

**ANNA UNIVERSITY, CHENNAI**  
**AFFILIATED INSTITUTIONS**  
**B.E. MECHATRONICS ENGINEERING**  
**REGULATIONS – 2017**  
**CHOICE BASED CREDIT SYSTEM**

**1. PROGRAMME EDUCATIONAL OBJECTIVES:**

Bachelor of Mechatronics Engineering curriculum is designed to prepare the graduates having attitude and knowledge to

1. Develop innovative and sustainable products with multidisciplinary Engineering expertise.
2. Solve complex engineering problems by applying mechanical, electrical and computer knowledge and engage in lifelong learning in their profession
3. Work or pursue higher education in multicultural, multilingual and multinational environment with competent oral and written communication.
4. Lead and contribute in a team entrusted with professional, social and ethical responsibilities.

**2. PROGRAMME OUTCOMES:**

- a. Will be able to apply the laws of science and mathematics to provide engineering solutions to solve complex problems.
- b. Will be able to identify and analyze complex problems by modeling with the help of literature survey and validate the solution with experiments.
- c. Will be able to design and develop Mechatronics systems by selecting and integrating, sensors, appropriate materials, mechanics, thermal systems, manufacturing and automation methods.
- d. Will be able to collect, condition monitor and interpret data to provide engineering solutions.
- e. Will be able to create applications, products as well as modernizing the existing systems by using latest tools and technologies.
- f. Will be able to develop solutions for local and global requirements by applying engineering knowledge and professional ethics.
- g. Will have professional values on environmental and energy consumption for sustainability.
- h. Will be able to become a leader and contribute in a team with entrepreneurial qualities.
- i. Will be able to interact effectively in both oral and written format.
- j. Will continuously update their knowledge and skills to meet the ever changing global needs.

**3. PEO / PO Mapping**

PEO / PO	a	b	c	d	e	f	g	h	i	j
1	✓	✓	✓	✓	✓	✓	✓			
2	✓	✓	✓	✓	✓	✓				✓
3									✓	✓
4							✓	✓	✓	

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**I TO VIII SEMESTERS CURRICULA AND SYLLABI**

**SEMESTER I**

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
<b>THEORY</b>								
1.	HS8151	Communicative English	HS	4	4	0	0	4
2.	MA8151	Engineering Mathematics - I	BS	4	4	0	0	4
3.	PH8151	Engineering Physics	BS	3	3	0	0	3
4.	CY8151	Engineering Chemistry	BS	3	3	0	0	3
5.	GE8151	Problem Solving and Python Programming	ES	3	3	0	0	3
6.	GE8152	Engineering Graphics	ES	6	2	0	4	4
<b>PRACTICALS</b>								
7.	GE8161	Problem Solving and Python Programming Laboratory	ES	4	0	0	4	2
8.	BS8161	Physics and Chemistry Laboratory	BS	4	0	0	4	2
<b>TOTAL</b>				<b>31</b>	<b>19</b>	<b>0</b>	<b>12</b>	<b>25</b>

**SEMESTER II**

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
<b>THEORY</b>								
1.	HS8251	Technical English	HS	4	4	0	0	4
2.	MA8251	Engineering Mathematics - II	BS	4	4	0	0	4
3.	PH8251	Materials Science	BS	3	3	0	0	3
4.	BE8253	Basic Electrical, Electronics and Instrumentation Engineering	ES	3	3	0	0	3
5.	GE8291	Environmental Science and Engineering	HS	3	3	0	0	3
6.	GE8292	Engineering Mechanics	ES	5	3	2	0	4
<b>PRACTICALS</b>								
7.	GE8261	Engineering Practices Laboratory	ES	4	0	0	4	2
8.	BE8261	Basic Electrical, Electronics and Instrumentation Engineering Laboratory	ES	4	0	0	4	2
<b>TOTAL</b>				<b>30</b>	<b>20</b>	<b>2</b>	<b>8</b>	<b>25</b>



HS8581

**PROFESSIONAL COMMUNICATION**

L	T	P	C
0	0	2	1

**OBJECTIVES: The course aims to:**

- Enhance the Employability and Career Skills of students
- Orient the students towards grooming as a professional
- Make them Employable Graduates
- Develop their confidence and help them attend interviews successfully.

**UNIT I**

Introduction to Soft Skills-- Hard skills & soft skills - employability and career Skills—Grooming as a professional with values—Time Management—General awareness of Current Affairs

**UNIT II**

Self-Introduction-organizing the material - Introducing oneself to the audience – introducing the topic – answering questions – individual presentation practice— presenting the visuals effectively – 5 minute presentations

**UNIT III**

Introduction to Group Discussion— Participating in group discussions – understanding group dynamics - brainstorming the topic -- questioning and clarifying –GD strategies- activities to improve GD skills

**UNIT IV**

Interview etiquette – dress code – body language – attending job interviews– telephone/skype interview -one to one interview &panel interview – FAQs related to job interviews

**UNIT V**

Recognizing differences between groups and teams- managing time-managing stress- networking professionally- respecting social protocols-understanding career management-developing a long-term career plan-making career changes

**TOTAL : 30 PERIODS**

**OUTCOMES: At the end of the course Learners will be able to:**

- Make effective presentations
- Participate confidently in Group Discussions.
- Attend job interviews and be successful in them.
- Develop adequate Soft Skills required for the workplace

**Recommended Software**

1. Globearena
2. Win English

**REFERENCES:**

1. Butterfield, Jeff Soft Skills for Everyone. Cengage Learning: New Delhi, 2015
2. E. Suresh Kumar et al. Communication for Professional Success. Orient Blackswan: Hyderabad, 2015
3. Interact English Lab Manual for Undergraduate Students,. OrientBalckSwan: Hyderabad, 2016.
4. Raman, Meenakshi and Sangeeta Sharma. Professional Communication. Oxford University Press: Oxford, 2014
5. S. Hariharanetal. Soft Skills. MJP Publishers: Chennai, 2010.



**UNIT V CHASSIS AND SAFETY SYSTEMS****10**

Traction control system – Cruise control system – electronic control of automatic transmission – antilock braking system – electronic suspension system – working of airbag and role of MEMS in airbag systems – centralized door locking system – climate control of cars.

**TOTAL : 45 PERIODS****OUTCOMES:**

**After successful completion of this course, the students should be able to**

**CO1:** Know the importance of emission standards in automobiles.

**CO2:** Understand the electronic fuel injection/ignition components and their function.

**CO3:** Choose and use sensors and equipment for measuring mechanical quantities, temperature and appropriate actuators.

**CO4:** Diagnose electronic engine control systems problems with appropriate diagnostic tools.

**CO5:** Analyses the chassis and vehicle safety system.

**TEXT BOOK:**

1. Ribbens, "Understanding Automotive Electronics", 8<sup>th</sup> Edition, Elsevier, Indian Reprint, 2013

**REFERENCES**

1. Barry Hollembeak, "Automotive Electricity, Electronics & Computer Controls", Delmar Publishers, 2001.
2. Richard K. Dupuy "Fuel System and Emission controls", Check Chart Publication, 2000.
3. Ronald. K. Jurgon, "Automotive Electronics Handbook", McGraw-Hill, 1999.
4. Tom Denton, "Automobile Electrical and Electronics Systems", Edward Arnold Publishers, 2000.

**MT8811****PROJECT WORK**

L	T	P	C
0	0	20	10

**OBJECTIVES:**

- To develop knowledge to formulate a real world problem and project's goals.
- To identify the various tasks of the project to determine standard procedures.
- To identify and learn new tools, algorithms and techniques.
- To understand the various procedures for validation of the product and analysis the cost effectiveness.
- To understand the guideline to Prepare report for oral demonstrations.

Students in the form of group, not exceeding 3 members in a group to carry out their main project. It should be a Mechatronics project. However, special considerations can be given for interdisciplinary measurement and computer based simulation projects. This exception should be recorded and approved by the department committee. Management related projects will not be allowed. The interdisciplinary projects will carry more weight age. It is mandatory to publish their main project in national/international level conferences to appear in the viva-voce exam.

**TOTAL: 300 PERIODS****OUTCOMES:**

**After successful completion of this course, the students should be able to**

**CO1:** Design, analyze, realize / simulate a physical system by using the technology they learnt during the program.

**CO2:** Integrate various systems into one Mechatronics product.

**CO3:** Work in a team with confined time duration.

**CO4:** Disseminate his work both in oral and written format.









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S.P.G.C.Nagar, K.Vellakulam - 625 701, (Near Virudhunagar), Madurai District.

## **B.E-MECHATRONICS ENGINEERING**

**Regulation - 2020**

**AUTONOMOUS SYLLABUS**

**CHOICE BASED CREDIT SYSTEM (CBCS)**

**CURRICULUM AND SYLLABI**

**(III & IV)**

### **VISION:**

To make the Department of Mechatronics Engineering the unique of its kind in the field of Research and Development towards Industrial Automation & Robotics.

### **MISSION:**

To impart highly innovative and technical knowledge in Mechatronics Engineering to the urban and unreachable rural student folks through "Total Quality Education"

### **PROGRAM EDUCATION OBJECTIVES:**

Educational objectives of the course Bachelor of Mechatronics Engineering programme can be divided into

**PEO 1:** Graduates will be able to apply their multi-disciplinary knowledge to formulate, design, develop and analyse Mechatronics Systems.

**PEO 2:** Graduates will be able to come up with solution for any real time problems in the field of Mechatronics Engineering and allied areas demanded by the Industry and Society.

**PEO 3:** Graduates will be able to get familiarized with economical issues in Mechatronics Engineering and work in multi-disciplinary teams with ethical code of conduct.

**BE-MECHATRONICS ENGINEERING**  
**Regulation - 2020**  
**AUTONOMOUS SYLLABUS**  
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**(III & IV)**  
**SEMESTER III**

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
<b>THEORY</b>								
1	MA1373	Transforms and Partial Differential Equations	BS	3	1	0	4	4
2	EC1371	Digital Electronics	PC	3	0	0	3	3
3	MT1301	Analog Devices and Circuits	PC	3	0	0	3	3
4	MT1302	Fluid Mechanics and Thermal Sciences	PC	3	0	0	3	3
5	MT1303	Solid Mechanics	PC	3	0	0	3	3
6	MT1306	Electrical Circuits and Machines	ES	3	0	0	3	3
<b>PRACTICAL</b>								
7	MT1311	Solid and Fluid Mechanics Laboratory	PC	0	0	4	4	2
8	MT1316	Electrical Circuits and Machines Laboratory	ES	0	0	4	4	2
9	HS1321	Interpersonal Skills- Listening and Speaking	EE	0	0	2	2	1
<b>TOTAL</b>				<b>18</b>	<b>1</b>	<b>10</b>	<b>29</b>	<b>24</b>

**SEMESTER IV**

SI. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
<b>THEORY</b>								
1	MA1402	Statistics and Numerical Methods	BS	3	1	0	4	4
2	EE1471	Control Systems Engineering	PC	3	0	0	3	3
3	ME1471	Kinematics of Machinery	PC	3	0	0	3	3
4	MT1401	Manufacturing Technology	PC	3	0	0	3	3
5	MT1402	Microprocessors and its Applications	PC	3	0	0	3	3
6	MT1403	Sensors and Instrumentation	PC	3	0	0	3	3
<b>PRACTICAL</b>								
7	MT1411	Manufacturing Technology and Sensors Laboratory	PC	0	0	4	4	2
8	MT1412	Microprocessors and its Applications Laboratory	PC	0	0	4	4	2
9	HS1421	Introduction to Advanced Reading and Writing	EE	0	0	2	2	1
<b>TOTAL</b>				<b>18</b>	<b>1</b>	<b>10</b>	<b>29</b>	<b>24</b>

Wattmeter 300/600V,5/10A UPF	2
Wattmeter 150/300V,5/10A LPF	2
Wattmeter 300/600V,5/10A LPF	2
Stepper motor 5Kg	1
Synchronous motor 5KW	1
Rheostat 360 ohm/1.2A	3
Tachometer	5
Rheostat 50 ohm/5A	3
Resistors & Breadboards	-
Dual Regulated power supplies	6
Ammeter A.C and D.C	20
Voltmeters A.C and D.C	20

## HS1321 INTERPERSONAL SKILLS- LISTENING AND SPEAKING

L	T	P	C
0	0	2	1

### OBJECTIVES

The course will enable learners to:

- Equip students with the English language skills required for the successful undertaking of academic studies with primary emphasis on academic speaking and listening skills.
- Provide guidance and practice in basic general and classroom conversation and to engage in specific academic speaking activities.
- improve general and academic listening skills
- Make effective presentations.

### Unit I LISTENING AS A KEY SKILL 6

Listening as a key skill- its importance- speaking – give personal information – ask for personal information – express ability – enquire about ability – ask for clarification - Improving pronunciation– pronunciation basics — stressing syllables and speaking clearly – intonation patterns – conversation starters: small talk.

### Unit II LISTEN TO A PROCESS INFORMATION 6

Listen to a process information- give information, as part of a simple explanation — taking lecture notes – preparing to listen to a lecture – articulate a complete idea as opposed to



## REFERENCES

1. Bhatnagar, Nitin&MamtaBhatnagar,2010, *Communicative English for Engineers and Professionals*, Pearson, New Delhi.
2. Hughes, Glyn & Josephine Moate,2014, *Practical English Classroom*, Oxford University Press, Oxford.
3. Vargo, Mari,2013, *Speak Now Level 4*, Oxford University Press, Oxford.
4. Richards, C, Jack,2006,*Person to Person (Starter)*, Oxford University Press, Oxford.
5. Ladousse, Gillian Porter,2014, *Role Play*. Oxford University Press, Oxford.

## WEB RESOURCES

1. <https://www.cambridge.org/elt/blog/wp-content/uploads/2019/10/Learning-Language-in-Chunks.pdf>
2. <https://english.eagetutor.com/english/628-how-to-greet-your-boss-people-in-office.html>
3. <https://www.groupdiscussionideas.com/group-discussion-topics-with-answers/>
4. <https://www.bbc.co.uk/worldservice/learningenglish/business/talkingbusiness/unit3presentations/1opening.html>

**HS1421 AN INTRODUCTION TO ADVANCED READING  
AND WRITING**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>

**OBJECTIVES**

The Course will enable learners to:

- To strengthen the reading skills of students of engineering.
- To enhance their writing skills with specific reference to technical writing
- To develop their critical thinking skills.
- To provide more opportunities to develop their project and proposal writing skills

**UNIT I EFFECTIVE READING 6**

Reading – Strategies for effective reading-Use glosses and footnotes to aid reading comprehension- Read and recognize different text types-Predicting content using photos and title. Reading-Read for details-Use of graphic organizers to review and aid comprehension.

**UNIT II CRITICAL READING 6**

Reading– Understanding pronoun reference and use of connectors in a passage- speed reading techniques. Reading– Genre and Organization of Ideas- Reading– Critical reading and thinking- understanding how the text positions the reader.

**UNIT III PARAGRAPH WRITING 6**

Writing-Plan before writing- Develop a paragraph: topic sentence, supporting sentences, concluding sentence. Write a descriptive paragraph Writing-State reasons and examples to support ideas in writing– Write a paragraph with reasons and examples- Write an opinion paragraph

**UNIT IV ESSAY WRITING 6**

Writing– Elements of a good essay-Types of essays- descriptive-narrative- issue-based-argumentative-analytical.

**UNIT V EFFECTIVE WRITING 6**

Writing– Email writing- visumes – Job application- Report Writing - Project writing-Writing convincing proposals

**TOTAL: 30 PERIODS**

## **COURSE OUTCOMES**

- CO1 Understand how the text positions the reader
- CO2 Develop critical thinking while reading a text
- CO3 Develop a descriptive paragraph
- CO4 Make use of sentence structures effectively when creating an essay
- CO5 Demonstrate proper usage of grammar in writing E-Mails, Job application and project proposals

## **TEXT BOOKS**

1. Gramer, F, Margot & Colin, S, Ward, 2011, *Reading and Writing (Level 3)* Oxford University Press, Oxford.
2. Debra Daise, CharlNorloff, and Paul Carne, 2011, *Reading and Writing (Level 4)* Oxford University Press: Oxford.

## **REFERENCES**

1. Davis, Jason & Rhonda Liss. *Effective Academic Writing (Level 3)* Oxford University Press: Oxford, 2006
2. E. Suresh Kumar and et al. *Enriching Speaking and Writing Skills*. Second Edition. 2012, Orient Black swan:Hyderabad.
3. Withrow, Jeans and et al. *Inspired to Write. Readings and Tasks to develop writing skills*. 2004, Cambridge University Press: Cambridge.
4. Goatly, Andrew. *Critical Reading and Writing*, 2000, Routledge: United States of America.
5. Petelin, Roslyn & Marsh Durham, *The Professional Writing Guide: Knowing Well and Knowing Why*, 2004,Business & Professional Publishing: Australia.

## **WEB RESOURCES**

1. <http://learnenglishteens.britishcouncil.org/skills/reading>
2. <https://learnenglish.britishcouncil.org/skills/reading>
3. <https://www.readingrockets.org/article/25-activities-reading-and-writing-fun>
4. <https://linguapress.com/advanced.html>





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## **BE-MECHATRONICS ENGINEERING**

**Regulation - 2020**

### **AUTONOMOUS SYLLABUS**

**CHOICE BASED CREDIT SYSTEM (CBCS)**

**CURRICULUM**

**(V & VI semester)**

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Regulation - 2020

AUTONOMOUS SYLLABUS

CHOICE BASED CREDIT SYSTEM (CBCS)

CURRICULUM AND SYLLABI

( V & VI semester)

SEMESTER V

SI. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
<b>THEORY</b>								
1.	IT1471	Object Oriented Programming using JAVA (Theory Cum Lab)	PC	3	0	2	5	4
2.	MT1501	Machine Design	PC	3	0	0	3	3
3.	MT1502	Machine Dynamics for Mechatronics Engineers	PC	3	0	0	3	3
4.	MT1503	Power Electronic Converters and Drives	PC	3	0	0	3	3
5.	PE1	Professional Elective I	PE	3	0	0	3	3
6.	OE1	Open Elective I	OE	3	0	0	3	3
<b>PRACTICAL</b>								
7.	MT1511	Power Electronic Converters and	PC	0	0	4	4	2

		Drives laboratory						
8.	MT1512	Kinematics and Dynamics Laboratory	PC	0	0	4	4	2
9.	HS1521	Professional Communication	EE	0	0	2	1	1
<b>TOTAL</b>				<b>18</b>	<b>0</b>	<b>12</b>	<b>29</b>	<b>24</b>

### SEMESTER VI

SI. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
<b>THEORY</b>								
1.	MT1601	Design of Mechatronics System	PC	3	0	0	3	3
2.	MT1602	Fluid Power Systems (Theory Cum Lab)	PC	3	0	2	5	4
3.	MT1603	Industrial Automation (Theory Cum Lab)	PC	3	0	2	5	4
4.	PEII	Professional Elective–II	PE	3	0	0	3	3
5.	PEIII	Professional Elective–III	PE	3	0	0	3	3
6.		Online Course	OC	NPTEL/SWAYAM				3
<b>PRACTICAL</b>								
7.	MT1621	Design and Fabrication Project for Mechatronics Engineering	EE	0	0	4	4	2
<b>TOTAL</b>				<b>15</b>	<b>0</b>	<b>8</b>	<b>23</b>	<b>22</b>

L	T	P	C
0	0	2	1

**OBJECTIVES:**

The course aims to:

- Enhance the Employability and Career Skills of students
- Orient the students towards grooming as a professional
- Make them Employable Graduates
- Develop their confidence and help them attend interviews successfully.

**UNIT I****6**

Introduction to Soft Skills– Hard skills & soft skills – employability and career Skills— Grooming as a professional with values—Time Management—General awareness of Current Affairs- Error Spotting

**UNIT II****6**

Self-Introduction-organizing the material – Introducing oneself to the audience – introducing the topic – answering questions with clarity and appropriate phrases – individual presentation practice— presenting the visuals effectively – 5 minute presentations

**UNIT III****6**

Introduction to Group Discussion— Participating in group discussions – understanding group dynamics – brainstorming the topic -- questioning and clarifying –GD strategies- activities to improve GD skills

**UNIT IV****6**

Interview etiquette – dress code – body language – attending job interviews– telephone/skype interview -one to one interview & panel interview – FAQs related to job interviews

**UNIT V****6**

Recognizing differences between groups and teams - managing stress- networking professionally- respecting social protocols-understanding career management-developing a long-term career plan-making career changes

**TOTAL: 30 PERIODS**

**COURSE OUTCOMES:**

**After successful completion of the course, the students will be able to:**

- CO1:** Make effective presentations
- CO2:** Participate confidently in Group Discussions.
- CO3:** Participate confidently in Group Discussions.
- CO4:** Develop adequate Soft Skills required for the workplace

**REFERENCES:**

1. Butterfield, Jeff., 2015, *Soft Skills for Everyone*, Cengage Learning: New Delhi.
2. E. Suresh Kumar et al., 2015 , *Communication for Professional Success. Orient Blackswan: Hyderabad.*
- 3.OBS Exports ,2018 *Interact English Lab Manual for Undergraduate Students.* OrientBalckSwan: Hyderabad, .
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