DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO. SU/Sci./B.Sc. Syllabi/6/2016

It is hereby inform to all concerned that, on the recommendations of the Committees/Ad-hoc Boards the Hon'ble Vice-Chancellor has accepted the following revised syllabi in his emergency powers under Section-14[7] of the Maharashtra Universities Act, 1994 on behalf of the Academic Council as mentioned against their names under the Faculty of Science :-

Sr. No.	B.Sc. III Year Revised Syllabi		Semester
[1]	B.Sc. Automobile Technology	[Degree Course],	V & VI
[2]	B.Sc. Workshop Technology	[Degree Course],	V & VI
[3]	B.Sc. Refrigeration & Air Conditioning	[Degree Course],	V & VI
[4]	B.Sc. Bioinformatics	[Degree Course].	V & VI
[5]	B.Sc. Biotechnology	[Optional],	V & VI
[6]	B.Sc. Horticulture	[Optional],	V & VI
[7]	B.Sc. Dry Land Agriculture	[Optional],	V & VI
[8]	B.Sc. Sericulture	[Optional],	V & VI

This is effective from the Academic Year 2016-2017 and onwards as appended herewith.

These **syllabi are also available on the University Website www.bamu.ac.in**

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO.SU/B.Sc./2016/3849-68

Date:- 23-06-2016.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Director,
Board of College and
University Development.

Copy forwarded with compliments to :-

1] The Principals, affiliated concerned Colleges, Dr. Babasaheb Ambedkar Marathwada University.

Copy to :-

1] The Controller of Examinations,
2] The Section Officer, [B.Sc. Unit],
3] The Section Officer, [B.C.S. Unit],
4] The Programmer [Computer Unit-1] Examinations,
5] The Programmer [Computer Unit-2] Examinations,
6] The In-Charge, E-Suvidha Kendra, [Professional Unit], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr. Babasaheb Ambedkar Marathwada University,
7] The Record Keeper,
Dr. Babasaheb Ambedkar Marathwada University.

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DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

Revised Syllabus of

B.Sc. III Year

MANUFACTURING PROCESS / WORKSHOP TECHNOLOGY

Semester-V & VI

[Three Year Degree Course]

[Effective from 2016-17 & onwards]

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

APPENDIX – 'A'

B. Sc. (MANUFACTURING PROCESS)/(WORKSHOP TECHNOLOGY)

THIRD YEAR

FIFTH SEMESTER

Paper no.	Name of Paper	Max Marks			Min. Marks for passing		Total Mark
		Theory		Practical	Theory	Practical	
1	Entrepreneurship development program -I	30	20	--	18	--	50
2	Robotics-I	30	20	--	18	--	50
3	Tool Engineering	30	20	--	18	--	50
4	Mechatronics –I	30	20	--	18	--	50
5	Computer Integrated Manufacturing Systems	30	20	--	18	--	50
6	Quality Engineering & Industrial Management	30	20		18		50
7	Project-I	--	--	50	--	18	50
8	Practical-I based on paper 2	--	--	50		18	50
9	Practical-II based on paper 3	--	--	50	--	18	50
10	Practical-III based on paper 4	--	--	50	--	18	50
11	Practical –IV based on paper 5	--	--	50	--	18	50
12	Seasonal based on paper 6	--	--	50	--	18	50
	Total	**300**		**300**	**--**	**--**	**600**

Total marks 300+ 300= 600

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

APPENDIX – 'A'

B. Sc. (MANUFACTURING PROCESS)/(WORKSHOP TECHNOLOGY)
THIRD YEAR

R-1878: The following shall be the scheme of examination of the Course.

FIFTH SEMESTER

Paper no.	Name of Paper	Scheme and Pattern of Examination					Total Mark
		Teaching Scheme Periods (1 Hr.)			Duration		
		Theory Per week	Pract. Per week	Total	Theory Hrs.	Pract.	
1	Entrepreneurship development program -I	3	--	3	3	--	50
2	Robotics-I	3	--	3	3	--	50
3	Tool Engineering	3	--	3	3	--	50
4	Mechatronics –I	3	--	3	3	--	50
5	Computer Integrated Manufacturing Systems	3	--	3	3	--	50
6	Quality Engineering & Industrial Management	3	--	3	3	--	50
7	Project-I	--	3	3	--	3	50
8	Practical-I based on paper 2	--	3	3	--	3	50
9	Practical-II based on paper 3	--	3	3	--	3	50
10	Practical-III based on paper 4	--	3	3	--	3	50
11	Practical –IV based on paper 5	--	3	3	--	3	50
12	Seasonal based on paper 6	--	3	3	--	3	50
	Total	**18**	**18**	**36**	--	--	**600**

PAPER – I

Entrepreneurship development program –I

Teaching Scheme Hours		Evaluation Scheme				Duration for Exam	
Th.	Pr.	Th. Ex.	PR	TW	Total	Theory	Practical
40(3hrs/week)	40(3hrs/week)	50	--	--	50	Two Hrs.	--

1 Introduction to Entrepreneurship, need, importance from national economy and global market.

2 Function of Entrepreneur- Contribution to economic growth, regional development, Employment generation, export promotion.

3 Different types of enterprises such as SSI, MSI, LSI, Pvt., Ltd., Public Ltd. etc.

4 Different types of ownership such as proprietorship, partnership, joint stock, cooperative society, etc.

5 Government policies to encourage business and study of various law of business such as excise duty, sales tax, income tax, custom duty, etc.

Term work

The term work shall consist of at least ten assignments based on the above syllabus.
The assessment of the term work will be based on the following criteria

1) The record of the assignment submitted.
2) The assessment of the term work to be conducted internally.
3) Viva vice

Books Recommended

1. Small business management – Iteeinlplf and burgess.
2. Marketing management - Philip Kotler.
3. Entrepreneurial Development (Himalaya Publishing)

PAPER - II
ROBOTICS-I

Teaching Scheme Hours		Evaluation Scheme				Duration for Exam	
Th.	Pr.	Th. Ex.	PR	TW	Total	Theory	Practical
40(3hrs/week)	40(3hrs/week)	50	50	--	100	Two Hrs.	Three Hrs

Objective: Student is expected to understand the robot and its application

Chapter no 1:- Introduction (15 Hr.)

Definition and history of robot, Automation and robotics, Robot anatomy, Robot classification, Drive technology, Envelope geometry, Motion control method, Robot speciation, Part of robot

Chapter no 2:-End Effectors (10 Hr.)

Types of end effectors, Mechanical, Vacuums, Magnetic, Adhesive gripper, Tool as end effectors, Gripper force analysis and design

Chapter no 3:- Robot Actuator (15Hr.)

Introduction of actuator, Classification, Hydraulic actuator, Classification of hydraulic motor, Advantage of hydraulic motor, Pneumatic actuator, Liner actuator, Rotary actuator, Advantage and disadvantage, Electric actuator, D.C. servo motor, A.C. servo motor, Steeper motor.

Practical's:

1. Demonstration of Cartesian/ cylindrical/ spherical robot.
2. Demonstration of Articulated/ SCARA robot.
3. Study of different types of grippers.
4. Study of different types of actuator

Reference Books:

1) "Industrial Robotics"(Technology Programming and application) by M.P. Groover, M. Weiss, R.N. Nagel, N.G. Odrey McGraw, Hill 1996
2) S.R. Deb "Robotics Technology and Flexible Automation", Tata Mc Graw Hill 1994
3) K.S. Fu, R.C. Gonzalez and C.S.G. Lee "Robotics: Control, Sensors, Vision and Unintelligence", MCGraw-Hill 1987

PAPER - III

TOOL ENGINEERING

Teaching Scheme Hours		Evaluation Scheme				Duration for Exam	
Th.	Pr.	Th. Ex.	PR	TW	Total	Theory	Practical
40(3hrs/week)	40(3hrs/week)	50	50	--	100	Two Hrs.	Three Hrs

Objective: Student is expected to understand the machining process & operations of cutting tools

1. **INTRODUCTION :**

   Definition of cutting tool, Classification of cutting tools, Cutting tool materials & their properties **03 Hours**

2. **ELEMENTS OF MACHINING PROCESS :**

   Basic requirement of machining process, Single point cutting tool, Tools signature, Mechanics of chip formation, Geometry of chip formation, Types of chips, Effect of tool geometry and cutting conditions on machining process, Tools wear, Tool Life, **Cutting Fluids** – Types, Properties, Applications. **12 Hours**

3. **MULTIPOINT CUTTING TOOLS**

   Drill – Classification and Nomenclature, Drill point geometry, Selection of drill for various operations. **Reamers** - Classification and Nomenclature, **Milling Cutter :** Classification and Nomenclature of end mill, plain milling cutter. **Taps** - Classification and Nomenclature, **Broches** - Classification and Nomenclature, **Hob** - Classification and Nomenclature, **Advance tools** **12 Hours**

4. **JIG & FIXTURES :**

   Principle of location, Twelve degree of freedom, 3-2-1 method of location, 4-2-1 method of location, Redundancy, Fool proofing, Locating device, Clamping device & indexing mechanism, **Drill Jig** – Types of drill bushes, Types of Drill jigs, Design and development procedure of jigs for different components, **Fixtures** – Types of fixtures, Setting block, Tennon, Clamping of fixtures, Design and development of milling, Turning/Boring fixtures for different components **13 Hours**

Practical Based on Above Chapter

Reference Books

1. Donaldson, Lucian & Goold, "Tool Design" TMH
2. M.H.A. Kempster "Introduction of Jigs & Fisture"
3. P.H.Joshi "Jigs & Fixtures"
4. P.C.Sharma "A Textbook of Production Engineering" S.Chand

PAPER -IV
MECHATRONICS-I

Teaching Scheme Hours		Evaluation Scheme				Duration for Exam	
Th.	Pr.	Th. Ex.	PR	TW	Total	Theory	Practical
40(3hrs/week)	40(3hrs/week)	50	50	--	100	Two Hrs.	Three Hrs

1) Number system and Boolean Algebra

1.1 Types of Number Systems. 1.2 Binary Codas. 1.3 Binary Arithmetic

2) Logic gates

2.1 Basic Logic Operation. 2.2 Logic gates 2.3 Boolean Algebra 2.4 Derived gates
2.5 Arithmetic Circuit

3) Sequential Logic Circuits

3.1 lip Flop 3.2 Registers 3.3 Counters

4) Operational Amplifiers (Op-Amps)

4.1 Introduction 4.2 Op-Amps Parameters 4.3 Linear Application of Op-Amps 4.4 Non- Linear Application of Op-Amps

5) Combinational Logic Circuits

5.1 D/A Converter 5.2 A/D Converter

6) Electronic Timers

6.1 Timer Fundamentals 6.2 Timer Circuits 6.3 Schmitt Trigger 6.4 555 Timer

References:-

01] Modern Digital Electronics by R.P. Jain
02] Introduction to Mechatronics and Measurement Systems by David G Alciator. Michael B Histand
03] Mechatronics by W.Bolton
05] Mechatronics by HMT Limited

Practical Based on above Chapter

PAPER - V

COMPUTER INTEGRATED MANUFACTURING SYSTEMS

Teaching Scheme Hours		Evaluation Scheme				Duration for Exam	
Th.	Pr.	Th. Ex.	PR	TW	Total	Theory	Practical
40(3hrs/week)	40(3hrs/week)	50	50	--	100	Two Hrs.	Three Hrs

Objective: Student is expected to understand the advance manufacturing process by using computer technique.

1) **Automation:** Types, Automation for mass manufacturing and assembly, Automation of continuous processing systems, Detroit type automation, Automated flow lines, Methods of work transport, Partial automation, Assembly system and line balancing (10 Hr.)
2) **Computer Integrated Manufacturing System:** Introduction , Integration and Rationalization, Sequence of Functions in CIM, Elements of CIM system, CIM wheel, Benefits of CIM, Applications of CIM system. (7 Hr.)
3) **Introduction to Various Manufacturing Systems:** Single Station Manufacturing Cells, Group Technology, Cellular Manufacturing, Flexible Manufacturing Systems, Manual Assembly Lines, Transfer Lines, Automated Assembly Systems. (9 Hr.)
4) **Computer Numerical Control:** Computer numerical control, CNC system design, direct numerical Control system, Adaptive control system. (6 Hr.)
5) **Computer Aided Process Planning:** Role of Process Planning, Approach of Process Planning, Process Planning System, Benefits of CAPP, Advantages of CAPP. (09 Hr.)

Reference Books:

1. Computer Aided Design and Manufacturing , Groover, M. P. , Prentice-Hall of India , 5th Edition ,2005.

2.Automation Production Systems and Computer Integrated Manufacturing, Groover, M. P., Prentice-Hall of India, 2nd Edition

3.CAD/CAM, Zeid Ibrahim, Tata McGraw Hill,1st revised edition,2006

4.Robot System and Analysis, Shah S.K., Tata McGraw Hill ,1st edition, 2008.

Practical Based on above Chapter

PAPER - VI

Quality Engineering & Industrial Management

Teaching Scheme Hours		Evaluation Scheme				Duration for Exam	
Th.	Pr.	Th. Ex.	SW	TW	Total	Theory	Practical
40(3hrs/week)	40(3hrs/week)	50	50	--	100	Two Hrs.	--

Objective: Student is expected to understand the fundamentals of quality & to apply different statistical process control tools for managerial decisions.

1. **INTRODUCTION :**

   Goals of managers and Organizations, Scientific management, Principal of management, Behavioral science, Fayols operational management. **06 Hours**

2. **QUALITY PHILOSOPHY :**

   The meaning of quality & quality improvement ; Brief history of quality methodology, Quality Goals & quality policies, Quality Characteristics, Sporadic and chronic quality problems, Total Quality management- Quality philosophy, Links between quality & productivity, quality improvement, Management mindset- Cornet stone for preparing TQM, managing the transition of TQM. **12 Hours**

3. **MOTIVATION AND BEHAVIOR :**

   Hawthorns studies and its findings, Maslow's theory, C and Y theory, Pretence of need and satisfaction of needs, Goal Oriented Behavior, Integration of organization goals and needs of employee. **08 Hours**

4. **PROCESS MANAGEMENT :**

   Definitions of process management, Major process decision – Process choice, Vertical integration, recourses flexibility, customer involvement, capital intensity, relationships between decision, service operation, Designing processes, Rearranging and process improvement. **07 Hours**

5. **Introduction of ISO 9000 :**

   Definition of standardizations, Techniques for standardizations, Codification system, Varity control, Value engineering. **07 Hours**

Assignment based on above Chapter

Reference Books

1. Principles of Management Koontz O Donnel McGraw Hill
2. Statistical Quality Control E.L. Grant and R.S. Leavenworth, 7th edition McGraw Hill

3. Essentials of management Koontz Weirich 7th Edition TATA McGraw Hill
4. Management of Organizational Behavior Hersey Paul and Kenneth H, Prentice Hall of India Pvt. Ltd.
5. Operations management strategy and analysis Lee J.Krajewski and Larry P. Ritzman Fifth Edition Addison-Wiley.
6. Organizational Behavior Stephen P Robbins, 9th Edition Pearson Education

PROJECT – I / SEMINAR

Teaching Scheme Hours		Evaluation Scheme				Duration for Exam	
Th.	Pr.	Th. Ex.	PR	TW	Total	Theory	Practical
--	40(3hrs/week)	-	50	--	50	--	Three Hrs.

Every individual student shall work on a recent topic selected or assigned from any engineering/allied/applied fields for the seminar of academic or industrial interest. It is expected that the student has to collect information on a topic which is not covered in curriculum of the under graduate course. Student has to refer hand book, research journals, reference books, proceeding of conference through library or internet and record of references considered for seminar is to preserved in hard copy or soft copy, which shall be produced at the time of seminar.

The report of seminar should be submitted in printed volume duly certified by guide, HOD and Principal in prescribed format given below. The student should deliver a seminar talk at least for 20 minutes based on the work done by him/her. The performance will be judged by his guide and another expert appointed by HOD.

INSTRUCTIONS TO PREPARE REPORT AND PPT

1. Seminar report shall be typed on A-4 size white bond paper.
2. Typing shall be with line spacing of 1.5using black inkjet print on one side of the paper.
3. Margins a) Left 37.5mm b) Right, Top and Bottom 25mm.
4. Page number – At the bottom center aligned 12 point font size.
5. Header and Footer (12 point font size – Times New Roman)

a) Header – Right side at top stating title of the seminar.

b) Footer – Right side at bottom stating institute name.

6. Font

a) Main title font – 14 point – bold – Times New Roman – Upper case

b) Sub title font – 12 point – bold - Times New Roman – Title case

c) Text font - 12 point – normal - Times New Roman – Running

d) Graph / Figure / Table titles – 12 point – normal - Times New Roman – Title case

7. Graph / Figure / Table: - shall be located at the center along with its title and Graph No. / Figure No. / Table No. If Graph / Figure / Table or any information is copied from any of the references, reference no. is to be shown at the end of its title / statement in square bracket superscripted form

8. Seminar report shall consists of at least following contents

a. First page.

b. Certificate.

c. Acknowledgement.

d. Index page (Chapter wise)

e. Graph index (Graph no., Title, Page no.)

f. Figure index (Figure no., Title, Page no.)

g. Table index (Table no., Title, Page no.)

h. Introduction /Abstract of seminar.

i. Literature review.

j. Core content of seminar.

k. Merits and demerits of subject.

l. Future scope.

m. Conclusion.

n. References.

o. Appendix

p. Compact Disc.

9. Format of seminar report

a. First page (Title page) and cover of seminar report.

(Institute logo)

Seminar Report

on

"Title of Seminar"

By

Name of student

Submitted in partial fulfillment of the requirement for the degree of

Bachelor of Science (Manufacturing Process)

Department of Mechanical Engineering

Name of Institute

Year ------

b. Certificate

(Institute logo)

CERTIFICATE

This is to certify that the seminar report entitled

"Title of Seminar"

Submitted by

Name of student

has completed as per the requirement of Dr. Babasaheb Ambedkar Marathwada University in partial fulfillment of Degree of B.Sc.(Manufacturing Process)

Guide | Head of Department | Principal

Department of Mechanical Engineering

Name of Institute

Year----

c. Acknowledgement:- Acknowledgement shall consists of students opinion related to the seminar topic and his gratitude towards his guide, other staff, social members and his friends those who have really helped him to complete seminar report.

d. Chapter Index: - Shall have title as "INDEX" in bold - 14 point aligned at top center and page consisting of table with three columns as

Chapter No., Chapter particulars, and Page No. Chapter No. and Page No shall be aligned at center of cell and chapter particulars left aligned in the cell.

e. Graph Index / Figure Index / Table Index: - Shall have title as "GRAPH INDEX / FIGURE INDEX / TABLE INDEX" in bold – 14 point center aligned at top of page. Page consisting of three column table as Graph No. / Figure No. / Table No. in first column, Title of Graph / Figure / Table in second column and Page No. in third column. (Similar to chapter index.)

10. Sketches:-Shall be drawn on separate sheet, center aligned with Figure No. and Title of sketch at its bottom.

11. Table shall preferably be typed in text format only with table no. and its title at the top, centrally aligned.

12. Standard mathematical symbols and notations shall be used.

13. The last item on Index should be references.

14. Compact Disc (C.D.) consisting of soft copy of seminar report, PPT, and supporting literature shall be affixed at back cover of report.

15. Presentation shall be made with help of Power point.

a. Preferably each slide shall have plain white or faint yellow or navy blue or maroon colored back ground with contrast matching font.

b. Each slide shall be numbered and header - footer shall be added similar to report.

c. Figure / Graph / Table shall be labeled with Figure No. / Graph No. / Table No. and with reference nos. shown in seminar report

d. Only brief points are to be highlighted on slides

e. Information copied from references shall be numbered with reference number.

f. Points are not to be read directly from slide at the time of presentation.

g. Presentation shall be based on Figure, Graph, Table, Charts and points etc.

h. First slide shall be identical to cover page of report.

i. Second slide should contain introduction / abstract of seminar and content of presentation with bullets.

j. Third slide shall focus on literature review.

k. Fourth slide on wards core content of presentation shall be discussed.

l. Slides at the end shall consist of merits, demerits, future scope, conclusion and references.

The Practical work marks for seminar will be allotted based on the following

1. Seminar Report 10 Marks
2. Literature Review 08 Marks
3. Technical Content 10 Marks
4. Presentation Skill(Aids used) 14 Marks
5. Question Answer 08 Marks Total 50 Marks

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

APPENDIX – 'A'

B. Sc. (MANUFACTURING PROCESS)/(WORKSHOP TECHNOLOGY)

THIRD YEAR

SIXTH SEMESTER

Paper no.	Name of Paper	Max Marks			Min. Marks for passing		Total Mark
		Theory		Practical	Theory	Practical	
1	Entrepreneurship development Program -II	30	20	--	18	--	50
2	Robotics – ii	30	20	--	18	--	50
3	Industrial Hydraulics and Pneumatics	30	20	--	18	--	50
4	Mechatronics –II	30	20	--	18	--	50
5	Auto Cad	30	20	--	18	--	50
6	Industrial Engineering	30	20		18		50
7	Project-II	--	--	50	--	18	50
8	Practical-I based on paper 2	--	--	50		18	50
9	Practical-II based on paper 3	--	--	50	--	18	50
10	Practical-III based on paper 4	--	--	50	--	18	50
11	Practical –IV based on paper 5	--	--	50	--	18	50
12	Seasonal based on paper 6	--	--	50	--	18	50
	Total	**300**		**300**	**--**	**--**	**600**

Total marks 300 + 300= 600

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

APPENDIX – 'A'

B. Sc. (MANUFACTURING PROCESS)/(WORKSHOP TECHNOLOGY)
THIRD YEAR

R-1878 : The following shall be the scheme of examination of the Course.

SIXTH SEMESTER

Paper no.	Name of Paper	Scheme and Pattern of Examination					Total Mark
		Teaching Scheme Periods (1 Hr.)			Duration		
		Theory Per week	Pract. Per week	Total	Theory Hrs.	Pract.	
1	Entrepreneurship development Program -II	3	--	3	3	--	50
2	Robotics – II	3	--	3	3	--	50
3	Industrial Hydraulics and Pneumatics	3	--	3	3	--	50
4	Mechatronics –II	3	--	3	3	--	50
5	Auto Cad	3	--	3	3	--	50
6	Industrial Engineering	3	--	3	3	--	50
7	Project- II	--	3	3	--	3	50
8	Practical-I based on paper 2	--	3	3	--	3	50
9	Practical-II based on paper 3	--	3	3	--	3	50
10	Practical-III based on paper 4	--	3	3	--	3	50
11	Practical –IV based on paper 5	--	3	3	--	3	50
12	Seasonal based on paper 6	--	3	3	--	3	50
	Total	**18**	**18**	**36**	--	--	**600**

PAPER-I

ENTREPRENEURSHIP DEVELOPMENT PROGRAMME-II

Teaching Scheme Hours		Evaluation Scheme				Duration for Exam	
Th.	Pr.	Th. Ex.	PR	TW	Total	Theory	Practical
40(3hrs/week)	40(3hrs/week)	50	--	--	50	Two Hrs.	--

1 Concept & Philosophy of Entrepreneurship Evolution and development

2 Important qualities for an entrepreneur such as leadership, communication skill, deal making, frustration tolerance, hard work, persuasion etc.

3 Setting up new venture, search for new ideas, project identification, project report and business planning.

4 Study of various causes of failure of business and precaution to be taken to avoid failures.

5 Introduction to marketing concept, Definition, scope, objectives, marketing techniques.

Term work

The term work shall consist of at least ten assignments based on the above syllabus.
The assessment of the term work will be based on the following criteria

1) The record of the assignment submitted.
2) The assessment of the term work to be conducted internally.
3) Viva vice

Books Recommended

1) Small business management – Iteeinlplf and burgess.
2) Marketing management - Philip Kotler.
3) Entrepreneurial Development (Himalaya Publishing)

PAPER - II

ROBOTICS-II

Teaching Scheme Hours		Evaluation Scheme				Duration for Exam	
Th.	Pr.	Th. Ex.	PR	TW	Total	Theory	Practical
40(3hrs/week)	40(3hrs/week)	50	50	--	100	Two Hrs.	Three Hrs

Objective: Student is expected to understand the robot and its application

Chapter no 1:-Robot Sensor (15 Hr.)

Need of sensor in robotic system, Types of sensor based on working principal, Various sensing device used in robot, Work cell, sensor characteristics, Selection of sensor, Type of sensor, Range sensor, Proximity sensor, Touch sensor

Chapter no 2:-Robot Vision System (8 Hr.)

Need of vision system in robotics, Image acquisition, Illumination technique, Image conversion, Camera sensor

Chapter no 3:-Robot Programming Language (8 Hr.)

Introduction, Robot programming method, Robot programming language, Artificial intelligences in robot

Chapter no 4:-Industrial Application (9 Hr.)

General consideration in robot application, Material transfer, Machine loading, Welding and spray painting, Assembly, Inspection.

Practical's:

1. Study of sensor integration.
2. Study of robot vision system
3. Study of programming language.
4. Study of industrial application of robot

Reference Books:

1) "Industrial Robotics"(Technology Programming and application) by M.P. Groover, M. Weiss, R.N. Nagel, N.G. Odrey McGraw, Hill 1996
2) S.R. Deb "Robotics Technology and Flexible Automation", Tata Mc Graw Hill 1994
3) K.S. Fu, R.C. Gonzalez and C.S.G. Lee "Robotics: Control, Sensors, Vision and Unintelligence", MCGraw-Hill 1987

PAPER-III

Industrial Hydraulics & Pneumatics

Teaching Scheme Hours		Evaluation Scheme				Duration for Exam	
Th.	Pr.	Th. Ex.	PR	TW	Total	Theory	Practical
40(3hrs/week)	40(3hrs/week)	50	50	--	100	Two Hrs.	Three Hrs

Objective: Student is expected to understand hydraulic & pneumatic system used in industry

1. **PROPERTIES OF OIL & FLUID :**

   Fluid – Definition, Classification & Application. Properties of Fluid, Static pressure, Pascal law, Centre of pressure for different surface, Atmospheric pressure, Gauge Pressure, vacuum pressure, Pressure measurement device **05 Hours**

2. **Turbine & Pumps :**

   Turbine – Classification, Construction & working, Application, **Pumps: Centrifugal Pumps** – Classification, Construction & working, Types of casing & impellers, Need of priming & method of priming of centrifugal pumps, **Reciprocating Pumps –** Classification, Construction & Working and Application. **10 Hours**

3. **CONTROL VALVES :**

   Graphics Symbols, **Types of Control valve –** Poppet Valve, Spool Valve, Rotary valve, Pilot Operated Valve, **Check Valve –** Pilot operated check valve, Restriction check valve, Shuttle & Fats exhaust Valve, Sequence valve, Time delay valve, Proportional valves. **09Hours**

4. **PNEUMATICS SYSTEM :**

   Introduction, Comparison of pneumatic /Hydraulic & Electrical system, Air Compressor system, Types of Compressor, Compressor specification, Filter : Classification & Working principles, Direction Control valves : Ways & Position of direction control valve, Important characteristics of Pneumatic D.C.Valves. **09 Hours**

5. **Actuators :**

   Pneumatic Cylinders & Motors, Construction & working of actuators, Types of hydraulic cylinders, Single & Double acting Cylinders, Special Hydraulic cylinders – Telescopic & Tandem, Specification & Cushioning of Hydraulic Cylinders. **07 Hours**

Reference Books

1. Hydraulics and Pneumatics: A technician's and engineer's guide By Andrew Parr
2. Introduction to Hydraulics and Pneumatics By S. Ilango, V. Soundararajan
3. Hydraulics & Fluid Mechanics by Modi Seth (Standard Book House)
4. Pneumatics System Principal & Maintenance by S.R.Mujumdar

PRACTICAL BASED ON ABOVE CHAPTER

PAPER-IV
MECHATRONICS-II

Teaching Scheme Hours		Evaluation Scheme				Duration for Exam	
Th.	Pr.	Th. Ex.	PR	TW	Total	Theory	Practical
40(3hrs/week)	40(3hrs/week)	50	50	--	100	Two Hrs.	Three Hrs

1) Mechatronics

1.1What is Mechatronics? 1.2 Systems 1.3 Measurement systems 1.4 Control systems 1.5Microprocessor-based controllers 1.6 Response of systems 1.7 The Mechatronics approach Problems

2) Sensors and transducers

2.1 Sensors and transducers 2.2 Performance terminology 2.3 Displacement, position and proximity 2.4 Velocity and motion 2.5 Force 2.6 Fluid Pressure 2.7 Liquid Flow 2.8 Liquid Level 2.9Temperature 2.10 Light Sensor 2.11 Selection of sensor 2.12 Inputting data by switches Problems

3) Electrical actuation systems

3.1 Electrical systems 3.2 Mechanical switches 3.3 Solid- state switches 3.4 Solenoids 3.5 D.C. motors 3.6 Stepper motors problems

4) Introduction to Microprocessor

4.1 Introduction 4.2 Features of 8085 4.3 Architecture of 8085 a) Registers b) ALU c) Address Buffer d) Address / Data Buffer e) Interrupt control f) Timing & control circuitry 4.4 Pin connection of 8085

5) The 8051 microcontroller

5.1 Block Diagram 5.2 Over View of 8051 microcontroller family 5.3 Connection of 8051 & 89C51 Microcontroller 5.4 Input output port

6) Motor control Relay

6.1 DC & Steeper motor 6.2 LCD Display 6.3 LED 6.4 Seven segment display 6.5 Interfacing of Sensors 6.6 Controller and display device

Reference Books

1) Microprocessor Technique - By Atul P. Godse & Deepali A Godse
2) Mechatronics - By W.Bolten
3) The 8051 Micro controller Embedded System - By M.A. Mazidi

Practical Based on above Chapter

PAPER-V
AUTO CAD (COMPUTER AIDED DESIGN)

Teaching Scheme Hours		Evaluation Scheme				Duration for Exam	
Th.	Pr.	Th. Ex.	PR	TW	Total	Theory	Practical
40(3hrs/week)	40(3hrs/week)	50	50	--	100	Two Hrs.	Three Hrs

01) AN INTRODUCTION TO AUTO CAD

*The X,Y co-ordinate system*Angular Measurement*Entering Points In AutoCAD*Various Types Co-ordinates*The Status Bar*Basic AutoCAD Terminology.

02) DRAWING OBJECTS

*Introduction*Types of Command*Direct Distance Entry*Various Tracking Such as Polar, Object Snap.

03) DRAWING AIDS & MODIFYING OBJECTS

*Introduction*Types of Command such as ORTHO, GRID, DRAWING LIMITS, SNAP, DRAWING AIDS.*The Function Keys. *Introduction*Types of Command ERASE, COPY, MIRROR, OFFSET, ARRAY, MOVE, ROTATE, SCALE, STRETCH, LENGTH, TRIM, EXTEND, BREAK, CHAMFER, FILLET, EXPLODE.

04) OBJECT SNAP & ADVANCED FEATURES

*Introduction*Object Snap*Object Snap Cycling. *Zooming & Panning*Blocks*Attributes*Hatching*Using X-REFS.

05) OBJECT PROPERTIES, UNITS & SCALES

*Introduction*Types of LAYERE & Command. Colors'.*Line types* The Match Properties Command.*Introduction*Units Control*Linear Units*Angular Units*Unit Precision*ISO Paper Sizes*Common Plot.

06) USER CO-ORDINATE SYSTEMS & DIMENSIONING

*Introduction*The UCS Command*The 3 Point Option* The UCSICON Command* UCS Command Options* The UCS Control Dialogue Box* The UCS Follow system variable* Other UCS Icons* *Introduction*Types Of Dimension Commands LINEAR, CONTINUE, BASELINE, ALIGNED, RADIAL, DIAMETER, RADIUS, CENTER MARK,EDIT, STYLE, * Angular Dimensions* Ordinate Dimensions *Dimension Scale.

07) 3D CAD

*Introduction*C-D CAD Terminology*Isometric Drawing*The 3 D Co-ordinate System*Viewing 3-D Objects*Perspective Views*The Properties command*Basic wire-Frame Models*The 3D Face Command*Region & 3-D Surfaces*Revolved Objects*Drawing The Table*Adding Materials*3D Objects,

08) PAPER SPACE AND LAYOUT

*Introduction*Overview of Paper Space*Creating a Drawing Sheet Space*Creating the View ports*Other Paper Space Considerations.

Reference Books:-

01] CAD All India Council For Professional Training & Research Pvt.Ltd.
02] CAD/ CAM-by Zimmer & Groover, PHI Publications,
03] CAD/ CAM/CIM-by Radha Krishnan,
04] CAD/ CAM –by P.N.Rao

Practical Based on above Chapter

PAPER-VI

Industrial Engineering

Teaching Scheme Hours		Evaluation Scheme				Duration for Exam	
Th.	Pr.	Th. Ex.	SW	TW	Total	Theory	Practical
40(3hrs/week)	40(3hrs/week)	50	50	--	100	Two Hrs.	--

Objective: Student is expected to understand various concept of Industrial Engineering

1. **INTRODUCTION :**

   Productivity, Definition of work study, Scope, Application, Relationship between productivity and stranded of living, Basic work content, Excess work content, Technique to reduce excess work content. **06 Hours**

2. **Work Study :**

   Definition, Concept, Relation with productivity, Human factor, Good relation, Work study verses management, Supervisor, Work-study man, Quality of work-study man Working conditions, Preventions accidents and hazards. **10 Hours**

3. **Work Measurement :**

   Techniques, Purpose, Use, Basic Procedure of time study, Time study equipment, Selection of job for time study, Approach to worker, Steps in Time study, Data collection about job. **08 Hours**

4. **Work Measurement Techniques :**

   Work Sampling,-Need, Establishing confidence level, Determination of sample size, Random Observation, Conduct of study, Use of Work sampling, Introduction of business process reengineering. **08 Hours**

5. **Kaizen :**

   Continues method improvement, Kaizen concept, Kaizen umbrella for quality improvement, Kaizen and management, Kaizen & TQC, PDCA cycle, SMED-Single Minute Exchange of Die-Introduction, JIT system-Concept, scope & objectives, Toyota production system. **08 Hours**

Assignment based on above Chapter

Reference Books :

1 Introduction to work study ILO

2 Motion & Time study Design & Measurement of Work Ralph Barnes (Wiley Eastern)

3 Work Study R.M. Currie & J. Faraday

4 Hand Book of Industrial Engineering Irson & Grant

5 Just In Time David Hukins

6 Kaizen Shyam.Talwadekar

7 Kaizen Masaki Imai & 8 SMED Shino Shingo

PROJECT – II

Teaching Scheme Hours		Evaluation Scheme				Duration for Exam	
Th.	Pr.	Th. Ex.	PR	TW	Total	Theory	Practical
--	40(3hrs/week)	-	50	--	50	--	Three Hrs.

1. Student/s shall have to continue with the projects approved in last semester.
2. It is recommended to follow schedule of activities planned and accordingly have to work for completion of project under the guidance of allotted teacher.
3. Regular monitoring and guidance is expected to complete project in specified duration.
4. Student/s will have to prepare report of project similar to the seminar report with hard binding and golden embossing. Report shall consist of at least contents as that of seminar report.
5. Pre-demonstration session shall be arranged at the term end, in order to observe completion of project, corrections, proofreading of report shall be done by guide and committee. Suggestions are to be given for minor improvements in the project/project report. (If any)
6. Projects / Project report must be ready in all respect at the time of final dissertation.

Practical examination shall be based on final demonstration / presentation. Performance and Percentage of theme achieved.

Instructions:

1. The project report shall be typed on A-4 size white bond paper.
2. Typing shall be with spacing of 1.5 or 2.0 using black ribbon or carbon on one side of the paper.
3. Margins:- (i) Left 37.5 mm. (ii) Right, top and bottom 25 mm.
4. Binding:- Hard with golden embossing on the front cover of blue colour or soft comb binding with transparent front cover and non transparent plastic blue/black cover.
5. From: cover in case of hard bound report: It should be identical to first title page.

6. Format for title page (First Page)

Report of the project on

(Title of Project)

By

(Name of student)

Submitted in partial fulfillment of the requirements for the degree of Bachelor of Science

(Manufacturing Process)

Department of Manufacturing Process

(Name of the college)

7. Format for Certification page (i.e. Second page)

CERTIFICATE

This is to certify that the project entitled

"Title of Project"

Submitted by

(Name of Student/s).

is completed as per the requirements of the Dr. Babasaheb Ambedkar Marathwada University

in partial fulfillment of

Degree of B.Sc.(Manufacturing Process)

For the academic year--------

Guide Head of Department Principal

8. The third page would be for acknowledgements which would be followed by index page.

9. Sketches should be drawn on separate sheet (minimum A4 size) and be inserted at proper places. The sketches should be drawn in black ink and be numbered.

10. Tables should preferably type in the text only.

11. The mathematical symbol should be typed or neatly written so as to match darkness of the text.

12. The last item on the index should be references

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