Final Year B. Tech Production Engineering (Revised syllabus)

INDUSTRIAL ENGINEERING

STRUCTURE:

Periods			Evaluation Scheme					Credits
			Sessional Exam			ESE	Total	
L	T	P	TA	PR	CT			
4	--	2	25	50	25	80	180	5

Semester End Theory Examination Duration: 3 Hrs

OBJECTIVE:

To understand importance of Layout and standardized procedures

To learn effective utilization of industrial resource

A: THEORY:

Unit	Contents	Duration	Nature
1	**Introduction:** Productivity, relationship between productivity and higher living standards, productivity management.	**02 H**	Theoretical
2	**Attitude of Workers:** Management techniques to reduce work content due to product. Processes management techniques to reduce ineffective time within control of workers management.	**03 H**	Theoretical
3	**Work Study:** Direct means of raising productivity, techniques and procedure, human factor in application of work study, good relations, work study and management the supervisor work study man	**03 H**	Theoretical
4	**Working Conditions:** General cleanliness, lightening, ventilation, heating and cooling color ,noise the work place, prevention of accidents and other hazards	**02 H**	Theoretical
5	**Method Study:** Definition and objective basis procedure, selection the work factors involved review of the recording techniques, operation process chart flow chart, factory layout ,worker involvement in shop, movements of workers and materials, review of operation process chart, multiple activity chart, man machine chart ,string diagram and its significance	**09 H**	Theoretical
6	**Methods and Movement at Workplace:** Two handed process chart, principles of motion economy, development a new layout use of jigs/fixtures/tools, micro motion study, SIMO chart, use of film in method study.	**06 H**	Theoretical
7	**Productivity Improvement Tool: SMED:** Introduction, stages of SMED, separating internal and external setup, converting internal and external setup streamlining, all aspects of set up operation, examples.	**05 H**	Theoretical
8	**Work Measurements:** Definition and objective, basis procedure, time study forms, selection of job for time study, approach to the workers.	**03 H**	Theoretical
9	**Making a Time Study:** The steps, information and data collection	**04 H**	Theoretica

	about job operator and surroundings, breaking down jobs in elements and recording of elements. Selection and measurement of each element.		l
10	**Study Rating and Allowances:** Average workers, comparison of observed and normal performance, factors affecting performance, purpose of rating, scales of rating, use of rating factor ,rating the job, normalizing observations, various types of allowances calculation of standard time for operation.	**04 H**	Theoretica l and Analytical
11	**Use of Time Study:** Work covered by allowance time, work unit, programme, planning and utilization of plant and labor, estimation, standard costing and budgetary control incentive schemes	**03 H**	Theoretica l
12	**Work sampling studies** Illustrative example; determining observation needed, determining the frequency of the observations, observing and recording the data, use of random activity analysis camera, application in establishing allowances, application in deterring machine sampling	**08 H**	Theoretica l and Analytical
13	**Other Techniques of work Measurement** Predetermined Motion Time Study (PMTS),Maynard Operations Sequence Techniques(MOST)	**04 H**	Theoretica l
14	**Significant Wage Payment Plans** Introduction, Factors Influencing Wage rates, Essential Characteristics of a Good Wage Incentive plan, Methods of Payment for Direct and Indirect Labour, Wage Incentives, General Classification of Wage Incentive Plans.	**04 H**	Theoretica l and Analytical

SECTION A:

SECTION B:

TERM WORK:

The assessment of term work shall be on the following criteria:

- Continuous Assessment
- Performing the experiments in the laboratory
- Oral examination conducted (internally) on the syllabus and the term work mentioned above

PRACTICAL EXAMINATION:

The practical examination shall consist of performing the experiments based on the practical work done during the course, the record of the experiments submitted by the candidate and Viva-voce based on the syllabus.

C: RECOMMENDED TEXT BOOKS AND REFERENCES:

Sr. No.	Title of Book	Author	Publication
1	Introduction To Work study		ILO
2	A Revolution In Manufacturing-The SMED system	Shiego-Shings	Productivity Press
3	Maynard's Operation Sequence Technique(Most)	Kiell B.Zandin	
4	Work study	Currie And Faraday	
5	Handbook of Industrial Engineering	Irson And Grant	
6	Motion and time study-Improving Productivity	Marvin E.Mundel	PHI
7	Motion and time study	Benjamin	

Note:-The distribution of marks in question paper should be based on the proportion of teaching hours allotted

PATTERN OF QUESTION PAPER

Faculty of Engineering and Technology

Final year(B. Tech) Production Engineering (Revised Course) Examination

November / December, May/June 200_

Industrial Engineering

Time: 3 Hrs **Max Marks: 80**

'Please check whether you have got the right question paper'

N.B:-

- All the questions are compulsory
- Use separate answer book for each section
- ……
- ……

SECTION A

Question no 1 **16 marks**

This question will consists of questions from all the chapters under section A mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 2 **12 marks**

OR

Question no 2

Question no 3 **12 marks**

OR

Question no 3

Note: 1. The questions will be memory based, application based and understanding type.
2. There should be intermixing in the questions.

SECTION B

Question no 4 **16 marks**

This question will consist of questions from all the chapters under section B mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 5 **12 marks**

OR

Question no 5

Question no 6 **12 marks**

OR

Question no 6

Note: 1. The questions will be memory based, application based and understanding type.
2. There should be intermixing in the questions.

Final Year B. Tech Production Engineering (Revised syllabus)

MACHINE TOOL DESIGN

STRUCTURE:

Periods			Evaluation Scheme					Credits
			Sessional Exam			ESE	Total	
L	T	P	TW	PR	CT			
4	--	2	25	50	25	80	180	5

Semester End Theory Examination Duration: 3 Hrs

OBJECTIVE:

Students are expected to understand & analyze the fundamentals of Machine Tool Design

A: THEORY:

Unit	Contents	Duration	Nature
1	**Introduction:** General requirements to machine tools, Machine tool design recommendations, Classification of motions to shape surface, Machine tool drives for rectilinear motion, Periodic motion, reversing motion etc.	3 H	Theory & Analytical
2	**Kinematics of Machine Tools:** Kinematics or gearing diagram of Lathe, drilling Machine, Milling Machine etc. Main drive and feed drive, principles specification of Machine tool.	8 H	Theory & Analytical
3	**Design of Kinematics Scheme:** Methods to determine transmission ratios for drives. Development of Kinematics scheme, minimum of transmission groups, Determination of number of teeth on gears.	8 H	Theory & Analytical
4	**Speed and Feed Boxes:** General requirement Design of gear trains, speed boxes types, speed changing devices Feed boxes characteristics of feed mechanism, types of Rapid traverse mechanisms, variable devices.	12 H	Theory & Analytical
5	**Spindle Design And Spindle Bearings:** Main requirement, Materials and details of spindle design, Spindle bearings, bearings, types of bearings and their selections, Bearing Materials BED,	12 H	Theory & Analytical
6	**Columns, Tables And Ways:** Materials, typical constructions and design.	4 H	Theory & Analytical
7	**Machine Tools Control Systems:** Requirement of control system selection and construction of control systems Mechanical control system, predilection control, remote control safety devices.	5 H	Theory & Analytical
8	**Machine Tool Dynamics:** Dynamic performance, dynamic and elastic system of Machine, tools. Dynamics of cutting forces, tool chatter.	5 H	Theory & Analytical
9	**Recent Trends :** A review of recent practices used in Machine Tool Technology effect of development on manufacturing process, modular design concept	3 H	Theory & Analytical

SECTION A: 1,2,3,4

SECTION B: 5,6,7,8,9

B: PRACTICAL:

Term work shall consist of record book on laboratory experiments studies on the following.

1	Design & Working drawing of speed gear and feed gear box
2	Design & Working drawing of four machine tool mechanisms
3	Design of bed or column
4	Design of sideways or power screws
5	Preparation of standard test chart for General Purpose Machine (Anyone)

The assessment of term work shall be on the following criteria:

- Continuous Assessment.
- Performing the experiments in the laboratory.

C. RECOMMENDED BOOKS:

Sr. No.	Title	Author	Publication	Edition
1	Machine Tools Design	Sen and Bhattacharya	CBS Publishers	
2	Machine Tool Design	N.K. Mehta	Tata Mc Graw Hill.	
3	Machine Tool Design	N. Acherkan	Mir Publishers	Four Volumes
4	Design of machine tools	S.K. Basu and D.K. Pal	Oxford and IBH	4th Edition. 2005
5	Principles of Machine Tool	Bhattacharya and S. G. Sen	New central book agency Calcutta	
6	Design Principles of Metal Cutting Machine Tools	F. Koenigsberger	The Macmillan Company New York	
7	Numerical control and computer Aided Manufacturing	T. kundra, Rao, Tiwari N.K.	Tata Mc Graw Hill	
8	NC Machine Tools	Martin S.J.	ELBS	

PATTERN OF QUESTION PAPER

Faculty of Engineering and Technology

Final year(B. Tech) Mechanical / Production Engineering (Revised Course) Examination

November / December, May/June 200_

Machine Tool Design

Time: 3 Hrs **Max Marks: 80**

'Please check whether you have got the right question paper'

N.B:-

- All the questions are compulsory
- Use separate answer book for each section
- ……
- ……

SECTION A

Question no 1 **16 marks**

This question will consists of questions from all the chapters under section A mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 2 **12 marks**

OR

Question no 2

Question no 3 **12 marks**

OR

Question no 3

Note: 1. The questions will be memory based, application based and understanding type.
2. There should be intermixing in the questions.

SECTION B

Question no 4 **16 marks**

This question will consist of questions from all the chapters under section B mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 5 **12 marks**

OR

Question no 5

Question no 6 **12 marks**

OR

Question no 6

Note: 1. The questions will be memory based, application based and understanding type.
2. There should be intermixing in the questions.

Final Year B. Tech Production Engineering (Revised syllabus)

AUTOMATIC CONTROL SYSTEMS

Periods			Evaluation Scheme					Credits
			Sessional Exam			ESE	Total	
L	T	P	TW	PR	CT			
4	-	2	25	50	25	80	180	5

Semester End Theory Examination Duration: 3 Hrs

OBJECTIVE:

To understand basic principles and applications of automatic control systems.
To know the different fundamental components which are required for design of automatic control systems.

A. THEORY:

Unit	Contents	Duration	Nature
1	**Introduction:** Introduction ,Review of various types of measuring instruments and transducers, Basic concepts of control systems, Classification of control systems, Open loop and Closed loop control system, Transfer Function & its significance.	4 H	Theoretical & Analytical
2	**Representation of Control System Components:** Introduction, Study of Mechanical, Electrical & Electronics components employed in construction of control systems and Mathematical equations for the same, Study of Mechanical ,Electrical, Thermal & Fluid systems and mathematical equations for the same, Analogies (Direct and Indirect) for Mechanical ,Electrical, Thermal & Fluid systems	8 H	Theoretical & Analytical
3	**Block Diagram Algebra:** Introduction, Basic rules for solving block diagrams, Representing & reducing block diagram for actual control systems like Liquid level systems, Speed control systems, Temperature control systems, Position control systems	8 H.	Theoretical & Analytical
4	**Hydraulic Systems:** Study of Hydraulic components used in Hydraulic Systems Viz.**Pumps** (Gear, Reciprocating, Vane Pump etc); **Hydraulic Actuators** (Hydraulic Cylinder, Hydraulic servo motors etc); **Valves** (2 ways, 3 ways, 4way, Directional, Pressure Control Valves).	6 H	Theoretical & Analytical
5	**Pneumatic Systems:** Study of components used in Pneumatic systems viz.pneumatic cylinders, Bellows, Various types of Pressure Control Relays, Flapper nozzle system etc	4H	Theoretical &Analytical
6	**Electrical Systems:** Study of electrical motors viz. A.C., D.C., Stepper, Servomotors ;Speed control of these electrical	6H	Theoretical & Analytical

	motors by armature control, field control etc and their circuit diagrams; Study of electrical servomechanism for position control, speed control of stepper motor,		
7	**Modes of Control:** Study of a) On Off Control, b) Proportional (P) Control ,c) Integral (I) Control,d) Derivative (D) Control, e) P + I, f) P + D, g) P + I + D (including mathematical representation of the same); Study of these control actions with examples of Mechanical, Hydraulic ,Pneumatic systems	6 H	Theoretical & Analytical
8	**Response Characteristics:** Introduction of various types of standard input signals ,Transient & Steady state response, Transient & Steady state response characteristics of First order and Second order systems when subjected to standard input signals	8 H	Theoretical & Analytical
9	**Analysis of Frequency Response:** Introduction, Characteristics of Frequency Response of different functions (up to Second order systems only) Graphical Method of analyzing frequency response, Bode Plot, Nyquist Plot(Polar Plot),Concept of Stability, Routh's stability criteria	10 H	Theoretical & Analytical

SECTION A- Unit 1, 2,3,4,5

SECTION B- Unit 6,7,8,9

B: PRACTICAL/DRAWING/DESIGN

TERM WORK:

(Any TEN of the following should be completed)

1	Study of various types of measuring instruments & transducers (at least ONE of each type)
2	Study of control system components (At least TEN components)
3	Study of any ONE of Hydraulic system using hydraulic servomechanism
4	Experiment on speed control of DC Motor
5	Experiment on speed control of AC Motor
6	Experiment on speed control of Stepper Motor
6	Circuit Preparation by using Hydraulic Trainer Kit
8	Circuit Preparation by using Pneumatic Trainer Kit
9	Study of Circuits for M/C Tools.
10	Experiment on Level Control System
11	Experiment on Temperature Control System
12	Experiment on Position Control using Synchros

13	Study of Design of Automatic Control System with i) Plant layout. ii) Block diagram. iii) Steady state Analysis iv) Design of controller. For various control systems like Temp. flow etc.

Assignments on unit 1, 2, 3, 9&13

The assessment of term work shall be on the following criteria:

- Continuous Assessment
- Performing the experiments in the laboratory
- Oral examination shall be conducted (internally) on the syllabus and the term work mentioned above

PRACTICAL EXAMINATION:

The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and Viva-voce based on the syllabus

C: SUGGESTED TEXT BOOKS & REFERENCES

Sr.No.	Title	Author	Publication	Edition
1	Automatic Control Systems	Nagrath Gopal		
2	Modern Control Engg.	K. Ogata	PHI	3rd
3	Automatic Control Systems	Francis Raven	TMH	5^{th}
4	Automatic Control System	Benjamin C. Kuo.	PHI	7^{th}

Note: Distribution of Marks in question paper should be based upon the proportion of teaching hours allotted to each topic

PATTERN OF QUESTION PAPER

Faculty of Engineering and Technology

Final year(B. Tech) Mechanical / Production Engineering (Revised Course) Examination

November / December, May/June 200_

Automatic Control Systems

Time: 3 Hrs **Max Marks: 80**

'Please check whether you have got the right question paper'

N.B:-

- All the questions are compulsory
- Use separate answer book for each section
- ……
- ……

SECTION A

Question no 1 **16 marks**

This question will consists of questions from all the chapters under section A mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 2 **12 marks**

OR

Question no 2

Question no 3 **12 marks**

OR

Question no 3

Note: 1. The questions will be memory based, application based and understanding type.
2. There should be intermixing in the questions.

SECTION B

Question no 4 **16 marks**

This question will consist of questions from all the chapters under section B mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 5 **12 marks**

OR

Question no 5

Question no 6 **12 marks**

OR

Question no 6

Note: 1. The questions will be memory based, application based and understanding type.
2. There should be intermixing in the questions.

Final Year B. Tech Production Engineering (Revised syllabus)

THEORY OF METAL FORMING

STRUCTURE:

Periods			Evaluation Scheme					Credits
			Sessional Exam			ESE	Total	
L	T	P	TA	PR	CT			
4		2	25		25	80	130	5

Semester End Theory Examination Duration: 3 Hrs

OBJECTIVE:

1. To understand basic concepts of metal forming
2. To understand the processes
3. Know the mathematical modeling of the process and to evaluate the load to be applied used for the process.
4. To study the defects for the process residual stresses after the processses.

A: THEORY:

Unit	Contents	Duration	Nature
1.	**Theory of Metal Forming:** Plasticity, Stress-strain curves, true strain, maximum shear stress theory, distortion energy theory, yield criteria, stress and strain in variants, Methods of analysis of bulk forming process like slip-line, upper bound and equilibrium method.	**08 H**	Theoretical & Analytical
2.	**Fundamentals of Plastic Working of Metals:** Classification of forming processes effect of temperature and strain rate on forming processes. Structural changes during the process.	**06 H**	Theoretical & Analytical
3.	**Sheet Metal Working:** Shear on press tools movement of metal in bending and forming operation, classics spring back movement of metal and stresses in drawing Red drawing limits wall thinning and thickness and ironing theory, defects in deep drawing, deep drawn parts, applications of tensile, cupping wedge and simulative tests. Drawing speeds load calculations. Reverse drawing Metal spinning cold roll forming, high energy rate forming explosive forming.	**08 H**	Theoretical & Analytical
4.	**Forming:** Application of plastic theory of metal flow under impact pressure, press forging, designing forged parts selection of forging metals and heat treating practice. Die design for drop hammer, presses and upset machines. Effect of friction load calculations Die block materials and heat treatments, forging plant equipment, Finishing-operations and inspection of forgings. Recent developments in forging.	**08 H**	Theoretical & Analytical
5.	**Extrusion:** Classification of extrusion processes, equipments and dies used in extrusion, Application plasticity theory to extrusion problem, variables in extrusion. Deformation in extrusion .The influences of speed and temperature upon extrusion pressure, extrusion defects and remedies for minimizing them, metals and alloys available for extrusion defects and remedies for minimizing	**08 H**	Theoretical & Analytical

	them ,metals and alloys available for extrusion production of seamless pipe and tubing, Hydrostatic extrusion.		
6.	**Rolling:** Types of rolling mills for hot and cold, rolling, forces and geometrical relationship in rolling, Deformation in rolling Residual stress in rolled products, Theories of cold rolling and hot rolling add their applications. Calculation of mill-torque, mill horsepower and rolling load .Defects in rolled products, Roll pass design considerations.	**08 H**	Theoretical & Analytical
7.	**Rod Wire and Tube Drawing:** Principals involved in the drawing of rod and wire, variables in wire drawing with and without friction, wire drawing machines, Applications of theory of plasticity to drawing. The drawing process with a stationary and moving material. Residual stresses in rod wire and tubes, defects in wires and tubes	**08 H**	Theoretical & Analytical
8.	**Friction and Lubrication in Metal Working:** Influence of friction measurement of coefficient of friction principles of lubrication lubricants used in industrial metal working.	**06 H**	Theoretical & Analytical

SECTION A: 1,2,3,4

SECTION B: 5,6,7,8

TERM WORK:

It shall consist of the record of at least 08 assignments on the above syllabus.

Assessment of term work shall be done on the following criterion

1. Continues assessment
2. Performing the experiment in the Laboratory
3. Oral examination conducted (internally) on the syllabus and term work mentioned above.

PRACTICAL EXAMINATION:

Practical examination shall consist of performing an experiment. Work done during the course, record of experiment submitted by the candidate and viva voce based on the syllabus.

1. Performing experiments.
2. Record of the experiments submitted by the candidate.
3. Viva voce based on the syllabus.

C: SUGGESTED TEXT BOOKS AND REFERENCES:

Sr. No.	**Title**	**Author**	**Publication**
01	Principles of Industrial Metal Working Process	G.W. Rowe	Amold
02	Engineering Plasticity	Johnson and Mellor	Reinhold
03	Metal forming Process & Analysis	B-Avitzue	Tata McGraw Hill
04	Principals of Metal Working	S.Kumar	PHI
05	Introduction to the Theory of Plasticity for Engineers	Hoffman and Sachs	Mc. Graw Hill
06	Metal Rolling	R.C.Chatuvedi	

07	Stresses and Strains in Rolling	Wustavolsky	
08	Cold Rolling:	W.Roberts.	

PATTERN OF QUESTION PAPER

Faculty of Engineering and Technology

Final year(B. Tech) Mechanical / Production Engineering (Revised Course) Examination

November / December, May/June 200_

Theory of Metal Forming

Time: 3 Hrs **Max Marks: 80**

'Please check whether you have got the right question paper'

N.B:-

- All the questions are compulsory
- Use separate answer book for each section
- ……
- ……

SECTION A

Question no 1 **16 marks**

This question will consists of questions from all the chapters under section A mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 2 **12 marks**

OR

Question no 2

Question no 3 **12 marks**

OR

Question no 3

Note: 1. The questions will be memory based, application based and understanding type.
2. There should be intermixing in the questions.

SECTION B

Question no 4 **16 marks**

This question will consist of questions from all the chapters under section B mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 5 **12 marks**

OR

Question no 5

Question no 6 **12 marks**

OR

Question no 6

Note: 1. The questions will be memory based, application based and understanding type.
2. There should be intermixing in the questions.

Final Year B. Tech Production Engineering (Revised syllabus)

MECHATRONICS

STRUCTURE:

Periods			Evaluation Scheme					Credits
			Sessional Exam			ESE	Total	
L	T	P	TA	PR	CT			
4	--	2	25	50	25	80	180	5

Semester End Theory Examination Duration: 3 Hrs

OBJECTIVE:

- To study need and application of mechatronics
- To study mechatronics system components
- To study interfacing of various components in mechatronics system

A: THEORY:

Unit	Contents	Duration	Nature
1	**Introduction:** Introduction to mechatronics system, need of mechatronics,mechatronics in daily life,role of mechatronics system engineer, an introduction to micro, nanotechnology, application of mechatronics in micro-nanotechnology	**6** H	Theory
2	**Mechatronics system model:** Element of mechatronics system,mechanical system (sensor/actuators),signal conditioning,data acquisition,micro controllers,role of each components in working of the system	**5** H	Theory
3	**Sensors:** Linear and rotational sensors, Acceleration sensors,Force measurement,Temperature measurement,Vision sensors	**8** H	Theory
4	**Signal conditioning:**Need of signal conditioning, instrumentation amplifiers, OP-AMP (S/I/D/A),filters (active / passive), Resolution and quantization,A to D conversion, D to A conversion	**8** H	Theory
5	**Data acquisition:**Introduction to micro controllers and microprocessors,use of micro controllers and microprocessors in mechatronics,micro controller 8051 architecture, Microprocessor 8085 and Microcontroller 8051.	**8** H	Theory
6	**Actuators:** Microprocessor 8085 and Microcontroller 8051, Electro-mechanical Actuators, Electrical Machines (Stepper & servo motors),Piezoelectric actuators, Hydraulic & Pneumatic actuation system, MEMS actuators	**9** H	Theory
7	**Programmable Logic Controllers (PLC):** Introduction-Basic structure, Input/Output Processing-Programming Mnemonics-Timers, Internal relays and counters, Data handling Analog Input/Output,Case study of any one industrial PLC.	**8** H	Theory
8	**Mechatronics System Design:** Case study, Definition of problem,Design of Mechatronics system,Selection of sensor,Selection of actuator,Selection of a PLC,Case study.	**8** H	Theory

SECTION A:
SECTION B:

TERM WORK:

1. Study experiment on mechatronics system.
2. Study experiment on mechatronics system components.
3. Experiment on signal conditioning.
4. Experiment on data acquisition.
5. Experiment on PLC/microprocessor programming.
6. Development of simple mechatronics system using components studied in scope of syllabus.

C: RECOMMENDED TEXT BOOKS AND REFERENCES:

Sr. No.	Title of Book	Author	Publication
1	Introduction to mechatronics and measurement system	David G. Alciator, Michal B. Histand	
2	Mechatronics	HMT	
3	Electronic Instrumentation	H S Kalsi	
4	Process Control Instrumentation Technology	Curtis Johnson	
5	The 8051 Microcontroller Architecture, Programming and Application	Kenneyth J Ayayla	Penram International Publication
6	Computer based Industrial Control	Krishna Kant	

PATTERN OF QUESTION PAPER

Faculty of Engineering and Technology

Final year(B. Tech) Mechanical / Production Engineering (Revised Course) Examination

November / December, May/June 200_

Mechatronics

Time: 3 Hrs **Max Marks: 80**

'Please check whether you have got the right question paper'

N.B:-

- All the questions are compulsory
- Use separate answer book for each section
- ……
- ……

SECTION A

Question no 1 **16 marks**

This question will consists of questions from all the chapters under section A mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 2 **12 marks**

OR

Question no 2

Question no 3 **12 marks**

OR

Question no 3

Note: 1. The questions will be memory based, application based and understanding type.
2. There should be intermixing in the questions.

SECTION B

Question no 4 **16 marks**

This question will consist of questions from all the chapters under section B mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 5 **12 marks**

OR

Question no 5

Question no 6 **12 marks**

OR

Question no 6

Note: 1. The questions will be memory based, application based and understanding type.
2. There should be intermixing in the questions.

Final Year B. Tech Production Engineering (Revised syllabus)

Elective-III (PROJECT MANAGEMENT AND OPERATION RESEARCH)

STRUCTURE:

Periods			Evaluation Scheme					Credits
			Sessional Exam			ESE	Total	
L	T	P	TA	PR	CT			
4	--	2	25	--	25	80	130	5

Semester End Theory Examination Duration: 3 Hrs

OBJECTIVES:

- The objective of OR is to provide a scientific basis to the managers of an organization for solving problems involving interaction of the components of the system ,by employing a systems approach by a team of scientists drawn from different discipline, for finding a solution which is best interest of the organization
- To apply different OR techniques in solving Transportation, Assignment, Sequencing problems
- To understand use of PERT /CPM
- To understand concept of Advanced Linear programming.

A: THEORY:

Unit	Contents	Duration	Nature
1.	**Introduction:** Origin of OR and its role in solving industrial problems. General approach for solving OR problems. Classification of mathematical models, various decision making environments	03 H	Conceptual
2	**Linear Programming :** Assumption of LPP, Formulation of LP problem, Two variable Graphical methods, Types of solutions. Simplex algorithm (maximization and minimization), Big M method and two phase method, Degeneracy in simplex method. Duality in LP. Introduction to sensitivity analysis.	14 H	Descriptive and Analytical
3.	**Transportation model:** Assumption in the transportation model. Initial Basic Feasible solution and optimal solution. Variants in transportation problems(degeneracy, unbalanced problems)	07 H	Descriptive and Analytical
4.	**Assignment model:** Definition of Assignment model. Hungarian method for solution of the Assignment Problems. Variations of the Assignment problem(non-square and maximization).Travelling Salesman problem(Application in crew Assignment)	06H	Descriptive and Analytical
5.	**Game Theory:** Characteristics of Games, Game models, Definitions, Rules for Game theory, Mixed strategies(2X2 Game)	06H	Descriptive and Analytical
6.	**Queuing Model:** Queuing systems and structures, Notation, single server and multi server models, Poisson input-exponential service, constant rate	06 H.	Descriptive and Analytical

	service, infinite population.		
7.	**Sequencing Model** : Assumptions in Sequencing Problem. Processing n jobs through one.two,three and m machines Processing of two jobs through m machines using graphical method	06 H	Descriptive and Analytical
8.	**Network Analysis:** Role of Network Techniques in Project Management, Numbering the events(Fulkerson's Rule).Probability calculation and Float calculation , Critical path method, crashing cost and crashing Network.	08 H	Descriptive and Analytical
9	**Advanced Linear Programming:** Introduction to dynamic programming .Application in practical use	04 H	Conceptual

SECTION A: Unit 1, 2, 3, 4

SECTION B: Unit 5,6,7,8,9

B. PRACTICAL/ DRAWINGS / DESIGN:

A.Two case studies using OR technique
B. Assignments on unit 2,3,4,5,6,7
The assessment of term work shall be on the following criteria: Continuous Assessment Work in the practical

C. SUGGESTED TEXT BOOKS AND REFERENCES:

Sr. No.	Title	Author	Publication	Edition
1	Operation Research	Prem Kumar Gupta,D.S.Hira	S.Chand	Fourth
2	Operation Research	J.K.Sharma,	Mcmillan	
3	Operation Research	H.A.Taha	Prentice Hall of India	Sixth
4	Operation Research	Hillier and Lieberman	Holden Day	1986
5	Opeartion Research for Management	Shennoy,Srivastava	Wiley Eastern	1994

D. DIGITAL REFERENCES

Sr. No.	Website / Links / e-journals
1.	Wikipedia/

PATTERN OF QUESTION PAPER

Faculty of Engineering and Technology

Final year(B. Tech) Mechanical / Production Engineering (Revised Course) Examination

November / December, May/June 200_

Project Management and Operation Research

Time: 3 Hrs **Max Marks: 80**

'Please check whether you have got the right question paper'

N.B:-

- All the questions are compulsory
- Use separate answer book for each section
- ……
- ……

SECTION A

Question no 1 **16 marks**

This question will consists of questions from all the chapters under section A mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 2 **12 marks**

OR

Question no 2

Question no 3 **12 marks**

OR

Question no 3

Note: 1. The questions will be memory based, application based and understanding type.
2. There should be intermixing in the questions.

SECTION B

Question no 4 **16 marks**

This question will consist of questions from all the chapters under section B mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 5 **12 marks**

OR

Question no 5

Question no 6 **12 marks**

OR

Question no 6

Note: 1. The questions will be memory based, application based and understanding type.
2. There should be intermixing in the questions.

Final Year B. Tech Production Engineering (Revised syllabus)

Elective-III ADVANCED MANAGEMENT CONCEPTS

STRUCTURE:

Periods			Evaluation Scheme					Credits
			Sessional Exam			ESE	Total	
L	T	P	TA	PR	CT			
4	--	02	25		25	80	130	05

Semester End Theory Examination Duration: 3 Hrs

OBJECTIVE:

- Understanding and Application of Management Concepts in Manufacturing.

A: THEORY:

Unit	Contents	Duration	Nature
1	**Production Improvement Technique** Value Engineering-Value types, Value Analysis, Value Engineering, Value Control, Fast Analysis, DARASARI Method. Just In Time-Introduction, Push and Pull systems, Features of JIT ,Advantages-Reduced Inventories ,Improved Set-up times, JIT applied to Indian Scenario ,Kanban, Types of kanban Toyota production system, Concept of flexible manufacturing, Cell Group Technology.	**06**	Theoretical
2	**Method Engineering** Continuous method improvement, Waste types of Waste, Waste diminution, Kaizen, Improvement Vs Innovation, finding and Implementing improvements-PDCA Cycle five-W process, Process reengineering, Ensuring correct method of working POKAYOKE. Work place layout and work station design.	**06**	Theoretical
3	**Lean Manufacturing** Introduction, Definition, Distinctive features, Small lot production, Set up time reduction, Maintaining and improving equipment, Pull Production systems, Focused factories and group technology, Works sales and Cellular manufacturing and standard operation.	**06**	Theoretical
4	**Total Productive Maintenance** Introduction, Definition, Distinctive features, Four Developmental stages of TPM, Striving for overall equipment effectiveness, The five TPM Development activities, The Twelve Steps of TPM, Stages of TPM Development.	**06**	Theoretical
5	**Supply Chain Management** Introduction, Decision phases in supply chain , Process view of a supply chain, Importance of supply chain flows, New customer-supplier relationship, Suppliers selection, Purchasing, JIT in supply chain, E-Business and supply chain.	**06**	Theoretical
6	**Management Information Systems** Data information, Needs of Computer based information systems,	**06**	Theoretical

	Definition and concept of MIS and data processing, Need of data base, Role of MIS in Organizations, Impact of MIS on function organization.		
7	**Mechanism Of Mind** Introduction, Mechanism of mind,Types of Thinking, Vertical, Lateral Thinking, Parallel thinking, Practical Thinking Techniques, Six Thinking Hats, Six Thinking Shoes, Introduction to concept of Transactional Analysis.	**06**	Theoretical
8	**Process Evaluation And Control** Uses of Orthogonal Arrays,(Two level, Three level) Parameter and Tolerance Design, Design of Experimentation technique.	**06**	Theoretical
9	**Quality Function Deployment** Product Development System, Customer based measurement of Quality, Use of function and quality matrix.	**06**	
10	**Contemporary Management Issues** Managing World Economic Change, The Global Environment, Multinational Strategies, Economic Cycles and Director Investment, Change and Organization Development, Managerial Ethics and Social Responsibilities.	**06**	

SECTION A: 1,2,3,4,5
SECTION B: 6- 10

C: SUGGESTED TEXT BOOKS AND REFERENCES:

Sr. No.	Title	Author	Publication	Edition
1.	Management in Engineering-Principles and practice	Gail Freeman, Bell and Janes Balkwill	Prentice Hall of India Pvt.ltd,1998	
2.	Management Today Principles and Practice	Gene Burton and Manab Thaker	TataMcGraw Hill.1995	
3.	Techniques of Value Analysis and Engineering	L.D.Miles		
4.	Just in Time	David Hutchins		
5.	Kaizan	Masaaki Imai		
6.	POKAYOKE	Hiroyuki Herman	Productivity Press, Cambridge	
7.	Supply Chain Management	Sunil Chopra Peter Mlindl		
8.	Mechanism of Mind	Edward De Bono		

PATTERN OF QUESTION PAPER

Faculty of Engineering and Technology

Final year (B. Tech) Mechanical / Production Engineering (Revised Course) Examination

November / December, May/June 200_

Advanced Management Concepts

Time: 3 Hrs **Max Marks: 80**

'Please check whether you have got the right question paper'

N.B:-

- All the questions are compulsory
- Use separate answer book for each section
- ……
- ……

SECTION A

Question no 1 **16 marks**

This question will consists of questions from all the chapters under section A mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 2 **12 marks**

OR

Question no 2

Question no 3 **12 marks**

OR

Question no 3

Note: 1. The questions will be memory based, application based and understanding type.
2. There should be intermixing in the questions.

SECTION B

Question no 4 **16 marks**

This question will consist of questions from all the chapters under section B mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 5 **12 marks**

OR

Question no 5

Question no 6 **12 marks**

OR

Question no 6

Note: 1. The questions will be memory based, application based and understanding type.
2. There should be intermixing in the questions.

Final Year B. Tech Production Engineering (Revised syllabus)

PROJECT

Periods				Evaluation Scheme					Credit
				Sessional Exam		ESE		Total	
L	T	P	Total	TA	CT	TH	PR		
-----	-----	04	04	50	-----	-----	100	150	2

OBJECTIVE:

The practical implementation of theoretical knowledge gained during your study to till date is important for Engineering Education. The student should be able implement their ideas/real time industrial problem/ current application of their engineering branch which they have studied in curriculum. This will definitely help in building the confidence in the student what he has learnt theoretically. The dependent study of the state of the art topics in a broad area of his/her specialization.

GUIDELINES FOR STUDENTS AND FACULTY:

1. Students have to finalize their project title based on Industrial Assignments.
2. The projects selected should be such so as to ensure the satisfaction of the urgent need to establish a direct link between education, national development and productivity and thus reduce the gap between the world of work and the world of study. The term work will consist of a report prepared by the student on the project allotted to them.
3. Project topics may be chosen by the student or group of students (maximum 3 students) with advice from the faculty members.
4. To design a project at adequate scale level for the following applications- It may be based (i) Entirely on study and analysis of a typical Instrumentation and Control System, (ii) Experimental verification, or (iii) Design, fabrication, testing and calibration of an Instrumentation system. The software based project can be considered based on its application for instrumentation and control purpose. The students are required to submit the report based on project work done.
5. Use appropriate tools for the preparation of the report.
6. Each student/group is required to-
   a. Submit a one page synopsis before the project talk for display on the notice board in the first week of their academic semester.
   b. Give a 10 minutes presentation through OHP, PC, and Slide projector followed by a 10 minute discussion in the second week of their academic semester.
   c. Submit a report on the project topic with a list of required hardware, software or other equipment for executing the project in the third week of their academic semester.
   d. Start working on the project and submit initial development and CPM/PERT planning drawing in the fourth week of their academic semester.
   e. Preparation of PCB layout, wiring diagram, purchase of components, software demo, flowchart, algorithm, program/code, assembling, testing, etc. should be submitted by student/s within next five/Six weeks and minimum one page report should be there for each major activity.
   f. Overall assembling, wiring, code writing, testing, commissioning, should completed within next two weeks.

g. At the last but one week of end of academic semester the internal assessment of project will be done by panel of internal faculties and they will decide marks out 25 marks for term work (TA).
h. In the last week, student/group will submit final project report to guide and thereafter guide will finalize marks out of the remaining 25 marks for term work (TA).

7. Projects are to be scheduled in the weekly scheduled time-table during the semester and any change in schedule should be discouraged.
8. Every assigned faculty/s should maintain separate file for evaluating progress of each student or group.
9. Award 50 TA, Sessional marks based on the assessment done by internal guide and panel during semester and the involvement of student/group in the work assigned related to the topic and its application.

10. The format and other guidelines for the purpose of the Project Submission in hard bound copies should be as follows,

REPORT STRUCTURE

Index/Contents/Intent
List of Abbreviations
List of Figures
List of Graphs
List of Tables
and List of if any other inclusion
1. Introduction
2. Literature survey
3. System development
4. Performance analysis
5. Conclusions
References
Appendices
Acknowledgement

1. INTRODUCTION
1.1 Introduction
1.2 Necessity
1.3 Objectives
1.4 Theme
1.5 Organization
2. LITERATURE SURVEY
Literature Survey
Related information available in standard Books, Journals, Transactions, Internet Websites *etc.* till date (More emphasis on last three to five years)
3. SYSTEM DEVELOPMENT
Model Development

- Analytical
- Computational
- Experimental

- Mathematical
- Statistical

(out of above methods at least one method is to be used for the model development) Some mathematical treatment or related information is required to be embodied

4. PERFORMANCE ANALYSIS

- Analysis of system developed either by at least two methods depending upon depth of standard
- These methods normally used are Analytical /Computational/Statistical/Experimental/ or Mathematical
- Results at various stages may be compared with various inputs
- Output at various stages with same waveforms or signals or related information/parameters
- Comparison of above results by at least two methods and justification for the differences or error in with theory or earlier published results

5. CONCLUSIONS

5.1 Conclusions

5.2 Future Scope

5.3 Applications

Contributions (if any,)

The innovative work/invention/new ideas generated from the analysis of the work which can be taken from the conclusions

REFERENCES

- Author, "Title", Name of Journal/Transactions/ Book, Edition/Volume, Publisher, Year of Publication, page to page (pp.__).

These references must be reflected in text at appropriate places in square bracket

In case of web pages complete web page address with assessing date has to be enlisted

List of references should be as per use in the text of the report

APPENDICES

Related data or specifications or referred charts, details computer code/program, *etc*.

(1 Page)

Expression of gratitude and thankfulness for helping in completion of the said task with name

Signed by the candidate

- General Guidelines
  Text should be printed on front and correct side of the watermark on quality bond paper
  Paper size- A4, 75 to 85 gsm paper
  Left Margin-1.5"
  Right Margin-3/4"
  Top Margin-1"
  Bottom Margin-1"
- First page of first chapter need not be printed anywhere ,second page onwards at right hand corner at ½ inch from right and top side from second chapter onwards starting page number of chapter should be printed at bottom center place report total pages –around.
  All Greek words must be italic

Report Heading -All Capital—16 Font
Chapter heading -All Capital—14 Font
Subchapter –title case-12 Font
Sub-Subchapter –First Alphabet Capital case-12 Font
Page numbers for Index/Contents/Intent should be in roman
Title of the Report should not be more than two lines
Text pages should be in times new roman
The page of the Index/Contents/Intent heading should be below the words for appropriate sub chapter or sub-sub chapter as shown in sample copy
Cover page should have (Mission statement of Institute) in inverted commas, Symbol of Institute, Name of Department, and Institute

Suitable flap with name of the candidate, Department and Institute name and symbol can be used with nylon strip.

For more information and sample of hard copy please contact the respective Head of the Department

Final Year B. Tech Production Engineering (Revised syllabus)

Semester VIII

IN PLANT TRAINING

(a)	**Rationale:** The techniques and processes of production of goods and services do not demand only technical skills, but also a cluster or conglomerate of skills. A significant part of which is related to the total humanistic growth of the man. Such conglomerate skills technical and humanistic can not obviously be acquired through pure academic learning of concepts in formalized and institutional courses and in isolation of the actual work situation. It, therefore, naturally follows that no technical education will be complete till it has two components, one learning of concepts vis-a vis acquiring conceptual skill and other application of the concepts in real work situation vis-a vis acquiring manipulative or practicing skills. Technical education needs to have a complement of learning of the techniques of applying the concepts within the industry and business.
(b)	**Objective:** 1) The students of B.Tech course shall get an opportunity to work on live problems of the industry. 2) He/She shall apply his leaving concepts in the real work situation. 3) He/She shall get an exposure to the industrial environment and thereby enable himself/herself to appreciate the other related aspects of industry vis, human, economic, commercial and regulatory. 4) He/She shall identify career paths taking into account their individual strengths and aptitude. 5) He/She shall contribute for the achievement of economic goals and aspirations of the industry and our country as a whole.
	The curriculum for B.Tech students of final Year Course of Part-II shall consist of; 1) In plant training for a period of one full term, and the period of the term shall be as prescribed by the university from time to time. 2) A project on live problems of the industry shall be undertaken by the student/group of students undergoing atraining in the same establishment. 3) The term work shall consist of the in plant training record-daily diary, work diary, progress report, a record containing the literature survey in the field of appropriate branch of Engineering, a preliminary report related to project work etc. 4) Seminars will be arranged after successful completion of period specified in the scheme of semester VIII of B.Tech. The date and times will be decided according to the convenience of guide and student.
	General Provisions, Rules And Regulation Of In-Plant Training **1. Definition** • In-plant training means a course of training in any industry or establishment undergone in pursuance of memorandum of understanding between industry and institute and under the prescribed terms and conditions of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad. • Institution means an academic Institution of higher learning associated and admitted under the privileges of university, I.e. Maharashtra Institute of Technology, affiliated to Dr. Babasaheb Ambedkar Marathwada University, Aurangabad. • Industry means any industry or business in which any trade, occupation or subject field in engineering or technology may be specified as a designated trade. • Establishment includes any place where any industry is carried on. • University means any of the universities mentioned in the schedule of Maharashtra University Act, 1994 i.e. Dr. Babasaheb Ambedkar Marathwada University, Aurangabad. • Collaboration means collaborative academic activity of the Institute with industry. • Student means a B Tech Course student.

	2. Memorandum of understanding: Maharashtra Institute of Technology, Aurangabad will enter into an agreement with the industry through 'Memorandum of Understanding' for creating facilities of in-plant training in the appropriate branch of Engineering according to the Course Curriculum and keep this agreement for a period of 10 years to foster a healthy industry- institute interaction for mutual benefits of both.
	3. Admission to in-plant training: No student will be deputed for in-plant training unless he produces testimonial of having kept one term for the subject under B Tech Semester –VIII of final year course satisfactorily in Maharashtra Institute of Technology after passing the TY B Tech Examination (in the appropriate branch).
	4. Period of in-plant training: The period of in-plant training will be the period of one term for the subject under B Tech course semester-VIII, which will be notified by Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
	5. Contract of In-plant Training : • The student of Maharashtra Institute of Technology shall enter into a contract of in-plant training with the employing industry. • The in-plant training shall be deemed to have commenced on the date, on which the contract of in-plant training has been entered into. • Every contract of in-plant training will contain the Terms and Conditions to be agreed by both the parties. • Every contract of in-plant training shall be registered with the Maharashtra Institute of Technology within 15 days from entering into the contract.
	6. Violation of contract: Where an employer, with whom a contract for in-plant training has been entered into, is for any reason, unable to fulfill his obligation under the contract, the contract end with the consent of Maharashtra Institute of Technology. It is agreed between the employer, the student and any other employer that the student shall be engaged as an "in-plant trainee" under the other employer till the expiry period of the in-plant training. The agreement on registration with Maharashtra Institute of Technology shall be deemed to be the contract of in-plant training between the student and other employer, and from the date of such registration, the contract of in-plant training with the first employer shall terminate and no obligation under that contract shall be enforceable at the instance of any party to contract against the other party thereto.
	7. Termination of Contract: The contract of in-plant training shall terminate on the expiry of the period of in-plant training. Either party to the contract of in-plant training make an application to Maharashtra Institute of Technology, Aurangabad for the termination of the contract. After considering the content of the application, and objection, Maharashtra Institute of Technology by order in writing, will terminate the contract, if it is satisfied that the parties to the contract have/has failed to carry out the Terms and Conditions of the contract.

	Provided that where a contract is terminated- • For the failure on the part of the Employer, Maharashtra Institute of Technology will depute students to another Employer for providing facilities of in-plant training to the remaining period of training. • For the failure on the part of the student, the student will not be allowed to continue his/her in-plant training in that term. The student shall be deputed for in-plant training in the next coming term.
	8. Expectation from the Employer/Industry: The following expectations are derived for effective in-plant training. • To provide legitimate facilities for the training and learning of all the processes. • To guide the student for understanding a project of immense importance to industry and to help him/her for his/her career advancement.
	9. Obligation of Students: • To learn his/her subject field in Engineering or Technology conscientiously and diligently at his place of training. • To carry out all orders of his Employer and the Superior in the establishment. • To abide by the Rules and Regulations of the Industry/Establishment in all matters of conduct and discipline. • To carry out the obligation under the contract of in-plant training. • The student shall maintain a report of his work during the period of his in-plant training in a proforma Annexure. • Except in case of extreme urgency, the B.Tech student shall submit an application for all other leaves except the medical leave to the Manager/Gen. Manager (Personnel) of the concerned industry, where he is undergoing an in-plant training and obtain sanction before the leave is taken. In case of Medical Leave, he shall submit an application to Maharashtra Institute of Technology, Aurangabad. The shortage in attendance will be subjected to extending the period of in-plant training in which case, the student may not be allowed to appear for the test, project seminar and assessment of term work etc. which will be held immediately after successful completion of the in-plant training.
	10. Maintenance of Record: Every student of B.Tech course shall maintain a daily record of the work done by him/her relating to the in-plant training in the proforma (Annexure).
	11. Industry Sponsored Student Projects: The scheme envisages working out suitable programme for B.Tech students. They are required to complete their in-plant training in a given period. During this period, they shall be familiar with the understanding of the shop process and activities. The students can be asked to solve the mini-shop problem, which will make them think and try out short experiments as an improvement in the process, tools and equipment. The student here is not expected to acquire the skills in operating machines values. He should appreciate the application of theory learnt. The students in a group alone can undertake a project of immense importance for the benefit of the industry and also useful for the students for their advancementof career. Industry staff and Maharashtra Institute of Technology facultycan plan in advance to effectively complete the practical training with the project for preliminary studies on the floor. The projects should aim mainly-

	• Cost reduction • Reducing cycle time • Enhancing productivity • Energy conservation measures • Process Improvement technique • Inventory control • Quality control Technique • Improvement in Material handling system • Bottlenecks in material flow system and so on.
	12. What will form a good project? Through the project, it is hoped to provide the students an exciting experience in solving line problems under practical constraints. Hence it is desired that the project should be a well defined problem, which can be completed and implemented within the project period. It may be a problem, evolving analysis, design, fabrication and/or testing.
	13. Time Schedule for the Project: The following time schedule should be planned by each student or groups of students, who undertake the project. • Proposal to be received before specifies date. • Project acceptance before. • Commencement of the project. • Completion of the project.
	14. Commitment on the part of the Institute: • Providing a faculty member to supervise the project. • Providing the Institute facilities to complete the project. • Coordinator from industry will be invited to participate in the stage wise assessment of the students performance.
	15. Assistance for completion of the Project: All the projects undertaken by the students are time bound. Although, every attempt results may not be achieved within the period available for the student. In such cases, the services of the associated faculty members can be sought for the completion of the same on mutually agreed terms.
	16. Monitoring of In-Plant Training: The B.Tech students are expected to follow all the rules and discipline of the industry. However, because of other academic requirements and the nature of the project, the student may have to work in other places outside the industry. The faculty and Industry supervisor will work out a suitable arrangement to review the progress of the work from time to time. Maharashtra Institute of Technology, Aurangabad will monitor the progress of in-plant training in association with industry authority.
	17. Conduct and Discipline: In all matters of the conduct and discipline, B.Tech student shall be governed by the rules and regulations (applicable to employees of the corresponding category) in the Establishment, where he/she is undergoing a training.

	18. B.Tech Students are Trainees and not Workers: • Every B.Tech student undergoing an in-plant training in the respective branch of Engineering & Technology in any Establishment shall be treated as a trainee and not a worker and- • The provision of any law with respect to labour will not apply to such a trainee.
	19. Settlement of Disputes: Any disagreement or dispute between an industry and a B.Tech student trainee arising out of the contract of in-plant training shall be resolved both by Maharashtra Institute of Technology and the industry with mutual cooperation. The decision of both Maharashtra Institute of Technology and the industry shall be final.
	20. Holding of Test and Grant of Certificate: The progress in in-plant training of every student shall be assessed by the industry and Maharashtra Institute of Technology faculty from time to time. Every B.Tech student undergoing an in-plant training shall be issued a certificate of Proficiency on completion of his training to the satisfaction of the industry.
	21. Offer of Stipend / Other Welfare Activities and Employment: It shall not be obligatory on the part of the Employer / Industry to offer any stipend and other welfare amenities available, if any, to the students of B.Tech courses undergoing an in-plant training. However, if the industry desirous to do so, at will be a privilege for the students and also for Maharashtra Institute of Technology in view of the bonding of better understanding and cooperation forever.
	PRACTICAL EXAMINATION The Practical examination will be conducted after successful completion of the in-plant training for which guide will be internal examiner and external examiner will be appointed by the university. The date of practical examination will be same for the students of a branch and will be notified by the university. The assessment of the practical examination shall consist of 1. Seminar Performance 2. An oral on the project work done. 3. Assessment of the term work. **Note:** A 'Guide Note' on In-Plant training approved by the University is prepared and made available in each faculty of B.Tech course.

Revised Syllabus Structure for Final Year B.Tech (Production Engineering)

Part - I

Sr. No.	Course Code.	Subjects	Periods			Evaluation Scheme					Credits
			L	T	P	TA	PR	CT	ESE	Grand Total	
1		Industrial Engineering	4	--	2	25	50	25	80	180	5
2		Machine Tool Design	4	--	2	25	50	25	80	180	5
3		System	4	--	2	25	50	25	80	180	5
4		Theory of Metal Forming	4	--	2	25	50	25	80	180	5
5		EL-III	4	--	2	25		25	80	130	5
6		Project			4	50	100			150	2
		Total of Semester - VII	**20**	**--**	**14**	**175**	**300**	**125**	**400**	**1000**	**27**
Part- II											
1		Inplant Training and Project Seminar (After completion of training of @ 8 weeks)				75	75			150	
2		Inplant Training and Project Seminar (After completion of training of @ 14 weeks)				75	75			150	
3		Inplant Training and Project Seminar (After completion of training of @ 20 weeks)				100	200			300	
		Total of Semester VIII				**250**	**350**			**600**	
		Grand Total of VII & VIII				425	650			**1600**	

L : Lecture Hours per week
T : Tutorial Hours per week
P : Practical Hours per week

TA : Teachers Assessment
CT : Class Test
PR: Practical Exam
TOT : Total for Sessional exam of evaluation scheme
ESE : End Semester Examination

Class Test Duration : I Hour

Elective-III
1)Mechatronics
2)Project Management and Operation Research
3)Advanced Management Concepts