



# RKDF UNIVERSITY, BHOPAL

## Scheme of Examination

### First Semester- M.Tech (Production and Industrial Engineering)

S.no	Subject Code	Subject Name	Periods per week			Credits	Maximum Marks (Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
							End Sem. Exam	Tests (Two)	Assignments /Quiz	End Sem. Practical/ Viva	Practical Record/ Assignment/Quiz /Presentation	
1	MTPIE -1001	Advanced Mathematics	3	1	-	4	70	20	10			100
2	MTPIE -1002	Advanced Production Process	3	1	-	4	70	20	10			100
3	MTPIE -1003	Production planning & Inventory control	3	1	-	4	70	20	10			100
4	MTPIE -1004	Theory of Metal Cutting and Tool forming	3	1	-	4	70	20	10			100
5	MTPIE -1005	Operation Research	3	1	-	4	70	20	10			100
6	MTPIE -1006	Lab-I Advanced Production Process	-	-	6	6				90	60	150
7	MTPIE -1007	Lab-II Operation Research	-	-	6	6				90	60	150
<b>Total</b>			<b>15</b>	<b>5</b>	<b>12</b>	<b>32</b>	<b>350</b>	<b>100</b>	<b>50</b>	<b>180</b>	<b>120</b>	<b>800</b>

L: Lecture - T: Tutorial - P: Practical



# RKDF UNIVERSITY, BHOPAL

## MASTER OF TECHNOLOGY

(PRODUCTION & INDUSTRIAL ENGINEERING)

FIRST YEAR

Semester – I

Course Content & Grade

BRANCH	SUBJECT TITLE	SUBJECT CODE
PIE	Advanced Mathematics	MTPIE-1001

### UNIT 1

Linear Algebra: Linear transformation, vector spaces, hash function, Her mite polynomial , Heavisite's unit function and error function. Elementary concepts of Modular mathematics

### UNIT 2

Solution of Partial Differential Equation (PDE) by separation of variable method, numerical solution of PDE (Laplace, Poisson's, Parabolic) using finite difference methods, Elementary properties of FT, DFT, WFT, Wavelet transform, Haar transform.

### UNIT 3

Probability, compound probability and discrete random variable, Binomial, Normal and Poisson's distributions, Sampling distribution, elementary concept of estimation and theory of hypothesis, recurred relations.

### UNIT 4

Queuing system, transient and steady state, traffic intensity, distribution queuing system, concepts of queuing models (M/M/1: Infinity/ Infinity/ FC FS), (M/M/1: N/Infinity/ FC FS), (M/M/S: Infinity/ Infinity/ FC FS)

### UNIT 5

FEM: Variational functionals, Euler Lagrange's equation, Variational forms, Ritz method, Galerkin's method, descretization, finite elements method for one dimensional problems.

### Reference Books:

1. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Hill.
2. Advance Engineering Mathematics by Ervin Kreszig, Wiley Easten Edd.
3. Applied Numerical Methods with MATLAB by Steven C Chapra, TMH.
4. Numerical Solution of Differential Equation by M. K. Jain
5. Numerical Mathematical Analysis By James B. Scarborough
6. Fourier Transforms by J. N. Sheddon
7. Advance Mathematics for Engr and Sc, Spiegel, Schaum Series, TMH



# RKDF UNIVERSITY, BHOPAL

## MASTER OF TECHNOLOGY

(PRODUCTION & INDUSTRIAL ENGINEERING)

FIRST YEAR

Semester – I

Course Content & Grade

BRANCH	SUBJECT TITLE	SUBJECT CODE
PIE	Advance Production Technology	MTPIE-1002

### Unit I

**Metrology:** Standards of Measurements, Linear and angular instruments; slip gauges, comparators, sine bar, angle gauges, clinometers, tape gauge, screw thread measurements limit gauging, Gauge design; fits and tolerance.

**Rolling:** General description of machines and process; Rolling of structural sections plates and sheets; construction of mills; hot and cold rolling techniques

### Unit II

**Metal cutting :** Principles of metal cutting, tool geometry, Tool life plots, Mach inability, Tool wear, Cutting force analysis, Cutting tool materials & Cutting fluids, Economics of metal machining.

### Unit III

**Pattern Making:** Pattern and pattern making, pattern allowances; pattern design considerations, core, coreboxes, types of patterns. **Foundry:** molding and core sands and their properties molding machines, centrifugal casting, die casting shell molding; cupola description and operation. Lost wax molding; continuous casting.

### Unit IV

**Forging:** Theory and application of forging processes description; principle of toleration of drop and horizontal forging machines; General principle of designs.

**Press working:** Description and operation of processes, process of shearing, punching, piercing, blanking, trimming, perfecting, notching, lancing, embossing, coining, bending, forging and drawing press, tool dies, auxiliary equipment, safety devices, stock feeders, scrap cutters, forces, pressure and power requirements, requirements of stock material.

### Unit V

**Welding:** Gas welding, Electric arc welding, A.C. and D.C. welding machines and their characteristics. Flux, Electrodes, Pressure welding, electric resistance welding spot, seam and built welding, submerged arc welding; thermit and TIG & MIG Welding, Brazing Gas cutting, Spinning: Introduction of spinning.

## References:

1. Anderson and Tetro; Shop Theory;TMH
2. Kaushik JP; Manufacturing Processes; PHI
3. Bawa; Manufacturing Processes; TMH
4. Rao PN; Manufacturing Tech- Foundry, forming welding; TMH
5. Rao PN; Manufacturing Tech- Metal cutting and machine tools; TMH
6. Chapman; Workshop Technology :
7. Begeman; Manufacturing Process : John Wiley
8. Raghuvanshi; Workshop Technology ;; Dhanpat Rai.
9. Ravi B; Metal Casting- CAD analysis; PHI.
10. Hajra Choudhary; Workshop Technology:, Vol I
11. Pandya & Singh;Production Engineering Science:.



# R.K.D.F. UNIVERSITY, BHOPAL

## MASTER OF TECHNOLOGY

### (PRODUCTION & INDUSTRIAL ENGINEERING)

#### Semester – I

#### Course Content & Grade

BRANCH	SUBJECT TITLE	SUBJECT CODE
PIE	Production Planning & Inventory Control	MTPIE-1003

#### Unit 1

**SALES OPERATION PLANNING** - Nature of sales operation planning, relevant costs, Sales & operation planning Methods.

#### Unit 2

**MASTER PRODUCTION SCHEDULE** - NATURE OF MASTER Production Schedule, Master production Scheduling Techniques, Time Fencing and Master Production Schedule stability, Final assembly Schedule, Managing master production Schedule.

#### Unit 3

**MATERIAL RESOURCE PLANNING** - Nature of Material Resource planning, Using MRP and MRP-II system; order control and flow control; routing, scheduling and priority , Buffering Concepts.

#### Unit 4

**PRODUCTION ACTIVITY CONTROL** - Shop floor control concepts, Techniques, performance measurement, Gantt Chart, Finite Loading systems, concept of JIT manufacturing system; logistics, distribution, and supply chain management technology- Process planning layout designs, manufacturing Planning & Control. ;

#### Unit 5

**Inventory** – functions, costs, classifications, deterministic and probabilistic inventory models, quantity discount; perpetual and periodic inventory control systems.

#### REFERENCES

1. Thomas E. Vollmann William L. Berry “ Manufacturing Planning and Control for supply chain management” fifth edition Mc Graw Hill International edition – 2005.
2. Edward A. Silver “ Inventory Management and Production, Planning And Scheduling” Third Edition John Wiley & sons `1998.
3. Seetharama L. Narsinham , Dennis W Mcleavy “ Production , Planning and Inventory Control” Second Edition Prentice Hall of India .
4. Richard J. Tersine “ Production/ Operations Management” Second Edition North Holland 1985.
5. A.C.Hax and D. Candea “ Production & Inventory management” Prentice Hall Eaglewood cliffs. NJMetallurgy techniques.



# R.K.D.F. UNIVERSITY, BHOPAL

## MASTER OF TECHNOLOGY (PRODUCTION & INDUSTRIAL ENGINEERING)

FIRST YEAR

Semester – I

Course Content & Grade

BRANCH	SUBJECT TITLE	SUBJECT CODE
PIE	Theory of Metal Cutting and Tool forming	MTPIE-1004

### Unit 1

**Lathe:** Classification of machine tools and their basic components; lathe- specification, components & accessories, various operations on lathes, capstan & turret lathes, tool layout, methods of thread production, machining time, single point cutting tools, tool signature and nomenclature

**Grinding:** Types of grinding machines, surface, cylindrical and internal grinding, grinding wheels, specifications, wheel turning and dressing without eccentricity, centre-less grinding.

### Unit 2

**Milling:** Vertical, horizontal and universal type machines, specifications and classifications of milling machines, universal dividing head plain and different indexing, gear cutting, milling cutters.

**Drilling & Broaching:** Fixed spindle, radial and universal drilling machines, drilling time, broaching principle, broaches and broaching machines

### Unit 3

**Shapers:** Classification and specifications, principle parts, quick return mechanism, shaper operations, speed feed, depth of cut, machining time. Surface qualities, equipment used for rating surfaces, rms. CLA value, causes for surface irregularities.

**Gear Cutting:** Die casting, methods of forming gears, generating process, Gear shaping, gear shaving, gear grinding gear testing.

### Unit 4

**Design of Metal working Tools:** Design of press working tools, shearing, piercing, blanking, dies, compound die design principles for forging dies, bending, forming drawing dies, tooling for forging design principles for forging dies, drop forging, upset forging, design principles and practice for rolling, roll press design

### Unit 5

**Design of Jigs and Fixtures:** Principles of location, locating method and devices, principles of clamping, clamping devices, drilling jigs, types, drill bushes, fixture and economics, types of fixture, milling, grinding, broaching, assembly fixtures indexing jig and fixtures, indexing devices.

## **References:**

1. Groover MP; Fundamentals of modern manufacturing; Wiley India
2. Kaushish JP; Manufacturing processes; PHI
3. Boothroyd G, Knight WA; Fundamentals of machining and machine tools; CRC-Taylor and Francis
4. Munoz J and Oswald PF; Manufacturing processes and systems; Wiley India; Boston; Metal Processing.
5. Hazra Chowdhary; Workshop Tech.II
6. Lindberg – Materials & Processes of Manufacture.
7. Work shop technology by Raghuvanshi-Vol-II
8. Production Processes by HMT

## **List of Experiment (Pl. expand it):**

1. To make a complicate job on lathe machine with all operations like turning, step turning, drilling, tapper turning, thread cutting and knurling .
2. Study of center less grinding machine/ tool and cutter type grinding machine.
3. Study of horizontal/ universal milling machine, diving head and indexing mechanism of it.
4. To cut a spur gear on milling machine using rapid indexing method.
5. Study of radial drilling machine and preparing a job on it.
6. To study a sapping machine to learn about working of quick return



**R.K.D.F. UNIVERSITY, BHOPAL**  
**MASTER OF TECHNOLOGY**  
**(PRODUCTION & INDUSTRIAL ENGINEERING)**  
**FIRST YEAR**

**Semester – I**

**Course Content & Grade**

<b>BRANCH</b>	<b>SUBJECT TITLE</b>	<b>SUBJECT CODE</b>
<b>PIE</b>	<b>Operation Research</b>	<b>MTPIE-1005</b>

**Unit 1**

**Linear Programming:** Introduction, history and development of OR, model building, process of OR, linear programming– formulation, graphical method, simplex method, big-M-method, two-phase method, degeneracy in LPP, unrestricted variables, duality in LP, convex sets, revised simplex, sensitivity analysis, parametric linear programming, introduction to integer programming, branch and bound algorithm, cutting plane algorithm, single and multiple goal programming algorithms.

**Unit 2**

**Allocations in LPP- assignment** model- hungarian method, unbalanced, traveling sales man and miscellaneous problem; **transportation-** optimality test, degeneracy unbalanced problems, transshipment.

**Unit 3**

**Decision and Game theory:** Decision tree, decision making models under certainty, risk and uncertainty; rectangular, two persons zero sum games, maximin and minimax principles, saddle point, dominance, graphical and algebraic methods of solution, solution by transforming into linear programming problem

**Unit 4**

**Dynamic programming:** Characteristics of dynamic optimization model, Bellman's principle, typical problems, salesmen problem, forward and backward recursion, use of software to solve LP and DP problems.

**Unit 5**

**Network (NW) models for projects:** Activity and event presentation on NW, summary and detailed blowup NW, work breakdown structure, manageable work units; dummy activity, node numbering rule, time scaled NW, activity and event times, forward and backward pass calculations of earliest/ latest start/ finish time, slack and floats, critical path; resource leveling and critical chain; activity-cost tradeoff and crashing of NW; use of PERT for activity duration uncertainty, probability of completing project in estimated times.

**References:**

1. Taha H. A., Operation Research, PHI.
2. Hillier and Lieberman Introduction to OR; TMH
3. Sharma JK; OR Theory and Application; macMillan Pub;
4. Banerjee B., Operation Research; Business Publicity, Bombay.
5. Hira & Gupta, Operation Research, S. Chand.
6. Rao S. S., Optimization, Jain Bros., Delhi.
7. Chitale A. K., J. Negi, Text Book of Operation Research, Jain Bros., Delhi.



8. Sharma S. D., Kedarnath, Operation Research, Ramnath & Co., Meerut.

**Suggested List of Experiments (Pl. expand it):**

Use computer and software to solve problems contained in the syllabus



# RKDF UNIVERSITY, BHOPAL

## Scheme of Examination

### Second Semester- M.Tech (Production and Industrial Engineering)

S. No	Subject Code	Subject Name	Periods per week			Credits	Maximum Marks (Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
							End Sem. Exam	Tests (Two)	Assignments /Quiz	End Sem. Practical/ Viva	Practical Record/ Assignment/Quiz /Presentation	
1	MTPIE -2001	Reliability and Quality control	3	1	-	4	70	20	10	-	-	100
2	MTPIE -2002	Simulation Modeling	3	1	-	4	70	20	10	-	-	100
3	MTPIE -2003	Metrology and Measurement	3	1	-	4	70	20	10	-	-	100
4	MTPIE -2004	Method Study & Engineering Economy	3	1	-	4	70	20	10	-	-	100
5	MTPIE -2005	Dynamics of Machines	3	1	-	4	70	20	10	-	-	100
6	MTPIE -2006	Lab-I Metrology and Measurement	-	-	6	6	-	-	-	90	60	150
7	MTPIE -2007	Lab-II Dynamics of Machine	-	-	6	6	-	-	-	90	60	150
		<b>Total</b>	<b>15</b>	<b>5</b>	<b>12</b>	<b>32</b>	<b>350</b>	<b>100</b>	<b>50</b>	<b>180</b>	<b>120</b>	<b>800</b>

L: Lecture - T: Tut



# R.K.D.F. UNIVERSITY, BHOPAL

## MASTER OF TECHNOLOGY (PRODUCTION & INDUSTRIAL ENGINEERING)

FIRST YEAR

Semester – II

### Course Content & Grade

Branch	Subject Title	Subject Code
PIE	Reliability and Quality Management	MTPIE-2001

#### Unit 1

INTRODUCTION: Reliability function - MTBF - MTTF - mortality curve - Availability - Maintainability.  
FAILURE DATA ANALYSIS: Repair time distributions - exponential, normal, log normal. Gamma and Weibull- reliability data requirements - Graphical evaluation.

#### Unit 2

RELIABILITY PREDICTION: Failure rate estimates - Effect of environment and stress - Series and Parallel systems - RDB analysis - Standby Systems – Complex Systems.

#### Unit 3

RELIABILITY MANAGEMENT: Reliability demonstration testing – Reliability growth testing - Duane curve - Risk assessment - FMEA, Fault tree.

#### Unit 4

TOTAL PRODUCTIVE MAINTENANCE: Causes of Machine Failures - Downtime-Maintenance policies - Restorability predictions - Replacement models - Spares provisioning - Maintenance management - Cleanliness and House Keeping.

#### Unit 5

Quality Management: Quality – concept and costs, quality circles, quality assurance; statistical quality control, acceptance sampling, zero defects, six sigma; total quality management; ISO 9000; design of experiments – Taguchi method.

### Reference Book

1. Paul Kales, Reliability for technology, "Engineering and Manufacturing", Prentice Hall, New Jersey, 1998.
2. Modarres, "Reliability and Risk Analysis", Marcel Dekker Inc., 1993.
3. Gopalakrishnan.P, and Banerji A.K., "Maintenance and Spare Parts Management", Prentice Hall of India, New Delhi, 1996.



# R.K.D.F. UNIVERSITY, BHOPAL

## MASTER OF TECHNOLOGY (PRODUCTION & INDUSTRIAL ENGINEERING)

FIRST YEAR

Semester – II

### Course Content & Grade

Branch	Subject Title	Subject Code
PIE	Simulation Modeling Process	MTPIE-2002

#### Unit 1

**Introduction to modeling and simulation:** Modeling and simulation methodology, system modeling, concept of simulation; gaming; static, continuous and discrete event simulation.

#### Unit 2

**Basic concept of probability,** generation and characteristics of random variables, continuous and discrete variables and their distributions; mapping uniform random variables to other variable distributions; linear, nonlinear and stochastic models

#### Unit 3

**Introduction to Queuing Theory:** Characteristics of queuing system, Poisson's formula, birth death system, equilibrium of queuing system, analysis of M/M/1 queues. Introduction to multiple server Queue models M/M/c Application of queuing theory in manufacturing and computer system

#### Unit 4

**System Dynamics modeling:** Identification of problem situation, preparation of causal loop diagrams and flow diagrams, equation writing, level and rate relationship, Simulation of system dynamics models.

#### Unit 5

**Verification and validation:** Design of simulation experiments, validation of experimental models, testing and analysis. Simulation languages comparison and selection, study of simulation software –Arena, Pro-model, SIMULA, DYNAMO, STELLA, POWERSIM.

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#### References:

1. Law AM and Kelton WD; Simulation Modeling and Analysis; TMH
2. Gordon G., System simulation, PHI Learning.
3. Taha H, Operations Research; PHI.
4. Hillier FS, Liberman GJ; Introduction to OR; TMH.
5. Deo N; System Simulation with Digital Computer; PHI Lea
6. Payer T., Introduction to system simulation, McGraw Hill.
7. Sushil, System Dynamics, Wiley Eastern



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## MASTER OF TECHNOLOGY (PRODUCTION & INDUSTRIAL ENGINEERING)

FIRST YEAR

Semester – II

### Course Content & Grade

Branch	Subject Title	Subject Code
PIE	Metrology and Measurement	MTPIE-2003

#### Unit 1

General concepts of measurement: definition-standards of measurement, errors in measurement, limit-gauging, various systems of limits, fits and tolerance, interchangeability, ISI and ISO system. basic principles and design of standards of measuring gauges, types of gauges and their design, accuracy and precision, calibration of instruments, principles of light interference, interferometer, measurement and calibration.

#### Unit 2

Linear and angular measurements: Slip gauges, micrometers, verniers, dial gauges, surface plates, comparators- mechanical, electrical, pneumatic and optical comparator, angular measuring instruments- sine bar, angle gauges, spirit level, autocollimators, clinometers; measurement of straightness, flatness and squareness.

#### Unit 3

Measurement of surface finish and measuring machines: surface finish- definitions, types of surface texture, surface roughness measurement methods, comparison, profile-meters, pneumatic and replica, measurement of run out and concentricity, length bar measuring machine, optical projection, comparator, tool makers microscope.

#### Unit 4

Metrology of screw threads and gears: internal/external screw thread, terminology, measurement of various elements of threads, thread micrometer method, two wire and three wire methods; gear-terminology, measurement of various elements, constant chord method, base tangent method, plug method; gear tester, gear tooth measurement; rolling gear tester.

#### Unit 5

Computer aided and laser metrology: Co-ordinate measuring machine; applications;laser micrometer, laser interferometer, laser scanning gauge, non contact and in- process inspection, vision system.

#### References:

1. ASTE; Handbook of industrial metrology; Prentice hall of india ltd
2. Jain R.K.; Engineering metrology; Khanna publishers
3. Gupta. I.C. "A text book of engineering metrology", Dhanpat rai and sons;
4. Galye G.N et al; Metrology for engineers; elbs,
5. Rajput R.K; Engineering metrology and instrumentation; Kataria &sons publishers



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## MASTER OF TECHNOLOGY (PRODUCTION & INDUSTRIAL ENGINEERING)

FIRST YEAR

Semester – II

### Course Content & Grade

Branch	Subject Title	Subject Code
PIE	Method Study & Engineering Economy	MTPIE-2004

#### Unit 1

**METHOD STUDY** - Definition and concept , scope of method study , indicators of method study  
Elements of method design , Process charts , procedures of method study.

#### Unit 2

**WORK MEASUREMENT** - Definition & objectives of work measurement, Procedure for time study  
time estimates & production standard, level of performance, Allowances, Recording techniques in time  
study. stop watch.

**MICROMOTION STUDY** Introduction, objectives of micro motion study. SIMO charts , ;

#### Unit 3

**JOB EVALUATION** – Definition and concept Need for job evaluation , Methods of job evaluation  
Essentials for success of job evaluation programme

#### Unit 4

**Economy and Costing:** Elementary cost accounting and methods of depreciation; break-even  
analysis, techniques for evaluation of capital investments, financial statements.

#### REFERENCES:

1. Sharma S.K. “ Industrial Engineering & operations management “ Kataria Publications
2. Barnes R.M. “ Work Design And Measurement “ Wiley & Sons
3. Maccormic E.J. “ Human factors in Engg. & Design “ Tata Mc Graw Hil
4. Mahajan M .S. “ Industrial Engg & Production Management” Dhanpat Rai  
& Sons DelhI
5. Shah H.S. “ Work Study & Ergonomics “ Dhanpat rai & Sons



# R.K.D.F. UNIVERSITY, BHOPAL

## MASTER OF TECHNOLOGY

### (PRODUCTION & INDUSTRIAL ENGINEERING)

#### FIRST YEAR

#### Semester – II

#### Course Content & Grade

Branch	Subject Title	Subject Code
PIE	Machines of Dynamics	MTPIE-2005

#### Unit -1

Dynamics of Engine Mechanisms: Displacement, velocity and acceleration of piston; turning moment on crankshaft, turning moment diagram; fluctuation of crankshaft speed, analysis of flywheel.

#### Unit- 2

Governor Mechanisms: Types of governors, characteristics of centrifugal governors, gravity and spring controlled centrifugal governors, hunting of centrifugal governors, inertia governors.

#### Unit -3

Balancing of Inertia Forces and Moments in Machines: Balancing of rotating masses, two plane balancing, determination of balancing masses (graphical and analytical methods), balancing of rotors, balancing of internal combustion engines (single cylinder engines, in-line engines, V-twin engines, radial engines, Lanchester technique of engine balancing.

#### Unit -4

Friction: Frictional torque in pivots and collars by uniform pressure and uniform wear rate criteria. Boundary and fluid film lubrication, friction in journal and thrust bearings, concept of friction circle and axis, rolling friction. Clutches: Single plate and multi plate clutches, Cone clutches.

#### Unit -5

Belt drives; Velocity ratio, limiting ratio of tension; power transmitted; centrifugal effect on belts, maximum power transmitted by belt, initial tension, creep; chain and rope drives;

Brakes: Band brake, block brakes, Internal and external shoe brakes, braking of vehicles.

Dynamometer: Different types and their applications.

Dynamic Analysis of Cams: Response of un-damped cam mechanism (analytical method), follower response analysis by phase-plane method, jump and cross-over shock.

#### **References:**

1. Ambekar, AG; Mechanism and Machine Theory; PHI
2. Rattan SS; Theory of machines; TMH
3. Bevan; Theory of Machines;
4. Norton RL; kinematics and dynamics of machinery; TMH
5. Grover; Mechanical Vibration

#### **List of Experiment (Pl. expand it):**

- 1- Study of various models of governors.
- 2- Study of gyroscopic motion and calculation of value of gyroscopic couple.
- 3- Study of various types of Cams and followers and drawing the cam profile with the help of test kit.
- 4- Study of various first order vibration systems.
- 5- To study working of friction clutches using models Course Content &



# RKDF UNIVERSITY, BHOPAL

## Scheme of Examination

### Third Semester- M.Tech Production and Industrial Engineering )

S. No.	Subject Code	Subject Name	Periods per week			Credits	Maximum Marks(Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End Sem. Exam	Tests (Two)	Assignments /Quiz	End Sem. Practical/ Viva	PracticalRecord/ Assignment/Quiz /Presentation	
1	MTPIE -3001	Elective-I	3	1	-	4	70	20	10			100
2	MTPIE -3002	Industrial Training (6 month)			4	4					100	100
3	MTPIE -3003	Seminar	-	-	4	4					100	100
4	MTPIE -3004	Dissertation Part- I (Literature Review/Problem Formulation/ Synopsis	-	-	8	8				120	80	200
		<b>Total</b>	<b>6</b>	<b>2</b>	<b>16</b>	<b>20</b>	<b>140</b>	<b>40</b>	<b>20</b>	<b>120</b>	<b>180</b>	<b>500</b>

L: Lecture - T: Tutorial - P: Practical

### ELECTIVE-

Subject code	Subject name
MTPIE-3001(A)	Computer Integrated Manufacturing
MTPIE-3001(B)	Entrepreneurship and Management Concepts
MTPIE-3001(C)	Principals of Robotics and Applications





# R.K.D.F. UNIVERSITY, BHOPAL

## MASTER OF TECHNOLOGY (PRODUCTION & INDUSTRIAL ENGINEERING)

Semester – III

### Course Content & Grade

Branch	Subject Title	Subject Code
PIE	<b>ELECTIVE-I</b> <b>Computer Integrated Manufacturing</b>	<b>MTPIE-3001(A)</b>

#### Unit 1

##### **Computer Integrated manufacturing System**

Definition, CIM wheel concept, Evolution of CIM, CIM and system view of manufacturing, and CIM IT & Concurrent Engineering, Elements of CIM system, CIM hardware and software.

#### Unit2

##### **Computer Aided Design**

Historical background, Development of CAD, CAD system hardware, Software, Graphics standards, Basic definitions, Modes of graphic operation, User interface, Software modules, Modeling and viewing.

#### Unit3

2D - Representation and Transformation of Points - -transformation of Lines -Rotation. Reflection. Scaling and combined transformations - 3Dscaling - shearing - Rotation - Reflection - Translation - Projections parametric representation of Ellipse, Parabola, Hyperbola.

#### Unit 4

##### **CNC Machine Tool and Programming**

Development of CNC Technology, Principles, Features, NC, CNC, DNC concepts, Classification of CNC Machine Tools, CNC Controller, CNC Programming for various Controllers -SI numeric, FANUC Program, G&M codes, Part Programming of Prismatic and revolved components, APT part programming using CAD, CAM S/w.

#### Unit 5

Manufacturing Planning and Control - CAD/CAM Integration - Principles of Computer Integrated Manufacturing - Hierarchical Network of Computers - Local Area Networks - Process Planning: Computer Aided Process Planning - Retrieval and Generative approaches.

#### **Reference Books:**

1. Groover, Production System & CIM: PHI
2. Zeid, CAD/CAM Theory & Practice: Mc Graw Hills



# R.K.D.F. UNIVERSITY, BHOPAL

## MASTER OF TECHNOLOGY

### (PRODUCTION & INDUSTRIAL ENGINEERING)

SECOND YEAR

Semester – III

#### Course Content & Grade

Branch	Subject Title	Subject Code
PIE	<b>ELECTIVE-I</b> <b>Entrepreneurship and Management</b> <b>Concepts</b>	<b>MTPIE-3001(B)</b>

#### Unit-1

**System Concepts:** Types, definition & characteristics; supra & subsystems, key component; boundary & interface complexity; feedback (pull) & feed forward (push) controls, open flexible-adaptive system, computer as closed system, law of requisite variety; system coupling, stresses and entropy; functional & cross functional system.

#### Unit-2

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

#### Unit-3

**Marketing:** Importance, definition, core concepts of need want and demand, exchange & relationships, product value, cost and satisfaction (goods and services ) marketing environment; selling, marketing and societal marketing concepts; four P's, product, price, placement, promotion; consumer, business and industrial market, market targeting, advertising, publicity, CRM and market research.

**Finance:** Nature and scope, forms of business ownerships, balance sheet, profit and loss account, fund flow and cash flow statements, breakeven point (BEP) and financial ratio analysis, pay-back period, NPV and capital budgeting.

#### Unit-4

**Productivity and Operations:** Productivity, standard of living and happiness, types of productivity, operations (goods and services) Vs project management, production processes and layouts, steps in method improvement, time measurement, rating and various allowances; standard time and its utility, predetermined motion and time method, product and process specification, TQM, cost of quality, introduction to lean manufacturing (JIT), QFD, TPM & six sigma quality.

## Unit 5

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

### **References:**

- 1- Daft R; The new era of management; Cengage.
- 2- Bhat Anil, Arya kumar ; Management: Principles , Processes and Practices; Oxford higher education.
- 3- Davis & Olson; Management Information System; TMH.
- 4- Steven Alter; Information systems, Pearson, [www.stevenalter.com](http://www.stevenalter.com)
- 5- Kotler P; Marketing management;
- 6- Khan, Jain; Financial Management;
- 7- ILO; Work study; ILO.
- 8- Mohanty SK; Fundamental of Entrepreneurship; P



# R.K.D.F. UNIVERSITY, BHOPAL

## MASTER OF TECHNOLOGY (PRODUCTION & INDUSTRIAL ENGINEERING)

SECOND YEAR

Semester – III

### Course Content & Grade

Branch	Subject Title	Subject Code
PIE	<b>ELECTIVE-I</b> <b>Principals of Robotics and Applications</b>	<b>MTPIE-3001(C)</b>

#### Unit -1

**Introduction:** Definition, configurations, work envelopes, specifications, and other basic parameters of robots.

#### Unit-2

**Kinematic principles:** Position and orientation, co-ordinate systems, relative frames, homogeneous co-ordinates, direct and inverse kinematics, differential motions and the Jacobians.

#### Unit-3

**Introduction to dynamics:** Types of motions: slew – joint-interpolated – straight line interpolated motions. Path planning – trajectory planning and control. Drives: electrical, hydraulic, and pneumatic drives – basics and relative merits. Components: harmonic reduction units, servo valves, and grippers. Sensors: basic types including vision, force – torque wrist sensors.

#### Unit -4

**Robot application:** Robot motion planning – configuration space concepts. Robot programming concepts: off line programming and simulation – work cell application. Development: requirements – modeling – work cell calibration – layout planning. Case studies.

#### **References:**

1. Shiman Y., “Handbook of industrial robotics”, John Wiley & Sons, 1985
2. Deh S. R., “Robotics technology and flexible automation”, Tata McGraw Hill, 1994
3. Craig, J. J., “Robotics: mechanics and control”, Addison Wesley, 1989
4. Groover M. P., “Fundamentals of modern manufacturing materials, processes, and systems”, Prentice Hall, 1996
5. Craig

RKDF University Bhopal Launched a programme "RAIN WATER HARVESTING" with coordination of all the staff members and students. Our Achievements. RKDF University Students Achievements. 2018-08-02. RKDF University Students Achievements. 2017-02-01. RKDF University Students Achievements. 2016-02-16. RKDF University Students Achievements. 2015-03-31. RKDF University Students Achievements. 2015-08-07. RKDF University Students Achievements. 2015-02-06. RKDF University Students Achievements. RKDF University, Bhopal Bhopal , Madhya Pradesh. ESTD 2012. Private University. The history of RKDF University establishment lies long back in the 1990s, when RKDF Group felt the need of quality higher education in central India and decided to open a series of colleges across various cities of Madhya Pradesh. Soon by the year 1995, the group has successfully established a group of colleges across the state offering education in the field of Engineering, Medical, Management, Nursing, and others. RKDF University, Bhopal - Know more about affiliated Colleges, Admissions notices, Results and timetables. RKDF University, Bhopal has 15 Departments listed that offer various academic courses. Faculty of Agriculture. Faculty of Commerce.