation, Graph Formulation, Knowledge Based System for Group Technology, Economic Justification Of FMS, Implementation issues and maintenance of FMS, Application of Possibility Distributions in FMS Systems Justification.

UNIT-V: Applications of FMS and factory of the future

FMS Application in Machining, Sheet Metal Fabrication, Prismatic Component Production, Aerospace Application, FMS Development Towards Factories of The Future, Artificial Intelligence and Expert Systems in FMS, Design Philosophy and Characteristics for Future, case studies.

Books and References:

1. Jha, N.K. “Handbook of Flexible Manufacturing Systems”, Academic Press Inc., 1991.
2. Radhakrishnan P. And Subramanyan S., “CAD/CAM/CIM”, Wiley Eastern Ltd., New Age International Ltd., 1994.
3. Raouf, A. And Ben-Daya, M., Editors, “Flexible Manufacturing Systems: Recent Development”, Elsevier Science, 1995.
4. GrooverM.P., “Automation, Production Systems And Computer Integrated Manufacturing”, Prentice Hall Of India Pvt., New Delhi, 1996.
5. Reza A Maleki “Flexible Manufacturing system” Prentice Hall of Inc New Jersey, 1991
6. TaiichiOhno, “Toyota Production System: Beyond Large-Scale Production”, Productivity Press (India) Pvt. Ltd. 1992.

Semester – VII: Departmental Elective – IV

Subject Code: KPI 072	Facility Planning and Design	L T P : 3 0 0	Credits: 3

Course Outcomes: The students will be able to		Blooms Taxonomy
CO-1	Understand the plant location and site selection, factors influencing the plant location, the plant layout and plant layout design techniques	K2
CO-2	Understand the group technology and formation of machine cells, balancing of manufacturing line.	K2
CO-3	Understand the material handling and flow pattern.	K2
CO-4	Use the concepts of plant location and site selection and its layout design.	K3
CO-5	Apply the concepts of group technology and manufacturing cell formation.	K3
CO-6	Use material handling technologies in the plant.	K3

UNIT -I

Factory Planning: Introduction, factors to be considered

Plant Location and Site Selection: Levels of plant location, rural, urban and suburban location of plants, factors influencing the plant location, optimum plant location, location theories.

UNIT -II

Plant Layout: Introduction of production system, scope, objectives, importance, and types of plant layout, characteristics of a good plant layout, factoring affecting plant layout, procedure of developing a plant layout, different graphical and computerized plant layout design techniques, installation and evaluation of plant layout, optimum plant layout.

UNIT -III

Group Technology: Definition, objectives, planning, part families and machine cell formation, evaluation of machine cells, types of GT layout, benefits of GT, implementation of GT.

UNIT -IV

Line Balancing: Definitions, heuristic and analytical methods of balancing the assembly and production line, single and mixed model line balancing.

UNIT -V

Materials Handling: Definition, scope, objectives, principles, importance, factors in materials handling problem, analysis of materials handling, types and selection of materials handling equipment's, aids and techniques in materials handling equipment selection. Planning of material flow, advantages of planned material flow, flow planning principles, flow patterns, analysis of material flow.

Recommended Books:

1. Francis, R.L., McGinnis, L.F., and White, J.A., "Facility Layout and Location: An Analytical Approach", Prentice Hall of India 2004
2. Meyers, F.E., and Stephens, M.P., "Manufacturing Facilities Design and Material Handling", Prentice-

Hall, Inc. 2000
3. Groover,M.P.,“Automation, Production Systems and ComputerIntegrated Manufacturing”,2nd 2001 Ed., Pearson Education Inc. Delhi
4. Sule,D.R.,“Manufacturing Facilities-Location, Planning, and Design”, PWS Publishing Company 1984
5. Tompkins,J.A., White, J.A.,Bozer,Y.A.,Frazelle, E.H.,Tanchoco, J.M., and Tervino,J.,“Facilities Planning”,2nd 1996 Ed., John Willey & Sons

Semester – VII: Departmental Elective – IV

Subject Code: KMT 071	Advance Casting Process	L T P : 3 0 0	Credits: 3

Course Outcomes: The students will be able to		Blooms Taxonomy
CO-1	Understand the mould production and equipments and how internal cavities are produced.	K2
CO-2	Understand and apply the principles of melting and pouring systems and develop analytical relation between input and output process parameters.	K2
CO-3	Understand the various advance casting techniques.	K2
CO-4	Analyze the thermal, metallurgical aspects during solidification in casting and welding and their role on quality of cast or weld objects.	K4
CO-5	Analyze the concept of cooling rate of materials in metal casting.	K4
CO-6	Design the gating and riser system needed for casting and requirements to achieve defect free casting.	K6

UNIT-I: Production of Moulds and Cores

Mould production - equipment for moulding, moulding technique - pattern utilisation, hand and machine compaction, machine moulding, mould drying and hardening. Cores and core making - core boxes, compaction, core hardening, closing of moulds.

UNIT-II: Melting and Pouring

Melting Practice : Classification of melting furnaces, brief description of construction and operation of various furnaces - cupola and its design, electric arc furnaces, electric induction furnaces. Melting charge, melting conditions, melting losses, special melt treatment, melt quality control and recent development in metal melting.Pouring : Metal temperature, pouring equipment and techniques.

UNIT-III: Details Study of Following Casting Techniques

Shell moulding - Basic operation, production systems, characteristics of shell moulded casting and D-process. Investment Casting - expandable pattern process. Pattern production, investment, pattern removal and firing, casting.Factor influencing casting quality characteristics of precision investment casting.Investment casting from permanent casting.Die-casting - Gravity die-casting, pressure-die casting, die-casting machines, casting techniques, characteristics of die - castings.Centrifugal casting - Fundamental principles, methods production techniques, characteristics of centrifugal casting.

UNIT-IV: Solidification of Castings

Crystallization and development of cast structure - Nucleation, Growth and dendrite growth, independent nucleation, eutectic freezing, paratactic relations, structure of castings - significance and practical control cast structure, grain shape and orientation, grain size, refinement and modification of cast structure. Concept of progressive and directional solidification, solidification time and derivation of Chvorinov's equation influence of mould characteristics and cast metal. Properties on solidification, process numerical methods for heat flow analysis.

UNIT-V: Feeding of Castings

Feeding characteristics of alloys, geometric influences on solidification.Methods of the feeding of castings - cost and concept of yield, orientations, gating technique, casting temperature and pouring

speed, design and location of feeder heads.Aids to feeder head efficiency, junction of feeder head and casting, use of padding, chills and insulators.

REFERENCE :

1. Beeley P.R., “Foundry Technology” (Buttersworth) Heine and Rosenthal, “Principles of Metal Cutting” (TMH) “
2. Engineering Plastics, Parmar, Khanna Book Publishing Co., Delhi Metal Casting” ASME Handbook P.C.Mukherji, “Metal Casting Technology”

Semester – VII: Departmental Elective – V:

Subject Code: KMT 072	Composite Materials	L T P : 3 0 0	Credits: 3

Course Outcomes: The students will be able to		Blooms Taxonomy
CO-1	Understand the composite material concept, need and different types of matrix available.	K2
CO-2	Understand about various fibers their properties and their selection.	K2
CO-3	Understand how composites are classified based on matrix and fibers	K2
CO-4	Understand processing and manufacturing techniques of composite material	K2
CO-5	Understand the mechanical testing of composites and analysis of laminated plates.	K2

COMPOSITE MATERIALS

UNIT-I: Overview of Composite material
Classifications of Engineering Materials, Concept of composite materials.

Matrix materials, Functions of a Matrix, Desired Properties of a Matrix, Polymer Matrix (Thermosets and Thermoplastics), Metal matrix, Ceramic matrix, Carbon Matrix, Glass Matrix etc.

UNIT-II:Types of Reinforcements/Fibers
Role and Selection of reinforcement materials.Types of fibres: Glass fibers, Carbon fibers, Aramid fibers, Metal fibers, Alumina fibers, Boron Fibers, Silicon carbide fibers, Quartz and Silica fibers, Multiphase fibers, Whiskers, Flakes etc.

Mechanical properties of fibres: Material properties that can be improved by forming a composite material and its engineering potential.

UNIT-III:Various types of composites
Classification based on Matrix Material: Organic Matrix composites, Polymer matrix composites (PMC), Carbon matrix Composites or Carbon-Carbon Composites, Metal matrix composites (MMC), Ceramic matrix composites (CMC).

Classification based on reinforcements: Fiber Reinforced Composites, Fiber Reinforced Polymer (FRP) Composites, Laminar Composites, Particulate Composites.

UNIT-IV:Fabrication methods
Processing of Composite Materials: Overall considerations, Autoclave curing, Other Manufacturing Processes like filament welding, compression moulding, resin transplant method, pultrusion, pre-peg layer, Fiber-only performs, Combined Fiber-Matrix performs.

Manufacturing Techniques: Tooling and Specialty materials, Release agents, Peel plies, release films and fabrics, Bleeder and breather plies, bagging films, maximum stress and strain criteria, Von Mises Yield criterion for isotropic materials.

UNIT-V:Testing of Composites and Analysis

Mechanical testing of composites, tensile testing, Compressive testing, Intra-laminar shear testing, Inter-laminar shear testing, Fracture testing etc.

Analysis of laminated plates: equilibrium equations of motion, energy formulation, static bending analysis, buckling analysis, free vibrations, natural frequencies.

Books and References:

1. Materials characterization, Vol. 10, ASM hand book.
2. Mechanical Metallurgy, by G. Dieter, McGraw Hill.
3. Analysis and Performance of Fiber Composites, by Agarwal, McGraw Hill.
4. Thermal Analysis of Materials, by R.F. Speyer, Marcel Decker.
5. Engineering Mechanics and Composite Materials, by Daniels, Oxford University Press.
6. Material Science and Engineering (SIE) with CD, by Smith, McGraw Hill.
7. Gibson R.F. Principles of Composite Material Mechanics, second edition, McGraw Hill, 1994.
8. Engineering Materials: Polymers, Ceramics and Composites, by A.KBhargava Prentice Hall India.

Semester – VII: Departmental Elective – V

Subject Code: KMT 073	Manufacturing Strategies	L T P : 3 0 0	Credits: 3

Course Outcomes: The students will be able to		Blooms Taxonomy
CO-1	Understand modern product development theories and customer needs.	K2
CO-2	Understand product tears down methods and product modularity.	K2
CO-3	Understand concepts of modelling and morphological analysis.	K2
CO-4	Understand material properties and economic factors influencing design	K2
CO-5	Understand the significance of value engineering.	K2

UNIT I: Product Design and Development

Product development verses design, modern product development theories and methodologist in design. Product development teams.Product development planning, technical and business concerns. Understanding customer needs, Establishing product functions. Functional decomposition, modeling process, Function trees system functionality, augmentation.

Aggregation, common basis, functional modeling methods

UNIT II: Benchmarking

Product tear down and experimentation, benchmarking and establishing engineering specification. Product portfolios and portfolio architecture.

Tear down process, tear down methods, post teardown reporting, benchmarking approach, support tools, setting specifications, portfolio architecture, types, platform, functional architecting, optimization selection. Product modularity, modular design.

UNIT III:Concepts and Modeling

Generation of concepts, information gathering and brain storming, directed search,morphological analysis, combining solutions. Decision making, estimation of technical feasibility, concept selection process, selection charts, measurement theory, numerical concept scoring, design evaluation scheme, concept embodiment, geometry and layout, system modeling, modeling of product metrics, selection of model by performance specifications, physical prototyping, informal and formal models.

UNIT IV: Design materials & human factors in product design

Material properties, metals, plastics, rubber, woods & factors considered while designing for metals, plastics, rubber, woods etc, Anthropometry factors, physiological factors, psychology factors, anatomy factors.

Economic factors influencing design, product value, safety, reliability & environmental considerations, economic analysis, break even analysis, profit & competitiveness, economics of a new product design.

UNIT V: Value engineering in product design

Introduction, historical perspective, nature & measurement of value, importance of value, value analysis job plan, creativity, steps for solving & value analysis, value analysis tests

Principal stress trajectories(force flow lines), balanced design, criteria & objective of design, material toughness, resilience, designing for uniform strength.

TEXT BOOKS:

1. Chitale A. K., Gupta R. C., “Product Design & Manufacturing”, Prentice Hall India Ltd., ISBN: 978-81-203-4282-8
2. RoozenburgN.F.M., Eekels J., “Product Design : Fundamentals & Methods”, IFS (Publications) Ltd and Springer-Verlag London UK

REFERENCE BOOKS:

1. Dale Huchingson R “New Horizons for Human Factors in Design ” McGraw Hill Company 19811. Indistrial Design-Mayall
2. RoozenburgNFM and J. Eekels, “Product Design: Fundamentals and Methods A Wiley Series in Product Development”, John Wiley and Sons.

Semester – VII: Departmental Elective – V

Subject Code: KMT 074	Maintenance Engineering & Management	L T P : 3 0 0	Credits: 3

Course Outcomes: The students will be able to		Blooms Taxonomy
CO-1	Understand the basics of maintenance planning.	K2
CO-2	Understand the preventive maintenance and maintenance schedules.	K2
CO-3	Understanding of repair methods for basic machine elements.	K2
CO-4	Understanding of repair methods for material handling equipment.	K2
CO-5	Cost comparison with and without CM.	K4

UNIT-I:Principles and practices of maintenance planning

Basic Principles of Maintenance Planning – Objectives and Principles of Planned Maintenance Activity – Importance and Benefits of Sound Maintenance Systems.

Reliability and Machine Availability – MTBF, MTTRAndMWT – Factors of Availability – Maintenance Organization – Maintenance Economics.

UNIT-II:Maintenance policies – preventive maintenance

Maintenance Categories – Comparative Merits of Each Category – Preventive Maintenance, Maintenance Schedules, Repair Cycle – Principles and Methods of Lubrication – TPM.

UNIT-III:Condition monitoring

Condition Monitoring – Cost Comparison with And Without CM – On-Load Testing and Offload Testing – Methods and Instruments for CM – Temperature Sensitive Tapes – Pistol Thermometers – Wear-Debris Analysis.

UNIT-IV:Repair methods for basic machine elements

Repair Methods for Beds, Slideways, Spindles, Gears, Lead Screws and Bearings – Failure Analysis – Failures and Their Development – Logical Fault Location Methods – Sequential Fault Location.

UNIT-V:Repair methods for material handling equipment

Repair Methods for Material Handling Equipment – Equipment Records –Job Order Systems -Use of Computers in Maintenance.

Books and References:

1. SrivastavaS.K., “Industrial Maintenance Management”, – S. Chand And Co., 1981.
2. Venkataraman .K “Maintancence Engineering And Management”, PHI Learning, Pvt. Ltd., 2007.
3. Bhattacharya S.N., “Installation, Servicing And Maintenance”, S. Chand And Co., 1995.
4. White E.N., “Maintenance Planning”, I Documentation, Gower Press, 1979.
5. GargM.R., “Industrial Maintenance”, S. Chand & Co., 1986.
6. Higgins L.R., “Maintenance Engineering Hand Book”, McGraw Hill, 5th Edition, 1988.
7. Armstrong, “Condition Monitoring”, BSIRSA, 1988.
8. Davies, “Handbook Of Condition Monitoring”, Chapman &Hall, 1996.

Semester – VII: Departmental Elective – V

Subject Code: KMT 075	Process Planning and Cost Estimation	L T P : 3 0 0	Credits: 3

Course Outcomes: The students will be able to		Blooms Taxonomy
CO-1	Understand the various processes planning and learn to estimate cost.	K2
CO-2	Learn to estimate various cost elements.	K2
CO-3	Learn to estimate production cost.	K2
CO-4	Learn to fix foundry cost.	K2
CO-5	Learn the find machining time estimation.	K2

UNIT-I:Overview of process planning

Introduction- methods of process planning-Drawing Interpretation-Material evaluation – steps in process selection-.Production equipment and tooling selection.

UNIT-II:Process planning activities

Process parameters calculation for various production processes-Selection jigs and fixtures election of quality assurance methods - Set of documents for process planning-Economics of process planning- case studies.

UNIT-III:Introduction to cost estimation

Importance of costing and estimation –methods of costing-elements of cost estimation. Types of estimates – Estimating procedure- Estimation labour cost, material cost- allocation of overhead charges-Calculation of depreciation cost.

UNIT-IV:Production cost estimation:

Estimation of Different Types of Jobs - Estimation of Forging Shop, Estimation of Welding Shop, Estimation of Foundry Shop.

UNIT-V:Machining time calculation

Estimation of Machining Time - Importance of Machine Time Calculation- Calculation of Machining Time for Different Lathe Operations, Drilling and Boring - Machining Time Calculation for Milling, Shaping and Planning -Machining Time Calculation for Grinding.

Books and References:

1. Peter scalon, “Process planning, Design/Manufacture Interface”, Elsevier science technologyBooks, Dec 2002.
2. OstwalalP.F. and Munez J., “Manufacturing Processes and systems”, 9th Edition, John Wiley,1998.
3. Russell R.S and Tailor B.W, “Operations Management”, 4th Edition, PHI, 2003.
4. ChitaleA.V. and Gupta R.C., “Product Design and Manufacturing”, 2nd Edition, PHI, 2002.
5. Process planning and cost estimation by M. Adithan.
6. Process planning and cost estimation by B. Vijayaramanath.