Study & Evaluation Scheme

of

Bachelor of Technology
(Electrical Engineering)

[Applicable for Academic Session 2018-19]

[Approved by Hon'ble VC dated August 08, 2017]

[With revision approved by VC date July 23, 2018 & August 14, 2018, January 23, 2019 & November 29, 2019]

TEERTHANKER MAHAVEER UNIVERSITY

N.H.-24, Delhi Road, Moradabad, Uttar Pradesh-244001

Website: www.tmu.ac.in

Study & Evaluation Scheme

Semester I

S. No	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	EAS116	Engineering Mathematics-I	3	1	-	4	40	60	100
2	EAS112/212	Engineering Physics-I	3	1	-	4	40	60	100
	EAS113/213	Engineering Chemistry							
3	EEE117/217	Basic Electrical Engineering	3	1	-	4	40	60	100
	EEC111/211	Basic Electronics Engineering							
4	TMU101	Environmental Studies	1	2	-	2	40	60	100
5	EHM199/ BHM199	English communication and soft skills – I	1	1	2	2	50	50	100
6	EAS162/262	Engineering Physics (Lab)	-	-	2	1	50	50	100
	EAS163/263	Engineering Chemistry (Lab)							
7	EEE161/261	Basic Electrical Engineering (Lab)	-	-	2	1	50	50	100
	EEC161/261	Basic Electronics Engineering (Lab)							
8	EME161/261	Engineering Drawing (Lab)	-	-	4	2	50	50	100
	EME162/262	Workshop Practice (Lab)							
9	EGP111	Discipline & General Proficiency	-	-	-	-	100	-	100
		Total	**11**	**6**	**10**	**20**	**460**	**440**	**900**

Semester II

S. No	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	EAS211	Engineering Mathematics-II	3	1	-	4	40	60	100
2	EAS212/112	Engineering Physics-I	3	1	-	4	40	60	100
	EAS213/113	Engineering Chemistry							
3	EEE217/117	Basic Electrical Engineering	3	1	-	4	40	60	100
	EEC211/111	Basic Electronics Engineering							
4	ECS212/ BCS111	Computer System & Programming in C++	3	-	-	3	40	60	100
5	EHM249/ BHM249	English communication and soft skills – II	1	1	2	2	40	60	100
6	EAS262/162	Engineering Physics (Lab)	-	-	2	1	50	50	100
	EAS263/163	Engineering Chemistry (Lab)							
7	EEE261/161	Basic Electrical Engineering (Lab)	-	-	2	1	50	50	100
	EEC261/161	Basic Electronics Engineering (Lab)							
8	ECS262/ BCS161	Computer System & Programming in C++ (Lab)	-	-	2	1	50	50	100
9	EME261/161	Engineering Drawing (Lab)		-	4	2	50	50	100
	EME262/162	Workshop Practice (Lab)							
10	EGP211	Discipline & General Proficiency	-	-	-	-	100	-	100
		Total	**13**	**4**	**12**	**22**	**500**	**500**	**1000**

Semester III

S. No	Course Code	Subject	Periods			Evaluation Scheme			
			L	T	P	Credit	Internal	External	Total
1	EEE311	Electrical Machines – I	3	1	-	4	40	60	100
2	EEE312	Circuit Theory	3	1	-	4	40	60	100
3	EEC311	Engineering Electromagnetics	3	1	-	4	40	60	100
4	EEC315	Signals & Systems	3	1	-	4	40	60	100
5	EEC312	Digital Logic & Circuits	3	1	-	4	40	60	100
6	EHM349/ EHM449/ BHM349	English communication and soft skill-III	1	1	2	2	40	60	100
7	EEE361	Electrical Machines – I (Lab)	-	-	3	2	50	50	100
8	EEC361	Digital Logic & Circuits (Lab)	-	-	3	2	50	50	100
9	EGP311	Discipline & General Proficiency	-	-	-	1	100	-	100
		Total	**16**	**6**	**8**	**27**	**440**	**460**	**900**

Following additional Course for Lateral Entry Students with B.Sc. background to be taken in III semester and all should pass with minimum of 45% marks for obtaining the degree: credits will not be added

1	EME161/261	Engineering Drawing (Lab)	-	-	4	-	50	50	100

Semester IV

S. No	Course Code	Subject	Periods			Evaluation Scheme			
			L	T	P	Credit	Internal	External	Total
1	EEE411	Electrical Machines – II	3	1	-	4	40	60	100
2	EEE412	Electrical Measurements and Measuring Instruments	3	1	-	4	40	60	100
3	EEE413	Network Analysis & Synthesis	3	1	-	4	40	60	100
4	ECS412/ ECS312	Object oriented Programming using JAVA	3	1	-	4	40	60	100
5	EEE461	Electrical Machines – II (Lab)	-	-	3	2	50	50	100
6	EEE462	Electrical Measurements and Measuring Instruments (Lab)	-	-	3	2	50	50	100
7	EEE463	Network Analysis &Synthesis (Lab)	-	-	3	2	50	50	100
8	ECS461/ ECS361	Object oriented Programming using JAVA (Lab)	-	-	3	2	50	50	100
9	EGP411	Discipline & General Proficiency	-	-	-	1	100	-	100
		Total	**12**	**4**	**12**	**25**	**460**	**440**	**900**

Following additional Courses for Lateral Entry Students with B.Sc. background to be taken in IV semester and all should pass with minimum of 45% marks for obtaining the degree: credits will not be added

1	EME162/262	Workshop Practice (Lab)	-	-	4	-	50	50	100

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Semester V

S. No.	Course Code	Subject	Periods			Evaluation Scheme			
			L	T	P	Credit	Internal	External	Total
1	EEE511	Control Systems	3	1	-	4	40	60	100
2	EEE512	Power Electronics	3	1	-	4	40	60	100
3	EEE513	Power System Analysis-I	3	1	-	4	40	60	100
4	EHM599/ EHM699/ BHM499	English Communication and Soft Skills-IV	1	1	2	2	50	50	100
5	EEC511	Microprocessor & Applications	3	1	-	4	40	60	100
6	EEE561	Control Systems (Lab)	-	-	3	2	50	50	100
7	EEE562	Power Electronics (Lab)	-	-	3	2	50	50	100
8	EEC561	Microprocessor & Applications (Lab)	-	-	3	2	50	50	100
9	MOOC01	MOOC Program -I (Optional)	-	-	-	1/2	-	100	100
10	EGP511	Discipline & General Proficiency	-	-	-	1	100	-	100
		Total	**13**	**5**	**11**	**25**	**460**	**440**	**1000**

Semester VI

S. No	Course Code	Subject	Periods			Evaluation Scheme			
			L	T	P	Credit	Internal	External	Total
1	EEE611	Electrical Drives & Controls	3	1	-	4	40	60	100
2	EEE612	Power System Analysis-II	3	1	-	4	40	60	100
3	**Program Elective-I**								
	EEC612	Embedded System	3	1	-	4	40	60	100
	EEC617	Microcontroller Hardware, Programming & its Application (Arduino)							
4	**Program Elective-II**								
	EEE620	Vehicle Dynamics and Energy Storage	3	1	-	4	40	60	100
	ECS611/ 411/511/ MSC014/ BCS311	Database Management System							
5	EEC619	Analog and Digital Communication System	3	1	-	4	40	60	100
6	EEE661	Electrical Drives & Controls (Lab)	-	-	3	2	50	50	100
7	EEE665	Modelling & Simulation using MATLAB-Simulink	-	2	2	2	50	50	100
8	MOOC02	MOOC Program -II (Mandatory)	-	-	-	½	-	100	100
9	EGP611	Discipline & General Proficiency	-	-	-	1	100	-	100
		Total	**15**	**7**	**5**	**26/27**	**400**	**500**	**900**

Semester VII

S. No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	EEE711	Switchgear & Protection	3	-	-	3	40	60	100
2	EEE712/ EEE614	Non-Conventional Energy Resources	3	1	-	4	40	60	100
3	**Departmental Elective-I**								
	EEE713	FACTS Technology	3	-	-	3	40	60	100
	EEE714	Power Generation Systems							
	EEE720	Electric Vehicle							
4	**Open Elective-I**								
	FOE011	Principle of Management	3	1	-	4	40	60	100
	FOE012	Artificial Neural Network							
	FOE013	Industrial Sociology							
	FOE014	Organizational Behaviour							
	FOE015	Engineering and Managerial Economics							
	FOE016	Network security & cryptography							
5	EEE761	Switchgear & Protection (Lab)	-	-	2	1	50	50	100
6	EEC761	Electronics Devices & Circuits (Lab)	-	-	3	2	50	50	100
	EEC762/ BAS464	Design and installation of Solar Photovoltaic System	-	2	2				
7	EEE792	Industrial Training & Presentation (6 weeks)	-	-	-	4	50	50	100
8	EEE798	Project Work Phase-I (Synopsis, Literature Survey & Presentation & 30% Project	-	-	8	4	100	-	100
9	MOOC03	MOOC Program -III (Mandatory)	-	-	-	1/2	-	100	100
10	EGP711	Discipline & General Proficiency	-	-	-	1	100	-	100
		Total	**12**	**2/4**	**13/12**	**27/28**	**510**	**490**	**1000**

Semester VIII

S. No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P	Credit	Internal	External	Total
1	EEE811	Electric Power System Operation	3	-	-	3	40	60	100
2	**Departmental Elective-II**								
	EEE812	High Voltage Engineering	3	-	-	3	40	60	100
	EEC814	Electronic Circuits							
3	**Open Elective-II**								
	FOE021	Machine learning & Data Analytics	3	1	-	4	40	60	100
	FOE022	Total Quality Management							
	FOE023	Entrepreneurship							
	FOE024	Big Data & Hadoop							
	FOE025	Financial Management							
4	EEE861	Power System Simulation (Lab)	-	-	3	2	50	50	100
	EEE864	Electric Vehicle Design and Assembly							
5	EEC861	PLC Programming (Lab)	-	-	4	2	50	50	100
	EEC862	Electronic Circuits (Lab)	-	-	3				
6	EEE898	Project Work Phase -II (100 % working condition, report analysis, plagiarism check report analysis Simulation, and Presentation)	-	-	14	7	50	50	100
7	MOOC04	MOOC Program -IV (Optional)	-	-	-	1/2	-	100	100
8	EGP811	Discipline & General Proficiency	-	-	-	1	100	-	100
		Total	**9**	**1**	**21/20**	**22**	**370**	**330**	**800**

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4. The faculty advisor will suggest the additional courses to be taken by the students based on their choice and level of their academic competence.
5. The list of such additional courses offered by the NPTEL will be approved by the Honourable Vice Chancellor in the beginning of the academic year to facilitate the registration process.
6. The student can also opt for post graduate level courses.
7. The students have to submit the NPTEL course completion certificate to exam division for considering as B.Tech (Hons)

* Student should have to take permission of registration for the B.Tech. (Hons.) degree from Honourable Vice Chancellor in starting of third semester.

B. Choice Based Credit System (CBCS)

Choice Based Credit System (CBCS) is a versatile and flexible option for each student to achieve his/her target number of credits as specified by the AICTE/UGC and adopted by our University.

The following is the course module designed for the B.Tech. program:

- ***Program Core Course (PCC):*** Core courses of B.Tech. program will provide a holistic approach to engineering education, giving students an overview of the field, a basis to build and specialize upon. These core courses are the strong foundation to establish technical knowledge and provide broad multi-disciplined knowledge can be studied further in depth during the elective phase.
  The core courses will provide more practical-based knowledge, case-based lessons and collaborative learning models. It will train the students to analyze, decide, and lead-rather than merely know-while creating a common student experience that can foster deep understanding, develop decision-making ability and contribute to the society at large.
  A wide range of core courses provides groundwork in the basic engineering disciplines: Electrical Machines (Motors, Generators, and Transformers), Power Generation/Transmission/Distribution Systems etc.
  The integrated foundation is important for students because it will not only allow them to build upon existing skills, but they can also explore career options in a range of industries, and expand their understanding of various Technical fields.
  We offer core courses from semester III onwards during the B.Tech. program. There will be 2, 3 and 4 credits for each core course offered.
- ***HSMC – (Humanities and Social Sciences including Management courses):*** As per the AICTE guidelines of Choice Based Credit System (CBCS) for all Universities, including the private Universities, the ***Humanities and Social Sciences including Management courses*** are actually Ability Enhancement Compulsory Course (AECC) which is designed to develop the ability of students in communication (especially English) and other related courses where they might find it difficult to communicate at a higher level in their prospective job at a later stage due to lack of practice and exposure in the language, etc. Students are motivated to learn the theories, fundamentals and tools of communication which can help them develop and sustain in the corporate environment and culture. We offered four HSMCs of 3 credits in I, II, III, V, VI semesters.
- ***Skill Enhancement Course:*** This course may be chosen from a pool of courses designed to provide value-based and/or skill-based knowledge. We offer two SECs course as Lab- one each in VI Semester & VII Semester. One SEC will carry 2 credits each.
- ***Open Elective Course (OEC):*** Open Elective is an interdisciplinary additional subject that is compulsory in a program. The score of Open Elective is counted in the overall aggregate marks under Choice Based Credit System (CBCS). Each Open Elective paper will be of 3 Credits in VII and VIII semesters. Each student has to take Open/Generic Electives from department other than the parent department. Core / Discipline Specific Electives will not be offered as Open Electives.

Study & Evaluation Scheme

B.Tech (Electrical Engineering)-Semester I

S. No	Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	BSC-1	EAS116	Engineering Mathematics-I	3	1	-	4	40	60	100
2	BSC-2	EAS112	Engineering Physics-I	3	1	-	4	40	60	100
		EAS113	Engineering Chemistry							
3	ESC-1	EEE117	Basic Electrical Engineering	3	1	-	4	40	60	100
		EEC111	Basic Electronics Engineering							
4	MC-1	TMU101	Environmental Studies	2	1	-	3	40	60	100
5	HSMC-1	TMUGE101	English Communication- I	2	-	2	3	40	60	100
6	LC-1	EAS162	Engineering Physics (Lab)	-	-	2	1	50	50	100
		EAS163	Engineering Chemistry (Lab)							
7	LC-2	EEE161	Basic Electrical Engineering (Lab)	-	-	2	1	50	50	100
		EEC161	Basic Electronics Engineering (Lab)							
8	LC-3	EME161	Engineering Drawing (Lab)	-	-	4	2	50	50	100
		EME162	Workshop Practice (Lab)							
			Total	**13**	**4**	**10**	**22**	**350**	**450**	**800**

B.Tech (Electrical Engineering)-Semester II

S. No	Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	BSC-3	EAS211	Engineering Mathematics-II	3	1	-	4	40	60	100
2	BSC-4	EAS212	Engineering Physics-I	3	1	-	4	40	60	100
		EAS213	Engineering Chemistry							
3	ESC-2	EEE217	Basic Electrical Engineering	3	1	-	4	40	60	100
		EEC211	Basic Electronics Engineering							
4	ESC-3	ECS212	Computer System & Programming in C++	3	-	-	3	40	60	100
5	HSMC-2	TMUGE201	English Communication- II	2	-	2	3	40	60	100
6	LC-4	EAS262	Engineering Physics (Lab)	-	-	2	1	50	50	100
		EAS263	Engineering Chemistry (Lab)							
7	LC-5	EEE261	Basic Electrical Engineering (Lab)	-	-	2	1	50	50	100
		EEC261	Basic Electronics Engineering (Lab)							
8	LC-6	ECS262	Computer System &Programming in C++ (Lab)	-	-	2	1	50	50	100
9	LC-7	EME261	Engineering Drawing (Lab)	-	-	4	2	50	50	100
		EME262	Workshop Practice (Lab)							
			Total	**14**	**3**	**12**	**23**	**400**	**500**	**900**

B.Tech (Electrical Engineering)-Semester III

S. No	Category	Course Code	Course	Periods			Evaluation Scheme			
				L	T	P	Credit	Internal	External	Total
1	PCC-1	EEE311	Electrical Machines – I	3	-	-	3	40	60	100
2	PCC-2	EEE312	Circuit Theory	3	-	-	3	40	60	100
3	ESC-4	EEC311	Engineering Electromagnetics	3	1	-	4	40	60	100
4	ESC-5	EEC312	Digital Logic & Circuits	3	1	-	4	40	60	100
5	ESC-6	EEC315	Signals & Systems	3	1	-	4	40	60	100
6	HSMC-3	TMUGE301	English Communication- III	2	-	2	3	40	60	100
7	LC-8	EEE361	Electrical Machines – I (Lab)	-	-	2	1	50	50	100
8	LC-9	EEC361	Digital Logic & Circuits (Lab)	-	-	2	1	50	50	100
9	DGP-3	EGP311	Discipline & General Proficiency	-	-	-	-	100	-	100
			Total	**17**	**3**	**6**	**23**	**340**	**460**	**800**

Following additional Course for Lateral Entry Students with B.Sc./Polytechnic background to be taken in III semester and all should pass with minimum of 45% marks for obtaining the degree: credits will not be added

1	LC	EME161/261	Engineering Drawing (Lab)	-	-	4	-	50	50	100
2		TMU101	Environmental Studies	2	1	-	-	40	60	100

Value Added Course:
It is an audit course. The performance of the student in this course will not be counted in the overall result however the student has to pass it compulsorily with 45% marks.

1	VAC-1	TMUGA-301	Foundation in Quantitative Aptitude	2	1	-	-	40	60	100

B.Tech (Electrical Engineering)-Semester IV

S. No	Category	Course Code	Course	Periods			Evaluation Scheme			
				L	T	P	Credit	Internal	External	Total
1	PCC-3	EEE411	Electrical Machines – II	3	1	-	4	40	60	100
2	PCC-4	EEE412	Electrical Measurements and Measuring Instruments	3	-	-	3	40	60	100
3	PCC-5	EEE413	Network Analysis & Synthesis	3	1	-	4	40	60	100
4	ESC-7	ECS412	Object oriented Programming using JAVA	3	1	-	4	40	60	100
5	LC-10	EEE461	Electrical Machines – II (Lab)	-	-	2	1	50	50	100
6	LC-11	EEE462	Electrical Measurements and Measuring Instruments (Lab)	-	-	2	1	50	50	100
7	LC-12	EEE463	Network Analysis &Synthesis (Lab)	-	-	2	1	50	50	100
8	LC-13	ECS461	Object oriented Programming using JAVA (Lab)	-	-	2	1	50	50	100
9	DGP-4	EGP411	Discipline & General Proficiency	-	-	-	-	100	-	100
			Total	**12**	**3**	**8**	**19**	**360**	**440**	**800**

*Skill based Training/Internship of 4 weeks duration from a reputed Industry/organization after completion of 4th semester end-semester examination.

Following additional Courses for Lateral Entry Students with B.Sc./Polytechnic background to be taken in IV semester and all should pass with minimum of 45% marks for obtaining the degree: credits will not be added

1	LC	EME162/262	Workshop Practice (Lab)	-	-	4	-	50	50	100

***Value Added Course:**

1	VAC-2	TMUGA-401	Analytical Reasoning	2	1	-	-	40	60	100

B.Tech (Electrical Engineering)-Semester V

S. No	Category	Course Code	Course	Periods			Evaluation Scheme			
				L	T	P	Credit	Internal	External	Total
1	PCC-6	EEE511	Control Systems	3	1	-	4	40	60	100
2	PCC-7	EEE512	Power Electronics	3	1	-	4	40	60	100
3	PCC-8	EEE513	Power System Analysis-I	3	-	-	3	40	60	100
4	HSMC-4	TMUGE501	English Communication- IV	2	-	2	3	40	60	100
5	ESC-8	EEC511	Microprocessor & Applications	3	1	-	4	40	60	100
6	LC-14	EEE561	Control Systems (Lab)	-	-	2	1	50	50	100
7	LC-15	EEE562	Power Electronics (Lab)	-	-	2	1	50	50	100
8	LC-16	EEC561	Microprocessor & Applications (Lab)	-	-	2	1	50	50	100
9	PROJ-1	EEE592	Skill based Practical Training & Presentation	-	-	-	2	50	50	100
10	DGP-5	EGP511	Discipline & General Proficiency	-	-	-	-	100	-	100
			Total	**14**	**3**	**8**	**23**	**400**	**500**	**900**

***Value Added Course:**

1	VAC-3	TMUGA-501	Modern Algebra and Data Management	2	1	-	-	40	60	100
2	VAC-4	TMUGS-501	Managing Self	2	1	-	-	50	50	100

MOOC Course:

1	MOOC-1	MOOC01	MOOC Program -I (Optional)	-	-	-	2	-	100	100

B.Tech (Electrical Engineering)-Semester VI

S. No	Category	Course Code	Course	Periods			Evaluation Scheme			
				L	T	P	Credit	Internal	External	Total
1	PCC-9	EEE611	Electrical Drives & Controls	3	1	-	4	40	60	100
2	PCC-10	EEE612	Power System Analysis-II	3	1	-	4	40	60	100
3	PEC-1		Program Elective: Program Elective-I	3	1	-	4	40	60	100
4	PEC-2		Program Elective: Program Elective-II	3	1	-	4	40	60	100
5	ESC-9	EEC619	Analog and Digital Communication System	3	1	-	4	40	60	100
6	HSMC-5	EHM613	Human values & Professional Ethics	2	-	-	2	40	60	100
7	LC-17	EEE661	Electrical Drives & Controls (Lab)	-	-	2	1	50	50	100
8	LC-18	EEE665	Modelling & Simulation using MATLAB-Simulink (Lab)	-	1	2	2	50	50	100
9	DGP-6	EGP611	Discipline & General Proficiency	-	-	-	-	100	-	100
			Total	**17**	**6**	**4**	**25**	**340**	**460**	**800**

*Industrial Training of 6 weeks duration from a reputed Industry/organization after completion of 6th semester end-semester examination.

***Value Added Course:**

1	VAC-5	TMUGA-601	Advance Algebra and Geometry	2	1	-	-	40	60	100
2	VAC-6	TMUGS-601	Managing Work and Others	2	1	-	-	50	50	100

MOOC Course:

1	MOOC-2	MOOC02	MOOC Program –II (Optional)	-	-	-	2	-	100	100

B.Tech (Electrical Engineering)-Semester VII

S. No	Category	Course Code	Course		Periods			Evaluation Scheme			
					L	T	P	Credit	Internal	External	Total
1	PCC-11	EEE711	Switchgear & Protection		3	-	-	3	40	60	100
2	PCC-12	EEE712	Non-Conventional Energy Resources		3	-	-	3	40	60	100
3	PEC-3		Program Elective	Program Elective-III	3	1	-	4	40	60	100
4	PEC-4			Program Elective-IV	3		-	3	40	60	100
5	OEC-1		Open Elective	Open Elective-I	3	-	-	3	40/50	60/50	100
6	LC-19	EEE761	Switchgear & Protection (Lab)		-	-	2	1	50	50	100
7	LC-20	EEC761	Electronics Devices & Circuits (Lab)		-	-	4	2	50	50	100
		EEC762	Design and installation of Solar Photovoltaic System (Lab)		-	1	2				
8	PROJ-2	EEE792	Industrial Training & Presentation		-	-	-	2	50	50	100
9	PROJ-3	EEE798	Project Work Phase-1		-	-	10	5	100	-	100
10	DGP-7	EGP711	Discipline & General Proficiency		-	-	-	-	100	-	100
			Total		**15**	**1/2**	**16/14**	**26**	**450/460**	**450/440**	**900**

MOOC Course:

1	MOOC-3	MOOC03	MOOC Program –III (Optional)	-	-	-	2	-	100	100

B.Tech (Electrical Engineering)-Semester VIII

S. No	Category	Course Code	Course		Periods			Evaluation Scheme			
					L	T	P	Credit	Internal	External	Total
1	PCC-13	EEE811	Electric Power System Operation		3	1	-	4	40	60	100
2	PEC-5		Program Elective	Program Elective-V	3	1	-	4	40	60	100
3	PEC-6			Program Elective-VI	3	1	-	4	40	60	100
4	PEC-7		Program Elective (Lab)	Program Elective-VII	-	-	2	1	50	50	100
5	OEC-2		Open Elective	Open Elective-II	3	-	-	3	40/50	60/50	100
6	PROJ-4	EEE898	Project Work Phase –II		-	-	6	3	50	50	100
7	DGP-8	EGP811	Discipline & General Proficiency		-	-	-	-	100	-	100
			Total		**15**	**-**	**08**	**19**	**260/270**	**340/330**	**600**

MOOC Course:

1	MOOC-4	MOOC04	MOOC Program –IV (Optional)	-	-	-	2	-	100	100

ELECTIVE COURSES OFFERED

S. No	Code	Course	L	T	P	Credit
Semester VI - Program Elective I -(Any one)						
Specialization: Signal Processing						
1	EEC612	Embedded System	3	1	0	4
2	EEC617	Microcontroller Hardware, Programming & its Application (Arduino)	3	1	0	4
Semester VI - Program Elective II -(Any one)						
Specialization: Soft Computing Techniques						
3	EEE620	Artificial Neural Network	3	1	0	4
4	EEE621	Advanced Control System	3	1	0	4
5	ECS611	Database Management System	3	1	0	4
6	ECS631	Network security & cryptography	3	1	0	4
Semester VII- Program Elective III -(Any one)						
Specialization: Power System Engineering						
7	EEE713	High Voltage Engineering	3	1	0	4
8	EEE714	Power Generation Systems	3	1	0	4
9	EEE720	Electric Vehicle	3	1	0	4
Semester VII- Program Elective IV -(Any one)						
Specialization: Industrial Management Theory						
10	EHM731	Principle of Management	3	0	0	3
11	EHM735	Industrial Sociology	3	0	0	3
12	EHM733	Organizational Behaviour	3	0	0	3
13	EHM734	Engineering and Managerial Economics	3	0	0	3
Semester VIII- Program Elective V -(Any one)						
Specialization: Semiconducting Devices and power Transmission						
15	EEE812	FACTS Technology	3	1	0	4
16	EEC814	Electronic Circuits	3	1	0	4
17	EEE821	EHV AC/DC Transmission	3	1	0	4
Semester VIII- Program Elective VI -(Any one)						
Specialization: Industrial application						
18	EEE831	Machine learning & Data Analytics	3	1	0	4
19	EHM832	Total Quality Management	3	1	0	4
20	EHM833	Entrepreneurship	3	1	0	4
Semester VIII- Program Elective VII (Lab) -(Any one)						
21	EEE861	Power System Simulation (Lab)	0	0	2	1
22	EEC864	Electronic Circuits (Lab)	0	0	2	1

New Course Added

Course Code: TMUGA-301	Value Added Course B.Tech.- Semester-III **Foundation in Quantitative Aptitude**	L-2 T-1 P-0 C-0
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Solving complex problems using Criss cross method, base method and square techniques.	
CO2.	Applying the arithmetical concepts of Average, Mixture and Allegation.	
CO3.	Evaluating the different possibilities of various reasoning based problems in series, Blood relation and Direction.	
CO4.	Operationalizing the inter-related concept of Percentage in Profit Loss and Discount, Si/CI and Mixture/Allegation.	
Course Content:		
Unit-1:	**Speed calculations** Squares till 1000,square root, multiplications: base 100, 200 300 etc., 11-19, crisscross method for 2X2, 3X3, 4X4, 2X3, 2X4 etc., cubes, cube root	**3 Hours**
Unit-2:	**Percentages** Basic calculation, ratio equivalent, base, change of base, multiplying factor, percentage change, increment, decrement, successive percentages, word problems	**5 Hours**
Unit-3:	**Profit Loss Discount** Basic definition, formula, concept of mark up, discount, relation with successive change, faulty weights	**5 Hours**
Unit-4:	**SI and CI** Simple Interest, finding time and rate, Compound Interest, difference between SI and CI, Installments	**4 Hours**
Unit-5:	**Averages** Basic Averages, Concept of Distribution, Weighted Average, equations	**3 Hours**
Unit-6:	**Mixtures and allegations** Mixtures of 2 components, mixtures of 3 components, Replacements	**5 Hours**
Unit-7:	**Blood relations** Indicating type, operator type, family tree type	**3 Hours**
Unit-8:	**Direction sense** Simple statements, shadow type	**2 Hours**
Reference Books:	• R1:-Arun Shrama:- How to Prepare for Quantitative Aptitude • R2:-Quantitative Aptitude by R.S. Agrawal • R3:-M Tyra: Quicker Maths • R4:-Nishith K Sinha:- Quantitative Aptitude for CAT • R5:-Reference website:- Lofoya.com, gmatclub.com, cracku.in, handakafunda.com, tathagat.mba, Indiabix.com • R6:-Logical Reasoning by Nishith K Sinha • R7:-Verbal and Non Verbal Reasoning by R.S. Agrawal *** Latest editions of all the suggested books are recommended.**	

New Course Added

Course Code: TMUGA-401	Value Added Course B.Tech.- Semester-IV **Analytical Reasoning**	L-2 T-1 P-0 C-0
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Applying the arithmetical concepts in Ratio Proportion Variation.	
CO2.	Employing the techniques of Percentage; Ratios and Average in inter related concepts of Time and Work, Time Speed and Distance.	
CO3.	Identifying different possibilities of reasoning based problems of Syllogisms and Venn diagram.	
CO4.	Examining the optimized approach to solve logs and Surds.	
Course Content:		
Unit-1:	**Ratio, proportions and variations** Concept of ratios, proportions, variations, properties and their applications	**5 Hours**
Unit-2:	**Time and Work** Same efficiency, different efficiency, alternate work, application in Pipes and Cisterns	**6 Hours**
Unit-3:	**Time Speed Distance** Average speed, proportionalities in Time, Distance, trains, boats, races, circular tracks	**6 Hours**
Unit-4:	**Logs and Surds** Concept and properties of logs, surds and indices	**4 Hours**
Unit-5:	**Coding and decoding** Sequential coding, reverse coding, abstract coding	**3 Hours**
Unit-6:	**Syllogisms** Two statements, three statements	**4 Hours**
Unit-7:	**Venn diagram** Basic concept and applications	**2 Hours**
Reference Books:	• R1:-Arun Shrama:- How to Prepare for Quantitative Aptitude • R2:-Quantitative Aptitude by R.S. Agrawal • R3:-M Tyra: Quicker Maths • R4:-Nishith K Sinha:- Quantitative Aptitude for CAT • R5:-Reference website:- Lofoya.com, gmatclub.com, cracku.in, handakafunda.com, tathagat.mba, Indiabix.com • R6:-Logical Reasoning by Nishith K Sinha • R7:-Verbal and Non Verbal Reasoning by R.S. Agrawal *** Latest editions of all the suggested books are recommended.**	

Now Course Added

Course Code: EEE592	B. Tech (Electrical)- Semester-V **Skill based Practical Training & Presentation**	L-0 T-0 P-0 C-2
Course Procedure:		
	Students will have to undergo Skill based Practical Training (Certificate course) of four weeks in any industry or reputed organization or training centre after the IV semester examination in summer. The evaluation of this certificate course shall be included in the V semester evaluation. The student will be assigned a faculty guide who would be the supervisor of the student. The faculty would be identified before the end of the IV semester and shall be the nodal officer for coordination of the training. Students will receive certificate after completion his/her training which will be duly signed by the officer under whom training was undertaken in the industry/ organization/training centre. The student at the end of the V semester will present his/her presentation about the training before a committee constituted by the Director/Principal of the College which would comprise of at least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Director/Principal. The students guide would be a special invitee to the presentation. The presentation session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately in a sealed envelope to the Director/Principal. The marks by the external examiner would be based on the presentation presented by the student which shall be evaluated by the external examiner and cross examination done of the student concerned.	
	The marking shall be as follows:	
Internal: 50 marks	By the Faculty Guide – 25 marks. By Committee appointed by the Director/Principal – 25 marks.	
External: 50 marks	By External examiner appointed by the University – 50 marks	

New Course Added

Course Code: EEE 620	Program Elective- II B.Tech - Semester-VI **Artificial Neural Network**	L-3 T-1 P-0 C-4
Course Outcomes:	**On completion of the course, students will be:**	
CO1.	**Understanding** the concepts of Artificial Intelligence and Neural Network.	
CO2.	**Understanding** the concepts of different types Layer Feed Forward Neural Networks	
CO3.	**Applying** Biological and Artificial Neuron Models, and various Learning strategies.	
CO4.	**Analyzing** Perceptron Models and Training Algorithms.	
CO5.	**Evaluating** problems through BAM Training Algorithms: Storage and Recall Algorithm	
Course Content:		
Unit-1:	**Artificial Intelligence:** Issues, Techniques, Problems, Problem solving state space search; DFS; BFS Production: System, Problem characteristics; Heuristic Search Techniques; generate and Test; Hill Climbing; Best First Search; Constraint satisfaction.	8 Hours
Unit-2:	**Knowledge representation**: Approaches; Issues; Representing simple facts in logic; Resolution and natural deduction; Representing knowledge using rules; Procedural vs. Declarative knowledge; Forward v/s Backward chaining. **Slot and Filler Structures:** Semantic nets; Frames; Conceptual dependency; Scripts; parsing techniques.	8 Hours
Unit-3:	**Introduction to Neural Network:** Introduction, Organization of the Brain, Biological and Artificial Neuron Models, Characteristics of ANN, McCulloch-Pitts Model, Potential Applications of ANN. **Essentials of Artificial Neural Networks:** Artificial Neuron Model, Types of Neuron Activation Function, ANN Architectures, Learning Strategy (Supervised, Unsupervised, Reinforcement).	8 Hours
Unit-4	**Single Layer Feed Forward Neural Networks:** Introduction, Perceptron Models and Training Algorithms. **Multilayer feed forward Neural Networks:** Credit Assignment Problem, Generalized Delta Rule, Derivation of Back propagation (BP) Training.	8 Hours
Unit-5	**Expert System:** Definition and Characteristics; Expert system life cycle & Expert system tools; MYCIN & DENDRAL. **Associative Memories:** Paradigms of Associative Memory, Pattern Engineering, Hebbian Learning, Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function, Architecture of Hopfield Network.	8 Hours
Text Book:	1. S. Rajasekharan and G. A. Vijayalakshmipai, Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications, PHI Publication.	
Reference Books:	1. "Simon Haykin, Neural Networks- A comprehensive foundation, Pearson Education. 2. S.N. Sivanandam, S. Sumathi,S. N. Deepa, Introduction to Neural Networks using MATLAB 6.0", TMH. 3. James A Freeman and Davis Skapura, Neural Networks Pearson Edu. 4. Timothy J. Ross, Fuzzy Logic with Engineering Applications, McGraw-Hill Inc. 5. E Rich. and K Knight, "Artificial Intelligence", Tata McGraw Hill. ***Latest editions of all the suggested books are recommended.**	

New Course Added,

Course Code: EEE621	Program Elective-II B.Tech (Electrical) - Semester-VI **Advanced Control System**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be:**	
CO1.	**Understanding** non-linear system behavior by phase plane and describing function methods.	
CO2.	**Applying** discrete-time mathematical models in both time domain (difference equations, state equations) and z domain (transfer function using z-transform).	
CO3.	**Analyzing** the stability analysis of nonlinear systems by Lyapunov method develops design skills in optimal control problems.	
CO4.	**Evaluating**, Predicting and analyzing transient and steady-state responses and stability and sensitivity of both open-loop and closed-loop linear, time-invariant, discrete-time control systems.	
CO5.	**Creating** state space and state feedback in modern control systems, pole placement, design of state observers and output feedback controllers.	
Course Content:		
Unit-1:	**INTRODUCTION:** Modern Vs Conventional Control theory Concept of linear vector space, Linear Independence, Bases & Representation, domain and range, Concept of linearity, relaxedness, time invariance, Casuality, Concept of state, state variable, state vector.	**8 Hours**
Unit-2:	**STATE APPROACH OF CONTROL SYSTEM ANALYSIS:** Concept of state space, state space equations, Writing state space equations of mechanical, electrical systems, analogous systems. **STATE SPACE REPRESENTATION**: Analyses using Physical and phase variables, comparison form of system representation, Block diagram representation of state model, Signal Flow Graph representation, state space representation using canonical variables, Diagonal matrix. Jordan canonical Form, derivation of transfer function from state model.	**8 Hours**
Unit-3:	**SOLUTION OF STATE EQUATIONS**: Diagonalization, Eigen values and eigen vectors, Matrix exponential, state transition matrix, properties of state transition matrix. Computation of state transition matrix, Concepts of controllability & observability, pole-placement by state feedback, Ackerman's formula.	**8 Hours**
Unit-4:	**NONLINEAR SYSTEMS:** Introduction, Common physical Non linearities, The Phase-plan method: Basic Concepts, Singular points, Stability of nonlinear system, Construction of Phase trajectories, the describing function method, Derivation of describing functions, Stability analysis by Describing function method, Jump Resonance.	**8 Hours**
Unit-5:	**DIGITAL CONTROL SYSTEMS:** Introduction, sampled-data control system, signal reconstruction, Difference equations, The z-Transform, Z-Transfer function, Block diagram analysis of sampled data system, z-and s domain relationship, Digital PID controllers.	**8 Hours**
Text Book:	1. I J Nagrath and M Gopal; Control systems Engineering, 3rd Ed, New Age Publication.	
Reference Books:	1. Katsuhiko Ogata: Modern control engineering. PHI 2. M. Gopal, "Control Systems: Principles and Design", McGraw Hill Education, 1997. 3. B. C. Kuo, "Automatic Control System", Prentice Hall, 1995. ***Latest editions of all the suggested books are recommended.**	
Additional electronics reference material	• https://nptel.ac.in/courses/108/103/108103007/ • https://onlinelibrary.wiley.com/journal/10991239	

Registrar

New course Added

Course Code: ECS 631	Program Elective- II B.Tech - Semester-VI **Network security & cryptography**	L-3 T-1 P-0 C-4
Course Outcomes:	**On completion of the course, students will be:**	
CO1.	**Understanding** the most common type of cryptographic algorithms used to provide confidentiality, integrity and authenticity.	
CO2.	**Understanding** different types of cryptosystems.	
CO3.	**Applying** different approaches of Network security.	
CO4.	**Analyzing** modes of operation for block ciphers.	
CO5.	**Evaluating** different hash functions in Information Security.	
CO6.	**Creating** mechanisms for electronic mail security.	
Course Content:		
Unit-1:	**Network Security:** Attacks; Services & Mechanisms; Conventional Encryption: Classical Encryption Techniques, Steganography.	8 Hours
Unit-2:	**Encryption Schemes:** DES: Standard, Strength; Block Cipher Design Principles; Block Cipher Modes of Operation: Triples DES; Key Distribution, Random Number Generation.	8 Hours
Unit-3:	**Public-Key Cryptography:** Principles; RSA Algorithm; Key Management; Fermat's & Euler's Theorems; Primarily Miller Test; Chinese Remainder Theorem.	8 Hours
Unit-4	**Message Authentication & Hash Functions:** Authentication: Requirements, Protocols, Introduction to Message Authentication Codes and Hash Functions, MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA), Digital Signature.	8 Hours
Unit-5	**IP Security:** Electronic Mail Security; Pretty Good Privacy (PGP); S/MIME; Authentication Header; Encapsulating Security Payloads. **Web Security:** Secure Socket Layer & Transport Layer Security, Secure Electronic Transaction (Set);	8 Hours
Text Book:	1. Stallings, W., Cryptography and Network Security: Principles and Practice, Prentice Hall.	
Reference Books:	1. Johannes, A. B., Introduction to Cryptography, Springer. 2. Kahate, A., Cryptography and Network Security, Tata McGraw Hill. ***Latest editions of all the suggested books are recommended.**	
Additional electronics reference material	https://onlinecourses.nptel.ac.in/noc20_cs21/preview https://www.youtube.com/watch?v=9X1rSWLFhLY&list=PL9FuOtXibFj8	

New Course Added

Course Code: EHM613	B. Tech (Electrical)- Semester-VI **Human Values & Professional Ethics**	L-2 T-0 P-0 C-2
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the importance of value education in life and method of self-exploration.	
CO2.	**Understanding** 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration.	
CO3.	**Applying** right understanding about relationship and physical facilities.	
CO4.	**Analysing** harmony in myself, harmony in the family and society, harmony in the nature and existence.	
CO5.	**Evaluating** human conduct on ethical basis.	
Course Content:		
Unit-1:	Understanding of Morals, Values and Ethics; Introduction to Value Education- need for Value Education. Self- Exploration–content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration. Continuous Happiness and Prosperity- basic Human Aspirations. Gender Issues: Gender Discrimination and Gender Bias (home & office), Gender issues in human values, morality and ethics.	**8 Hours**
Unit-2:	Conflicts of Interest: Conflicts between Business Demands and Professional Ethics. Social and Ethical Responsibilities of Technologists. Ethical Issues at Workplace: Discrimination, Cybercrime, Plagiarism, Sexual Misconduct, Fraudulent Use of Institutional Resources. Intellectual Property Rights and its uses. Whistle blowing and beyond, Case study.	**8 Hours**
Unit-3:	Harmony in the Family and Society- Harmony in Human-Human Relationship, Understanding harmony in the Family- the basic unit of human interaction. Understanding values in human-human relationship; meaning of Nyaya; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman and other salient values in relationship.	**8 Hours**
Unit-4:	Understanding Harmony in the Nature and Existence – Whole existence as Co-existence. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Coexistence (Sah-astitva) of mutually interacting units in all pervasive space. Holistic perception of harmony at all levels of existence.	**8 Hours**
Unit-5:	Implications of the above Holistic Understanding of Harmony on Professional Ethics. Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Competence in professional ethics: a) Ability to utilize the professional competence for augmenting universal human order b) Ability to identify the scope and characteristics of people friendly and eco-friendly production systems c) Ability to identify and develop appropriate technologies and management patterns for above production systems.	**8 Hours**

New Course Added -

Course Code: EEE812	Program Elective V Semester-VIII **FACTS Technology**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the concept of semi-conductor devices and its application as FACTS Controllers.	
CO2.	**Applying** gathered knowledge & select the controllers for different Contingencies.	
CO3.	**Analysing** real network problems with FACTS controllers.	
CO4.	**Evaluating** the control of power system parameters effectively and appropriately using FACTS Controllers	
CO5.	**Creating** an understanding the recent trend in FACTS controllers and coordination of FACTS controllers.	
Course Content:		
Unit-1:	**Introduction to FACTS:** Electrical Transmission Network: Necessity, Power flow in AC system; Relative importance of controllable parameter; Opportunities for FACTS: Possible benefits for FACTS, Power Semiconductor Devices, Perspective on Power Devices, Types of High-Power Devices, Principal High-Power Device Characteristics and Requirements: Voltage and Current Ratings, Losses and Speed of Switching, Parameter Trade-Off of Devices; Power Device Material, Diode (PN Junction)Transistor, MOSFET, Thyristor (without Turn-Off Capability), Gate Turn-Off Thyristor (GTO), Turn-On and Turn-Off Process, MOS Turn-Off Thyristor (MTO), Insulated Gate Bipolar Transistor (IGBT), MOS-Controlled Thyristor (MCT).	8 Hours
Unit-2:	**Static VAR Compensation:** Need for compensation: Shunt & series compensation, Objectives of shunt & series compensation, Configuration & operating characteristics; Thyristor controlled reactor (TCR); Thyristor Switched Capacitor (TSC); Comparison of TCR & TSC.	8 Hours
Unit-3:	**Voltage-Sourced Converters:** Basic Concept of Voltage-Sourced Converters, Single-Phase Full-Wave Bridge Converter Operation, Single Phase-Leg Operation, Square-Wave Voltage Harmonics for a Single-Phase Bridge, Three-Phase Full-Wave Bridge Converter, Converter Operation, Fundamental and Harmonics for a Three-Phase Bridge Converter, Sequence of Valve Conduction Process in Each Phase-Leg, Transformer Connections for 12-Pulse Operation, Three-Level Voltage-Sourced Converter, Operation of Three-Level Converter, Fundamental and Harmonic Voltages for a Three-Level Converter, Three-Level Converter with Parallel Legs, Pulse-Width Modulation (PWM) Converter.	8 Hours
Unit-4:	**Series Compensation:** Variable impedance type series compensation; Thyristor switched series capacitor (TSSC); Thyristor controlled series capacitor (TCSC); Basic operating control schemes for TSSC & TCSC. **Static Voltage Phase Angle Regulator:** Objectives of voltage & phase angle regulators: approaches to Thyristor, Controlled Voltage & Phase Angle Regulator.	8 Hours
Unit-5:	**Emerging FACTS Controller:** STATCOM; Unified Power Flow Controller (UPFC); Interline Power Flow Controller (IPFC); Basic operating principles of UPFC; Sub-synchronous resonance.	8 Hours
Text Book:	1. Narain G. Hingorani & Laszlo Gyugyi, "Understanding FACTS – Concepts & Technology offlexible AC Transmission Systems", Standard Publishers, New Delhi.	
Reference Books:	1. T. J. E Miller., "Reactive Power Control in Electric System", John Wiley & Sons. 2. G.K Dubey., "Thyristorized Power Controller", New Age international (P) Ltd., New Delhi.	

New Course Added.

Course Code: EEE821	Program Elective- V B.Tech (Electrical)- Semester-VIII **EHV AC/DC Transmission**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** qualitative comparison of AC and DC transmission system with all aspects.	
CO2.	**Understanding** the need of EHV AC transmission and various issues related with it.	
CO3.	**Applying** Reactive power management, Stability of AC and DC systems.	
CO4.	**Analysing** In depth converter analysis, faults, protections, harmonic considerations, grounding system.	
CO5.	**Evaluating** the Journey from conventional HVDC control to modern HVDC control schemes.	
Course Content:		
Unit-1:	EHV AC TRANSMISSION: Need of EHV transmission lines, power handling capacity and surge impedance loading. Problems of EHV transmission, bundled conductors geometric mean radius of bundle, properties of bundle conductors. Electrostatic fields of EHV lines and their effects, corona effects: Corona loss, audio and radio noise.	**8 Hours**
Unit-2:	LOAD FREQUENCY CONTROL: Introduction to control of active and reactive power flow, trubin speed governing system. Speed governing characteristic of generating unit and parllel operation of generations. Element of load frequency control. Flat frequency, flat tie line and tie line load bias control. Automatic generation control (description of block diagram only)	**8 Hours**
Unit-3:	VOLTAGE CONTROL: No load receiving end voltage and reactive power generation. Methods of voltage control. Synchronous phase modifier, shunt capacitors and reators, saturable reactors, Thynstorised static VAR compensators.	**8 Hours**
Unit-4:	FACTS : Introduction to FACTS controllers	**6 Hours**
Unit-5:	HVDC TRANSMISSION: Types of D.C. links, advantages and disadvantages of HVDC transmission. Basic scheme and equipment of converter station. Ground return. Basic principles of DC link control and basic converter control characteristics. Introduction to multiterminal HVDC systems. Application of HVDC transmission.	**8 Hours**
Text Book	1. R.D. Begamudre-EHV AC Transmission Engineering. New Age International Publishers. ***Latest editions of all the suggested books are recommended.**	
Reference Books:	1. K. R. Padiyar, "HVDC Power Transmission Systems", New Age International Publishers, 2011. 2. J. Arrillaga, "High Voltage Direct Current Transmission", Peter Peregrinus Ltd., 1983. 3. E. W. Kimbark, "Direct Current Transmission", Vol.1, Wiley-Interscience, 1971. 2. B.R. Gupta-Generation of Electrical Engineering. S. Chand Publication.	
Additional electronic reference material	• https://nptel.ac.in/courses/108/108/108108099/ • https://www.mdpi.com/journal/applsci/special_issues/modern_power	

Registrar

New course Added

Course Code: TMUGA-501	Value Added Course B.Tech.- Semester-V **Modern Algebra and Data Management**	L-2 T-1 P-0 C-0
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Applying the concepts of modern mathematics Divisibility rule, Remainder Theorem, HCF /LCM in Number System.	
CO2.	Relating the rules of permutation and combination, Fundamental Principle of Counting to find the probability.	
CO3.	Applying calculative and arithmetical concepts of ratio, Average and Percentage to analyze and interpret data.	
CO4.	Correlating the various arithmetic concepts to check sufficiency of data	
Course Content:		
Unit-1:	**Number theory** Classification of Numbers, Divisibility Rules, HCF and LCM, Factors, Cyclicity(Unit Digit and Last Two digit), Remainder Theorem, Highest Power of a Number in a Factorial, Number of trailing zeroes	**8 Hours**
Unit-2:	**Data interpretation** Data Interpretation Basics, Bar Chart, Line Chart, Tabular Chart, Pie Chart, DI tables with missing values	**7 Hours**
Unit-3:	**Data Sufficiency** Introduction of Data Sufficiency, different topics based DS	**5 Hours**
Unit-4:	**Permutations and combinations** Fundamental counting, and or, arrangements of digits, letters, people in row, identical objects, rank, geometrical arrangements, combination: - basic, handshakes, committee, selection of any number of objects, identical and distinct, grouping and distribution, de-arrangements	**6 Hours**
Unit-5:	**Probability** Introduction, Probability based on Dice and Coins, Conditional Probability, Bayes Theorem	**4 Hours**
Reference Books:	• R1:-Arun Shrama:- How to Prepare for Quantitative Aptitude • R2:-Quantitative Aptitude by R.S. Agrawal • R3:-M Tyra: Quicker Maths • R4:-Nishith K Sinha:- Quantitative Aptitude for CAT • R5:-Reference website:- Lofoya.com, gmatclub.com, cracku.in, handakafunda.com, tathagat.mba, Indiabix.com • R6:-Logical Reasoning by Nishith K Sinha • R7:-Verbal and Non Verbal Reasoning by R.S. Agrawal *** Latest editions of all the suggested books are recommended.**	

Registrar

New Course Added.

Course Code: TMUGA-601	Value Added Course B.Tech.- Semester-VI **Advance Algebra and Geometry**	L-2 T-1 P-0 C-0
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Recognizing the rules of Crypt-arithmetic and relate them to find out the solutions.	
CO2.	Illustrating the different concepts of Height and Distance and Functions.	
CO3.	Employing the concept of higher level reasoning in Clocks, Calendars and Puzzle Problems.	
CO4.	Correlating the various arithmetic and reasoning concepts in checking sufficiency of data.	
Course Content:		
Unit-1:	**Clocks and calendars** Introduction , Angle based , faulty Clock, Interchange of hands, Introduction of Calendars, Leap Year , Ordinary Year	**5 Hours**
Unit-2:	**Set theory** Introduction , Venn Diagrams basics, Venn Diagram – 3 sets, 4-Group Venn Diagrams	**4 Hours**
Unit-3:	**Heights and Distance** Basic concept, Word problems	**3 Hours**
Unit-4:	**Functions** Introduction to Functions, Even and Odd Functions, Recursive	**3 Hours**
Unit-5:	**Problem Solving** Introduction, Puzzle based on 3 variable, Puzzle based on 4 variable	**6 Hours**
Unit-6:	**Data Sufficiency** Introduction, Blood relation based, direction based, ranking based	**5 Hours**
Unit-7:	**Crypt Arithmetic** Introduction of Crypt Arithmetic, Mathematical operations using Crypt Arithmetic, Company Specific Pattern	**4 Hours**
Reference Books:	• R1:-Arun Shrama:- How to Prepare for Quantitative Aptitude • R2:-Quantitative Aptitude by R.S. Agrawal • R3:-M Tyra: Quicker Maths • R4:-Nishith K Sinha:- Quantitative Aptitude for CAT • R5:-Reference website:- Lofoya.com, gmatclub.com, cracku.in, handakafunda.com, tathagat.mba, Indiabix.com • R6:-Logical Reasoning by Nishith K Sinha • R7:-Verbal and Non Verbal Reasoning by R.S. Agrawal *** Latest editions of all the suggested books are recommended.**	

Registrar

New Course Added

Course Code: TMUGS-601	B.Tech - Semester-VI **Managing Work and Others**	L-2 T-1 P-0 C-0
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Communicating effectively in a variety of public and interpersonal settings.	
CO2.	Applying concepts of change management for growth and development by understanding inertia of change and mastering the Laws of Change.	
CO3.	Analyzing scenarios, synthesizing alternatives and thinking critically to negotiate, resolve conflicts and develop cordial interpersonal relationships.	
CO4.	Functioning in a team and enabling other people to act while encouraging growth and creating mutual respect and trust.	
CO5.	Handling difficult situations with grace, style, and professionalism.	
Course Content:		
Unit-1:	**Intrapersonal Skills:** Creativity and Innovation Understanding self and others (Johari window) Stress Management Managing Change for competitive success Handling feedback and criticism	**8 Hours**
Unit-2:	**Interpersonal Skills:** Conflict management Development of cordial interpersonal relations at all levels Negotiation Importance of working in teams in modern organisations Manners, etiquette and net etiquette	**12 Hours**
Unit-3:	**Interview Techniques:** Job Seeking Group discussion (GD) Personal Interview	**10 Hours**
Reference Books:	1. Robbins, Stephen P., Judge, Timothy A., Vohra, Neharika, Organizational Behaviour (2018), 18th ed., Pearson Education 2. Burne, Eric, Games People Play (2010), Penguin UK 3. Carnegie, Dale, How to win friends and influence people (2004), RHUK 4. Rathgeber, Holger, Kotter, John, Our Iceberg is melting (2017), Macmillan 5. Steinburg, Scott, Nettiquette Essentials (2013), Lulu.com 6. https://www.hloom.com/resumes/creative-templates/ 7. https://www.mbauniverse.com/group-discussion/topic.php 8. https://www.indeed.com/career-advice/interviewing/job-interview-tips-how-to-make-a-great-impression *** Latest editions of all the suggested books are recommended.**	

Registrar

Post Revision

B.Tech LET

Course Code: TMUGE101	~~B.Sc. (H) Physics Semester-I~~ **English Communication – I**	L-2 T-0 P-2 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Remembering and understanding** of the basic of English grammar and vocabulary.	
CO2.	**Understanding** of the basic Communication process.	
CO3.	**Applying** correct vocabulary and tenses in sentences construction.	
CO4.	**Analyzing** communication needs and developing communication strategies using both verbal & non-verbal method.	
CO5.	**Drafting** applications in correct format for common issues.	
CO6.	**Developing** self-confidence.	
Course Content:		
Unit-1:	**Introductory Sessions** • Self-Introduction • Building Self Confidence: Identifying strengths and weakness, reasons Failure, strategies to overcome Fear of Failure • Importance of English Language in present scenario (Practice: Self-introduction session)	**6 Hours**
Unit-2:	**Basics of Grammar** • Parts of Speech • Tense • Subject and Predicate • Vocabulary: Synonym and Antonym (Practice: Conversation Practice)	**12 Hours**
Unit-3:	**Basics of Communication** • Communication: Process, Types, 7Cs of Communication, Importance & Barrier • Language as a tool of communication • Non-verbal communication: Body Language • Etiquette & Manners • Basic Problem Sounds (Practice: Pronunciation drill and building positive body language)	**10 Hours**
Unit-4:	**Application writing** • Format & Style of Application Writing • Practice of Application writing on common issues.	**8 Hours**
Unit-5:	**Value based text reading:** Short Story (Non- detailed study) • Gift of Magi - O. Henry	**4 Hours**
Text Book:	1. Singh R.P., An Anthology of Short stories, O.U.P. New Delhi.	
Reference Books:	1. Kumar, Sanjay. & Pushp Lata. "Communication Skills" New Delhi: Oxford University Press.	

Registrar

Pre Revision

B-Tech LET

Semester I

English Communication and Soft Skills – I

[BHM199/EHM199 amended vide approval dt. July 23, 2018 of V.C]

Course Code: BHM199/EHM199

L	T	P	C
1	1	2	2

Objectives:

1. To remove the phobia of conversing in English.
2. To make the learners enable to express themselves among peers & teachers.
3. To enable students, improve their vocabulary.
4. To introduce them with basic communicative skills in real life situations

Course Outcomes: At the end of the semester, the learner will be able to

1. Remove fear of speaking in English among peers & teachers.
2. Develop the ability to speak in English (even if grammatically not perfect).
3. Use vocabulary taught for speaking and writing simple sentence for day to day conversation.
4. Use taught vocabulary for writing applications on common issues.

Course Contents:

Unit – I Fear of Failure, Reasons of Fear of Failure & How to overcome it (12 hours)

- Self-Introduction
- Identifying strengths and weakness
- Fear of Failure: Signs of Fear of Failure, Reasons of Fear of Failure, Strategies to overcome Fear of Failure
- Positive Attitude
- Motivation
- Building Self Confidence

Unit – II Confidence, Presentability, Etiquettes & Manners (10 hours)

- Body Language: Facial Expression, Eye Contact, Gesture, Posture, Tips to have appropriate body language
- Grooming & Dressing Sense
- Etiquette & Manners: Social Etiquettes, Telephonic Etiquettes, Dining Etiquettes, Etiquettes to handle cultural differences, Etiquettes of Effective Conversation.
- Problem Sounds (s-sh,j-z,v-b)

Unit – III Conversation Practice, commonly made mistake & Initiating a conversation (10 hours)

- Vocabulary of commonly used words (50 Words)
- Conversation Practice: At College, At Bank, At Ticket Counter (Railway Station & Movie Theatre)
- How to initiate a conversation
- Commonly made mistakes in conversation
- Basic of Communication: 7Cs of Communication

Unit – IV Application writing (08 hours)

- Format & Style of Application Writing
- Practice of Application writing on common issues.

Post Revision

B. Tech EE

Course Code: TMUGE201	~~B.Sc.(H) Physics Semester-II~~ **English Communication – II**	L-2 T-0 P-2 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Remembering & understanding** the basics of English Grammar and Vocabulary.	
CO2.	**Understanding** the basics of Listening, Speaking & Writing Skills.	
CO3.	**Understanding** principles of letter drafting and various types of formats.	
CO4.	**Applying** correct vocabulary and grammar in sentence construction while writing and delivering presentations.	
CO5.	**Analyzing** different types of listening, role of Audience & Locale in presentation.	
CO6.	**Drafting** Official Letters, E-Mail & Paragraphs in correct format.	
Course Content:		
Unit-1:	**Functional Grammar** **(10 hours)** • Prefix, suffix and One words substitution • Modals • Concord	**10 Hours**
Unit-2:	**Listening Skills** • Difference between listening & hearing, Process and Types of Listening • Importance and Barriers to listening	**04Hours**
Unit-3:	**Writing Skills** **(12 hours)** • Official letter and email writing • Essentials of a paragraph, • Developing a paragraph: Structure and methods Paragraph writing (100-120 words)	**12 Hours**
Unit-4:	**Strategies & Structure of Oral Presentation** **(08 hours)** • Purpose, Organizing content, Audience & Locale, Audio-visual aids, Body langauge • Voice dynamics: Five P's - Pace, Power, Pronunciation, Pause, and Pitch. • Modes of speech delivery and 5 W's of presentation	**8 Hours**
Unit-5:	**Value based text reading:** Short Essay (Non- detailed study) **(06 hours)** How should one Read a book? - Virginia Woolf	**6 Hours**
Text Book:	**1.** Singh R.P., An Anthology of English Essay, O.U.P. New Delhi	

Pre Revision

B.Tech ECE

Semester II
English Communication and Soft Skills-II

[BHM249/EHM249 amended vide approval dt. July 23, 2018 of V.C]

Course Code: BHM249/EHM249

L	T	P	C
1	1	2	2

Objectives:

1. To enhance the vocabulary of learners to address competitive exams like GATE
2. To develop ability of sentence construction.
3. To enhance learner's writing ability.
4. To make the learner effective in presenting himself/herself.

Course Outcomes: At the end of the semester, the learner will be able to

1. Learn additional 50 words apart from 50 words learnt in preceding semester (Two words/lecture)
2. Write letters effectively.
3. Acquire competence in constructing short sentences dealing day to day activities with grammatical accuracy.
4. Express themselves before class / in a group and attain proficiency in deliverance.
5. Acquire adequate knowledge of grammar to address competitive exams like GATE

Course Contents:

Unit – I Vocabulary & Grammar **(14 hours)**

- Homophones, Homonyms, Synonyms, Antonyms and One-word substitution.
- Parts of Speech, Modals, Tenses and Simple sentence construction.

Unit – II Listening Skills **(05 hours)**

- Difference between listening & hearing, Types of Listening, Process
- Importance and Barriers to listening

Unit – III Writing Skills **(08 hours)**

- Letters and Email writing
- Story Narration

Unit – IV Strategies & Structure of Presentation and Problem Sounds **(13 hours)**

- Managing Time, Audience & Locale, Structure and Organization of Content and 5 W's
- Problem Sounds: S- Sh, J-Z and V-B

Reference Books:

1. Nesfield J.C. "*English Grammar Composition & Usage*" Macmillan Publishers
2. Sood Madan "*The Business letters*" Goodwill Publishing House, New Delhi
3. Kumar Sanjay &Pushplata "*Communication Skills*" Oxford University Press, New Delhi.

Registrar

Post Revision

Course Code: TMUGE301	B.Tech LEE ~~B.Sc.(H) Chemistry- Semester-III~~ **English Communication- III**	L-2 T-0 P-2 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** knowledge of grammar to face competitive exams.	
CO2.	**Understanding** advance English language by using variety of words i.e. idioms and phrase in variety of sentences in functional context.	
CO3.	**Understanding** listening for effective communication.	
CO4.	**Applying** their English grammar knowledge in day to day context.	
CO5.	**Applying** writing and comprehensive skills in English.	
CO6.	**Analyzing** Comprehending & enriching their vocabulary through prescribed text.	
Course Content:		
Unit-1:	English Grammar & Vocabulary **(a)** Correction of Common Errors (with recap of English Grammar with its usage in practical context.) **(b)** Synthesis: Simple, complex and compound sentence **(c)** Commonly used Idioms & phrases (Progressive learning whole semester)	**14 Hours**
Unit-2:	Speaking Skills **(a)** Art of public speaking **(b)** Common conversation **(c)** Extempore **(d)** Power Point Presentation (PPt) Skills: Nuances of presenting PPTs	**10 Hours**
Unit-3:	Comprehension Skills **(a)** Strategies of Reading comprehension: Four S's **(b)** How to solve a Comprehension (Short unseen passage: 150-200 words)	**6 Hours**
Unit-4:	Professional Writing **(a)** Preparing Notice, Agenda & Minutes of the Meeting	**7 Hours**
Unit-5:	Value based text reading: Short story **(a)** The Barber's Trade Union - Mulk Raj Anand	**3 Hours**
Text Book:	**(d)** Singh R.P., An Anthology of English Essay, O.U.P. New Delhi	
Reference Books:	1. Wren & Martin *"High School English Grammar and Composition"* S.Chand & Co.Ltd., New Delhi. 2. Kumar Sanjay &Pushplata *"Communication Skills"* Oxford University Press, New Delhi. 3. Agrawal, Malti *"Professional Communication"* Krishana Prakashan Media (P) Ltd. Meerut. ***Latest editions of all the suggested books are recommended.**	
Additional Electronics Reference Material	1- https://www.youtube.com/watch?v=dpYltVtsS_Q 2- https://www.youtube.com/watch?v=Z8HttKW8jVE 3- https://www.youtube.com/watch?v=srn5jgr9TZo	

Registrar

Post Revision

B. Tech ECE

Semester-III

English Communication and Soft Skills-III

[BHM349/EHM349/449 amended vide approval dt. July 23, 2018 & January 23, 2019 of V.C]

Course Code: BHM349/EHM349/449

L	T	P	C
1	1	2	2

Objectives:

1. To enable the learners to upgrade their knowledge of grammar and vocabulary to address competitive exams like GATE.
2. To enable the learner to improve their listening.
3. To enable the learners to improvise their voice modulation in reading and speaking.
4. To enable the learners to enhance their writing and comprehensive skills in English
5. To enable the learners to proactively participate in activities in situational context.

Course Outcomes: At the end of the semester, the learners will be able to

1. Refine their usage of English grammar in day to day context.
2. Acquire adequate knowledge of grammar to address competitive exams like GATE.
3. Use advance English language by using variety of words i.e. idioms and phrase in variety of sentences in functional context.
4. Improve their listening to understand the basic content.
5. Improvise their voice modulation while reading and speaking something.
6. Enhance writing and comprehensive skills in English.
7. Present simple Power Point Presentation (PPt).
8. Proactively participate in activities in situational context (like impromptu).

Course Contents:

Unit – I Grammar & Vocabulary **(14 hours)**

- Correction of Common Errors (with recap of English Grammar with its usage in practical context.)
- Transformation of sentences
- Commonly used Idiom & Phrases (Progressive learning whole semester)

Unit – II Essence of Effective listening & speaking **(12 hours)**

- Listening short conversation/ recording (TED talks / Speeches by eminent personalities) *Critical Review of these abovementioned*
- Voice Modulation: Five P's - Pace, Power, Pronunciation, Pause, and Pitch.
- Impromptu
- Power Point Presentation (PPt) Skills: Nuances of presenting PPTs

Unit – III Reading and Comprehension Skills **(08 hours)**

- Strategies of Reading comprehension: Four S's
- How to solve a Comprehension (Short unseen passage: 150-200 words)
- Reading Newspaper (Progressive learning whole semester)

Unit – IV Writing Skills **(06 hours)**

- Essentials of a paragraph
- Paragraph writing (100-120 words)

Reference Books:

1. Allen, W. *"Living English Structure"* Pearson Education, New Delhi.

Post Revision

B. Tech EE

Course Code TMUGE401 TMUGE501	~~B.Sc.(H) Physics- Semester-IV~~ **English Communication – IV**	L-2 T-0 P-2 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Remembering** adequate knowledge of grammar and vocabulary through prescribed text to address competitive exams.	
CO2.	**Understanding** the value of listening to understand the basic content.	
CO3.	**Understanding** the usage of English grammar in day to day context.	
CO4.	**Understating** about the skills required in corporate world.	
CO5.	**Applying** writing and comprehensive skills in English.	
CO6.	**Creating** a simple proposal and report.	
Course Content:		
Unit-1:	**Vocabulary & Grammar** • Homophones and Homonyms • Correction of Common Errors (with recap of English Grammar with its usage in practical context.) • Transformation of sentences	**12 Hours**
Unit-2:	**Essence of Effective listening & speaking** • Listening short conversation/ recording (TED talks / Speeches by eminent personalities) *Critical Review of these abovementioned* • Impromptu	**5 Hours**
Unit-3:	**Professional Writing** • Proposal: Significance, Types, Structure & AIDA • Report Writing: Significance, Types, Structure& Steps towards Report writing	**8 Hours**
Unit-4:	**Job Oriented Skills** • Cover Letter • Preparing Resume and Curriculum-Vitae • Interview: Types of Interview, Tips for preparing for Interview and Mock Interview • Corporate Expectation & Professional ethics: Skills expected in corporate world.	**10 Hours**
Unit-5:	**Value based text reading:** Short story • A Bookish Topic - R.K. Narayan	**5 Hours**
Text Book:	**1.** Singh R.P., An Anthology of English Essay, O.U.P. New Delhi	
Reference Books:	**1.** Joseph, Dr C.J. & Myall E.G. "A *Comprehensive Grammar of Current English*" Inter University Press, Delhi **2.** Chaudhary Sarla "Basic Concept of Professional Communication" Dhanpat Rai Publication, New Delhi. **3.** Kumar Sanjay &Pushplata "Communication Skills" Oxford University Press, New Delhi. ***Latest editions of all the suggested books are recommended.**	
Additional Electronics Reference Material	1- https://www.youtube.com/watch?v=dpYltVtsS_Q 2 - https://www.youtube.com/watch?v=QthdqIB0WS8 3 - https://www.youtube.com/watch?v=MrgHfK8Pcfk 4 - https://www.youtube.com/watch?v=860LtRxP3rw	

Pre Revision

B Tech & LE

Semester IV

English Communication and Soft Skills – IV

[BHM499/EHM599/699 amended vide approval dt. July 23, 2018 of V.C]

Course Code: BHM499/EHM599/699

L	T	P	C
1	1	2	2

Objectives:

1. To enable the learners to inculcate the skills of technical writing.
2. To enable the learners to proactively participate in Job Oriented activities.
3. To enable the learners to be aware of corporate Skills.

Course Outcomes: At the end of the semester, the learners will be able to

1. Formulate their CVs along with cover letter in Job oriented perspective.
2. Communicate technically in functional context.
3. Proactively participate in Job Oriented activities. (Like Interview, GD etc.)
4. Aware of the skills required in corporate world.

Course Contents:

Unit – I: Job Oriented Skills **(10 Hours)**

- Cover Letter
- Preparing Resume and Curriculum-Vitae
- Writing Joining Report

Unit – II: Technical Communication **(12 Hours)**

- Technical description of engineering objects
- Data Interpretation: Tables, Charts, & Graphs
- Preparing Agenda & Minutes of the Meeting
- Technical Proposal: Types, Significance, Structure & AIDA
- Report Writing: Types, Structure& Steps towards Report writing

Unit- III: Interview Skills **(10 Hours)**

- Branding yourself
- Interview: Types of Interview, Tips for preparing for Interview and Mock Interview
- Group Discussion: Do's and Don'ts of Group Discussion
- Negotiation skills

Unit – IV: Corporate Skills **(8 Hours)**

- Corporate Expectation
- Service mindset: Selling a product - Ad made shows
- Goal setting
- Team Building & Leadership
- Professional Ethics

Reference Books:

- Raman Meenakshi & Sharma Sangeeta, *"Technical Communication-Principles & Practice"* Oxford University Press, New Delhi.
- Mohan K. & Sharma R.C., "*Business Correspondence of Report Writing*", TMH, New Delhi.
- Chaudhary, Sarla "Basic Concept of Professional Communication" Dhanpat Rai Publication, New Delhi.
- Kumar Sanjay & Pushplata "*Communication Skills*" Oxford University Press, New Delhi.
- Agrawal, Malti "*Professional Communication*" Krishana Prakashan Media (P) Ltd. Meerut.

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