



Rajiv Gandhi Technical University, Bhopal (M.P.)  
M.E./M.Tech. Industrial Engineering and Management

Scheme of Examination

“FIRST SEMESTER”

S. No.	Code No.	Subject	Contact Period		Internal Assessment	End Sem Exam		Total
			L	P		Theory	Pract.	
1.	MMIE-101	Advanced Mathematics	3	-	50	100	-	150
2.	MMIE-102	Work study & Productivity Management	3	-	50	100	-	150
3.	MMIE-103	Principal & Practices of Management	3	-	50	100	-	150
4.	MMIE-104	Quantitative Techniques in Management	3	-	50	100	-	150
5.	MMIE-105	Operations Management	3	-	50	100	-	150
6.	MMIE-106	Lab- Industrial Engg./ Productivity	-	3	25	-	100	125
7.	MMIE-107	Lab-II OR OM	-	3	25	-	100	125
		TOTAL			300	500	200	1000



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Scheme of Examination

“SECOND SEMESTER”

S. No.	Code No.	Subject	Contact Period		Internal Assessment	End Sem Exam		Total
			L	P		Theory	Pract.	
1.	MMIE/MM PD-201	Product Design and Lifecycle Management	3	-	50	100	-	150
2.	MMIE-202	Reliability Engg. & Quality Management	3	-	50	100	-	150
3.	MMIE-203	Elective-I	3	-	50	100	-	150
4.	MMIE-204	Elective-II	3	-	50	100	-	150
5.	MMIE-205	Elective-III	3	-	50	100	-	150
6.	MMIE-206	Lab-III Cpp, Java	-	3	25	-	100	125
7.	MMIE-207	Lab-IV DBMS/PLM	-	3	25	-	100	125
		<b>TOTAL</b>			<b>300</b>	<b>500</b>	<b>200</b>	<b>1000</b>

MMIE-203 Elective I-	MMIE-204 Elective II	MMIE-205 Elective III
(A) Ergonomics and Design (B) Computer Aided Modeling & Machining	(A) Supply Chain Management (B) Lean Manufacturing (C) Industrial Org. & Management	(A) Management Information System ERP and CRM *(B) e-Commerce

Note: Star(\*) marked subject can't be taken for study since its syllabus is yet to be made/to be modified



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Scheme of Examination

“THIRD SEMESTER”

S. No.	Code No.	Subject	Contact Period		Internal Assessment	End Sem Exam		Total
			L	P		Theory	Pract.	
1.	MMIE-301	Elective-IV	3	-	50	100	-	150
2.	MMIE-302	Elective-V	3	-	50	100	-	150
3.	MMIE-303	Seminar	-	3	50	-	-	50
4.	MMIE-304	Dissertation	-	6	75	-	75	150
		TOTAL			225	200	75	500

MMIE-301 Elective IV	MMIE-302 Elective V
(A) Ergonomics and Design	(A) Marketing Management
(B) Computer Aided Modeling & Machining	(B) Rural Marketing

Note: Star (\*) marked subject can't be taken for study since its syllabus is yet to be made/to be modified



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Scheme of Examination

“FOURTH SEMESTER”

S. No.	Code No.	Subject	Contact Period		Internal Assessment	End Sem Exam		Total
			L	P		Theory	Pract.	
1.	MMCM-401	Dissertation evaluation and Defense	-	6	200	-	300	500
		TOTAL			200	-	300	500

Grand Total of Marks :- 10000+10000+500+500 = 3000

\* Max.Min Pass Marks:-

- |    |                                 |               |
|----|---------------------------------|---------------|
| 1. | Theory Marks = 100              | Min. = 40     |
| 2. | Practical Max = 50              | Min. = 25     |
| 3. | Internal Ass. Marks = 25/50/200 | Min=15/30/120 |
| 4. | Dissertation End. Exam = 300    | Min=150       |



Rajiv Gandhi Technical University, Bhopal (M.P.)  
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"FIRST SEMESTER"

Course Contents

Category	Title	Code	Credits		Theory Papers
			L	P	
BS1	ADVANCED MATHEMATICS	MMPD/MMCM/MIE/MMTH-101	3	-	Max. Marks-100 Min Marks-40 Duration: 3 hrs.

**UNIT 1**

Linear Algebra: Linear transformation, vector spaces, hash function, Hermite 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, Poissio'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 Possion's distributions, Sampling distribution, elementary concept of estimation and theory of hypothesis recurred relations.

**UNIT 4**

Stochastic process, Markov process transition probability transition probability matrix, just and higher order Markov process, Application of Elgen value problem in Markov Process, Markov chain, Queuing system, transient and steady state, traffic instensity, 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: Variation functionals, Euler Largrang's equation, Variation forms, Ritz method, Galerkin's method, decartelization, finite elements method for one dimensional problem.

Reference Books:

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

## Course Contents

Category	Title	Code	Credits		Theory Papers
			L	P	
DC	WORK STUDY & PRODUCTIVITY MANAGEMENT	MMIE-102	3	-	Max. Marks-100 Min Marks-40 Duration: 3 hrs.

### UNIT 1

Productivity Management: Concept of Productivity, Factors affecting Productivity, Total Productivity model, Short term and Long term Productivity Planning Models, Productivity improvement Techniques: Technology based, Material based, Employee based, Product and time base P.I. Techniques, Work Study: Definition, objectives and areas of application of work study in industries, Historical review,; Human aspects of work-study, Role of work-study in productivity improvement.

### UNIT 2

Interrelation between method study and work measurement, Method Study: Definition and objectives; Engineering approach to methods analysis and improvement, Data collection and recording techniques; critical examination and development, creative thinking, tools of creativity, Installation and maintenance of the new improved methods, Motion economy and Analysis; Principals of motion economy, motion analysis; Micro motion and memo motion study; Therbligs and Simo charts.

### UNIT 3

Work Measurement: Definition and objectives; work measurement techniques, Stop watch time study, Principles and procedures, Systems of performance rating; calculation of basic time, allowances and standard time, predetermined motion time and other standard system, introduction to MOST, Work Sampling: principles and techniques, application of work sampling studies.

### UNIT 4

Introduction to Ergonomics: Ergonomics as a multi-disciplinary field, components, importance of ergonomics in equipments and work design, concept of man-machine; system; Types and characteristics of Man-machine system Rest pause design based on physiological consideration, Anthropometry and Work place design.

### UNIT 5

Wage Incentives and Job Evaluation: Various types of wage Incentive schemes and their impact on productivity, Comparison of different incentive plans, design of incentive plans, Group system of Wage payment, Supervisory incentive plans, Job Evaluations: Purpose, Various types of jobs evaluation system and their application of classification, Wage Cure, Designing salary structure and Grade, Merit Rating, Performance Appraisal

Case Studies.

References:

1. Sumanth D.J. , Productivity Management, TMH
2. I.L.O, Introduction of Work Study, ILO
3. Maynard H.B., Industrial Engineering Hand Book.
4. Jhamb L.C. Workstudy and Ergonomics.

## Course Contents

Category	Title	Code	Credits		Theory Papers
			L	P	
DC	PRINCIPAL AND PRACTICES OF MANAGEMENT	MMIE-103	3	-	Max. Marks-100 Min Marks-40 Duration: 3 hrs.

### UNIT 1

Introduction: Definition, Roles and Functions of a Manager, Schools of Management Tough, Comparison of American, Japanese and Indian Philosophies of Management, Importance and relation between planning and control, why planning is difficult, types of plans, Objectives of business, Decision-Making, Policy Formulation and Strategies, Management of Objectives.

### UNIT 2

Organization: Nature and Purpose of Organizing, size, complexity, centralization and formalization, Departmentation, Organization Structures, line, staff and matrix organization, formal and informal organization, Span of Control Delegation of Authority.

### UNIT 3:

Staffing: Function of Personnel Manager, Manpower Planning, Selection and Recruitment, Methods & Types of Training, Motivation, Maslow's need hierarchy, role of money, reduction in hierarchy levels, Herzberg hygienic and motivating factors, leadership Theories, characteristic and styles of leaderships, performance Appraisal.

### UNIT 4:

Control: Meaning, Process and Evaluations, effectiveness and efficiency controls, feed forward (push) and feedback (pull) controls, Developing and compensating employees, control methods, Effective Communication.

### UNIT 5:

Understanding Organization Behavior, O.B model, Hawthorne studies, Foundations of Individual & Group behavior Introduction to HRD, Importance & Need of HRD, HRD process and mechanisms, Planning & organizing HRD, OCTAPAC, KIZEN, HRIS, TQM.

Case Studies.

### Refernces

- 1) Koontz-O Donnell, Essentials of Management : TMH
- 2) Bhat Anil and Arya K; Management principals process and practices: Oxford university P.
- 3) Daft; The new era of management; Cengage pub.
- 4) Robbins and Coulter; Management; PHI
- 5) Stoner, Freeman, Gibert; Management, PHI
- 6) Chabra T.N. Principals and practices of Management
- 7) Murtyon-Gulab, Management Today.
- 8) Prasad L.M. Principals and Practice of Management
- 9) Murton-Gulab, Management Today.
- 10) Stoner- Philips, Management.
- 11) Terry G.R. Principals of Management.

## Course Contents

Category	Title	Code	Credits		Theory Papers
			L	P	
DID	QUANTITATIVE TECHNIQUES IN MANAGEMENT	MMIE-104	3	-	Max. Marks-100 Min Marks-40 Duration: 3 hrs.

### UNIT 1

Introduction: History and Development of O.R. & Linear Programming, Present Trend, Assignment models, Transportation: Optimality Test, Degeneracy unbalanced Problems, Transshipment.

### UNIT 2

Linear Programming: Formulation, Graphical Method, Simplex Method, and Big – M Method, Two-phase Method, Degeneracy, and Unrestricted variables, Revised Simplex, Duality, and Sensitivity analysis, Introduction to integer programming. Branch and Bound Method.

### UNIT 3

Waiting line models: Introduction, Classification, States in queue, Probability distribution of arrival and service times Birth and Death Process, Single Server Model (M/M/1), Multiple Server Model (MM/S), Single Server Model with finite capacity.

### UNIT 4

Game Theory: Rectangular, Two persons, Zero Sum Games, Maximum and Minimax Principals, Saddle Point, Dominance, Graphical and Algebraic Methods of solution, transforming into Linear Programming Problem, Bidding Problems, Introduction to nonlinear and Dynamic Programming.

### UNIT 5

Simulation: Building a Simulation Model, Monte-Cario Simulation and Applications, Random No. characteristics and generation, pseudorandom nos., mapping to probability distributions, Simulation Software, applications, Decision under uncertainty, Tree diagram, probability trees, Decision tree, Computer Application in O.R. and Case Study.

### Reference:

1. Taha H. Operation Research, PHI
2. Hillier F and Liberman G; Introduction to Operations research; TMH
3. Bronson Richard; Schaum's Outline or OR; TMH
4. Philp, Ravindran, Operation Research, John Wiley.
5. Heera and Gupta, Operation Research, s. Chand.
6. Sharma S.D. Operation Research.
7. Vohra N.D. Operation Research, TMH

## Course Contents

Category	Title	Code	Credits		Theory Papers
			L	P	
DID	OPERATIONS MANAGEMENT	MMIE-105	3	-	Max. Marks-100 Min Marks-40 Duration: 3 hrs.

### UNIT 1

Operations Management; Introduction, System concept, Decisions, Organization, Objectives and Evolution of Operations Management, comparing production of tangible goods and services, Operations Strategy, Type of Production Systems, Role of Production Manager.

### UNIT 2

Facilities Planning & Production Planning Control: Plant location, Plant layout and material Handling, Layout analysis, Procedures such as CORELAP, CRAFT etc. Organization & Functions of PPC CAPP, Make or Buy Decision, Forecasting Methods & its relationship with Product Life Cycle, Case Studies.

### UNIT 3

Aggregate Planning and Master Scheduling: Strategies of Aggregate Planning, Graphic & and Charting methods, Application of LP Master Scheduling, Job Shop Scheduling and Sequencing Algorithms Gantt Chart, Line Balancing, LOB, Case Studies

### UNIT 4

Maintenance Management: Types of maintenance strategies, Breakdown, Preventive and Predictive maintenance, Individual and Group Replacement Policies, Case Studies.

### UNIT 5

Materials Management as part of supply chain, Purchasing, stores and vendor selection, Inventory Models, Selective Inventory Control MRP, MRP-II, Lot size Techniques, Just-in-Time system of manufacturing, Kaizen, Total Productive Maintenance ( TPM), BPR, SCM, ERP etc & Case Studies.

### Reference:

1. Hop W. Spearman M: Factory Physics: TMH
2. Charry S.N. Production & Operations Management; TMH
3. Chase, Aquilino, Production & Operations Management, TMH
4. Eilon S. Production Planning and Control, McMillion Pub.
5. Vollmann; Mfg planning and Control for SCM; TMH
6. Nahmias Steven; Production and Operations analysis; TMH
7. Bedi Kaniska; Production and Operations Management; Oxford Pub
8. Dobler & Lee, Purchasing & Materials Management, PHI
9. Chitle A.K., Gupta R.C. Materials Management, PHI
10. Monk Joseph; Schaum's outline of Operations Management; McGraw Hill.

### Course Contents

Category	Title	Code	Credits		Theory Papers
			L	P	
DC	LAB- INDUSTRIAL ENGG./ PRODUCTIVITY	MMIE-105	-	3	Max. Marks-100 Min Marks-50

PRACTICAL/LAB WORK / CASE STUDIES RELATED TO WORK STDY & PRODUCTIVITY MANAGEMENT, INTRODUCTION TO MATLAB.

STUDENT IS REQUIRED TO SUBMIT A JORNAL/REPORT FOR THE SAME.

List of Experiments to expanded.

### Course Contents

Category	Title	Code	Credits		Theory Papers
			L	P	
DC	LAB-II OR OM	MMIE-107	-	3	Max. Marks-100 Min Marks-50

PRACTICAL/LAB WORK / CASE STUDIES RELATED TO QUANTITATIVE TECHNIQUES OF MANAGEMENT, SOLVING LPP ON LINGO-LINDO, USE OF TORA AND EXCEL. USE OF COMPUTER TO SOLVE LAYOUT AND OTHER OPERATIONS MANAGEMENT PROBLEM.

STUDENT IS REQUIRED TO SUBMIT A JORNAL/REPORT FOR THE SAME.

List of Experiments to expanded.