D.K.T.E. Society's

TEXTILE & ENGINEERING INSTITUTE

(An Autonomous Institute)
Rajwada,Ichalkaranji – 416115.

Syllabus of
Mechatronics (Honors)
(With effect from Jan 2021)
Department of Mechanical Engineering

D.K.T.E. Society's

TEXTILE & ENGINEERING INSTITUTE

(An Autonomous Institute)
Rajwada,Ichalkaranji – 416115.

Department of Mechanical Engineering

Mechatronics (Honors)

(With effect from Academic Year 2020-21)

Syllabus Structure

Sr. No.	Course Name		Sem	Teaching Scheme Hours/Week				Examination Scheme and Marks						Credits
								Theory			Practical		Total	
				Theory	Tutorial	Practical	Total	SE-I	SE-II	SEE	CIE	SEE		
1	MEL701	Fluid Power	IV	4	-	-	4	25	25	50	-	-	100	04
2	MEL702	Sensors and Digital Logic	V	4	-	-	4	25	25	50	-	-	100	04
3	MEL703	SCADA and Industry 4.0	VI	4	-	-	4	25	25	50	-	-	100	04
4	MEL704	Drives and Motion Control	VII	3	-	-	3	25	25	50	-	-	100	03
5	MEP705	Fluid Power Lab	IV	-	-	2	2	-	-	-	50	-	50	01
6	MEP706	Sensors and Digital Logic Lab	V	-	-	2	2	-	-	-	50	-	50	01
7	MEP707	SCADA and Industry 4.0 Lab	VI	-	-	2	2	-	-	-	50	-	50	01
8	MEP708	Mechatronics lab with Mini Project	VII	-	-	4	4	-	-	-	50	50	100	02
Total				**15**	**-**	**10**	**25**	**100**	**100**	**200**	**200**	**50**	**650**	**20**

DKTES Textile and Engineering Institute,Ichalkaranji

(An Autonomous Institute)

Teaching and evaluation Scheme from year 2020-21

Department of Mechanical Engineering

Second Year B. Tech. (Semester – IV) in **Mechatronics** Honors for Mechanical, Electronics, Electronics and Telecommunication

Sr. No.	Course Code	Course Title	Course Category	Teaching scheme				Course Credits	Evaluation scheme					
									Theory			Practical		TOTAL
				L	T	P	Contact Hrs/wk		CIE		SEE	CIE	SEE	
									SE-I	SE-II				
1	MEL701	Fluid Power	PCC	4	-	-	4	4	25	25	50	-	-	100
2	MEP705	Fluid Power (Lab)	PCC	-	-	2	2	1	-	-	-	50	-	50
		Total		**4**	**-**	**2**	**6**	**5**	**25**	**25**	**50**	**50**	**-**	**150**

L-Lecture
T-Tutorial
P-Practical

SE-I :Semester Examination-I
SE-II : Semester Examination-II

CIE – Continuous In Semester Evaluation
SEE-SemesterEnd Examination

Course Category	HSMC (Hum. & Social Sc.,Mgt)	BSC(Basic Sc.)	ESC Engg.Sc.)	PCC (Prof. Core Courses)	PEC (Prof. Elect.Courses)	OEC (OpenElct.Courses)	MC(Mandatory Courses)	PST (Project / Seminar / Ind. Training)
Credits	--	--	--	5	--	--	--	--
Cumulative Sum	--	--	--	5	--	--	--	--

Progressive Total Credits =05

DKTES Textile and Engineering Institute,Ichalkaranji

(An Autonomous Institute)

Teaching and evaluation Scheme from year 2020-21

Department of Mechanical Engineering

Third Year B. Tech. (Semester – V) in **Mechatronics** Honors for Mechanical, Electronics, Electronics and Telecommunication

Sr. No.	Course Code	Course Title	Course Category	Teaching scheme				Course Credits	Evaluation scheme					
									Theory			Practical		TOTAL
				L	T	P	Contact Hrs/wk		CIE		SEE	CIE	SEE	
									SE-I	SE-II				
1	MEL702	Sensors and Digital Logic	PCC	4	-	-	4	4	25	25	50	-	-	100
2	MEP706	Sensors and Digital Logic Lab.	PCC	-	-	2	2	1	-	-	-	50	-	50
		Total		**4**	**-**	**2**	**6**	**5**	**25**	**25**	**50**	**50**	**-**	**150**

L-Lecture
T-Tutorial
P-Practical

SE-I :Semester Examination-I
SE-II : Semester Examination-II

CIE – Continuous In Semester Evaluation
SEE-SemesterEnd Examination

Course Category	HSMC (Hum. & Social Sc.,Mgt)	BSC(Basic Sc.)	ESC Engg.Sc.)	PCC (Prof. Core Courses)	PEC (Prof. Elect.Courses)	OEC (OpenElct.Courses)	MC(Mandatory Courses)	PST (Project / Seminar / Ind. Training)
Credits	--	--	--	5	--	--	--	--
Cumulative Sum	--	--	--	10	--	--	--	--

Progressive Total Credits 05+05=10

DKTES Textile and Engineering Institute,Ichalkaranji

(An Autonomous Institute)

Teaching and evaluation Scheme from year 2020-21

Department of Mechanical Engineering

Third Year B. Tech. (Semester – VI) in **Mechatronics** Honors for Mechanical, Electronics, Electronics and Telecommunication

Sr. No.	Course Code	Course Title	Course Category	Teaching scheme				Course Credits	Evaluation scheme					
									Theory			Practical		TOTAL
				L	T	P	Contact Hrs/wk		CIE		SEE	CIE	SEE	
									SE-I	SE-II				
1	MEL703	SCADA and Industry 4.0	PCC	4	-	-	4	4	25	25	50	-	-	100
2	MEP707	SCADA and Industry 4.0 Lab	PCC	-	-	2	2	1	-	-	-	50	-	50
		Total		**4**	**-**	**2**	**6**	**5**	**25**	**25**	**50**	**50**	**-**	**150**

L-Lecture
T-Tutorial
P-Practical

SE-I : Semester Examination-I
SE-II : Semester Examination-II

CIE – Continuous In Semester Evaluation
SEE-SemesterEnd Examination

Course Category	HSMC (Hum. & Social Sc.,Mgt)	BSC(Basic Sc.)	ESC Engg.Sc.)	PCC (Prof. Core Courses)	PEC (Prof. Elect.Courses)	OEC (OpenElct.Courses)	MC(Mandatory Courses)	PST (Project / Seminar / Ind. Training)
Credits	-	--	--	5	--	--	--	--
Cumulative Sum	-	--	--	15	--	--	--	--

Progressive Total Credits 10+05=15

DKTES Textile and Engineering Institute,Ichalkaranji

(An Autonomous Institute)

Teaching and evaluation Scheme from year 2020-21

Department of Mechanical Engineering

Final Year B. Tech.(Semester – VII) in **Mechatronics** Honors for Mechanical, Electronics, Electronics and Telecommunication

Sr. No.	Course Code	Course Title	Course Category	Teaching scheme				Course Credits	Evaluation scheme					
									Theory			Practical		TOTAL
				L	T	P	Contact Hrs/wk		CIE		SEE	CIE	SEE	
									MSE	ISE				
1	MEL704	Drives and Motion Control	PCC	3	-	-	3	3	30	20	50	-	-	100
2	MEP 708	Mechatronics lab with Mini Project	PCC	-	-	-	4	2	-	-	-	50	50	100
		Total		**3**	**-**	**-**	**7**	**5**	**25**	**25**	**50**	**50**	**50**	**200**

L-Lecture
T-Tutorial
P-Practical

SE-I :Semester Examination-I
SE-II : Semester Examination-II

CIE – Continuous In Semester Evaluation
SEE-SemesterEnd Examination

Course Category	HSMC (Hum. & Social Sc.,Mgt)	BSC(Basic Sc.)	ESC Engg.Sc.)	PCC (Prof. Core Courses)	PEC (Prof. Elect.Courses)	OEC (OpenElct.Courses)	MC(Mandatory Courses)	PST (Project / Seminar / Ind. Training)
Credits	-	--	--	5	--	--	--	--
Cumulative Sum	-	--	--	20	--	--	--	--

Progressive Total Credits 15 + 05=20

S.Y. (MECHANICAL) SEM.- IV (HONOUR COURSE)

MEL701: FLUID POWER

Teaching Scheme	
Lectures	4 Hrs/week
Total Credits	4

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	100

UNIT 1 **6 Hrs**

Introduction to fluid Power: Introduction of Hydraulics and pneumatics system, basic elementsof fluid power system, Difference between hydraulics and pneumatics system, General features applications in various fields of engineering, ISO/JIC Symbols, Advantages and disadvantages.

UNIT 2 **7Hrs**

Elements of Hydraulic System: Pumps- Types, selection criteria, Actuators, Rotary & reciprocating cylinders – types and their mountings.

UNIT 3 **6 Hrs**

Elements of Pneumatic System: Air compressor- Types, selection criteria, piping layout, Air motor – types, Comparison with hydraulic and electric motor. Actuators and their mountings.

UNIT 4 **7 Hrs**

Fluid power controls: Direction control valves (two way, three way, four way), check valves, flow control valves, pressure control valves, speed regulators, quick exhaust valves, solenoid, pilot operated valves, , Serving of compressed air– filters, regulators, lubricators (FRL unit), mufflers, dryers.

UNIT 5 **7Hrs**

Fluid Power circuits: Basic fluid power circuits, impulse operation, speed control, pneumatic motor circuit, sequencing of motion, time delay circuit & their applications.

UNIT 6 **6Hrs**

Maintenance fluid system and fluidics:

Maintenance, troubleshooting and safety of hydraulic and pneumatic systems.

Introduction to fluidics – study of simple logic gates, Pneumatic sensors, applications.

TEXT BOOKS:

1. K. Shanmuga Sundaram- Hydraulic and Pneumatic Controls
2. Sameer Shaikh and Khan- Hydraulics and Pneumatics
3. 3. J. J. Pipenger- Industrial hydraulic- McGraw Hill.

REFERENCE BOOKS

1. S. R. Mujumdar- Oil hydraulics Systems- Principles and Maintenance.
2. S. R. Mujumdar- Pneumatic Systems- Principles and Maintenance.
3. H. L. Stewart- Hydraulic and Pneumatic- Industrial press.
4. D. A. Pease, Basic fluid Power-PHL

5.Joji P., Pneumatic Controls, Wiley India Pvt. Ltd.

6. H. s. Stewart- practical guide to Fluid Power.

7.. B. Lal- oil Hydraulics- Intl. Literature.

Third Year B. Tech. Semester V

MEL702: SENSORS AND DIGITAL LOGIC

Teaching Scheme	
Lectures	4 Hrs/Week
Total Credits	4

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	**100**

PREREQUISITES- Measurement and Testing

COURSE OBJECTIVES:

1. To provide in depth knowledge in physical principles applied in sensing, measurement and a comprehensive understanding on how measurement systems are designed, calibrated, characterized, and analyzed.
2. To introduce the students to sources and detectors of various Optical sensing mechanisms and provide in-depth understanding of the principle of measurement, and theory of instruments and sensors for measuring velocity and acceleration
3. To give a fundamental knowledge on the basic laws and phenomena on which operation of sensor transformation of energy is based.
4. To impart a reasonable level of competence in the design, construction, and execution of mechanical measurements strain, force, torque and pressure

COURSE OUTCOMES:

At the end of the course the students will be able to:

1. Use concepts in common methods for converting a physical parameter into an electrical quantity
2. Choose an appropriate sensor comparing different standards and guidelines to make sensitive measurements of physical parameters like pressure, flow, acceleration, etc
3. Locate different type of sensors used in real life applications and paraphrase their importance

Course Contents

Unit 1. Introduction: 06 Hrs.

Sensor, Sensor Classification, Performance and Types, Error Analysis characteristics, applications in industrial automation and robotics

Unit 2. Optical Sensors and Detectors: 10 Hrs.

Electronic and Optical properties of semiconductor as sensors, LED,

Semiconductor lasers, Fiber optic sensors, Thermal detectors, Photo multipliers, photoconductive detectors, Photo diodes, Avalanche photodiodes, CCDs.

Unit 3. Strain, Force, Torque and Pressure sensors: 10 Hrs.

Strain gages, strain gage beam force sensor, piezoelectric force sensor, load cell, torque sensor, Piezo-resistive and capacitive pressure sensor, optoelectronic pressure sensors, vacuum sensors.

Unit 4. Position, Direction, Displacement and Level sensors: 7 Hrs.

Potentiometric and capacitive sensors, Inductive and magnetic sensor, LVDT, RVDT, eddy current, transverse inductive, Hall effect, magneto resistive, magneto strictive sensors. Fiber optic liquid level sensing, Fabry Perot sensor, ultrasonic sensor, capacitive liquid level sensor.

Unit 5. Velocity and Acceleration sensors: 11 Hrs.

Electromagnetic velocity sensor, Doppler with sound, light, Accelerometer characteristics, capacitive, piezo-resistive, piezoelectric accelerometer, thermal accelerometer, rotor, monolithic and optical gyroscopes

Unit 6. Digital logic : 8 Hrs

Basics of digital logics, logic system, flip flop circuits,, gates, applications

Text Books:

1 Jacob Fraden, "Hand Book of Modern Sensors: physics, Designs and Applications", 2015, 3rd edition, Springer, New York.

2. Jon. S. Wilson, "Sensor Technology Hand Book", 2011, 1st edition, Elsevier, Netherland.

3. Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering 4/ED by W. Bolton Pearson Education

4. A Textbook of Mechatronics by Rajput R.K. S Chand & Company

Reference Books

1. Gerd Keiser,"Optical Fiber Communications", 2012, 4th edition, McGraw-Hill Science, Delhi.

2. John G Webster, "Measurement, Instrumentation and sensor Handbook", 2014, 2nd edition, CRC Press, Florida.

3. Eric Udd and W.B. Spillman, "Fiber optic sensors: An introduction for engineers and scientists", 2013, 2nd edition, Wiley, New Jersey.

4. Bahaa E. A. Saleh and Malvin Carl Teich, "Fundamentals of photonics", 2012, 1st edition, John Wiley, New York.

Third Year B. Tech. Semester VI

MEL703: SCADA AND INDUSTRY 4.0

Teaching Scheme	
Lectures	4 Hrs/Week
Total Credits	4

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	**100**

PREREQUISITES- Industrial Fluid Power, Sensors and Digital Logic

COURSE OBJECTIVES:

5. To make the students conversant to various concepts in Industry 4.0 and an overall view of technologies involved like Internet of Things, Artificial Intelligence, Machine Learning, Big Data, SCADA, etc.

6. To make students aware of the industrial activities and recent trends and practices in the context of Industry 4.0 in manufacturing sector for productivity improvement and cost, time and human intervention reduction.

7. To help students compare and understand innovative digital business strategies and their impact on corporate decisions and the company's growth/sustainability and gain an insight about how smartness is being harnessed from data and appreciate what needs to be done in order to overcome some of the challenges.

COURSE OUTCOMES:

At the end of the course the students will be able to:

1. Understand industrial scenario and various activities carried out in industry.

2. Gain an overview of Industry 4.0 and enablers of Industry 4.0 like Internet of Things, Artificial Intelligence, Machine Learning, Big Data, SCADA, etc.

3. Appreciate the smartness offered by comprehending the applications of Industry 4.0, SCADA and related technologies.

Course Contents

Unit 1. Introduction: 06 Hrs.

What is an industry, Classification of industries, Concept of Production and Production System, Introduction to Production / Operations Management,

Major activities in Operations Management – Plant Layout, Material Handling, Product Design, Process Design, Quality Control, Materials and Maintenance Management

Unit 2. Industry 4.0: 10 Hrs.

Definition, Development from Industry 1.0 to Industry 4.0, Main characteristics and advantages, Steps in implementing digital transformation, Common roadblocks in implementation, Requirements of Industry 4.0, Technologies, Processes, and Terms of Industry 4.0

Unit 3. Internet of Things (IoT): 10 Hrs.

Internet of Things – Definition, Concept and History, IoT network, architecture and design and their comparison, Sensors in IoT, Wireless technologies for IoT – Bluetooth, Zigbee and Wi-Fi, IoT platforms – Arduino and Raspberry Pi, Benefits of IoT to organizations, Advantages and limitations of IoT, Security issues in IoT, IoT Data Management, IoT functional stack

Unit 4. Industry 4.0 and IoT Applications: 7 Hrs.

Applications of Industry 4.0 and IoT with special reference to Smart Factory, Smart Cities, Smart Home, Smart Autonomous Cars, Smart Retail, Energy Management, IoT in Healthcare, 3 D printing

Unit 5. Industry 4.0 Technologies: 11 Hrs.

Introduction, Big Data – Definition, Types, Characteristics, Benefits of Big data processing, Artificial Intelligence and Machine Learning – Definition, Types, Advantages and Applications, Augmented Reality – Introduction and Applications, Cloud Computing – Introduction, Types and Applications, Cyber Physical Systems – Introduction, Advantages and Applications.

Unit 6. Supervisory Control and Data Acquisition (SCADA): 8 Hrs

Introduction, Objectives, Functions, Advantages, Typical SCADA system hardware and software, Human Machine Interface (HMI) and Machine to Machine Interface Network Topology, Open System Interconnection, Applications of SCADA to industry with special reference to power plant, process control, foundry and forging, Introduction to Real Time Systems and Applications

Text Books:

1. Operations Management, S. Anil Kumar, N. Suresh, New Age International Publishers, 2009, ISBN (13) : 978-81-224-2883-4

2. Internet of Things: A Hands-On Approach, Arshdeep Bahga, Vijay Madisetti, Orient Blackswan Private Limited - New Delhi; First edition (1 January 2015), ISBN-10 : 8173719543

3. Internet of Things : Architecture and Design Principles, Rajkamal, McGraw Hill Education; First edition (10 March 2017), ISBN-10 : 9352605225

4. Quick Start Guide to Industry 4.0: One-stop reference guide for Industry 4.0, Kiran Kumar Pabbathi, Createspace Independent Publishing Platform (11 May 2018), ISBN-10 : 1718978618

Reference Books:

1. SCADA, Stuart A. Boyer (ISA Publi.) ISBN 1-55617-660-0.

2. Practical SCADA for industry, David Bailey, (Elsevier Publi.) ISBN 0-7506-5805-3

3. Basics of Artificial Intelligence and Machine Learning, Dr. Dheeraj Mehrotra, Notion Press; 1st edition (1 January 2019), ISBN-10 : 1645872823

Web References:

1. https://internetofthingsagenda.techtarget.com/definition/Internet-of-Things-IoT
2. https://iotdunia.com/iot-architecture/
3. https://partsolutions.com/industry-4-0/#iiot
4. https://corporatefinanceinstitute.com/resources/knowledge/economics/industry/
5. https://www.toppr.com/guides/geography/industries/introduction-to-industry/
6. https://www.guru99.com/what-is-big-data.html
7. https://www.javatpoint.com/artificial-intelligence-tutorial
8. https://www.analyticssteps.com/blogs/what-augmented-reality-introduction-applications-and-threats
9. https://iot4beginners.com/commonly-used-sensors-in-the-internet-of-things-iot-devices-and-their-application/
10. https://www.finoit.com/blog/top-15-sensor-types-used-iot/
11. https://www.electronicdesign.com/technologies/iot/article/21801725/12-wireless-options-for-iotm2m-diversity-or-dilemma
12. https://www.designrush.com/trends/iot-security-issues

13.https://www.dataversity.net/data-management-internet-things/
14.https://www.allerin.com/blog/iot-data-management-the-benefits-challenges-and-strategies
15.https://environmental-conscience.com/smart-homes-pros-cons/
16.https://spd.group/artificial-intelligence/ai-for-retail/
17.https://www.hitachi.com/rd/sc/aiblog/023/index.html
18.https://www.upgrad.com/blog/what-is-big-data-types-characteristics-benefits-and-examples/
19.https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7340599/#:~:text=1.1.,and%20their%20large%20scale%20deployment.

Completed Journal

Final Year B. Tech. Semester VII

MEL704: Drives and Motion Control

Teaching Scheme	
Lectures	3 Hrs/Week
Total Credits	3

Evaluation Scheme	
MSE	30
ISE	20
SEE	50
Total	**100**

PREREQUISITES- Basic Electrical Engineering.

COURSE OBJECTIVES:

1. To make the students aware of the working of different types of D.C. and A.C. Servo Motors.
2. To make students aware of the different drives used for Motor control along with advanced drives like Motion Logic Drives.

COURSE OUTCOMES:

At the end of the course the students will be able to:

1. Understand the working of different types of D.C. and A.C. Servo Motors.
2. Understand the working of Stepper and Linear Motors.
3. Apply different drive systems according to the application.
4. Understand advanced drives like Motion Logic Drives.

Unit 1 **(7)**

D.C. Servo Motors: Construction, working, applications, Torque Speed Characteristics, Selection

Unit 2 **(7)**

A.C. Servo Motors: Construction, working, applications, Torque Speed Characteristics, Selection

Unit 3 **(6)**

Stepper Motors: Constructional features –Principle of operation –Types – Torque predictions – Linear and Nonlinear analysis – Characteristics – Drive circuits – Closed loop control – Applications. High-Speed Operation of Stepper-Motors: Pull-out torque/speed, characteristics of

Hybrid stepper motors, calculation of pull-out torque, pull-out torque/speed characteristics for the VR stepper motors, calculation of the pull out torque.

Unit 4 **(6)**

Linear Motors: The principle, construction and operation of linear induction motors, Goodness factor, short stator and short rotor effect High speed and low-speed applications.

Unit 5 **(6)**

AC DRIVES: Principles of speed control , Various methods of Induction motor drive, Variable voltage operation, Variable frequency operation, Constant flux operation, Torque-Slip characteristic, Constant Torque and Constant power operation, Implementation of V/f control with slip compensation scheme

Unit 6 **(6)**

Motion Logic Drives: Working, applications.

Reference Books:

1. N. Mohan, Electric Machines and Drives: A First Course, Wiley, 2012.

2. A. Veltman, D.W.J. Pulle, and R.W. DeDoncker, Advanced Electrical Drives: Analysis, Modeling, Control, Springer, 2011.

3. J.L. Kirtley, Electric Power Principles: Sources, Conversion, Distribution, and Use, Wiley, 2010.

4. A. Veltman, D.W.J. Pulle, and R.W. DeDoncker, Fundamentals of Electrical Drives, Springer, 2007.

5. I. Boldea and S.A Nasar, Electric Drives, CRC Press, 2nd ed. 2006.

6. J. Chiasson, Modeling and High Performance Control of Electric Machines, Wiley-IEEE, 2005.

7. Motion Logic Drives by Bosch Rexroth Mannuals.

S.Y. (MECHANICAL) SEM.- IV (HONOUR COURSE)

MEP705: FLUID POWER

Teaching Scheme	
Practical	2Hrs/week
Total Credits	1

Evaluation Scheme	
CIE	50
Total	50

TERM WORK

1) Study of ISO/JIC Symbols for fluid power systems.

2) Interdisciplinary applications of fluid power system.

3) Study of types of pressure control valves used in fluid power system.

4) Study of types of direction control valves used in fluid power system.

5) Study of types of flow control valves used in fluid power system.

6) At least four circuit preparations on Hydraulic trainer kit.

7) At least four circuit preparation on Pneumatic trainer kit.

8) At least two circuit preparation using Fluid simulation software.

9) Industrial visits are recommended for applications of Fluid power and their reports.

Third Year B. Tech. Semester V

MEP706: SENSORS AND DIGITAL LOGIC

Teaching Scheme		**Evaluation Scheme**	
Practical	2 Hrs./Week	CIE	50
Total Credits	1	**Total**	**50**

List of Experiments

Sr. No.	**Experiment/Assignment Title**
1	Assignment on Sensors and Transducers
2	Assignment on Optical Sensors and Detectors
3	Assignment on Strain, Force, Torque and Pressure sensors
4	Assignment on Position, Direction, Displacement and Level sensors
5.	Assignment on Velocity and Acceleration sensors
6	Assignment on Digital logic

Text Books:

1 Jacob Fraden, "Hand Book of Modern Sensors: physics, Designs and Applications", 2015, 3rd edition, Springer, New York.

2. Jon. S. Wilson, "Sensor Technology Hand Book", 2011, 1st edition, Elsevier, Netherland.

3. Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering 4/ED by W. Bolton Pearson Education

4. A Textbook of Mechatronics by Rajput R.K. S Chand & Company

Reference Books

1. Gerd Keiser,"Optical Fiber Communications", 2012, 4th edition, McGraw-Hill Science, Delhi.

2. John G Webster, "Measurement, Instrumentation and sensor Handbook", 2014, 2nd edition, CRC Press, Florida.

3. Eric Udd and W.B. Spillman, "Fiber optic sensors: An introduction for engineers and scientists", 2013, 2nd edition, Wiley, New Jersey.

4. Bahaa E. A. Saleh and Malvin Carl Teich, "Fundamentals of photonics", 2012, 1st edition, John Wiley, New York.

Submission:

Completed Journal

Third Year B. Tech. Semester VI

MEP707: INDUSTRY 4.0 AND SCADA

Teaching Scheme		**Evaluation Scheme**	
Practical	2 Hrs./Week	CIE	50
Total Credits	1	**Total**	**50**

List of Experiments

Sr. No.	**Experiment/Assignment Title**
1	Assignment on Industry and Production Management
2	Assignment on Industry 4.0
3	Assignment on Internet of Things
4	Assignment on Industry 4.0 and IoT Applications
5.	Assignment on Industry 4.0 Technologies
6	Assignment on SCADA

Text Books:

1. Operations Management, S. Anil Kumar, N. Suresh, New Age International Publishers, 2009, ISBN (13) : 978-81-224-2883-4

2. Internet of Things: A Hands-On Approach, Arshdeep Bahga, Vijay Madisetti, Orient Blackswan Private Limited - New Delhi; First edition (1 January 2015), ISBN-10 : 8173719543

3. Internet of Things: Architecture and Design Principles, Rajkamal, McGraw Hill Education; First edition (10 March 2017), ISBN-10 : 9352605225

4. Quick Start Guide to Industry 4.0: One-stop reference guide for Industry 4.0, Kiran Kumar Pabbathi, Createspace Independent Publishing Platform (11 May 2018), ISBN-10 : 1718978618

Reference Books:

1. SCADA, Stuart A. Boyer (ISA Publi.) ISBN 1-55617-660-0.

2. Practical SCADA for industry, David Bailey, (Elsevier Publi.) ISBN 0-7506-5805-3

3. Basics of Artificial Intelligence and Machine Learning, Dr. Dheeraj Mehrotra, Notion Press; 1st edition (1 January 2019), ISBN-10 : 1645872823

Submission:

Final Year B. Tech. Semester VII

MEP708: Mechatronics Lab with Mini Project

Teaching Scheme		**Evaluation Scheme**	
Practical	2 Hrs./Week	CIE	50
		SEE	50
Total Credits	2	**Total**	**100**

Course Objectives:

1. Embed the skill in group of students to work independently on a topic/problem/experimentation selected by them and encourage them to think independently on their own to bring out the conclusion under the given circumstances of the curriculum period in the budget provided with the guidance of the faculty.
2. Encourage creative thinking process to help them to get confidence by planning and carrying out the work plan of the project and to successfully complete the same, through observations, discussions and decision making process.
3. To study the concepts of optimization of mechanical systems/ elements.

Course Outcomes:

1. Improve the professional competency and research aptitude in relevant area.
2. Develop the work practice in students to apply theoretical and practical tools/techniques to solve real life problems related to industry and current research.

Load:

A batch of maximum four students per group, shall work under one Faculty member of department. The group of one student is strictly not allowed.

Term Work:

The term work under project submitted by students shall include

d. Synopsis.

The group should submit the synopsis in following format

2. The synopsis shall be signed by the each student in the group, approved by the guide and endorsed by the Head of the Department
3. Presentation: The group has to make a presentation in front of the Faculty members of department at the end of semester.

Important Notes:

• One copy of the report should be submitted to Institute/ Department, One copy to Guide and one copy should remain with each student of the project group.