D.K.T.E. Society's
Textile and Engineering Institute,
Rajwada, Ichalkaranji- 416115

(An Empowered Autonomous Institute Affiliated to Shivaji University, Kolhapur)

NAAC Accredited with A+ Grade, ISO 9001:2015 Certified

DEPARTMENT: Mechanical Engineering

CURRICULUM

Honors in "Mechatronics"

With effect from 2024-25

Teaching and Evaluation Scheme for Honors in "Mechatronics"

Sr. No.	Course Code	Course Title	Semester	Teaching Scheme				Course Credits	Evaluation scheme					
									Theory			Practical		Total
									CIE		SEE	CIE	SEE	
				L	T	P	Contact Hrs/wk		SE-I	SE-II				
01	01MEHOL1201	Fluid Power	IV	4	0	0	4	4	25	25	50	0	0	100
02	01MEHOP1202	Fluid Power Lab	IV	0	0	2	2	1	0	0	0	50	0	50
03	01MEHOL1301	Sensors and Digital Logic	V	3	0	0	3	3	25	25	50	0	0	100
04	01MEHOP1302	Sensors and Digital Logic Lab	V	0	0	2	2	1	0	0	0	50	0	50
05	01MEHOL1303	SCADA and Industry 4.0	VI	3	0	0	3	3	25	25	50	0	0	100
06	01MEHOP1304	SCADA and Industry 4.0 Lab	VI	0	0	2	2	1	0	0	0	50	0	50
07	01MEHOL1401	Drives and Motion Control	VII	3	0	0	3	3	25	25	50	0	0	100
08	01MEHOP1402	Mechatronics Lab with Mini Project	VII	0	0	4	4	2	0	0	0	50	50	100
			Total	13	0	10	23	18	100	100	200	200	50	650

L- Lecture T-Tutorial P-Practical SE-I: Semester Examination-I SE-II: Semester Examination-II CIE – Continuous in Semester Evaluation SEE- Semester End Examination

Second Year B. Tech. Hons. - (Mechatronics) (Semester–IV)								
Course Code	01MEHOL1201		**Course Name**	Fluid Power				
Teaching Scheme					**Evaluation Scheme**			
L	T	P	Credits		SE-I Marks	SE-II Marks	SEE Marks	
04	-	-	04		25	25	50	

Pre-requisites: .Basic Mechanical Engg.

Course Objectives:

01	To draw ISO symbols of fluid power elements and fluid power circuits
02	To design and analyze the fluid power circuits for industrial applications
03	To construct different fluid power elements and fluidic systems.
04	To evaluate maintenance and troubleshooting related problems in fluid power systems

Course Outcomes:

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

01	Identify and sketch ISO symbols of fluid power elements and fluid power circuits.
02	Design and analyze the fluid power circuits for industrial applications.
03	Explain construction and working of different fluid power elements and fluidic systems.
04	Evaluate maintenance and troubleshooting related problems in fluid power systems.

Course Contents

Unit I	**Introduction to Fluid Power**	**7 Hours**
Introduction of Hydraulics and pneumatics system, basic elements of fluid power system, Difference between hydraulics and pneumatics system, General features applications in various fields of engineering, ISO/JIC Symbols, Advantages and disadvantages.		
Unit II	**Elements of Hydraulic System**	**7 Hours**
Pumps- Types, selection criteria, Actuators, Rotary & reciprocating cylinders – types and their mountings.		
Unit III	**Elements of Pneumatic System**	**7 Hours**
Air compressor- Types, selection criteria, piping layout, Air motor – types, Comparison with hydraulic and electric motor. Actuators and their mountings.		
Unit IV	**Fluid power controls**	**7 Hours**

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 V	**Fluid Power circuits**	**7 Hours**
Basic fluid power circuits, impulse operation, speed control, pneumatic motor circuit, sequencing of motion, time delay circuit & their applications.		
Unit VI	**Maintenance fluid system and fluidics**	**7 Hours**
Maintenance, troubleshooting and safety of hydraulic and pneumatic systems. Introduction to fluidics – study of simple logic gates, Pneumatic sensors, applications.		
Texts Books:		
1	K. Shanmuga Sundaram- Hydraulic and Pneumatic Controls	
2	Sameer Shaikh and Khan- Hydraulics and Pneumatics	
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.	
Supplementary Readings:		

Second Year B. Tech. Hons. - (Mechatronics) (Semester–IV)						
Course Code	01MEHOP1202		**Course Name**	Fluid Power Lab		
Teaching Scheme					**Evaluation Scheme**	
L	T	P	Credits		CIE Marks	SEE Marks
0	0	2	1		50	--

Prerequisites: Basic Mechanical Engg.

Course Objectives:

01	To draw ISO symbols of fluid power elements and fluid power circuits
02	To design and analyze the fluid power circuits for industrial applications
03	To construct different fluid power elements and fluidic systems.
04	To evaluate maintenance and troubleshooting related problems in fluid power systems.

Course Outcomes:

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

01	Identify and sketch ISO symbols of fluid power elements and fluid power circuits.
02	Design and analyze the fluid power circuits for industrial applications.
03	Explain construction and working of different fluid power elements and fluidic systems.
04	Evaluate maintenance and troubleshooting related problems in fluid power systems.

List of Experiments

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.

Texts Books:

1	K. Shanmuga Sundaram- Hydraulic and Pneumatic Controls
2	Sameer Shaikh and Khan- Hydraulics and Pneumatics
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. Hons. - (Mechatronics) (Semester–V)								
Course Code	01MEHOL1301		**Course Name**	Sensors and Digital Logic				
Teaching Scheme					**Evaluation Scheme**			
L	T	P	Credits		SE-I Marks	SE-II Marks	SEE Marks	
03	-	-	03		25	25	50	

Pre-requisites: . Basic Mechanical Engg.

Course Objectives:

01	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.
02	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
03	To give a fundamental knowledge on the basic laws and phenomena on which operation of sensor transformation of energy is based.
04	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, students will be able to

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

Course Contents

Unit I	**Introduction**	**6 Hours**
Sensor, Sensor Classification, Performance and Types, Error Analysis characteristics, applications in industrial automation and robotics.		
Unit II	**Optical Sensors and Detectors**	**7Hours**
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 III	**Strain, Force, Torque and Pressure sensors**	**7Hours**
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 IV	**Position, Direction, Displacement and Level sensors**	**7 Hours**

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 V	**Velocity and Acceleration sensors**	**6 Hours**
Electromagnetic velocity sensor, Doppler with sound, light, Accelerometer characteristics, capacitive, piezo-resistive, piezoelectric accelerometer, thermal accelerometer, rotor, monolithic and optical gyroscopes.		
Unit VI	**Digital Logic**	**6 Hours**
Basics of digital logics, logic system, flip flop circuits,, gates, applications.		
Texts 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.	
Supplementary Readings:		

Third Year B. Tech. Hons. - (Mechatronics) (Semester–V)						
Course Code	01MEHOP1302		**Course Name**	Sensors and Digital Logic Lab		
Teaching Scheme					**Evaluation Scheme**	
L	T	P	Credits		CIE Marks	SEE Marks
0	0	2	1		50	--

Prerequisites: Basic Mechanical Engg.

Course Objectives:

On completion of the course, student will be able -

01	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.
02	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.
03	To give a fundamental knowledge on the basic laws and phenomena on which operation of sensor transformation of energy is based.
04	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, students will be able to

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

List of Experiments

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

Texts 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 Ed., John Wiley, NY.

Third Year B. Tech. Hons. - (Mechatronics) (Semester–VI)							
Course Code	01MEHOL1303		**Course Name**	SCADA and Industry 4.0			
Teaching Scheme					**Evaluation Scheme**		
L	T	P	Credits		SE-I Marks	SE-II Marks	SEE Marks
03	-	-	03		25	25	50

Pre-requisites: Basic Mechanical Engg.

Course Objectives:

01	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.
02	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.
03	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, students will be able to

01	Understand industrial scenario and various activities carried out in industry.
02	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.
03	Appreciate the smartness offered by comprehending the applications of Industry 4.0, SCADA and related technologies.

Course Contents

Unit I	Introduction	6 Hours

What is an industry, Classification of industries, Convergence of Mechanical industry with other engineering domains, Concept of Production and Production System, Major activities in an industry – Plant Layout, Material Handling, Product Design, Process Design, Maintenance Management, Quality Management, Digitization in mechanical industry – Benefits and Threats..

Unit II	Supervisory Control and Data Acquisition (SCADA)	7 Hours

Introduction, Objectives, Functions, Advantages, Typical SCADA system hardware, SCADA key features, DCS vs SCADA, Human Machine Interface (HMI), Network Topology, Applications of SCADA to industry with special reference to process control, foundry and forging, Introduction to Real Time Systems and Applications.

Unit III	Demystifying Industry 4.0	7 Hours

Definition, Development from Industry 1.0 to Industry 4.0, Main characteristics of Industry 4.0, Advantages of Industry 4.0 to industries and technology users, Steps in implementing digital transformation, 4Ps of digital transformation, Common roadblocks in implementation, Requirements of Industry 4.0, Technologies, Processes, and Terms of Industry 4.0, Industry 4.0 status in SMEs.

Unit IV	Internet of Things (IoT)	7 Hours

Internet of Things – Definition, Concept and History, IoT network, architecture, design and their comparison, Sensors in IoT, Wireless technologies for IoT – Bluetooth, Zigbee and Wi-Fi, etc., 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 V	**Industry 4.0 and IoT Applications**	**6 Hours**
Applications of Industry 4.0 and IoT with special reference to Smart Factory, Smart Cities, Smart Home, Smart Autonomous Cars, Smart Retail, IoT in Healthcare, 3 D printing		
Unit VI	**Industry 4.0 Technologies**	**6 Hours**
Introduction, Big Data – Definition, Types, Characteristics and Benefits of Big data, 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.		

Texts 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

Reference 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

Supplementary Readings:

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.mckinsey.com/featured-insights/mckinsey-explainers/what-are-industry-4-0-the-fourth-industrial-revolution-and-4ir

Third Year B. Tech. Hons. - (Mechatronics) (Semester–VI)						
Course Code	01MEHOP1304		**Course Name**	SCADA and Industry 4.0 Lab		
Teaching Scheme					**Evaluation Scheme**	
L	T	P	Credits		CIE Marks	SEE Marks
0	0	2	1		50	--

Prerequisites:

Course Objectives:

01	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.
02	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.
03	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, students will be able to

01	Understand industrial scenario and various activities carried out in industry.
02	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.
03	Appreciate the smartness offered by comprehending the applications of Industry 4.0, SCADA and related technologies.

List of Experiments

1	Assignment on Industry and Digitization in industries
2	Assignment on Demystifying 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

Texts Books:

5	SCADA, Stuart A. Boyer (ISA Publi.) ISBN 1-55617-660-0.
6	Practical SCADA for industry, David Bailey, (Elsevier Publi.) ISBN 0-7506-5805-3
7	Basics of Artificial Intelligence and Machine Learning, Dr. Dheeraj Mehrotra, Notion Press; 1st edition (1 January 2019), ISBN-10 : 1645872823

Reference Books:

5	Mechatronics, Venkatesh Naik, Sunstar Publisher, 2021
6	N.C.Braga, Mechatronics Source Book, Cengage Learning
7	Mechatronics : Integrated Mechanical Electronic System, Ramchandran Willey India

	Submission : Completed journal

Final Year B. Tech. Hons. - (Mechatronics) (Semester–VII)							
Course Code	01MEHOL1401		**Course Name**	Drivers and Motion Control			
Teaching Scheme					**Evaluation Scheme**		
L	T	P	Credits		SE-I Marks	SE-II Marks	SEE Marks
03	-	-	03		25	25	50

Pre-requisites: Basic Electrical Engineering.

Course Objectives:

01	To make the students aware of the working of different types of D.C. and A.C. Servo Motors.
02	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, students will be able to

01	Understand the working of different types of D.C. and A.C. Servo Motors.
02	Understand the working of Stepper and Linear Motors.
03	Apply different drive systems according to the application.
04	Understand advanced drives like Motion Logic Drives.

Course Contents

Unit I	**D.C. Servo Motors**	**7 Hours**
Construction, working, applications, Torque Speed Characteristics, Selection		
Unit II	**A.C. Servo Motors**	**7 Hours**
Construction, working, applications, Torque Speed Characteristics, Selection		
Unit III	**Stepper Motors**	**6 Hours**
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 IV	**Linear Motors**	**6 Hours**
The principle, construction and operation of linear induction motors, Goodness factor, short stator and short rotor effect High speed and low-speed applications.		
Unit V	**AC DRIVES**	**6 Hours**
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 VI	Motion Logic Drives	6 Hours
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.

Final Year B. Tech. Hons. - (Mechatronics) (Semester–VII)						
Course Code	01MEHOP1402		**Course Name**	Mechatronics Lab with Mini Project		
Teaching Scheme					**Evaluation Scheme**	
L	T	P	Credits		CIE Marks	SEE Marks
0	0	4	2		50	50

Prerequisites:	
Course Objectives:	
01	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.
02	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.
03	To study the concepts of optimization of mechanical systems/ elements.
Course Outcomes:	
At the end of the course, students will be able to	
01	Improve the professional competency and research aptitude in relevant area.
02	Develop the work practice in students to apply theoretical and practical tools/techniques to solve real life problems related to industry and current research.
List of Experiments	

	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.
	The term work under project submitted by students shall include
1	Synopsis.
	The group should submit the synopsis in following format.
	The synopsis shall be signed by the each student in the group, approved by the guide and endorsed by the Head of the Department
2	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.
	Submission : Completed journal