DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO.ACAD/SU/Engg./B.E./Elective/56/2014

It is hereby notified for information of all concerned that, on the recommendations of the Faculty of Engineering & Technology, the **Academic Council at its meeting held on 29-11-2013 has accepted the One Elective for B.E. Final Year of Computer Science Engineering / I.T. i.e. "Cloud Computing" and B.E. Final Year of E.C.T./E & C i.e. "Advance Industrial Automation" under the Faculty of Engineering and Technology.**

This is effective from the **Academic Year 2013-2014** and onwards.

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. ACAD/ SU/ ENGG./
ELECT./2014/50754-87

A.C.S.A.I.No.80[09]

Date:- 05-03-2014.

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Director,
Board of College and
University Development.

Copy forwarded with compliments to :-

1] The Principals, affiliated concerned Colleges,
Dr. Babasaheb Ambedkar Marathwada University.
2] The Director, University Network & Information Centre, UNIC, with **a request to upload this Circular on University Website.**

Copy to :-

1] The Controller of Examinations,
2] The Superintendent, [Engineering Unit] Examination Branch,
3] The Superintendent, [Eligibility Unit],
4] The Programmer [Computer Unit-1] Examinations,
5] The Programmer [Computer Unit-2] Examinations,
6] The Director, [E-Suvidha Kendra], in-front of Registrar's Quarter,
Dr. Babasaheb Ambedkar Marathwada University,
7] The Public Relation Officer,
8] The Record Keeper,
Dr. Babasaheb Ambedkar Marathwada University.

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S/-110314/-*

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

Syllabus of

'ADVANCE INDUSTRIAL AUTOMATION'

B.E.[E.C.T/E & C]

PART SECOND

[ELECTIVE]

Effective from the Academic Year 2013-14 & onwards]

ADVANCE INDUSTRIAL AUTOMATION

Theory: - 4Hr/week

Theory: - 100 Mark

Practical: - 2Hr/week

OBJECTIVE.

The trend in the Industry for automation is changing one and student will able to develop the skill set for latest development of automation.

Chapter 1

Basic of Automation

Introduction of sensors, actuators, control loop,concept of process variables, set point, controlled variable, manipulated variable, load variable. Representation of process loop components using standard symbols (basic with reference to control loop), and Examples of process loops like temperature, flow, level, pressure etc. Hierarchical levels of automation, introduction to plant automation.

Chapter 2

Transmitters and Converter:

Need of transmitter (concept of field area & control room area), Need for standardization of signals, current, voltage and pneumatic signal standards, concept of live & dead zero, DPT, span & zero adjustment, Two wire transmitter, SMART transmitter: Comparison with conventional transmitter, Block schematic.Converters: Difference between converter & transmitter, Pneumatic to current converter, Current to pneumatic converter.
Switches: Temperature, pressure, Level switch, Proximity switch, Reed switch, Contactors,

Chapter 3

Actuators:

Types of Control Valve, Control valve terminology Range ability, turndown, valve capacity, Air to open, Air to close, valve gain etc. Control valve characteristics: Inherent & installed Control valve accessories. Positioners: Application/Need, Types, Effect on performance of control valves. Volume boosters, Pressure Boosters, Reversing relay, Solenoid valves, Air lock, position indicating switches, Electro pneumatic converter, hand wheel.

Brief of stepper motor, servo-motor,Motor control circuits, AC Drives, DC Drives, VF Drives, PWM Techniques

Chapter 4

Programmable Logic Controller (PLC):
Continuous versus Discrete Process Control, ladder diagram using standard symbols, Architecture of PLC, Types of Input & Output modules (AI, DI, AO, DO), Types of Timer, Counters, Interfacing pneumatic & Hydraulic systems, Fixed & Modular PLC (Rack, Slot, Grouping), Specifications, manufacturers, PLC ladder diagram and instructions, PLC Programming for process applications.
Supervisory control system and data acquisition (SCADA): Introduction to SCADA, SCADA architecture, creation of data base, interfacing with PLC.

Chapter 5

Industry Standard Protocols
HART Protocol introduction, frame structure, programming, implementation examples, Benefits, Advantages and Limitations. Introduction to Foundation Fieldbus H which includes structure, programming, FDSconfiguration, implementation examples, benefits, advantages and limitations.Comparison with other fieldbus standards likeDevicenet, Profibus, Profinet, Controlnet, CAN, Industrial Ethernet etc.

Chapter 6

Distributed Control Systems Basics
DCS introduction, functions, advantages and limitations, DCS as an automation tool to support Enterprise Resources Planning, DCS Architecture of different makes, Latest trends and developments. DCS detail engineering, specifications, configuration and programming, functions including database management, reporting, alarm management, communication, third party interface, control and display

Typical Experiments:

1. Study of PLC and PLC programming
2. Study of PLC timers and counters
3. Solenoid valve sequential control using PLC.
4. Servo and Stepper Motor control using PLC systems.
5. Pneumatic control using PLC for air/gas control system.
6. PLC programming for distribution station.
7. PLC programming for PID block
8. Develop SCADA system for given application
9. Interfacing PLC to hydraulic & Pneumatic circuits.
10. Interfacing of VFD to PLC

Term Work:

a. Continuous assessment of the students in the semester
b. Satisfactory performance of laboratory experiments
c. Internal oral for the students

References Books / Handbooks

1. Programmable Logic Controller, 5th Edition,by W. Bolton,ELSEVIER
2. Programmable Logic Controller Principles and Applications by Webb and Reis, PHI Publications
3. Distributed Computer Control for Industrial Automations by PoppovikBhatkar, Dekkar Publications
4. Computer based Process Control by Krishna Kant , PHI Publications
5. Introduction to Programmable Logic Controller by Garry Dunning, Thomson Learning Publications.
6. Allen Bradley's PLC Programming Handbook.
7. Siemens PLC Programming Handbook.