

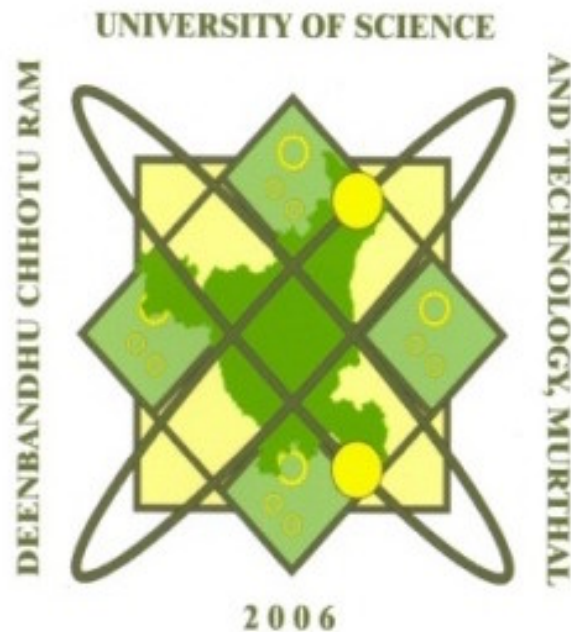
**SCHEME OF STUDIES & EXAMINATION
SYLLABUS**

BACHELOR OF TECHNOLOGY

(4 Year Degree Programme)

AUTOMOBILE ENGINEERING

(w.e.f. Session 2012-13)



**DEENBANDHU CHHOTU RAM UNIVERSITY OF
SCIENCE AND TECHNOLOGY**

MURTHAL -131039 (SONIPAT) HARYANA

JUNE – 2012/MARCH-2013

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonapat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 1ST YEAR (SEMESTER – I) (Common for all branches)
Credit Based Scheme w.e.f. 2012-13

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam	
			L	T	P		Theory	Practical				
1	HUM 101B	COMMUNICATIVE ENGLISH	3	1		25	75	-	100	4	3	
2	MATH 101B	MATHEMATICS-I	3	1		25	75	-	100	4	3	
3	PHY 101B	ENGINEERING PHYSICS-I	3	1		25	75	-	100	4	3	
4	ME101B	MANUFACTURING PROCESSES (Gr-A)	3	1		25	75	-	100	4	3	
	CH101 B	OR ENGINEERING CHEMISTRY (Gr-B)	3	1		25	75	-				
5	EE101B	PRINCIPLES OF ELECTRICAL ENGINEERING (Gr-A)	3	1		25	75	-	100	4	3	
	CSE101B	OR INTRODUCTION TO COMPUTERS & PROGRAMMING (Gr-B)	3	1		25	75	-				
6	ME103B	ENGINEERING GRAPHICS & DRAWING (Gr-A)	1	-	4	40	-	60	100	3	3	
	ME105B	OR ELEMENTS OF MECHANICAL ENGINEERING (Gr-B)	3	1	-	25	75		100	4		
7	PHY103B	PHYSICS LAB-I	-	-	2	20		30	50	1	3	
8	ME 107B	WORKSHOP PRACTICE (Gr-A)	-	-	4	40		60	100	2	3	
	CH103B	OR CHEMISTRY LAB (Gr-B)	-	-	2	20		30	50	1		
9	EE103B	PRINCIPLES OF ELECTRICAL ENGINEERING LAB (Gr-A)	-	-	2	20		30	50	1	3	
	CSE103B	OR COMPUTER PROGRAMMING LAB (Gr-B)	-	-	2	20		30	50	1		
10	ME109B	ELEMENTS OF MECHANICAL ENGINEERING LAB (Gr-B)	-	-	2	20		30	50	1	3	
Total												
			Gr-A	16	5	12	245	375	180	800	27	
			Gr-B	18	6	8	230	450	120	800	28	

Note:

- 1 Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weight age of sports is given in General Proficiency & Ethics Syllabus.
- 2 The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
- 3 Electronics gadgets including Cellular phones are not allowed in the examination.
- 4 All the branches are to be divided into group 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonapat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 1ST YEAR (SEMESTER – II) (Common for all branches)
Credit Based Scheme w.e.f. 2012-13

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1.	MATH102B	MATHEMATICS-II	3	1		25	75	-	100	4	3
2	PHY102B	ENGINEERING PHYSICS-II	3	1		25	75	-	100	4	3
3	ME101 B	MANUFACTURING PROCESSES (Gr-B)	3	1		25	75	-	100	4	3
	CH101 B	ENGINEERING CHEMISTRY (Gr-A)	3	1		25	75	-			
4	EE101B	PRINCIPLES OF ELECTRICAL ENGINEERING (Gr-B)	3	1		25	75	-	100	4	3
	CSE101B	INTRODUCTION TO COMPUTERS & PROGRAMMING (Gr-A)	3	1		25	75	-			
5	ECE102B	BASICS OF ELECTRONICS ENGINEERING	3	1		25	75	-	100	4	3
	BT102B	BASICS OF BIO TECHNOLOGY									
	HUM102 B	ORAL COMMUNICATION SKILLS OR									
	CE102 B	BASICS OF CIVIL ENGINEERING									
6	ME103B	ENGINEERING GRAPHICS & DRAWING (Gr-B)	1	-	4	40	-	60	100	3	3
	ME105B	ELEMENTS OF MECHANICAL ENGINEERING (Gr-A)	3	1	-	25	75	-	100	4	
7	PHY104B	PHYSICS LAB-II	-	-	2	20		30	50	1	3
8	ME 107B	WORKSHOP PRACTICE (Gr-B)	-	-	4	40		60	100	2	3
	CH103B	CHEMISTRY LAB (Gr-A)	-	-	2	20		30	50	1	
9	EE103B	PRINCIPLES OF ELECTRICAL ENGINEERING LAB (Gr-B)	-	-	2	20		30	50	1	3
	CSE103B	COMPUTER PROGRAMMING LAB (Gr-A)	-	-	2	20		30	50		
10	ME109B	ELEMENTS OF MECHANICAL ENGINEERING LAB (Gr-A)	-	-	2	20		30	50	1	3
11	GP 102B	GENERAL PROFICIENCY & ETHICS	1			-		50	50	2	
Total			17	5	12	245	375	230	850	29	
			19	6	8	230	450	170	850	30	

Note:

- Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weight age of Sports is given in General Proficiency & Ethics Syllabus.
- Each student has to undergo a workshop at least 4 weeks (80-100 hours) at the end of II semester during summer vacations. Out of the four weeks, two weeks would be dedicated to general skills and two weeks training for specialized discipline/department. The evaluation of this training shall be carried out in the III semester.
- The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator are prohibited in the examination.
- Electronics gadgets including Cellular phones are not allowed in the examination.
- The elective course HUM 102B ORAL COMMUNICATION SKILLS is deleted wef session 2013-2014.
- All the branches are to be divided into group 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonapat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 2nd YEAR (SEMESTER – III) AUTOMOBILE ENGINEERING
Credit Based Scheme w.e.f. 2013-14

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1	MGT 201B	ENGINEERING ECONOMICS (Common for all branches Except BT & BME) (Gr-A)	4	-	-	25	75	-	100	4	3
	GES 201 B	ENVIRONMENTAL STUDIES (Common for all branches) (Gr-B)	3	-	-	-	75*	-	75*	-	3
2	AE 201B	BASICS OF AUTOMOBILE ENGINEERING	4	-	-	25	75	-	100	4	3
3	AE 203B	ENGINEERING THERMODYNAMICS	3	1	-	25	75	-	100	4	3
4	AE 205B	MECHANICS OF SOLIDS	3	1	-	25	75	-	100	4	3
5	ME205B	ENGINEERING MECHANICS (Common with ME & AER)	3	1	-	25	75	-	100	4	3
6	AE 207B	FLUID MECHANICS & MACHINERY	3	1	-	25	75	-	100	4	3
7	A E 209B	AUTOMOBILE ENGINEERING DRAWING LAB	1	-	4	40	60	-	100	4	3
8	AE 211B	MECHANICS OF SOLIDS LAB	-	-	2	20	-	30	50	1	3
9	AE 213B	COMPUTER AIDED DRAFTING LAB	-	-	2	20	-	30	50	1	3
10	AE 215B	FLUID MECHANICS & MACHINERY LAB	-	-	2	20	-	30	50	1	3
11	AE 217B	AUTOMOBILE WORKSHOP	-	-	2	50	-	-	50	2	3
12	GES 203B	ENVIRONMENTAL STUDIES FIELD WORK (Common for all branches) (Gr- B)	-	-	-	-	-	25*	25*	-	-
Total			21	4	12	300	510	90	900	33	
			20	4	12	275	435	90	800	29	

Note:

- 1 Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weight age of Sports is given in General Proficiency & Ethics Syllabus.
- 2 *The Environmental studies (GES-201 B & Environment Studies Field work (GES-203B) are compulsory & qualifying courses.
- 3 The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
- 4 Electronics gadgets including Cellular phones are not allowed in the examination
- 5 All the branches are to be divided into group 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonapat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 2nd YEAR (SEMESTER – IV) AUTOMOBILE ENGINEERING
Credit Based Scheme w.e.f. 2013-14

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1	MGT 201 B	ENGINEERING ECONOMICS (Except BT & BME) (Gr- B)	4	-		25	75	-	100	4	3
	GES 201 B	ENVIRONMENTAL STUDIES (Gr-A)	3	-		-	75*		75*	--	
2	AE 202B	THEORY OF MACHINE	3	1		25	75	-	100	4	3
3	AE 204B	AUTOMOBILE PETROL ENGINES	3	1		25	75	-	100	4	3
4	AE 206B	AUTOMOBILE DIESEL ENGINES	3	1		25	75	-	100	4	3
5	AE 208B	COMBUSTION AND HEAT TRANSFER	3	1		25	75	-	100	4	3
6	AE 210B	AUTOMOBILE ENGINEERING MATERIALS	3	1		25	75	-	100	4	3
7	AE 212B	THEORY OF MACHINE LAB	-	-	2	20	-	30	50	1	3
8	AE 214B	AUTOMOBILE ENGINE COMPONENT LAB	-	-	2	20	-	30	50	1	3
9	AE 216B	COMBUSTION AND HEAT TRANSFER LAB	-	-	2	20	-	30	50	1	3
10	AE 218B	AUTOMOBILE ENGINEERING MATERIALS LAB	-	-	2	20	-	30	50	1	3
11	GES 203 B	ENVIRONMENTAL STUDIES FIELD WORK (Gr-A)	-	-	-	-	-	25*	25*	-	
12	GPAE 202B	GENERAL PROFICIENCY & ETHICS	1	-	-	-	-	75	75	2	3
Total			20	5	9	230	450	195	875	30	
Gr-A			19	5	9	205	375	195	775	26	

Note:

- 1 Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of Sports is given in General Proficiency & Ethics Syllabus.
- 2 *The Environmental studies (GES-201 B & Environment Studies Field work (GES-203B) are compulsory & qualifying courses.
- 3 The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
- 4 Electronics gadgets including Cellular phones are not allowed in the examination
- 5 Each students has to undergo Professional Training of at least 4 weeks from the industry, institute, research lab, training center etc during summer vacation and its evaluation shall be carries out in the V semester
- 6 All the branches are to be divided into group 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonapat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 3rd YEAR (SEMESTER – V) AUTOMOBILE ENGINEERING
Credit Based Scheme w.e.f. 2014-15

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1	AE 301B	ENGINEERING METROLOGY & MEASUREMENT	3	1	-	25	75	-	100	4	3
2	AE 303B	AUTOMOTIVE CHASSIS	4	-	-	25	75	-	100	4	3
3	AE 305B	AUTOMOTIVE ELECTRICAL & ELECTRONICS	4	-	-	25	75	-	100	4	3
4	AE 307B	AUTOMOTIVE ENGINE COMPONENT DESIGN	3	1	-	25	75	-	100	4	3
5	AE 309B	MANUFACTURING PROCESS FOR AUTOMOTIVE COMPONENTS	4	-	-	25	75	-	100	4	3
6	AE 311B	VEHICAL BODY ENGINEEING	3	1	-	25	75	-	100	4	3
7	AE 313B	AUTOMOTIVE CHASSIS COMPONENT LAB	-	-	2	20	-	30	50	1	3
8	AE 315B	AUTOMOTIVE ELECTRICAL & ELECTRONICS LAB	-	-	2	20	-	30	50	1	3
9	AE 317B	COMPUTER AIDED VEHICAL DRAFTING LAB	-	-	2	20	-	30	50	1	3
10	AE 319B	PROFESSIONAL TRAINING-I	-	-	2	50	-	-	50	2	3
Total			21	3	8	260	450	90	800	29	

Note:

- 1 Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weight age of Sports is given in General Proficiency & Ethics Syllabus.
- 2 The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator are prohibited in the examination.
- 3 Electronics gadgets including Cellular phones are not allowed in the examination

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonapat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 3rd YEAR (SEMESTER – VI) AUTOMOBILE ENGINEERING
Credit Based Scheme w.e.f. 2014-15

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1	AE 302B	AUTOMOTIVE FUELS & LUBRICANTS	3	1		25	75	-	100	4	3
2	AE 304B	AUTOMOTIVE TRANSMISSION	3	1		25	75	-	100	4	3
3	AE 306B	AUTOMOTIVE INSTRUMENTATION & EMBEDDED SYSTEMS	3	1		25	75	-	100	4	3
4	AE 308B	AUTOMOTIVE CHASSIS DESIGN	3	1		25	75	-	100	4	3
5	AE 310B	AUTOMOTIVE POLLUTION & CONTROL	3	1		25	75	-	100	4	3
6	AE 312B	TWO & THREE WHEELERS	3	1		25	75	-	100	4	3
7	HUM 302B	REPORT WRITING SKILLS (Common for all branches)	1	-	-	25	50	-	75	1	2
7	AE 314B	TWO & THREE WHEELERS LAB	-	-	2	20		30	50	1	3
8	AE 316B	COMPUTER AIDED CHASSIS DESIGN LAB	-	-	2	20		30	50	1	3
9	AE 318B	COMPUTER AIDED ENGINE DESIGN LAB	-	-	2	20		30	50	1	3
10	AE 320B	AUTOMOTIVE ENGINE TESTING & POLLUTION MEASUREMENT LAB	-	-	2	20	-	30	50	1	3
11	HUM 304B	ORAL PRESENTATION SKILLS (Common for all branches)	-	-	2	20	-	30	50	1	2
12	GP AE 302B	GENERAL PROFICIENCY & ETHICS	1	-	-	-	-	75	75	2	-
Total			19	6	10	275	500	225	1000	32	

Note:

- 1 Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weight age of Sports is given in General Proficiency & Ethics Syllabus.
- 2 The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
- 3 Electronics gadgets including Cellular phones are not allowed in the examination
- 4 Each students has to undergo Professional Training of at least 4 weeks from the industry, institute, research lab, training center etc during summer vacation and its evaluation shall be carries out in the VII semester

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonapat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. Final YEAR (SEMESTER – VII) AUTOMOBILE ENGINEERING
Credit Based Scheme w.e.f. 2015-16

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1	AE 401B	AUTOMOTIVE SAFETY	4	-		25	75	-	100	4	3
2	AE 403B	VEHICLE PERFORMANCES AND TESTING	4	-		25	75	-	100	4	3
3	AE 405B	VEHICLE DYNAMICS	3	1		25	75	-	100	4	3
4	AE 407B	VEHICLE MAINTANANCE	4	-		25	75	-	100	4	3
5	*	OPEN ELECTIVE	4	-		25	75	-	100	4	3
6	AE 409B	AUTO SCANING & VEHICLE TESTING LAB	-	-	2	20		30	50	1	3
7	AE 411B	VEHICLE MAINTANANCE & RECONDITIONING LAB	-	-	2	20		30	50	1	3
8	AE 413B	PROJECT	-	-	4	100	-	-	100	4	-
9	AE 415B	PROFESSIONAL TRAINING-II	-	-	2	50	-	-	50	2	-
Total			19	1	10	315	375	60	750	28	

*** List of Open Electives**

1	MEI 623B	ENTREPRENEURSHIP	6	BT 401B	BIOINFORMATICS
2	BME 451B	MEDICAL INSTRUMENTATION	7	AE 417B	MODERN VEHICLE TECHNOLOGY
3	ECE 305B	CONSUMER ELECTRONICS	8	CE 451B	POLLUTION & CONTROL
4	EE 451B	ENERGY AUDIT	9	CSE 411B	MANAGEMENT INFORMATION SYSTEM
5	EEE 457B	ENERGY RESOURCES & TECHNOLOGY	10	IT 413 B	CYBER SECURITY

Note:

- 1 Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weight age of Sports is given in General Proficiency & Ethics Syllabus.
- 2 Students will be permitted to opt for any one elective run by the other department. However, the department shall offer those elective for which they have expertise. The choice of the students for any elective shall not be binding for the department to offer, if the department does not have expertise. The minimum strength of the students should be twenty to run an elective course.
- 3 Assessment of Professional Training-II, undergone at the end of VI semester, will be based on seminar, viva-voce, report and certificate of Professional Training obtained by the student from the industry, , institute, research lab, training center etc
- 4 The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
- 5 Electronics gadgets including Cellular phones are not allowed in the examination
- 6 The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher). Project coordinator will be assigned the project load of, maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her. The format of the cover page and the organization of the body of the report for all the B. Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonapat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. Final YEAR (SEMESTER – VIII) AUTOMOBILE ENGINEERING
Credit Based Scheme w.e.f. 2015-16

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1	AE 402B	EMERGING AUTOMOTIVE TECHNOLOGIES	4	0		25	75	-	100	4	3
2	AE 404B	AUTOMOTIVE WORKSHOPS TOOLS AND EQUIPMENTS	4	0		25	75	-	100	4	3
3		ELECTIVE I	4	-		25	75	-	100	4	3
4		ELECTIVE II	4	-		25	75	-	100	4	3
5	AE 406B	AUTOMOTIVE WORKSHOPS TOOLS AND EQUIPMENTS LAB	-	-	2	20		30	50	1	3
6	AE 408B	SEMINAR	-	-	2	50			50	2	3
7	AE 413B	PROJECT	-	-	8	75	-	125	200	8	3
8	GFAE 402B	GENERAL FITNESS FOR THE PROFESSION	1	-	-		-	100	100	4	3
Total			17	0	12	245	300	255	800	31	

ELECTIVE I		ELECTIVE II	
AE 432B	AUTOMOTIVE AERODYNAMICS	AE 442B	TRANSPORT MANAGEMENT AND AUTOMOTIVE INDUSTRY
AE 434B	SPECIAL TYPE OF VEHICLE	AE 444B	ERGONOMICS ENGINEERING
AE 436B	AUTOMOTIVE AIR CONDITIONING	AE 446B	VIBRATION AND NOISE CONTROL
AE 438B	MECHATRONICS	AE 448B	DESIGN OF JIGS, FIXTURE AND PRESS TOOLS
AE 440B	NON DESTRUCTIVE TESTING METHODS	AE 450B	QUALITY CONTROL AND RELIABILITY ENGINEERING

Note:

- 1 Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weight age of Sports is given in General Fitness For The Profession Syllabus.
- 2 The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
- 3 Electronics gadgets including Cellular phones are not allowed in the examination
- 4 The choice of the students for any elective shall not be binding for the department to offer, if the department does not have expertise. The minimum strength of the students should be twenty to run an elective course.
- 5 The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher). Project coordinator will be assigned the project load of, maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her. The format of the cover page and the organization of the body of the report for all the B. Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonapat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 1ST YEAR (SEMESTER – I) (Common for all branches)
Credit Based Scheme w.e.f. 2012-13

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam	
			L	T	P		Theory	Practical				
1	HUM 101B	COMMUNICATIVE ENGLISH	3	1		25	75	-	100	4	3	
2	MATH 101B	MATHEMATICS-I	3	1		25	75	-	100	4	3	
3	PHY 101B	ENGINEERING PHYSICS-I	3	1		25	75	-	100	4	3	
4	ME101B	MANUFACTURING PROCESSES (Gr-A)	3	1		25	75	-	100	4	3	
	CH101 B	OR ENGINEERING CHEMISTRY (Gr-B)	3	1		25	75	-				
5	EE101B	PRINCIPLES OF ELECTRICAL ENGINEERING (Gr-A)	3	1		25	75	-	100	4	3	
	CSE101B	OR INTRODUCTION TO COMPUTERS & PROGRAMMING (Gr-B)	3	1		25	75	-				
6	ME103B	ENGINEERING GRAPHICS & DRAWING (Gr-A)	1	-	4	40	-	60	100	3	3	
	ME105B	OR ELEMENTS OF MECHANICAL ENGINEERING (Gr-B)	3	1	-	25	75	-	100	4		
7	PHY103B	PHYSICS LAB-I	-	-	2	20		30	50	1	3	
8	ME 107B	WORKSHOP PRACTICE (Gr-A)	-	-	4	40		60	100	2	3	
	CH103B	OR CHEMISTRY LAB (Gr-B)	-	-	2	20		30	50	1		
9	EE103B	PRINCIPLES OF ELECTRICAL ENGINEERING LAB (Gr-A)	-	-	2	20		30	50	1	3	
	CSE103B	OR COMPUTER PROGRAMMING LAB (Gr-B)	-	-	2	20		30	50	1		
10	ME109B	ELEMENTS OF MECHANICAL ENGINEERING LAB (Gr-B)	-	-	2	20		30	50	1	3	
Total												
			Gr-A	16	5	12	245	375	180	800	27	
			Gr-B	18	6	8	230	450	120	800	28	

Note:

- 5 Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weight age of sports is given in General Proficiency & Ethics Syllabus.
- 6 The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
- 7 Electronics gadgets including Cellular phones are not allowed in the examination.
- 8 All the branches are to be divided into group 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.

HUM 101B COMMUNICATIVE ENGLISH						
B. Tech. Semester - I (Common for all Branches)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	--	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

OBJECTIVE

The course aims at developing the desired language (English) skills of students of engineering and technology so that they become proficient in communication to excel in their professional lives. The course has been designed so as to enhance their linguistic and communicative competence.

COURSE CONTENT

UNIT I

COMMUNICATIVE GRAMMAR:

- A) Spotting the errors pertaining to tenses, conditional sentences, Concord – grammatical concord, notional concord and the principle of proximity b/w subject and verb
- B) Voice, Reported Speech.

UNIT II

LANGAUGE THROUGH LITERATURE:

- Linguistic Reading of the following texts
 - A) 'Kabuliwallah' by Rabindranath Tagore*
 - B) 'Am I Blue?' by Alice Walker*
 - C) 'If You are Wrong, Admit It' by Dale Carnegie*
 - D) 'Engine Trouble' by R.K. Narayan*

The prescribed texts will be used as case studies for various components of the syllabus. * the Source is given in the list of Texts Books given below.

UNIT III

GROUP COMMUNICATION:

- A) Communication: concept, Process and Barriers
- B) Communicating using Standard Pronunciation with the help of IPA
- C) Formal Speaking with peers (e.g. discussion, talks on current issues in a class)
- B) Writing official letters on issues concerning students and social life
- C) Writing small reports on scientific issues, IT issues, University fests/programmes
- C) E-mail writing and writing for web

UNIT IV

COMMUNICATIVE CREATIVITY:

- A) Comprehension: Extracting, interpreting, summarizing, reviewing and analyzing the prescribed texts.
- B) Composition: Developing themes and situations through role play activities or dialogue writing.

Contd.

TEXT BOOKS

1. Quirk, Randolph, Sidney Greenbaum, Geoffrey Leech & Jan Svartvik. *A Comprehensive Grammar of the English Language*. London: Longman, 1989
2. Communicative English for Engineers and Professionals by Nitin Bhatnagar & Mamta Bhatnagar New Delhi: Pearson / Longman
3. Crystal, David. *Rediscover Grammar*. London: Longman/Pearson, 1988.
4. *Tagore, Rabinder. "Kabuliwallah", *Famous Indian Stories*. Ed. M.G.Narsimha Murthy .Mumbai: Orient Blackswan, 2009. (Web source: www.angelfire.com)
5. * Walker, Alice. "Am I Blue", *An Anthology of Short Stories* .Ed. Usha Bande .New Delhi: OUP , 2004. (Web source- www.old.li.scriu.edu)
6. *Narayanan .K.R. "Engine Trouble", *Contemporary English Prose* .Ed. K.P.K.Menon. New York: OUP,1976. (Web Source- www.scribd.com)
7. *Carnegie, Dale. "If you are wrong admit it", *An Anthology of Modern Prose* . Ed Manmohan K.Bhatnagar.Delhi :Macmillan India Ltd,2006.

SUGGESTED READING

1. Pink, M.A. and S.E. Thomas. *English Grammar, Composition and Correspondence*. Delhi: S. Chand and Sons
2. McRae, John and Roy Boardman. *Reading Between the Lines*. Delh: Foundation Books (Cambridge University Press)
3. Sharma, Sangeeta and Binod Mishra. *Communication Skills for Engineers and scientists*. Delhi: PHI, 2009
4. Fitikides, T.J. *Common Mistakes in English*. Essex: Pearson Education, 1936, 6th edition 2000.

SCHEME OF END SEMESTER EXAMINATION (MAJOR TEST)

THEORY

1. The duration of the exam will be 3 hours.
2. The Question Paper for this theory course shall have seven questions in all covering all the units of the syllabus..
3. The student is required to attempt all the seven questions.
4. Questions No. 1 based on Unit I is of **15** marks. It may be in the form of 'Do as directed: trace the error, choose the correct alternative, supply the correct alternative/s, change the voice, convert the speech from direct to indirect or vice-versa'.
5. Question no 2 and 3 based on prescribed texts in Unit II. Question no 2 of **10 marks** is to evaluate the comprehension of the text through short answer questions or a long answer question to assess the students' reading comprehension, interpretative and analytical abilities. Question no 3 of **15 marks** will judge the linguistic aspect of the text such as using a particular word in its various syntactic forms like noun, adjective, verb etc.; matching the lists of words and their explanation; providing opposite/similar meanings and other grammar components prescribed in Unit I of the syllabus.
6. Question no 4 based on Unit III is of **10** marks. It may be in the form of transcription of words given, describe an event, classmate, discuss an issue etc.
7. Question no 5 based on Unit III is of **10** marks. It requires the student to frame either a small report on a topic given or write the given official letter, or e-mail a message.
8. Question no 6 based on unit IV is of **10** marks. It evaluates the Comprehension and Interpretation of the texts prescribed in Unit II. The vocabulary, general understanding and interpretation of the content may be evaluated in the form of question answer exercise, culling out important points, suggesting a suitable topic/title, summarising and interpreting.
9. Question No. 7 based on unit IV is of **5** marks. It requires the student to develop a hypothetical situation in a dialogue form, or to develop an outline, key expression, for role play activity.

MATH 101B MATHEMATICS - I						
B. Tech. Semester - I (Common for all Branches)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

INFINITE SERIES : Convergence and divergence, Comparison, D' Alembert's ratio, Integral, Raabe's, Logarithmic and Cauchy root tests, Alternating series, Absolute and conditional convergence.

Applications of Differentiation : Taylor's and Maclaurin's series, Asymptotes, Curvature Asymptotes.

UNIT II

PARTIAL DIFFERENTIATION & ITS APPLICATIONS : Functions of two or more variables; partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, Jacobians, Higher order partial derivatives.

Homogeneous functions, Euler's theorem, Taylor's series for functions of two variables (without proof), maxima-minima of function of two variables, Lagrange's method of undetermined multipliers, Differentiation under integral sign.

UNIT III

APPLICATIONS OF SINGLE & MULTIPLE INTEGRATION : Applications of single integration to find volume of solids and surface area of solids of revolution. Double integral, change of order of integration, Double integral in polar coordinates, Applications of double integral to find area enclosed by plane curves and volume of solids of revolution.

Triple integral, volume of solids, change of variables, Beta and gamma functions and relationship between them.

UNIT IV

VECTOR CALCULUS : Differentiation of vectors, scalar and vector point functions Gradient of a scalar field and directional derivative, divergence and curl of a vector field and their physical interpretations.

Integration of vectors, line integral, surface integral, volume integral, Green, Stoke's and Gauss theorems (without proof) and their simple applications.

TEXT BOOKS:

1. Advanced Engineering Mathematics : F. Kreyszig.
2. Higher Engineering Mathematics : B.S. Grewal.

REFERENCE BOOKS:

1. Engineering Mathematics Part-I : S.S. Sastry.
2. Differential and Integral Calculus : Piskunov.
3. Advanced Engineering Mathematics : R.K. Jain and S.R.K. Iyengar
4. Advanced Engg. Mathematics : Michael D. Greenberg

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

PHY 101B					ENGINEERING PHYSICS - I		
B. Tech. Semester - I (Common for all Branches)							
L	T	P	Credits		Class Work	:	25 Marks
3	1	-	4		Examination	:	75 Marks
					Total	:	100 Marks
					Duration of Examination	:	3 Hours

UNIT I

PHYSICAL OPTICS:

Interference: Division of wave front-Fresnel's Biprism, Division of amplitude – Newton's rings, Michelson interferometer, applications.

Diffraction : Difference between Fraunhofer and Fresnel diffraction, Fraunhofer diffraction through a slit, Plane transmission diffraction grating and its spectra, dispersive and resolving powers.

Polarization : Polarised and unpolarized light, double refraction, Nicol prism, quarter and half wave plates, Plane, Elliptically & circularly polarised light, Polarimetry: Biquartz and Laurent's half-shade polarimeters.

UNIT II

LASER & FIBRE OPTICS: Introduction, Spontaneous and stimulated emissions, Laser action, characteristics of laser beam, Ruby laser, He-Ne, Nd-Yag and semiconductor lasers, applications of laser.

Introduction, Propagation of light in fibres, Types of fiber (pulse & continuous), numerical aperture, Modes of propagation in optical fibre, application of optical fibre.

ACOUSTIC OF BUILDINGS: Introduction, Reverberation, Sabine's formula for reverberation time, Absorption coefficient and its measurements, factors affecting the architectural acoustics and their remedy, Sound absorbing materials.

UNIT III

TRANSMISSION OF HEAT AND THERMAL RADIATION

Modes of transmission of heat, Thermal conductivity, Rectilinear flow of heat through a rod, Radial flow of heat through a spherical shell, determination of Thermal conductivity of good and bad conductors.

Black body, Emissive and Absorptive Powers, Wein's Displacement Law, Kirchoff's Law, Stefan's Law, Determination of Stefan's Constant.

UNIT IV

NUCLEAR & ELEMENTARY IDEA OF PARTICLE PHYSICS

Outline of interaction of charged particles and of Gamma-rays with matter. Counters: Gas filled counters (Ionization Chamber, Proportional Counter and G M Counter). Detector: Scintillation detector, Semiconductor detectors (p-n junction detector), Biological effects of nuclear radiation.

Introduction to elementary particles, Interaction in particle physics: strong, electromagnetic, weak and gravitational. .

TEXT BOOKS:

1. A text book of Optics – Brij Lal and Subramanyam
2. Perspectives of Modern Physics - Arthur Beiser (TMH)
3. Modern Engineering Physics – A.S. Vasudeva (S. Chand)
4. Engineering Physics by R.K. Gaur and S.L. Gupta
5. Engineering Physics by H.K. Malik and A.K. Singh (Tata McGraw Hill).
7. Engineering Physics by S.P. Taneja (Chand Pub.)

REFERENCE BOOKS:

1. Physics Vol-I & II – Resnick & Halliday (Wiley Eastern)
2. Heat and Thermodynamics – M.N. Saha & B.N. Srivastava
3. Nuclear Physics Principles and Applications by John Lilley(Wiley-India).

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

ME 101B MANUFACTURING PROCESSES						
B. Tech. Semester - I (Common for all Branches)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

INTRODUCTION: Introduction to Manufacturing Processes and their Classification, automation in manufacturing, Industrial Safety; Introduction, Types of Accidents, Causes and Common Sources of Accidents, Methods of Safety, Electric Safety Measures, First Aid. Plant Layout, Principles of Plant Layout, Objectives of Layout, Types of Plant and shop layouts and their Advantages.

UNIT II

ENGINEERING MATERIALS: General Properties and Applications of Engineering Materials, Mild Steel, Medium Carbon Steel, High Carbon Steel, High Speed Steel and Cast Iron, Non-Ferrous Materials, Shop's Tools Materials, Super Alloys or High Temperature Materials
Foundry: Introduction to Casting Processes, Basic Steps in Casting Process, Pattern, Types of Patterns, Pattern allowances, Risers, Runners, Gates, Molding Sand and its composition, Sand Preparation, Molding Methods, Core Sands and Core Making, Core Assembly, Mold Assembly, Melting (Cupola) and Pouring, Fettling, Casting Defects and Remedies. Testing of Castings

UNIT III

COLD WORKING (SHEET METAL WORK): Sheet Metal Operations, Measuring, Layout Marking, Shearing, Punching, Blanking, Piercing, Forming, Bending and Joining - Advantages and Limitations. Hot Working Processes: Introduction to Hot Working, Principles of Hot Working Processes, Forging, Rolling, Extrusion, Wire Drawing.

INTRODUCTION TO MACHINE TOOLS: Specifications and Uses of commonly used Machine Tools in a Workshop such as Lathe, Shaper, Planer, Milling, Drilling, Slotter, Introduction to Metal Cutting. Nomenclature of a Single Points Cutting Tool and Tool Wear, Mechanics of Chips Formation, Type of Chips, Use of Coolants in machining.

UNIT IV

WELDING: Introduction to Welding, Classification of Welding Processes, Gas Welding: Oxy-Acetylene Welding, Resistance Welding: Spot and Seam Welding, Arc Welding: Metal Arc, TIG & MIG Welding, Welding Defects and Remedies, Soldering & Brazing, Comparisons among Welding, Brazing and Soldering
 Surface Finishing Processes, Introduction to Heat Treatment Processes, Estimating of Manufacturing Cost

TEXT BOOKS:

1. Workshop Technology Vol. I & II - Hazra & Chaudhary, Asian Book Comp., New Delhi.
2. Process and Materials of Manufacture -- Lindberg, R.A. Prentice Hall of India, New Delhi.
3. Principles of Manufacturing Materials and Processes - Campbell, J.S.- McGraw- Hill.

REFERENCE BOOKS:

1. Manufacturing Science - Amitabha Ghosh & Ashok Kumar Malik, - East-West Press.
2. Manufacturing Process and Systems - Ostwald, Munoz, John Wiley.
3. Workshop Technology, Vol. 1, 2 & 3 - Chapman, WAJ, Edward Arnold.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

CH 101B ENGINEERING CHEMISTRY						
B. Tech. Semester – I/II (Common for all Branches)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

THERMODYNAMICS: Second law, concept of entropy ,entropy change for ideal gas, free energy and work functions, free energy change ,chemical potential, Gibb's Helmholtz equation, Clausius –Clapeyron equation. Related numerical problems with above topics.

PHASE-RULE- Terminology, Derivation of Gibb's Phase Rule equation ,One component system(water system), Two components systems, system with Eutectic point (Pb-Ag), system with congruent melting point (Zn-Mg), system with incongruent melting point (Na-K), Applications of above systems. Elementary idea of Zone refining and Zone levelling

UNIT II

WATER AND ITS TREATMENT: Hardness of water and its determination, units of hardness, alkalinity of water and its determination, related numerical problems ,water softening, Ion-exchange process, mixed bed demineralisation, desalination of water by using different methods.

CORROSION AND ITS PREVENTION: Galvanic & concentration cell, dry and wet corrosion, Electrochemical theory of corrosion, Galvanic corrosion, Pitting corrosion , differential aeration corrosion, water line corrosion, stress corrosion, factor effecting corrosion, Preventing measures, electroless Plating of Ni and Cu.

UNIT III

POLYMERS AND POLYMERIZATION: Organic polymers, polymerisation, various types of polymerisation, effect of structure on properties of polymers, preparation properties and technical applications of thermoplastics (PE, PVC, PVA, Teflon), thermosets (PF, UF & MF) and elastomers (Synthetic Rubber including SBR, Buna-S, Buna-N, Thiokol & Polyurethanes) , Inorganic polymers (general properties) , Glass transition temperature, silicones

COMPOSITE MATERIALS & THEIR APPLICATION: optical fibres, Fullerenes ,organic electronic material ,composite materials & their classification, constituents of composites, role of interface in composite performance and durability, fiber –Reinforced composite, advantage and applications of composites.

UNIT IV

LUBRICANTS AND FUELS: Friction, mechanism of lubrication, classification and properties of lubricants and selection of Lubricants, Definition and classification of fuel, Calorific value and methods of its determination.

Analytical methods: Thermal methods; Principle, method and application of TGA,DTA & DSC, interaction of E.M radiation with a molecule and origin of spectrum, Vibrational & electronic spectra (Experimental details are excluded), spectrophotometry, , conductometric titrations, elementary discussion on Flame-photometry.

TEXT/ REFERENCE BOOKS:

1. Physical Chemistry, P.W. Atkins (ELBS, Oxford Press).
2. Physical Chemistry, W.J. Moore (Orient-Longman).
3. Instrumental methods of Chemical Analysis, MERITT & WILLARD (East-West Press).
4. Chemistry in Engineering & Tech., Vol.I& II, Rajaram, Kuriacose (TMH)
5. Engineering Chemistry ,ShashiChawla (DhanpatRai and co.)
6. Engineering Chemistry, P.C. Jain, Monica Jain (DhanpatRai& Co.).
7. Engeenring chemistry ,S.S Dara (S.chand&co.)

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

EE 101B PRINCIPLES OF ELECTRICAL ENGINEERING						
B. Tech. Semester – I/II (Common for all Branches)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	--	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

D.C. CIRCUIT ANALYSIS: Basic concepts of electric circuits, Ohm's Law, Independent energy sources, Dependent energy sources, passive elements, circuit properties, Kirchoff's laws, applications of Kirchoff's laws, Nodal and Loop methods of Analysis, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Reciprocity Theorem, Maximum Power Transfer Theorem, Millman's Theorem, Star-Delta or delta-star transformation, Applications of network theorems P-spice for DC circuit analysis.

UNIT II

A.C. CIRCUITS: Sinusoidal signal, Phasors, polar & rectangular, exponential & trigonometric representations, Resistance, Inductance & Capacitance components, behavior of these components in A.C. circuits, Phasor relationship for circuit elements, Impedance & Admittance, instantaneous & peak values, average and RMS values, active power, reactive power, apparent power, power factor, complex power, behavior of AC series, parallel circuits, RL, RC & RLC A.C. circuits (series and parallel), Resonance-series and parallel R-L-C Circuits, Q-factor, cut-off frequencies & bandwidth.

UNIT III

THREE PHASE CIRCUITS: Phase and line voltages and currents, balanced star and delta circuits, power equation, measurement of power by two wattmeter method.

Measuring Instruments: Principle, Construction & working of moving coil type voltmeter & ammeter, moving iron type voltmeter & ammeter, Electrodynamic type wattmeter, single-phase induction type energy meter.

UNIT IV

TRANSFORMERS: Ampere's law, Mutual Inductance, Construction, Working principle and phasor diagrams of Single-phase Transformer, Emf equation, Equivalent circuit, testing, efficiency and regulation of single-phase transformer, Auto transformer.

ROTATING MACHINES: Construction and working principle of dc motor and generator and its characteristics. Construction and working principle of 3-phase Induction machines & 3-phase synchronous machines, torque-speed characteristics.

TEXT BOOKS:

1. Basic Electrical Engg (2nd Edition) : Kothari & Nagarath, TMH
2. Electrical Technology (Vol-I): B.L Theraja & A K Theraja, S.Chand
3. Fundamental of electrical Engineering, Rajendra Prasad, PHI, Edition 2005.
4. Basic Electrical Engineering, V.N Mittle & Arvind Mittal, TMH, Second Edition
5. Basic Electrical Engineering, S.N. Singh, PHI

REFERENCE BOOKS:

1. Electrical Engineering Fundamentals: Deltoro, PHI
2. Basic Electrical Engineering (TMH WBUT Series), Abhijit Chakrabarti & Sudipta Nath, TMH
3. Basic Electrical Engineering, T.K. Nagsarkar & M.S. Sukhija, Oxford
4. Introduction to Electrical Engineering, M.S. Naidu & S, Kamakshaiyah, TMH
5. Basic Electrical Engineering, J.J. Cathey & S.A Nasar, TMH, Second Edition.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

CSE 101B		INTRODUCTION TO COMPUTERS AND PROGRAMMING					
B. Tech. Semester – I/II (Common for all Branches)							
L	T	P	Credits		Class Work	:	25 Marks
3	1	-	4		Examination	:	75 Marks
					Total	:	100 Marks
					Duration of Examination	:	3 Hours

UNIT I

AN INTRODUCTION OF COMPUTER SYSTEM: Anatomy of a digital Computer, Different Units of Computer System, Classification of Computer Systems, Radix Number systems. Binary codes: BCD, Gray, EBCDIC, ASCII

Operating System: Operating System Concepts, Operating System services, Types of Operating Systems. Introduction to PC Operating Systems: Unix/Linux, DOS, Windows.

UNIT II

PROGRAMMING LANGUAGES AND ALGORITHMS: Machine, Assembly and High Level Language; Assembler, Linker, Loader, Compiler, Interpreter, debuggers, Programming fundamentals: problem definition, algorithms, flowcharts and their symbols

COMPUTER NETWORKS: Basic concepts of Computer Networks, Working of Internet and its Major features. Network Topologies: Bus, Star, Ring, Hybrid, Tree, Complete, Irregular; Types of Networks: LAN, MAN and WAN.

ELECTRONIC MAIL: advantages and disadvantages, e-mail addresses, message components, message composition, mailer features, E-mail inner workings, E-mail management, Newsgroups, mailing lists, chat rooms.

UNIT III

BASICS OF 'C' LANGUAGE: C Fundamentals, Basic data types, local and external variables and scope, formatted input/ output, expressions, selection statements, loops and their applications; arrays, functions, recursive functions, pointers and arrays. Strings literals, arrays of strings; applications, Structures, Unions and Enumerations.

UNIT IV

ADVANCED FEATURES OF 'C' LANGUAGE: Preprocessor directives, macro definition, conditional compilation, storage classes, type's qualifiers, Low level programming (Bitwise operators, Bit fields in structures, other low level techniques), error handling, file operations(low level/high level).

BOOKS:

1. The C Programming Language by Dennis M Ritchie, Brian W. Kernigham, 1988, PHI.
2. Fundamentals of Computing and C Programming, R. B. Patel, Khanna Publications, 2010, New Delhi.
3. Information technology, Dennis P. Curtin, Kim Foley, Kunal Sen, Cathleen Morin, 1998, TMH
4. Theory and problem of programming with C, Byron C Gottfried, TMH
5. Using Computers and Information by Jack B. Rochester, 1996, Que Education & Training.
6. C Programming – A modern approach by K.N. King, 1996, WW Norton & Co.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

ME 103 B ENGINEERING GRAPHICS AND DRAWING						
B. Tech. Semester – I/II (Common for all Branches)						
L	T	P	Credits		Class Work	: 40 Marks
1	--	4	3		Examination	: 60Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

BASICS OF ENGINEERING GRAPHICS AND DRAWING: Drawing Papers, Mini drafter, Pencils. Drawing Paper Layout, Title Block, Types of Lines, Lettering, Dimensioning, types of Projections; First and Third Angle systems of Orthographic Projections, Projection of Points in different Quadrants.

PROJECTIONS OF STRAIGHT LINES: Contained by both Reference Planes, Contained by one and inclined to other Reference Plane, Contained by one and Parallel to other Reference Plane, Parallel to both Reference Plane, Perpendicular to one of the Reference Planes, Inclined to one Plane but Parallel to the other Reference Planes, Inclined to both the Reference Planes, True Length of a Line and its Inclination with Reference Planes, Traces of a Line.

UNIT II

PROJECTIONS OF PLANES: Parallel to one Reference Plane, Inclined to one Plane but Perpendicular to the other, Inclined to both Reference Planes.

PROJECTIONS OF POLYHEDRAL SOLIDS AND SOLIDS OF REVOLUTION: in simple positions with axis perpendicular to a Reference Plane, with axis parallel to both Reference Planes, with axis parallel to one Reference Plane and inclined to the other Reference Plane, Projections of sections of Prisms, Pyramids, Cylinders and Cones. True Shape of Sections of Solids.

UNIT III

DEVELOPMENT: Development of Surfaces of various Solids objects.

FREE HAND SKETCHING: Orthographic Views from Isometric, Views of Simple Machine Components such as Brackets, Bearing Blocks, Guiding Blocks and Simple Couplings and Pipe Joints.

UNIT IV

ISOMETRIC PROJECTIONS: Introduction, Isometric Scale, Isometric Views and Drawing of various Plane and Solids objects. Perspective drawing and oblique view.

ORTHOGRAPHIC DRAWINGS: Screw Threads, Bolts, Nuts and Washers, Bolted, Riveted and Welded Joints

TEXT BOOKS:

1. Engineering Drawing: MB Shah and BC Rana, Pearsons
2. Engineering Graphics and Drafting: P.S. Gill, S.K. Kataria and Sons.

REFERENCE BOOKS:

1. A Text Book of Engineering Drawing: RK Dhawan, S Chand & Company
2. Engineering Drawing Plane and Solid Geometry : N.D. Bhatt, Charotar Publishing House.

NOTE:

1. For class work, the students shall be assigned to prepare at least ten drawing sheets covering all units and each topic of the syllabus.
2. For practical examination, the examiner will set a question paper containing total eight questions, two questions from each unit covering each topic of the syllabus; students are required to attempt five questions at least one from each unit.

ME 105 B				ELEMENTS OF MECHANICAL ENGINEERING			
B. Tech. Semester – I/II (Common for all Branches)							
L	T	P	Credits	Class Work		:	25 Marks
3	1	-	4	Examination		:	75Marks
				Total		:	100 Marks
				Duration of Examination		:	3 Hours

UNIT I

THERMODYNAMICS- Elementary definitions in thermodynamics, fundamentals of first and 2nd law of thermodynamic- concept of internal energy, enthalpy and entropy, heat pump and refrigerator, elementary numerical problems

PROPERTIES OF STEAM & BOILERS: properties of steam, use of steam tables and mollier diagram, measurement of dryness fraction of steam, Carnot and Rankin cycle, elementary numerical problems. Classification of boilers, Comparison of water and fire tube boilers mounting and accessories with their functions, Constructional and operational details of Cochran and Babcock and Wilcox boilers, elementary numerical problems

STEAM TURBINES AND CONDENSERS: Classification of turbines and their working principles, Types of condensers and their uses

UNIT II

I.C. ENGINES AND GAS TURBINES: Introduction, Classification, Constructional details and working of two-stroke and four-stroke diesel and petrol engines, Efficiency of Otto & Diesel cycles , Working principle of gas turbine, elementary numerical problems

REFRIGERATION AND AIR CONDITIONING- rating of refrigeration machine, coefficient of performance, simple vapor compression cycle, fundamentals of air conditioning, use of Psychrometric charts

UNIT III

WATER TURBINES AND PUMPS : Introduction, Classification, Construction details and working principle of Pelton, Francis and Kaplan turbines, Classification of water pumps and construction detail & working principle of centrifugal pump

SIMPLE LIFTING MACHINES: Definition of machine, Velocity ratio, Mechanical advantage, Efficiency, Laws of machines, Reversibility of machine, Wheel and axle, Differential pulley block, Single, double and triple start worm and worm wheel, Single and double purchase winch crabs, Simple and compound screw jacks, elementary numerical problems

UNIT IV

INTRODUCTION TO POWER TRANSMISSION AND DEVICES: Belt drive, Rope drive, Chain drive, Types of gear and Gear train,

Types and function of clutches, Types and function of brakes

STRESSES AND STRAINS: Introduction, Concept & types of Stresses and strains, Poisson's ratio, stresses and strains in simple and compound bars under axial loading, Stress-strain diagrams, Hooks law, Elastic constants & their relationships, Concept of shear force and bending moments in beams, elementary numerical problems.

TEXT BOOKS:

1. Hydraulic and Fluid Mechanics – Modi and Seth, Pub. – Standard Book House, New Delhi
2. Engineering Thermodynamics – C.P. Arora, Pub. - TMH, New Delhi
3. Thermal Engineering – A.S. Sarad, Pub. - Satya Prakashan, New Delhi.
4. Engineering Mechanics – K.L. Kumar, Pub. - TMH, New Delhi.
5. Theory of Machines – S.S. Rattan, Pub. – TMH, New Delhi.

REFERENCE BOOKS:

1. Strength of Materials – Popov, Pub. - PHI, New Delhi.
2. Hydraulic Machines – Jagdish Lal, Pub.- Metropolitan, Allahbad.
3. Thermal Science and Engineering – D.S. Kumar, Pub. – Kateria & Sons, New Delhi.

NOTE:

1. **In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.**
2. **The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.**

PHY 103B PHYSICS LAB – I						
B. Tech. Semester - I (Common for all Branches)						
L	T	P	Credits		Class Work	: 20Marks
-	-	2	1		Examination	: 30Marks
					Total	: 50 Marks
					Duration of Examination	: 3 Hours

Note: Students will be required to perform 10 experiments in a semester.

LIST OF EXPERIMENTS

1. To find the wavelength of sodium light by using Newton's rings experimental setup.
2. To find the wavelength of sodium light by Fresnel's biprism experimental setup
3. To find the wavelength of various colours of white light with the help of a plane transmission diffraction grating.
4. To find the refractive index and Cauchy's constants of a prism by using spectrometer.
5. To find the wavelength of sodium light by using Michelson interferometer.
6. To find the resolving power of a telescope.
7. To find the pitch of a screw using He-Ne laser.
8. To find the specific rotation of sugar solution by using a polarimeter.
9. To compare the capacitances of two capacitors by De'sauty bridge.
10. To find the flashing and quenching potentials of Argon and also to find the capacitance of unknown capacitor.
11. To study the photo conducting cell and hence to verify the inverse square law.
12. To find the temperature co-efficient of resistance by using platinum resistance thermometer and Callender and Griffith bridge.
13. To find the frequency of A.C. mains by using sonometer.
14. To find the velocity of ultrasonic waves in non-conducting medium by piezo-electric method.
15. To determine the value of Stefan's constant.
16. To find the coefficient of thermal conductivity of a good conductor by Searle's method.
17. To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton method.

RECOMMENDED BOOKS:

1. Advanced Practical Physics – B.L. Worshnop and H.T. Flint (KPH)
2. Practical Physics – S.L.Gupta & V.Kumar (Pragati Prakashan).
3. Advanced Practical Physics Vol.I & II – Chauhan & Singh (Pragati Prakashan).

ME 107B WORKSHOP PRACTICE						
B. Tech. Semester – I/II (Common for all Branches)						
L	T	P	Credits		Class Work	: 40 Marks
--	--	4	2		Examination	: 60Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

LIST OF EXPERIMENTS / JOBS

1. To study different types of measuring tools/instruments used in metrology and determine least counts of vernier calipers, micrometers and vernier height gauges.
2. To study different types of machine tools (lathe, shaper, planer, slotter, milling, drilling machines).
3. To prepare a job on a lathe involving facing, outside turning, taper turning, step turning, radius making and parting-off.
4. To study different types of fitting tools and marking tools used in fitting practice.
5. To prepare lay out on a metal sheet by making and prepare rectangular tray, pipe shaped components e.g. funnel.
6. To prepare joints for welding suitable for butt welding and lap welding.
7. To study various types of carpentry tools and prepare simple types of at least two wooden joints.
8. To prepare simple engineering components/ shapes by forging.
9. To prepare mold and core assembly, to put metal in the mold and fettle the casting.
10. To prepare horizontal surface/ vertical surface/ curved surface/ slots or V-grooves on a shaper/ planner.
11. To prepare a job involving side and face milling on a milling machine.
12. To study of CNC lathe, CNC Milling and EDM Machines.

NOTE:

1. At least ten experiments/ jobs are to be performed/ prepared by students in the semester.
2. At least 8 experiments/ jobs should be performed / prepared from the above list, remaining two may either be performed/ prepared from the above list or designed and set as per the scope of the syllabus of Manufacturing Processes.

CH 103B CHEMISTRY LAB.						
B. Tech. Semester – I/II (Common for all Branches)						
L	T	P	Credits		Class Work	: 20 Marks
-	-	2	1		Examination	: 30Marks
					Total	: 50 Marks
					Duration of Examination	: 3 Hours

LIST OF EXPERIMENTS

1. Determination of Ca⁺⁺ and Mg⁺⁺ hardness of water sample using EDTA solution.
2. Determination of alkalinity of water sample.
3. Determination of dissolved oxygen (DO) in the given water sample.
4. To find the melting and eutectic point for a two component system by using method of cooling curve.
5. Determination of viscosity of lubricant by red wood viscometer(No. 1 & No. 2).
6. To determine Flash point & Fire point of an oil by Pensky-Marten's flash point apparatus and by Abel's closed cup apparatus..
7. To prepare Phenol-formaldehyde and urea- formaldehyde resin.
8. To find out saponification No. of an oil..
9. Determination of concentration of KMnO₄ solution spectrophotometrically.
10. Determination of strength of HCl solution by titrating it against NaOH solution conductometrically.
11. To determine amount of sodium and potassium in a given water sample by flame photometer
12. Estimation of total iron in an iron alloy.

SUGGESTED BOOKS:

1. A Text book on Experiments and Calculation –Engineering Chemistry by S.S.Dara, S.Chand & Company Ltd.
2. Essential of Experimental Engineering chemistry, Shashi Chawla, Dhanpat Rai Publishing Co.
3. Theory & Practice Applied Chemistry – O.P.Virmani, A.K. Narula(New Age).

NOTE:

1. The student will be required to perform 10 experiments/exercises from the above list and any other two experiments designed by the department based on the theory course (course code101B Course Name Chemistry)
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator are prohibited in the examination.
3. Electronic gadgets including Cellular phones are not allowed in the examination.

EE 103B PRINCIPLES OF ELECTRICAL ENGINEERING LAB						
B. Tech. Semester – I/II (Common for all Branches)						
L	T	P	Credits		Class Work	: 20 Marks
--	--	2	1		Examination	: 30Marks
					Total	: 50 Marks
					Duration of Examination	: 3 Hours

LIST OF EXPERIMENTS

1. To verify KCL and KVL.
2. To verify Thevenin's & Norton's Theorems.
3. To verify maximum power transfer theorem in D.C. Circuit.
4. To verify reciprocity theorem.
5. To verify Superposition theorem.
6. To study frequency response of a series R-L-C circuit and determine resonant frequency & Q- factor for various Values of R, L, C.
7. To study frequency response of a parallel R-L-C circuit and determine resonant frequency & Q -Factor for various values of R, L, C.
8. To perform direct load test of a transformer and plot efficiency Vs load characteristic.
9. To perform direct load test of a D.C. shunt generator and plot load voltage Vs load current curve.
10. To study various type of meters.
11. Measurement of power by three voltmeters / three ammeters method.
12. Measurement of power in a three phase system by two watt meter method.

NOTE:

1. At least 10 experiments are to be performed by students in the semester.
2. At least 8 experiments should be performed from the above list; remaining two experiments may either be performed from the above list or designed and set by the Dept. as per the scope of the syllabus of EE101B.

CSE 103B COMPUTER PROGRAMMING LAB						
B. Tech. Semester – I/II (Common for all Branches)						
L	T	P	Credits		Class Work	: 20 Marks
-	-	2	1		Examination	: 30Marks
					Total	: 50 Marks
					Duration of Examination	: 3 Hours

LIST OF PRACTICAL PROBLEMS

1. Write a program to find the largest of three numbers. (if-then-else)
2. Write a program to find the largest number out of ten numbers (for-statement)
3. Write a program to find the average male height & average female heights in the class (input is in form of sex code, height).
4. Write a program to find roots of quadratic equation using functions and switch statements.
5. Write a program using arrays to find the largest and second largest no. out of given 50 nos.
6. Write a program to multiply two matrices.
7. Write a program to sort numbers using the Quicksort Algorithm.
8. Represent a deck of playing cards using arrays.
9. Write a program to check that the input string is a palindrome or not.
10. Write a program to read a string and write it in reverse order.
11. Write a program to concatenate two strings.
12. Write a program which manipulates structures (write, read, and update records).
13. Write a program which creates a file and writes into it supplied input.
14. Write a program which manipulates structures into files (write, read, and update records).

NOTE:

At least 5 to 10 more exercises to be given by the teacher concerned

ME 109 B				ELEMENTS OF MECHANICAL ENGINEERING LAB			
B. Tech. Semester – I/II (Common for all Branches)							
L	T	P	Credits		Class Work	:	20 Marks
-	-	2	1		Examination	:	30Marks
					Total	:	50 Marks
					Duration of Examination	:	3 Hours

LIST OF EXPERIMENTS

1. To study Cochran & Babcock & Wilcox boilers.
2. To study the working & function of mountings & accessories in boilers.
3. To study 2-Stroke & 4-Stroke diesel engines.
4. To study 2-Stroke & 4-Stroke petrol engines.
5. To calculate the V.R., M.A. & efficiency of single, double & triple start worm & worm wheel.
6. To calculate the V.R., M.A. & efficiency of single & double purchase winch crabs.
7. To draw the SF & BM diagrams of a simply supported beam with concentrated loads.
8. To study the simple & compound screw jacks and find their MA, VR & efficiency.
9. To study the constructional features & working of Pelton Turbine.
10. To prepare stress-strain diagram for mild steel & cast iron specimens under tension and compression respectively on a Universal testing machine.

NOTE:

1. Total ten experiments are to be performed in the Semester.
2. At least eight experiments should be performed from the above list. Remaining three experiments should be performed as designed & set as per the scope of the syllabus of ME105B: Elements of Mechanical Engineering.

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonapat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 1ST YEAR (SEMESTER – II) (Common for all branches)
Credit Based Scheme w.e.f. 2012-13

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1.	MATH102B	MATHEMATICS-II	3	1		25	75	-	100	4	3
2	PHY102B	ENGINEERING PHYSICS-II	3	1		25	75	-	100	4	3
3	ME101 B	MANUFACTURING PROCESSES (Gr-B)	3	1		25	75	-	100	4	3
	CH101 B	OR ENGINEERING CHEMISTRY (Gr-A)	3	1		25	75	-			
4	EE101B	PRINCIPLES OF ELECTRICAL ENGINEERING (Gr-B)	3	1		25	75	-	100	4	3
	CSE101B	OR INTRODUCTION TO COMPUTERS & PROGRAMMING (Gr-A)	3	1		25	75	-			
5	ECE102B	BASICS OF ELECTRONICS ENGINEERING	3	1		25	75	-	100	4	3
	BT102B	OR BASICS OF BIO TECHNOLOGY									
	HUM102 B	OR ORAL COMMUNICATION SKILLS OR									
	CE102 B	BASICS OF CIVIL ENGINEERING									
6	ME103B	ENGINEERING GRAPHICS & DRAWING (Gr-B)	1	-	4	40	-	60	100	3	3
	ME105B	OR ELEMENTS OF MECHANICAL ENGINEERING (Gr-A)	3	1	-	25	75	-	100	4	
7	PHY104B	PHYSICS LAB-II	-	-	2	20		30	50	1	3
8	ME 107B	WORKSHOP PRACTICE (Gr-B)	-	-	4	40		60	100	2	3
	CH103B	OR CHEMISTRY LAB (Gr-A)	-	-	2	20		30	50	1	
9	EE103B	PRINCIPLES OF ELECTRICAL ENGINEERING LAB (Gr-B)	-	-	2	20		30	50	1	3
	CSE103B	OR COMPUTER PROGRAMMING LAB (Gr-A)	-	-	2	20		30	50		
10	ME109B	ELEMENTS OF MECHANICAL ENGINEERING LAB (Gr-A)	-	-	2	20		30	50	1	3
11	GP 102B	GENERAL PROFICIENCY & ETHICS	1			-		50	50	2	
Total			17	5	12	245	375	230	850	29	
			19	6	8	230	450	170	850	30	

Note:

7. Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weight age of Sports is given in General Proficiency & Ethics Syllabus.
8. Each student has to undergo a workshop at least 4 weeks (80-100 hours) at the end of II semester during summer vacations. Out of the four weeks, two weeks would be dedicated to general skills and two weeks training for specialized discipline/department. The evaluation of this training shall be carried out in the III semester.
9. The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator are prohibited in the examination.
10. Electronics gadgets including Cellular phones are not allowed in the examination.
11. The elective course HUM 102B ORAL COMMUNICATION SKILLS is deleted wef session 2013-2014.
12. All the branches are to be divided into group 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.

MATH 102B MATHEMATICS – II						
B. Tech. Semester - II (Common for all Branches)						
L	T	P	Credits		Class Work	: 75 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT-I

ORDINARY DIFFERENTIAL EQUATIONS & ITS APPLICATIONS : Exact differential equations, Equations reducible to exact differential equations. Applications of Differential equations of first order & first degree to simple electric circuits, Newton's law of cooling, heat flow and orthogonal trajectories.

Linear differential equations of second and higher order. Complete solution, complementary function and particular integral, method of variation of parameters to find particular Integral, Cauchy's and Legendre's linear equations, simultaneous linear equations with constant co-efficients.

UNIT-II

LAPLACE TRANSFORMS AND ITS APPLICATIONS : Laplace transforms of elementary functions, properties of Laplace transforms, existence conditions, transforms of derivatives, transforms of integrals, multiplication by t^n , division by t . Evaluation of integrals by Laplace transforms. Laplace transform of Unit step function, unit impulse function and periodic function. Inverse transforms, convolution theorem, application to linear differential equations and simultaneous linear differential equations with constant coefficients.

UNIT-III

FUNCTIONS OF COMPLEX VARIABLE : Definition, Exponential function, Trigonometric and Hyperbolic functions, Logarithmic functions. Limit and Continuity of a function, Differentiability and Analyticity. Cauchy-Riemann equations, necessary and sufficient conditions for a function to be analytic, polar form of the Cauchy-Riemann equations. Harmonic functions, application to flow problems. Integration of complex functions. Cauchy-Integral theorem and formula. Power series, radius and circle of convergence, Taylor's Maclaurin's and Laurent's series. Zeros and singularities of complex functions, Residues

UNIT-IV

FOURIER SERIES AND FOURIER TRANSFORMS : Euler's formulae, conditions for a Fourier expansion, change of interval, Fourier expansion of odd and even functions, Fourier expansion of square wave, rectangular wave, saw-toothed wave, half and full rectified wave, half range sine and cosine series.

Fourier integrals, Fourier transforms, Shifting theorem (both on time and frequency axes), Fourier transforms of derivatives, Fourier transforms of integrals, Convolution theorem, Fourier transform of Dirac-delta function.

TEXT BOOKS :

1. Advanced Engg. Mathematics F Kreyszig
2. Higher Engg. Mathematics B.S. Grewal

REFERENCE BOOKS:

1. Differential Equations – H.T.H. Piaggio.
2. Elements of Partial Differential Equations – I.N. Sneddon.
3. Advanced Engineering Mathematics – R.K. Jain, S.R.K. Iyengar.
4. Advanced Engg. Mathematics – Michael D. Greenberg.

NOTE:

3. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
4. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

PHY 102B ENGINEERING PHYSICS – II						
B. Tech. Semester - II (Common for all Branches)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

ELECTRODYNAMICS & QUANTUM PHYSICS

Introduction, Displacement current, Equation of continuity, Gauss's Law in dielectric, applications of Gauss's law, Maxwell's equations (both differential and integral form), plane e.m. wave equations in free space, dielectric and conducting medium; Poynting vector. Difficulties with Classical physics, Introduction to quantum mechanics-simple concepts, Black Body radiations, Planck's Law of radiation and its limitations, Group velocity and phase velocity, Schrodinger wave equations, Application of Schrodinger Equations (Particle in a box).

UNIT II

CRYSTAL STRUCTURE

Space Lattice, unit cell and translation vectors, Miller indices, Bravais lattice structure in 3D, simple crystal structure (NaCl, ZnS and CsCl₂), Elementary idea of reciprocal lattice, Ewald Construction, Experimental x-ray diffraction method, Laue method, powder Method.

FREE ELECTRON THEORY

Elements of classical free electron theory, Drude's Theory of Conduction and its limitations, quantum theory of free electrons, Fermi level, Density of states, Fermi-Dirac distribution function, Thermionic emission, Richardson's equation.

UNIT III

BAND THEORY OF SOLIDS

Origin of energy bands, Kronig, Penney Model (qualitative), E-K diagrams, Brillouin Zones, Concept of effective mass and holes, Classification of solids into metals, Semiconductors and insulators, Fermi energy and its variation with temperature, Conduction in Intrinsic and Extrinsic Semiconductors. Hall Effect and its Applications.

UNIT IV

SUPERCONDUCTIVITY & NANOSCIENCE

Introduction to superconductivity, Critical temperature, Meissner Effect, Types of Superconductor, London Equations, penetration depth and coherence length, BCS Theory(qualitative ideas), High temperature superconductors. Concept of Nano-materials, Size dependence of band gap, Top-down and bottom-up approach for preparing nano-materials, MEMS & NEMS, Properties and applications of Fullerene, Graphene, CNT, Nanowires, Nano-composites, Quantum dots..

TEXT BOOKS:

1. Solid State Physics – S.O.Pillai (6th Edition, New Age).
2. Quantum Mechanics – Ghatak & Loknathan.
3. Fundamentals of Solid State Physics – B.S.Saxena, R.C.Gupta & P.N.Saxena (Pragati Prakashan).
4. Solid State Physics by H. Ibach & H. Luth, Springer, Berlin.
5. Engineering Physics by H.K Malik and A.K. Singh (Tata McGraw Hill).
6. Engineering Physics by S.P. Taneja (Chand Pub.)

REFERENCE BOOKS:

1. Introduction to Solid State Physics (VII Ed.) - Charles Kittel (John Wiley).
2. Quantum Mechanics – Powell and Crasemann (Oxford & IBH)
3. Classical Electrodynamics by S.P. Puri (Narosa)
4. Nano-technology- Molecularly Designed Materials: G. M. Chow & K. E. Gonsalves (American Chemical society).

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

1.

ECE 102B BASICS OF ELECTRONICS ENGINEERING						
B. Tech. Semester - II (OPTIONAL) Common for all Branches						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

SEMICONDUCTOR PHYSICS, DIODES AND APPLICATIONS: Basic concepts, intrinsic and extrinsic semiconductors, diffusion and drift currents, Hall effect and its applications-pn junction under open circuit, reverse bias and forward bias conditions, p-n junction in the breakdown region, ideal diode, types of diodes –zener diode, varactor diode, LED and photodiode. Rectifier (half wave and full wave).

AMPLIFIERS: Introduction of different types of BJT amplifiers & their characteristics.

UNIT II

OPERATIONAL AMPLIFIERS: OP-amps, its characteristics, inverting, non-inverting, summing, averaging, scaling, difference, integrator and differentiator amplifiers.

Power Supplies: Introduction and working of switched mode power supply (SMPS), voltage regulator.

UNIT III

DIGITAL ELECTRONICS: Binary, Octal and Hexadecimal number system and conversion, Boolean algebra, truth tables of logic gates AND, OR, NOT, EX-OR, EX-NOR, NAND, NOR AND their implementation using diodes transistors, switches and lamps, Universal gates.

ELECTRONIC INSTRUMENTS: Transducers, Role, importance and applications of general purpose test instruments viz. multi meter (digital and analog), cathode ray oscilloscope (CRO), function/ signal generator.

UNIT IV

COMMUNICATION SYSTEM: Modulation, need of modulation, Block diagram of basic communication system, overview of AM, FM and PM.

MICROPROCESSOR: Basics of 8085 & its architecture. Instruction set, Interrupts, Addressing modes.

REFERENCE BOOKS:

1. Sedra A S and Smith K C. "Microelectronic Circuits" New York.Oxford University Press, New York
2. Tocci R J and Widner N S "Digital Systems" – Principles and Applications", Pearson Education India, New Delhi.
3. Cooper and Helfric, "Modern Electronic Instrumentation and Measuring Techniques". Prentice Hall of India, New Delhi.
4. Boylestad and Nashelsky, "Electronic Devices and Circuit Theory", Pearson Education India, New Delhi
5. Millman and Grabel, "Microelectronics", Tata McGraw Hill
6. Millman and Halkias, "Electronics Devices and Circuits". Tata McGraw Hill
7. Kennedy and Davis, "Electronic Communication Systems", Tata McGraw Hill
8. Ramesh S. Gaonkar, "Microprocessor Architecture, Programming, and Applications with the 8085", Penram International Publishing.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two questions from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

BT 102B BASICS OF BIOTECHNOLOGY						
B. Tech. Semester – II (OPTIONAL) Common for all Branches)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

INTRODUCTION: Nature and scope of Biotechnology.

CELL STRUCTURE AND FUNCTION: Prokaryotes and Eukaryotes- cell wall, cell membrane, nucleus, mitochondria, chloroplast, ribosome, vacuoles, bacteria and viruses: brief descriptions.

Biomolecules: A brief account of structure and functions of carbohydrates, lipids, proteins.

UNIT II

CELL DIVISION: Mitosis and meiosis

GENES AND CHROMOSOMES: Classical- Mendel's laws and chromosomes, nature of genetic material, DNA and RNA as genetic material, concept of organization of genetic material into chromosomes.

DNA replication: DNA polymerases, replication mechanism.

UNIT III

GENE EXPRESSION: Central dogma, genetic code, gene expression-a brief account of transcription and translation, housekeeping genes, mutations and their molecular basis.

GENETIC ENGINEERING: An introduction to genetic engineering: cloning (vectors, enzymes), DNA and genomic libraries, transgenics, DNA fingerprinting, genomics.

UNIT IV

APPLICATIONS OF BIOTECHNOLOGY : Bioprocess and fermentation technology, cell culture, enzyme technology, biological fuel generation, single cell protein, sewage treatment, environmental biotechnology, biotechnology and medicine, biotechnology in agriculture & forestry industry, food and beverage technology, production of biological inventions, safety in biotechnology.

TEXT/ REFERENCE BOOKS:

- Biotechnology, Smith, Cambridge Press.
- Modern Concepts of Biotechnology, H. D. Kumar, Vikas Publishing House (P) Ltd.
- Elements of Biotechnology, P. K. Gupta, Rastogi Publications.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

CE 102B BASICS OF CIVIL ENGINEERING						
B. Tech. Semester – II (OPTIONAL) Common for all Branches)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

MATERIALS FOR CONSTRUCTION: Stones, Sands, Lime, Bricks, Timber, Steel their Classification and Properties. Different Types of Cement and their Properties, manufacturing of Cement, Concrete, and properties of Concrete, Ingredient of Concrete and Their Functions Component parts of a Building, Foundation, Masonry Works, Doors and Windows, Floors, Roofs, DPC, Building Services

UNIT II

SURVEYING : Introduction to Surveying: Definition, importance, classification of surveys, Principle, Leveling: definitions of terms used in leveling, different types of levels, Contours, Definition, representation of reliefs, horizontal equivalent, contour interval, characteristics of contours, methods of contouring, contour gradient, uses of contour maps, Introduction to GIS, GPS and Remote sensing.

UNIT III

TRANSPORTATION: Various modes and means of transportation, Different types of transport systems, Importance of road transport, History of Road Development, Indian Road Congress. Main features of 20 years road development plans in India, PMGSY Sources of power, estimation of water power, water budget equation, necessity and importance of harnessing small hydro power plants, Dams, Types of Dams, Location and Impact assessment of a Dam project.

UNIT IV

GEOTECHNICAL ENGINEERING: History and its applications, Soil Properties, Classification of Soil, Geotechnical and Geophysical investigation of Soil.

IRRIGATION ENGINEERING: Necessity, advantages, disadvantages, impact of irrigation on human environment, need and development of irrigation in India.

TEXT BOOKS:

1. Basic Civil Engineering, Satheesh Gopi, Pearson.
2. Basic Civil Engineering, Dr. B.C. Punmia, Ashok Kumar Jain, Arun Kr. Jain, Firewall Medi

REFERENCE BOOKS:

1. Surveying by Prof. N. Singh, Tata McGraw Hill, New Delhi
2. Basic Civil Engineering, Rakesh Beohar, Firewall Media
3. Highway Engg. by S. K. Khanna & C.e.G.Justo, Nem Chand & Bros,Roorkee
4. Water Resources Engineering by Linseley and Franzini
5. Basic Civil Engineering, L.G. Kulkarni A. D. Pawar S. P. Nitsure, Technical Publications.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

PHY 104B PHYSICS LAB - II						
B. Tech. Semester - II (Common for all Branches)						
L	T	P	Credits		Class Work	: 20 Marks
-	-	2	1		Examination	: 30Marks
					Total	: 50 Marks
					Duration of Examination	: 3 Hours

NOTE: STUDENTS WILL BE REQUIRED TO PERFORM 10 EXPERIMENTS IN A SEMESTER.

LIST OF EXPERIMENTS

1. To find the low resistance by Carey - Foster's bridge.
2. To find the resistance of a galvanometer by Thomson's constant deflection method using a post office box.
3. To find the value of high resistances by Substitution method.
4. To find the value of high resistances by Leakage method.
5. To study the characteristics of a solar cell and to find the fill factor.
6. To find the value of e/m for electrons by Helical method.
7. To find the ionisation potential of Argon/Mercury using a thyratron tube.
8. To study the variation of magnetic field with distance and to find the radius of coil by Stewart and Gee's apparatus.
9. To study the characteristics of (Cu-Fe, Cu-Constantan) thermo couple.
10. To find the value of Planck's constant by using a photoelectric cell.
11. To find the value of co-efficient of self-inductance by using a Rayleigh bridge.
12. To find the value of Hall Co-efficient of semi-conductor.
13. To study the V-I characteristics of a p-n diode.
14. To find the band gap of intrinsic semi-conductor using four probe method.
15. To calculate the hysteresis loss by tracing a B-H curve.
16. To verify the Truth Table of various Logic Gates.

RECOMMENDED BOOKS:

1. Advanced Practical Physics – B.L. Worshnop and H.T. Flint (KPH)
2. Practical Physics – S.L.Gupta & V.Kumar (Pragati Prakashan).
3. Advanced Practical Physics Vol.I & II – Chauhan & Singh (Pragati Prakashan).

GP 102B GENERAL PROFICIENCY & ETHICS						
B. Tech. Semester – II (Common for all Branches)						
L	T	P	Credits		Examination	: 50Marks
1	-	-	2		Total	: 50 Marks

The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/ her performance / achievements in different walks of life.

A Faculty Counselor will be attached to a group of students which will remain associated with him / her during the entire period of the degree program in the University. Each faculty member will serve as a faculty counselor. They will act like a local guardian for the students associated with him / her and will help them in terms of career guidance, personal difficulties.

A. The student will present a written report before the committee with following in view:

The student will present before the committee his/ her achievements during the current academic session in the form of a written report highlighting followings:

	I.	Academic Performance	-----	
Marks)	II.	Extra Curricular Activities / Community Service, Hostel Activities		(8
Marks)	III	Technical Activities / Industrial, Educational tour		(8
Marks)	IV	Sports/games		(4
Marks)	V	Moral values & Ethics		(10

NOTE: Report submitted by the students should be typed on both sides of the paper.

B. A student will support his/ her achievement and verbal & communicative skill through presentation before the committee.
(20 Marks)

C. Moral values & Ethics

Syllabus - Introduction to Value Education. Understanding ethics, value system, happiness, prosperity

A minor test / Quiz will be conducted and It will be the duty of the concerned teacher assigned to teach Moral values & Ethics to submit the awards to respective chairman of the department / Director/Principal.

The evaluation of this course will be made by the following Committee.

University Departments:

1 Chairperson of the Department

Chairman

- | | | |
|---|-------------------------------|--------|
| 2 | Senior Most Faculty Counselor | Member |
| 3 | Vice- Chancellor's Nominee | Member |

Affiliated Colleges:

- | | | |
|---|---|----------|
| 1 | Director/Principal | Chairman |
| 2 | Head of the Department/Sr. Faculty | Member |
| 3 | External Examiner to be appointed by the University | Member |

Note: Remuneration will be paid to the external examiner only (at par with the other practical examinations).

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonapat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 2nd YEAR (SEMESTER – III) AUTOMOBILE ENGINEERING
Credit Based Scheme w.e.f. 2013-14

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1	MGT 201B	ENGINEERING ECONOMICS (Common for all branches Except BT & BME) (Gr-A)	4	-	-	25	75	-	100	4	3
	GES 201 B	ENVIRONMENTAL STUDIES (Common for all branches) (Gr-B)	3	-	-	-	75*	-	75*	-	3
2	AE 201B	BASICS OF AUTOMOBILE ENGINEERING	4	-	-	25	75	-	100	4	3
3	AE 203B	ENGINEERING THERMODYNAMICS	3	1	-	25	75	-	100	4	3
4	AE 205B	MECHANICS OF SOLIDS	3	1	-	25	75	-	100	4	3
5	ME205B	ENGINEERING MECHANICS (Common with ME & AER)	3	1	-	25	75	-	100	4	3
6	AE 207B	FLUID MECHANICS & MACHINERY	3	1	-	25	75	-	100	4	3
7	A E 209B	AUTOMOBILE ENGINEERING DRAWING LAB	1	-	4	40	60	-	100	4	3
8	AE 211B	MECHANICS OF SOLIDS LAB	-	-	2	20	-	30	50	1	3
9	AE 213B	COMPUTER AIDED DRAFTING LAB	-	-	2	20	-	30	50	1	3
10	AE 215B	FLUID MECHANICS & MACHINERY LAB	-	-	2	20	-	30	50	1	3
11	AE 217B	AUTOMOBILE WORKSHOP	-	-	2	50	-	-	50	2	3
12	GES 203B	ENVIRONMENTAL STUDIES FIELD WORK (Common for all branches) (Gr- B)	-	-	-	-	-	25*	25*	-	
Total			21	4	12	300	510	90	900	33	
			20	4	12	275	435	90	800	29	

Note:

- 6 Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weight age of Sports is given in General Proficiency & Ethics Syllabus.
- 7 *The Environmental studies (GES-201 B & Environment Studies Field work (GES-203B) are compulsory & qualifying courses.
- 8 The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
- 9 Electronics gadgets including Cellular phones are not allowed in the examination
- 10 All the branches are to be divided into group 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.

MGT 201B ENGINEERING ECONOMICS					
B. Tech. Semester – III/IV (Common for all Branches Except BT& BME)					
L	T	P	Credits	Class Work	: 25 Marks
4	-	-	4	Examination	: 75Marks
				Total	: 100 Marks
				Duration of Examination	: 3 Hours

COURSE OBJECTIVE: The aims of this course are to:

1. Acquaint the student with the basic economic concepts and their operational significance
2. Stimulate him to think systematically and objectively about cotemporary economic problems.

UNIT I

Definition of economics- various definitions, nature of Economic problem, Micro and macro economics- their feature and scope, production possibility curve, Economic laws and their nature. Relation between Science, Engineering Technology and Economics. Concept and measurement of utility, Law of Diminishing Marginal Utility, Law of equi-marginal utility – its practical application and importance.

UNIT II

Meaning of Demand, Individual and Market demand schedule, Law of demand, shape of demand curve. Elasticity of demand, measurement of elasticity of demand, factors effecting elasticity of demand, practical importance & application of the concept of elasticity of demand. Various concepts of cost-Fixed cost, variable cost, average cost, marginal cost, money cost, real cost, opportunity cost. Shape of average cost, marginal cost, total cost etc. in short run and long run.

UNIT III

Meaning of production and factors of production; Law of variable proportions, Law of Return to Scale, Internal and External economics and diseconomies of scale. Meaning of Market, Type of Market– perfect Competition, Monopoly, Oligopoly, Monopolistic competition (Main features of these markers).

UNIT IV

Supply and Law of Supply, Role of Demand & Supply in Price Determination and effect of changes in demand and supply on prices . Nature and characteristics of Indian economy, privatization – meaning, merits and demerits. Globalisation of India economy – merits and demerits. Elementary Concept of WTO & TRIPS agreement, Monetary Policy & Fiscal Policy

TEXT BOOKS:

1. Ahuja H.L.”Micro Economic Theory” S. Chand Publication, New Delhi
2. Dewett K.K “Modern Economic Theory” S. Chand Publication, New Delhi
3. Jain T.R, Grover M.L, Ohri V.K Khanna O.P, ”Economics for engineers” V.K .Publication ,New Delhi

SUGGESTED BOOKS:

1. Jhingan M.L”Micro Economic Theory” S.Chand Publication ,New Delhi
2. Chopra P.N “Principle of Economics” Kalyani Publishers, Delhi
3. Mishra S.K “Modern Micro Economics” Pragati Publication Mumbai.
4. Dwivedi D.N ”Micro Economics ” Pearson Education, New Delhi.

NOTE:

5. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
6. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

GES 201B ENVIRONMENTAL STUDIES					
B. Tech. Semester – III/IV (Common for all Branches)					
L	T	P	Credit		
3	-	-	0		
			Examination	:	75Marks
			Total	:	75 Marks
			Duration of Examination	:	3 Hours

UNIT I

The Multidisciplinary nature of environmental studies, Definition, scope and importance.
Need for Public awareness

UNIT II

NATURAL RESOURCES:

Renewable and non-renewable resources:
Natural resources and associated problems.

- Forest resources: Use and over-exploitation: deforestation, case studies, Timber exploitation, mining, dams and their effects and forests tribal people.
- Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- Food resources: World food problems, changes, caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources; case studies.
- Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
 - Role of an individual in conservation of natural resources.
 - Equitable use of resources for sustainable lifestyles.

UNIT III

ECOSYSTEMS:

- Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following eco-system:
 - Forest ecosystem, Grassland ecosystem, Desert ecosystem.
 - Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

UNIT IV

BIODIVERSITY AND ITS CONSERVATIONS:

- Introduction – Definition: Genetic, species and ecosystem diversity.
- Biogeographically classification of India.
- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.

UNIT V

ENVIRONMENTAL POLLUTION:

Definition, causes, effects and control, measures of:

Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal Pollution, Nuclear hazards

- Solid waste management: Causes effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster management: Floods, earthquake, cyclone and landslides.

UNIT VI

SOCIAL ISSUES AND THE ENVIRONMENT:

- From unsustainable to sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management

- d) Resettlement and rehabilitation of people; its problems and concerns, case studies
- e) Environmental ethics: Issues and possible solutions
- f) Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies
- g) Wasteland reclamation, Consumerism and waste products
- h) Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act
- i) Issues involved in enforcement of environmental legislation, Public awareness

UNIT VII

Human population and the Environment., Population growth, variation among nations.

Population explosion – Family Welfare Programme, Environment and human health, Human Rights, Value Education, HIV/ AIDS, Woman and Child Welfare.

Role of Information Technology in Environment and human health.

Case Studies.

REFERENCES:

1. Agarwal, K.C. 2001, Environmental Biology, Nidi Pub. Ltd. Bikaner.
2. Bharucha, Franch, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380013, India .
3. Brunner R.C. 1989, Hazardous Waste Incineration, Mc. Graw Hill Inc. 480p.
4. Clark R.S., Marine Pollution, Slanderson Press Oxford (TB).
5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Pub. House, Mumbai. 1195p.
6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment ®.
8. Gleick, H.P., 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security, Stockholm Env. Institute, Oxford Univ., Press 473p.
9. Hawkins R.E. Encyclopedia of Indian Natural History, Bomaby Natural History Society, Bombay (R).
10. Heywood, V.H. & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
11. Jadhav, H & Bhosale, V.M. 1995, Environmental Protection and Laws, Himalaya Pub. House, Helhi 284p.
12. Mckinney, M.L. & Schoch, RM 1996, Environmental Sciences Systems & Solutions, Web enhanced Edition 639p.
13. Mhaskar A.K., Mater Hazardous, Tekchno-Sciences Publications (TB).
14. Miller T.G. Jr. Environmental Science, Wadsoworth Publishing Co. (TB).
15. Odum, E.P. 1971, Fundamentals of Ecology, W.B. Saunders Co. USA, 574p.
16. Rao M.N. & Dutta, A.K. 1987, Waste Water Treatment. Oxford & IBH Publ. Co. Pvt. Ltd., 345p
17. Sharma, B.K., 2001, Environmental Chemistry, Goel Publ. House, Meerut.
18. Survey of the Environment, The Hindu (M).
19. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Sciences (TB).
20. Trivedi, R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II Enviro Mdiea (R).
21. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol I and II Enviro Media (R).
22. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno Sciences Pub. (TB).
23. Wagner K.D., 1998, Environmental Management, W.B. Saunders Co. Philadelphia, USA 499p.
24. A text bok environmental education G.V.S. Publishers by Dr. J.P. Yadav.

(M) Magazine (R) Reference (TB) Textbook

NOTE:

1. Examiner will set eight questions. Students will be required to attempt five Questions.
2. The awards of this paper shall not be counted in the award of the Degree/DMC.

AE 201B BASICS OF AUTOMOBILE ENGINEERING						
B. Tech. Semester – III (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

INTRODUCTION TO AUTOMOBILES : Classification of Two Wheelers, Three Wheelers and Four Wheeled Vehicles, Application & Capacity, Study of Main Specifications, Classification, Components, Requirements of Automobile Body; Vehicle Frame, Separate Body & Frame, Unitised Body, Car Body Styles, Bus Body & Commercial Vehicle Body Types; Front Engine Rear Drive & Front Engine Front Drive Vehicles, Four Wheel Drive Vehicles, Safety considerations; Safety features of latest vehicle; Future trends in automobiles.

Clutches : Requirement of Clutches ; Principle of Friction Clutch ; Wet Type & Dry Types; Single Plate Clutch, Diaphragm Spring Clutch, Multi plate Clutch, Centrifugal Clutches, Electromagnetic Clutch, Over Running Clutch; Clutch Linkages.

UNIT II

POWER TRANSMISSION: Requirements of transmission system, General Arrangement of Power Transmission system; Object of the Gear Box; Different types of Gear Boxes; Sliding Mesh, Constant Mesh, Synchro- mesh Gear Boxes; Epi-cyclic Gear Box, Freewheel Unit, Overdrive unit-Principle of Overdrive, Advantage of overdrive, Transaxle, Transfer cases.

Drive Lines, Universal Joint, Differential and Drive Axles: Effect of driving thrust and torque reactions; Hotchkiss Drive, Torque Tube Drive and radius Rods; Propeller Shaft, Universal Joints, Slip Joint; Constant Velocity Universal Joints; Front Wheel Drive; Principle, Function, Construction & Operation of Differential; Rear Axles, Types of load on Rear Axles, Full Floating, three quarter Floating and Semi Floating Rear Axles.

UNIT III

SUSPENSION SYSTEMS: Need of Suspension System, Types of Suspension; factors influencing ride comfort, Suspension Spring; Constructional details and characteristics of leaf springs.

Steering System : Front Wheel geometry & Wheel alignment viz. Caster, Camber, King pin Inclination, Toe-in/Toe-out; Conditions for true rolling motions of Wheels during steering; Different types of Steering Gear Boxes; Steering linkages and layout; Power steering – Rack & Pinion Power Steering Gear, Electronics steering.

UNIT IV

AUTOMOTIVE BRAKES, TYRES & WHEELS : Classification of Brakes; Principle and constructional details of Drum Brakes, Disc Brakes; Brake actuating systems; Mechanical, Hydraulic, Pneumatic Brakes; Factors affecting Brake performance, Power & Power Assisted Brakes; Tyres of Wheels; Types of Tyre & their constructional details, Wheel Balancing, Tyre Rotation; Types of Tyre wear & their causes.

EMISSION CONTROL SYSTEM & AUTOMOTIVE ELECTRICAL : Sources of Atmospheric Pollution from the automobile, Emission Control Systems Construction and Operation of Positive Crank Case Ventilation (PVC) Systems, Evaporative Emission Control, Heated Air Intake System, Exhaust Gas Recirculation (ECR) Systems, Air Injection System and Catalytic Converters; Purpose construction & operation of lead acid Battery, Capacity Rating & Maintenance of Batteries; Purpose and Operation of Charging Systems, Purpose and Operations of the Starting System; Vehicle Lighting System.

TEXT BOOKS:

1. Automobile Engineering by Anil Chhikara, Satya Prakashan, New Delhi.
2. Automobile Engineering by Dr. Kirpal Singh, Standard Publishers Distributors.

REFERENCE BOOKS:

1. Automotive Mechanics by Crouse / Anglin, TMH.
2. Automotive Technology by H.M. Sethi, TMH, New Delhi.
3. Automotive Mechanics by S.Srinivasan, TMH, New Delhi.
4. Automotive Mechanics by Joseph Heitner, EWP.
5. Motor Automotive Technology by Anthony E. Schwaller – Delmer Publishers, Inc.
6. The Motor Vehicle by Newton steeds Garrett, Butter Worths.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 203B ENGINEERING THERMODYNAMICS						
B. Tech. Semester – III (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

BASIC CONCEPTS: Systems, Zeroth law, First law. Steady flow energy equation. Heat and work transfer in flow and non- flow processes, Second law, Kelvin Planks and Clausius statements, Concept of entropy, Clausius inequality, Entropy changes in non-flow processes, Properties of gases and vapours, Rankine cycle.

UNIT II

AIR STANDARD CYCLES: Otto, Diesel Dual combustion and Brayton cycles, Air standard efficiency, Mean effective pressure, Reciprocating air compressors.

ONE DIMENSIONAL FLUID FLOW: Application of continuity and energy equations, Isentropic flow of ideal gases through nozzles, Simple jet propulsion system.

UNIT III

REFRIGERATION AND AIR-CONDITIONING: Principles of refrigeration, air-conditioning and heat pumps, Vapour compression and vapour absorption systems, co-efficient of performance, Properties of refrigerants.

UNIT IV

HEAT TRANSFER: Conduction in parallel, radial and composite wall, Convective heat transfer with laminar and turbulent flows, Overall heat transfer co-efficient, Flow through heat exchangers, Fundamentals of radiative heat transfer.

TEXT & REFERENCE BOOKS:

1. Nag P.K. Engineering Thermodynamics, Tata McGraw Hill Co Ltd
2. Mayhew and Rogers, Engineering Thermodynamics, Longman Green & Co Ltd., London, E.L.B.S
3. Van Wylen.G.J. and Sonntag. R.E., Fundamentals of Classical Thermodynamics
4. D.H.Bacon, Engineering Thermodynamics, Butterworth & Co., London
5. M.A.Sadd Thermodynamics for Engineers, Prentice Hall of India Pvt Ltd
6. Reynolds, Thermodynamics, Int.Student Edn, McGraw Hill Book Co Ltd

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 205B MECHANICS OF SOLIDS						
B. Tech. Semester – III (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

STRESS, STRAIN AND DEFORMATION OF SOLIDS: Rigid and Deformable bodies – Strength, Stiffness and Stability – Stresses; Tensile, Compressive and Shear – Deformation of simple and compound bars under axial load – Thermal stress – Elastic constants – Strain energy and unit strain energy – Strain energy in uniaxial load.

UNIT II

BEAMS - LOADS AND STRESSES: Types of beams: Supports and Loads – Shear force and Bending Moment in beams – Cantilever, Simply supported and Overhanging beams – Stresses in beams – Theory of simple bending – Stress variation along the length and in the beam section – Effect of shape of beam section on stress induced – Shear stresses in beams – Shear flow.

UNIT III

TORSION: Analysis of torsion of circular bars – Shear stress distribution – Bars of Solid and hollow circular section – Stepped shaft – Twist and torsion stiffness – Compound shafts – Fixed and simply supported shafts – Application to close-coiled helical springs – Maximum shear stress in spring section including Wahl Factor – Deflection of helical coil springs under axial loads – Design of helical coil springs – stresses in helical coil springs under torsion loads

UNIT IV

BEAM DEFLECTION Elastic curve of Neutral axis of the beam under normal loads – Evaluation of beam deflection and slope: Double integration method, Macaulay Method, and Moment-area Method –Columns – End conditions – Equivalent length of a column – Euler equation – Slenderness ratio – Rankine formula for columns

ANALYSIS OF STRESSES IN TWO DIMENSIONS: Biaxial state of stresses – Thin cylindrical and spherical shells – Deformation in thin cylindrical and spherical shells – Biaxial stresses at a point – Stresses on inclined plane – Principal planes and stresses – Mohr’s circle for biaxial stresses – Maximum shear stress - Strain energy in bending and torsion.

TEXT BOOKS:

1. Popov E.P, “Engineering Mechanics of Solids”, Prentice-Hall of India, New Delhi
2. Beer F. P. and Johnston R, “Mechanics of Materials”, McGraw-Hill Book Co, Third Edition

REFERENCES:

1. Nash W.A, “Theory and problems in Strength of Materials”, Schaum Outline Series, McGraw-Hill Book Co, New York
2. Kazimi S.M.A, “Solid Mechanics”, Tata McGraw-Hill Publishing Co., New Delhi
3. Ryder G.H, “Strength of Materials, Macmillan India Ltd”
4. Ray Hulse, Keith Sherwin & Jack Cain, “Solid Mechanics”, Palgrave ANE Books
5. Singh D.K “Mechanics of Solids” Pearson Education

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

ME 205B ENGINEERING MECHANICS						
(Common with ME & AER)						
B. Tech. Semester – III (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

REVIEW OF BASIC FORCE SYSTEMS: Dimensions and units of mechanics, idealization of mechanics, laws of mechanics, vector algebra review, moment of a force about a point and axis, the couple and couple moment, addition and subtraction of couples, moment of a couple about a line, translation of a force to a parallel position, resultant of a force system, Problems.

EQUILIBRIUM: Introduction, free body diagram, control volumes, general equations of equilibrium, two point equivalent loading, static in-determinacy, simple truss, method of joints, method of sections, Problems.

UNIT II

PROPERTIES OF SURFACES & MOMENTS AND PRODUCTS OF INERTIA : First moment of an area and the centroid, principal axes, formal definition of inertia quantities, relation between mass-inertia terms and area-inertia terms, translation of coordinate axes, Transportation properties of the inertia terms, a brief introduction to tensors, the inertia of ellipsoid and principal moments of inertia, Problems.

UNIT III

KINEMATICS OF PARTICLES AND RIGID BODIES: Velocity and acceleration in path and cylindrical coordinates, motion of a particle relative to a pair of translating axes, translation and rotation of rigid bodies, Chasles theorem, moving references, velocity and acceleration for different references, inertia and coriolis forces, Problems.

UNIT IV

PARTICLE DYNAMICS, ENERGY METHODS & MOMENTUM METHODS: Newton's law for rectangular coordinates & cylindrical coordinates, rectifier translation, central force motion, Newton's law for path variables, work energy equations, work energy equations for a systems of particles, linear and angular momentum equations for a systems of particles, Problems.

TEXT BOOK:

1. Engineering Mechanics - Statics & Dynamics by I.H. Shames, PHI, New Delhi.
2. Engineering Mechanics – Timoschenko.

REFERENCE BOOKS:

1. Statics & Dynamics by J.L. Meriam, JohnWiley & Sons (P) Ltd. New York.
2. Statics & Dynamics by Beer & Johnson, MGH, New Delhi.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 207B FLUID MECHANICS & MACHINERY						
B. Tech. Semester – III (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

BASIC CONCEPTS AND PROPERTIES: Fluid; definition, distinction between solid and fluid; Units and dimensions; Properties of fluids; density, specific weight, specific volume, specific gravity, temperature, viscosity, compressibility; vapour pressure, capillary and surface tension; Fluid statics- concept of fluid static pressure, absolute and gauge pressures - pressure measurements by manometers and pressure gauges.

UNIT II

FLUID KINEMATICS AND FLUID DYNAMICS: Fluid Kinematics; Flow visualization; lines of flow; types of flow; velocity field and acceleration; continuity equation (one and three dimensional differential forms)- Equation of streamline; stream function; velocity potential function; circulation; flow net; fluid dynamics; equations of motion; Euler's equation along a streamline; Bernoulli's equation; applications ; Venturi meter; Orifice meter, Pitot tube; dimensional analysis; Buckingham's e theorem; applications; similarity laws and models.

UNIT III

INCOMPRESSIBLE FLUID FLOW: Viscous flow; Navier - Stoke's equation (Statement only) ; Shear stress, pressure gradient relationship; laminar flow between parallel plates; Laminar flow through circular tubes (Hagen poiseulle's); Hydraulic and energy gradient; flow through pipes; Darcy; weisback's equation; pipe roughness; friction factor ; Moody's diagram; minor losses; flow through pipes in series and in parallel; power transmission; Boundary layer flows, boundary layer thickness, boundary layer separation; drag and lift coefficients.

UNIT IV

HYDRAULIC TURBINES & HYDRAULIC PUMPS: Fluid machines, definition and classification - exchange of energy - Euler's equation for turbo machines; Construction of velocity vector diagram's; head and specific work; components of energy transfer ; degree of reaction. Hydro turbines: definition and classifications; Pelton turbine; Francis turbine; propeller turbine; Kaplan turbine; working principles; velocity triangles; work done; specific speed; efficiencies; performance curve for turbines. Pumps: definition and classifications - Centrifugal pump: classifications, working principles, velocity triangles, specific speed, efficiency and performance curves; Reciprocating pump: classification, working principles, indicator diagram, work saved by air vessels and performance curves - cavitations in pumps - rotary pumps: working principles of gear and vane pumps

TEXT BOOKS:

1. Streeter, V.L., and Wylie, E.B., "Fluid Mechanics", McGraw-Hill.
2. Kumar, K.L., "Engineering Fluid Mechanics", Eurasia Publishing House (P) Ltd., New Delhi.
3. Varanasi, V.P., "Hydraulic Machines - Theory and Design", Khanna Publishers.

REFERENCE BOOKS:

1. Bansal, R.K., "Fluid Mechanics and Hydraulics Machines", (5th edition), Laxmi publications(P) Ltd., New Delhi.
2. White, F.M., "Fluid Mechanics", Tata McGraw-Hill, 5th Edition, New Delhi.
3. Ramamirtham, S., "Fluid Mechanics and Hydraulics and Fluid Machines", Dhanpat Rai and Sons, Delhi.
4. Som, S.K., and Biswas, G., "Introduction to fluid mechanics and fluid machines", Tata McGraw-Hill, 2nd edition.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 209B AUTOMOBILE ENGINEERING DRAWING LAB						
B. Tech. Semester – III (Automobile Engineering)						
L	T	P	Credits		Class Work	: 40 Marks
1	-	4	4		Examination	: 60 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

JOINTS AND PULLEYS: Universal Joint, Slip Joint, Stepped or Cone Pulley, V-Belt Pulley.

ENGINE BEARINGS : Bush Bearing; Split Bearing; Thrust Bearing; Ball Bearing; Roller Bearing; Straight and Needle.

UNIT II

ENGINE COMPONENTS: Four Stroke Petrol Engine Piston; Two Stroke Petrol Engine Piston; Four Stroke Diesel Engine Piston; Connecting Rod; Crank Shaft of 4 Cylinder Engines; Crank Shaft of Single Cylinder Engines.

UNIT II

GEARS: Drawing of Gear Tooth Profile for Spur Gear, Nomenclature and Profiles Approximate and Unwin's Method

CAM PROFILES: Different Types of Cams and Followers; Types of Motion of Follower; Uniform Velocity Motion; Simple Harmonic Motion; Uniformly Accelerated and Retarded Motion; Drawing of Cam Profiles for the Above Motions

RECOMMENDED BOOKS:

1. Engineering Drawing by RB Gupta; Satya Parkasan, New Delhi
2. Machine Drawing by PS Gill; BD Kataria and Sons, Ludhiana
3. Machine Drawing by Lakshminarayan; Jain Brothers, New Delhi

NOTE:

1. For class work, the students shall be assigned to prepare at least ten drawing sheets covering all units and each topic of the syllabus.
2. For theory examination, the examiner will set a question paper containing total six questions, two questions from each unit covering each topic of the syllabus; students are required to attempt three questions at least one from each unit. Each question will carry equal marks.

AE 211B MECHANICS OF SOLIDS LAB						
B. Tech. Semester – III (Automobile Engineering)						
L	T	P	Credit		Class Work	: 20 Marks
-	-	2	1		Examination	: 30Marks
					Total	: 50 Marks
					Duration of Examination	: 3 Hours

LIST OF EXPERIMENTS:

1. To study the Brinell hardness testing machine & perform the Brinell hardness test.
2. To study the Rockwell hardness testing machine & perform the Rockwell hardness test.
3. To study the Vickers hardness testing machine & perform the Vickers hardness test.
4. To study the Erichsen sheet metal testing machine & perform the Erichsen sheet metal test.
5. To study the Impact testing machine and perform the Impact tests (Izod & Charpy).
6. To study the Universal testing machine and perform the tensile test.
7. To perform compression & bending tests on UTM.
8. To perform the shear test on UTM.
9. To study the torsion testing machine and perform the torsion test.
10. To draw shear Force, Bending Moment Diagrams for a simply Supported Beam under Point and Distributed Loads.

NOTE:

1. At least ten experiments are to be performed in the semester.
2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the department as per the scope of the syllabus.

AE 213B COMPUTER AIDED DRAFTING LAB						
B. Tech. Semester – III (Automobile Engineering)						
L	T	P	Credits		Class Work	: 20 Marks
-	-	2	1		Examination	: 30 Marks
					Total	: 50 Marks
					Duration of Examination	: 3 Hours

The students will be required to carry out the following exercises using any one of the educational CAD softwares like Latest version of AUTOCAD, I-DEAS, CATIA, SOLID EDGE, PRO-ENGINEER etc).

LIST OF EXPERIMENTS/EXERCISES

UNIT I

1. Start a New Drawing, Name the Drawing Sheet, Set the Drawing Units, Drawing Precision, Drawing Limits, Grid, Snap and Draw the Margin and Title Block as given in Exercise Problems Sheet.
2. Redraw the 2D Figures including dimensions as given in Exercise Problems Sheet using various Fundamental of 2D commands in Draw and Modify Toolbars
3. Redraw the 2D Figures including dimensions as given in Exercise Problems Sheet using various Advance commands in Osnap, Grip, Block, Layers, Attributes, Edit Toolbars

UNIT II

4. Draw Front, Top, and Right Side Orthogonal view of each of the objects in given Exercise Problems Sheet using View Port commands
5. Draw 3D Surface Models of the Objects as given in Exercise Problems Sheet, using fundamental of 3D Drawing and Surface commands
6. Draw 3D Solid Models of the Objects as given in Exercise Problems Sheet, using fundamental of 3D Drawing and Solid commands

UNIT III

7. Draw 3D Models of different types of Joints, Pulleys and Engine Bearings as given in Exercise Problems Sheet.
8. Draw 3D Models of different types of Engine Piston, Connecting Shafts and Crank Shafts as given in Exercise Problems Sheet.
9. Draw 3D Models of Simple Automobile Assemblies of Gears & Cam Followers as given in Exercise Problems Sheet.

NOTE:

1. For class work, the students should be assigned to prepare at least ten drawing sheets covering all units and each topic/experiment/exercise of the syllabus.
2. For practical examination, the examiner should set a question paper containing total three questions, one question from each unit covering all units and each topic/experiment/exercise of the syllabus; students are required to attempt all the three questions.

AE 215B FLUID MECHANICS & MACHINARY LAB							
B. Tech. Semester – III (Automobile Engineering)							
L	T	P	Credits		Class Work	:	20 Marks
-	-	2	1		Examination	:	30 Marks
					Total	:	50 Marks
					Duration of Examination	:	3 Hours

LIST OF EXPERIMENTS

1. Determination of the Coefficient of discharge of given Orifice meter.
2. Determination of the Coefficient of discharge of given Venturi meter.
3. Calculation of the rate of flow using Rotameter.
4. Determination of friction factor of given set of pipes.
5. Conducting experiments and drawing the characteristic curves of centrifugal pump /submergible pump
6. Conducting experiments and drawing the characteristic curves of reciprocating pump.
7. Conducting experiments and drawing the characteristic curves of Gear pump.
8. Conducting experiments and drawing the characteristic curves of Pelton wheel.
9. Conducting experiments and drawing the characteristics curves of Francis turbine.
10. Conducting experiments and drawing the characteristic curves of Kaplan turbine.

NOTE:

1. At least ten experiments are to be performed in the semester.
2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the department as per the scope of the syllabus.

AE 217B AUTOMOBILE WORKSHOP						
B. Tech. Semester – III (Automobile Engineering)						
L	T	P	Credits		Class Work	: 20 Marks
-	-	2	1		Examination	: 30 Marks
					Total	: 50 Marks
					Duration of Examination	: 3 Hours

LIST OF EXPERIMENTS

1. Work on Lifting Equipment.
2. Work on Wheel Care Equipment.
3. Work on Body Shop Equipment.
4. Work on Weld Shop Equipment.
5. Work on Cleaning Equipment.
6. Work on Paint Shop Equipment.
7. Work on Power Tools.
8. Work on Injector Diagnostic, Testing & servicing Equipment.
9. Work on A/C Recharging, Recovery & Recycling Equipment.
10. Work on Battery Tester, Brake Bleeder & Coolant Flush-N-Fill Equipment.
11. Work on Gas & Smoke Analyzer Equipment.

NOTE:

1. **At least ten experiments are to be performed in the semester.**
2. **At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the department as per the scope of the syllabus.**

GES 203B ENVIRONMENTAL STUDIES FIELD WORK										
B. Tech. Semester –III/IV (Common for all Branches)										
L	T	P	Credit	Field Work				:	25Marks	
-	-	-	0	Total				:	25 Marks	

FIELD WORK:

- Visit to a local area to document environmental assets – river/ forest/ grassland/ hill/ mountain.
- Visit to a local polluted site-Urban/ Rural/ Industrial/ Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems – pond, river, hill slopes, etc. (Field work equal to 5 lectures hours).

NOTE:

The awards of this paper shall not be counted in the award of the Degree/DMC.

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonapat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 2nd YEAR (SEMESTER – IV) AUTOMOBILE ENGINEERING
Credit Based Scheme w.e.f. 2013-14

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1	MGT 201 B	ENGINEERING ECONOMICS (Except BT & BME) (Gr- B)	4	-		25	75	-	100	4	3
	GES 201 B	ENVIRONMENTAL STUDIES (Gr-A)	3	-	-	-	75*	-	75*	--	
2	AE 202B	THEORY OF MACHINE	3	1		25	75	-	100	4	3
3	AE 204B	AUTOMOBILE PETROL ENGINES	3	1		25	75	-	100	4	3
4	AE 206B	AUTOMOBILE DIESEL ENGINES	3	1		25	75	-	100	4	3
5	AE 208B	COMBUSTION AND HEAT TRANSFER	3	1		25	75	-	100	4	3
6	AE 210B	AUTOMOBILE ENGINEERING MATERIALS	3	1		25	75	-	100	4	3
7	AE 212B	THEORY OF MACHINE LAB	-	-	2	20	-	30	50	1	3
8	AE 214B	AUTOMOBILE ENGINE COMPONENT LAB	-	-	2	20	-	30	50	1	3
9	AE 216B	COMBUSTION AND HEAT TRANSFER LAB	-	-	2	20	-	30	50	1	3
10	AE 218B	AUTOMOBILE ENGINEERING MATERIALS LAB	-	-	2	20	-	30	50	1	3
11	GES 203 B	ENVIRONMENTAL STUDIES FIELD WORK (Gr-A)	-	-	-	-	-	25*	25*	-	
12	GPAE 202B	GENERAL PROFICIENCY & ETHICS	1	-	-	-	-	75	75	2	3
Total			20	5	9	230	450	195	875	30	
			19	5	9	205	375	195	775	26	

Note:

- 7 Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of Sports is given in General Proficiency & Ethics Syllabus.
- 8 *The Environmental studies (GES-201 B & Environment Studies Field work (GES-203B) are compulsory & qualifying courses.

- 9 **The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.**
- 10 **Electronics gadgets including Cellular phones are not allowed in the examination**
- 11 **Each students has to undergo Professional Training of at least 4 weeks from the industry, institute, research lab, training center etc during summer vacation and its evaluation shall be carries out in the V semester**
- 12 **All the branches are to be divided into group ‘A’ and ‘B’ as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.**

MGT 201B ENGINEERING ECONOMICS						
B. Tech. Semester – III/IV (Common for all Branches Except BT& BME)						
L	T	P	Credits		Class Work	: 25 Marks
4	-	--	4		Examination	: 75Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

COURSE OBJECTIVE: The aims of this course are to:

- Acquaint the student with the basic economic concepts and their operational significance
- Stimulate him to think systematically and objectively about cotemporary economic problems.

UNIT I

Definition of economics- various definitions, nature of Economic problem, Micro and macro economics- their feature and scope, production possibility curve, Economic laws and their nature. Relation between Science, Engineering Technology and Economics. Concept and measurement of utility, Law of Diminishing Marginal Utility, Law of equi-marginal utility – its practical application and importance.

UNIT II

Meaning of Demand, Individual and Market demand schedule, Law of demand, shape of demand curve. Elasticity of demand, measurement of elasticity of demand, factors effecting elasticity of demand, practical importance & application of the concept of elasticity of demand. Various concepts of cost-Fixed cost, variable cost, average cost, marginal cost, money cost, real cost, opportunity cost. Shape of average cost, marginal cost, total cost etc. in short run and long run.

UNIT III

Meaning of production and factors of production; Law of variable proportions, Law of Return to Scale, Internal and External economics and diseconomies of scale. Meaning of Market, Type of Market– perfect Competition, Monopoly, Oligopoly, Monopolistic competition (Main features of these markets).

UNIT IV

Supply and Law of Supply, Role of Demand & Supply in Price Determination and effect of changes in demand and supply on prices . Nature and characteristics of Indian economy, privatization – meaning, merits and demerits. Globalisation of India economy – merits and demerits. Elementary Concept of WTO & TRIPS agreement, Monetary Policy & Fiscal Policy

TEXT BOOKS:

- Ahuja H.L."Micro Economic Theory" S. Chand Publication, New Delhi
- Dewett K.K "Modern Economic Theory" S. Chand Publication, New Delhi
- Jain T.R, Grover M.L, Ohri V.K Khanna O.P,"Economics for engineers" V.K .Publication ,New Delhi

SUGGESTED BOOKS:

- Jhingan M.L"Micro Economic Theory" S.Chand Publication ,New Delhi
- Chopra P.N "Principle of Economics" Kalyani Publishers, Delhi
- Mishra S.K "Modern Micro Economics" Pragati Publication Mumbai.
- Dwivedi D.N "Micro Economics " Pearson Education, New Delhi.

NOTE:

- In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
- The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

GES 201B ENVIRONMENTAL STUDIES					
B. Tech. Semester – III/IV (Common for all Branches)					
L	T	P	Credit		
3	-	-	0		
			Examination	:	75Marks
			Total	:	75 Marks
			Duration of Examination	:	3 Hours

UNIT I

The Multidisciplinary nature of environmental studies, Definition, scope and importance.
Need for Public awareness

UNIT II

NATURAL RESOURCES:

Renewable and non-renewable resources:
Natural resources and associated problems.

- g) Forest resources: Use and over-exploitation: deforestation, case studies, Timber exploitation, mining, dams and their effects and forests tribal people.
- h) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- i) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- j) Food resources: World food problems, changes, caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- k) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources; case studies.
- l) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
 - Role of an individual in conservation of natural resources.
 - Equitable use of resources for sustainable lifestyles.

UNIT III

ECOSYSTEMS:

- Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following eco-system:
 - a) Forest ecosystem, Grassland ecosystem, Desert ecosystem.
 - b) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

UNIT IV

BIODIVERSITY AND ITS CONSERVATIONS:

- Introduction – Definition: Genetic, species and ecosystem diversity.
- Biogeographically classification of India.
- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.

UNIT V

ENVIRONMENTAL POLLUTION:

Definition, causes, effects and control, measures of:

Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal Pollution, Nuclear hazards

- Solid waste management: Causes effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster management: Floods, earthquake, cyclone and landslides.

UNIT VI

SOCIAL ISSUES AND THE ENVIRONMENT:

- j) From unsustainable to sustainable development
- k) Urban problems related to energy
- l) Water conservation, rain water harvesting, watershed management

- m) Resettlement and rehabilitation of people; its problems and concerns, case studies
- n) Environmental ethics: Issues and possible solutions
- o) Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies
- p) Wasteland reclamation, Consumerism and waste products
- q) Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act
- r) Issues involved in enforcement of environmental legislation, Public awareness

UNIT VII

Human population and the Environment., Population growth, variation among nations.

Population explosion – Family Welfare Programme, Environment and human health, Human Rights, Value Education, HIV/ AIDS, Woman and Child Welfare.

Role of Information Technology in Environment and human health.

Case Studies.

REFERENCES:

1. Agarwal, K.C. 2001, Environmental Biology, Nidi Pub. Ltd. Bikaner.
2. Bharucha, Franch, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380013, India .
3. Brunner R.C. 1989, Hazardous Waste Incineration, Mc. Graw Hill Inc. 480p.
4. Clark R.S., Marine Pollution, Slanderson Press Oxford (TB).
5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Pub. House, Mumbai. 1195p.
6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment ®.
8. Gleick, H.P., 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security, Stockholm Env. Institute, Oxford Univ., Press 473p.
9. Hawkins R.E. Encyclopedia of Indian Natural History, Bomaby Natural History Society, Bombay (R).
10. Heywood, V.H. & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
11. Jadhav, H & Bhosale, V.M. 1995, Environmental Protection and Laws, Himalaya Pub. House, Helhi 284p.
12. Mckinney, M.L. & Schoch, RM 1996, Environmental Sciences Systems & Solutions, Web enhanced Edition 639p.
13. Mhaskar A.K., Mater Hazardous, Tekchno-Sciences Publications (TB).
14. Miller T.G. Jr. Environmental Science, Wadsoworth Publishing Co. (TB).
15. Odum, E.P. 1971, Fundamentals of Ecology, W.B. Saunders Co. USA, 574p.
16. Rao M.N. & Dutta, A.K. 1987, Waste Water Treatment. Oxford & IBH Publ. Co. Pvt. Ltd., 345p
17. Sharma, B.K., 2001, Environmental Chemistry, Goel Publ. House, Meerut.
18. Survey of the Environment, The Hindu (M).
19. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Sciences (TB).
20. Trivedi, R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II Enviro Mdiea (R).
21. Trividi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol I and II Enviro Media (R).
22. Trividi R.K. and P.K. Goel, Introduction to air pollution, Techno Sciences Pub. (TB).
23. Wagner K.D., 1998, Environmental Management, W.B. Saunders Co. Philadelphia, USA 499p.
24. A text bok environmental education G.V.S. Publishers by Dr. J.P. Yadav.

(M) Magazine (R) Reference (TB) Textbook

NOTE:

1. Examiner will set eight questions. Students will be required to attempt five Questions.
2. The awards of this paper shall not be counted in the award of the Degree/DMC.

AE 202B THEORY OF MACHINE						
B. Tech. Semester – IV (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

MECHANISMS & FRICTION: Machine Structure, Kinematic link, pair and chain, Grueblers criteria, Constrained motion, Degrees of freedom, slider crank and crank rocker mechanisms, Inversions, Applications, Kinematic analysis of simple mechanisms, Determination of velocity and acceleration.

Friction in screw and nut, Pivot and collar, Thrust bearing, Plate and disc clutches, Flat, V Belt and rope drives, Ratio of tensions, Effect of centrifugal and initial tension, Condition for maximum power transmission, Open and crossed belt drive.

UNIT II

GEARING AND CAMS: Gear profile and geometry– Nomenclature of spur and helical gears – Gear trains: Simple, compound gear trains and epicyclic gear trains - Determination of speed and torque- Cams – Types of cams – Design of profiles – Knife edged, flat faced and roller ended followers with and without offsets for various types of follower motions.

UNIT III

BALANCING: Static and dynamic balancing – Single and several masses in different planes –Balancing of reciprocating masses- primary balancing and concepts of secondary balancing – Single and multi cylinder engines (Inline) – Balancing of radial V engine – direct and reverse crank method.

UNIT IV

VIBRATION: Free, forced and damped vibrations of single degree of freedom systems – Force transmitted to supports – Vibration isolation – Vibration absorption – Torsional vibration of shaft – Single and multi rotor systems – Geared shafts – Critical speed of shaft.

TEXT BOOKS:

1. Rattan.S.S, “Theory of Machines”, Tata McGraw–Hill Publishing Co., New Delhi
2. Ballaney.P.L, “Theory of Machines”, Khanna Publishers, New Delhi
3. R.S. Khurmi and J.K. Gupta, “Theory of Machines”, S.Chand&co

REFERENCES:

1. Rao, J.S and Dukkupati, R.V, “Mechanism and Machine Theory”, Second Edition, Wiley Eastern Ltd.
2. Malhotra, D.R and Gupta, H.C., “The Theory of Machines”, Satya Prakasam, Tech. India Publications
3. Gosh, A. and Mallick, A.K., “Theory of Machines and Mechanisms”, Affiliated East West Press
4. Shigley, J.E. and Uicker, J.J., “Theory of Machines and Mechanisms”, McGraw-Hill

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 204B AUTOMOBILE PETROL ENGINE						
B. Tech. Semester – IV (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

ENGINE CONSTRUCTION AND OPERATION: Constructional details of four stroke petrol engine, working principle, air standard Otto cycle, actual indicator diagram, two stroke engine construction and operation, comparison of four stroke and two stroke engine operation, firing order and its significance; Port Timing, Valve Timing of petrol engines.

UNIT II

SI ENGINE FUEL SYSTEM: Carburetor working principle, requirements of an automotive carburetor, starting, idling, acceleration and normal circuits of carburetors. Compensation, maximum power devices, constant choke and constant vacuum carburetors, fuel feed systems; mechanical and electrical fuel feed pumps; Petrol injection, MPFI.

UNIT III

IGNITION, COOLING AND LUBRICATION SYSTEM: Types and working of battery coil and magneto ignition systems, relative merits and demerits, centrifugal and vacuum advance mechanisms; Types and construction of spark plugs, electronic ignition systems. Need for cooling system, Types of cooling system: air cooling system, liquid cooling system, forced circulation system, pressure cooling system; Lubrication system; mist, wet sump lubrication system, properties of lubricants.

UNIT IV

COMBUSTION AND COMBUSTION CHAMBERS: Combustion in SI engine; stages of combustion, flame propagation, rate of pressure rise, abnormal combustion, detonation, effect of engine variables on knock, knock rating; Combustion chambers; different types, factors controlling combustion chamber design.

TEXT BOOKS:

1. Ganesan.V, "Internal Combustion Engines", Tata McGraw-Hill Publishing Co., New Delhi
2. M.L.Mathur and R.P.Sharma, "A course in Internal combustion engines", Dhanpat Rai & Sons Publications, New Delhi
3. K.K.Ramalingam, "Internal Combustion Engines", SciTech Publications, Chennai

REFERENCES:

1. Heldt P.M., "High Speed Combustion Engines", Oxford IBH Publishing Co., Calcutta
2. Obert E.F., "Internal Combustion Engines Analysis and Practice", International Text Books Co Scranton, Pennsylvania
3. William H.Crouse., "Automotive Engines", McGraw-Hill Publishers
4. Ellinger H.E., "Automotive Engines", Prentice Hall Publishers
5. John B.Heywood., "Internal Combustion Engine Fundamental", McGraw-Hill
6. Pulkrabek, "Engineering Fundamentals of the Internal Combustion Engines", Practice Hall of India

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 206B AUTOMOBILE DIESEL ENGINE						
B. Tech. Semester – IV (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

BASIC THEORY: Diesel engine construction and operation, two stroke and four stroke diesel dual cycle; engines, diesel cycle, fuel-air and actual cycle analysis, diesel fuel, ignition quality, cetane number, laboratory tests for diesel fuels, standards and specifications

UNIT II

FUEL INJECTION SYSTEM: Requirements, air and solid injection, functions of components, jerk and distributor type pumps common rail system, PTFI system pressure waves, injection lag, unit injector, mechanical and pneumatic governors, fuel injector, types of injection nozzle, nozzle tests, spray characteristics, injection timing, pump calibration.

UNIT III

AIR MOTION, COMBUSTION AND COMBUSTION CHAMBERS: Importance of air motion, swirl, squish and turbulence, swirl ratio, fuel air mixing, stages of combustion, delay period, factors affecting delay period, knock in CI engines. Combustion chamber; design requirements, direct and indirect injection combustion chambers, M type combustion chamber.

UNIT IV

SUPERCHARGING AND TURBOCHARGING: Necessity and limitations, types of supercharging and turbo charging, relative merits, matching of turbocharger, exhaust gas recirculation, charge cooling.

DIESEL ENGINE TESTING AND PERFORMANCE: automotive and stationary diesel engine testing and related emission standards; Engine performance and emission characteristics, variables affecting engine performance and emission, methods to improve engine performance, heat balance, performance maps.

TEXT BOOKS:

1. Ganesan.V, "Internal Combustion Engines", Tata McGraw-Hill Publishing Co., New Delhi
2. M.L.Mathur and R.P.Sharma, "A course in Internal combustion engines", Dhanpat Rai & Sons Publications, New Delhi
3. K.K.Ramalingam, "Internal Combustion Engines", SciTech Publications, Chennai

REFERENCES:

1. Heldt P.M., "High Speed Combustion Engines", Oxford IBH Publishing Co., Calcutta
2. Obert E.F., "Internal Combustion Engines Analysis and Practice", International Text Books Co Scranton, Pennsylvania
3. William H.Crouse., "Automotive Engines", McGraw-Hill Publishers
4. Ellinger H.E., "Automotive Engines", Prentice Hall Publishers
5. John B.Heywood., "Internal Combustion Engine Fundamental", McGraw-Hill
6. Pulkrabek, "Engineering Fundamentals of the Internal Combustion Engines", Practice Hall of India

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 208B COMBUSTION AND HEAT TRASFER						
B. Tech. Semester – IV (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

INTRODUCTION TO COMBUSTION PROCESSES: Combustion in premixed and diffusion flames, Combustion process in IC engines.

UNIT II

NORMAL, ABNORMAL COMBUSTION IN SI ENGINES: Stages of combustion , Flame propagation, Rate of pressure rise, Cycle to cycle variation , Abnormal combustion , Theories of detonation, Effect of engine operating variables on combustion..

UNIT III

COMBUSTION AND KNOCK IN CI ENGINES: Droplet and spray combustion theory, stages of combustion, delay period, peak pressure, Heat release, Gas temperature, Diesel knock.

UNIT IV

HEAT TRANSFER IN IC ENGINES: Basic definitions, Conduction heat transfer, Convective heat transfer, Radiation heat transfer, Heat transfer, temperature distribution and thermal stresses in piston - Cylinder liner - Cylinder head - fins and valves.

EXPERIMENTAL INVESTIGATION OF COMBUSTION AND HEAT TRANSFER IN IC ENGINES: Photographic studies of combustion processes, P-θ diagram in SI and CI engines, Anemometry, Temperature measurement in piston, cylinder liner, cylinder head and engine valves.

TEXT BOOKS:

1. SPALDING.D.B., "Some fundamental of Combustion ", Butterworth Science Publications, London

REFERENCES:

1. Lewis.B., Pease.R.N. and Taylor.H.S., " Combustion Process High Speed Gas dynamics and Jet Propulsion Series ", Princeton University Press, Princeton, New Jersey.
2. Taylor.E.F. " The Internal Combustion Engines ", International Text Book Co., Pennsylvania
3. Ganesan.V. " Internal Combustion Engines ", Tata McGraw Hill Co
4. Holman J.P "Heat and Mass Transfer" Tata McGraw-Hill
5. Obert E.F., "Internal Combustion Engines Analysis and Practice", International Text Books Co Scranton, Pennsylvania
6. William H.Crouse., "Automotive Engines", McGraw-Hill Publishers
7. Ellinger H.E., "Automotive Engines", Prentice Hall Publishers
8. John B.Heywood., "Internal Combustion Engine Fundamental", McGraw-Hill

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 210B AUTOMOBILE ENGINEERING MATERIALS						
B. Tech. Semester – IV (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

CRYSTAL STRUCTURE, CONSTITUTION OF ALLOYS AND PHASE DIAGRAMS: Crystal structure – BCC, FCC and HCP structure – unit cell – crystallographic planes and directions, miller indices – crystal imperfections, point, line, planar and volume defects – Grain size, ASTM grain size number; Constitution of alloys – Solid solutions, substitutional and interstitial – phase diagrams, Isomorphism, eutectic, peritectic, eutectoid and peritectoid reactions, Iron – Iron carbide equilibrium diagram; Classification of steel and cast Iron microstructure, properties and application.

UNIT II

HEAT TREATMENT: Definition – Full annealing, stress relief, recrystallisation and spheroidizing – normalizing, hardening and Tempering of steel. Isothermal transformation diagrams – cooling curves superimposed on I.T. diagram CCR - Hardenability, Jominy end quench test – Austempering, martempering – case hardening, carburizing, nitriding, cyaniding, carbonitriding – Flame and Induction hardening.

UNIT III

SELECTION OF MATERIALS: Criteria of selecting materials for automotive components viz cylinder block, Cylinder head, piston, piston ring, Gudgeon pin, connecting rod, crank shaft, crank case, cam, cam shaft, engine valve, gear wheel, clutch plate, axle, bearings, chassis, spring, body panel, radiator, brake lining etc.

UNIT IV

NON-METALLIC MATERIALS: Polymers – types of polymer, commodity and engineering polymers – Properties and applications of PE, PP, PS, PVC, PMMA, PET, PC, PA, ABS, PI, PAI, PPO, PPS, PEEK, PTFE Polymers – Urea and Phenol formal deliyydes –Engineering Ceramics – Properties and applications of Al₂O₃, SiC, Si₃N₄, PSZ and Sialon – Fibre and particulate reinforced composites.

MECHANICAL PROPERTIES AND TESTING: Mechanism of plastic deformation, slip and twinning – Types of fracture – Testing of materials under tension, compression and shear loads – Hardness tests (Brinell, Vickers and Rockwell) Impact test Izod and charpy, fatigue and creep test.

TEXT BOOKS:

1. Kenneth G. Budinski and Michael K. Budinski “Engineering Materials” Prentice-Hall of India Private Limited

REFERENCES:

1. William D Callsber “Material Science and Engineering”, John Wiley and Sons
2. Raghavan.V. Materials Science and Engineering, Prentice Hall of India Pvt. Ltd
3. Sydney H. Avner “Introduction to Physical Metallurgy” McGraw-Hill Book Company
4. Khanna.O.P., “Material Science and Metallurgy”, Dhanapat Rai & Sons
5. Dieter.G.E. Mechanical Metallurgy, McGraw Hill, New York
6. Avner.S.H. Introduction to physical metallurgy, McGraw Hill, New York
5. Raghavan.V. Physical Metallurgy, Principle and Practice, Prentice Hall, 1995.
6. Bawa.H.S. Materials Metallurgy, McGraw Hill, 1986.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 212B THEORY OF MACHINE LAB						
B. Tech. Semester – IV (Automobile Engineering)						
L	T	P	Credits		Class Work	: 20 Marks
-	-	2	1		Examination	: 30 Marks
					Total	: 50 Marks
					Duration of Examination	: 3 Hours

LIST OF EXPERIMENTS

1. To study various types of Kinematic links, pairs, chains and Mechanisms.
2. To study inversions of 4 Bar Mechanisms, Single and Double slider crank mechanisms.
3. To plot slider displacement, velocity and acceleration against crank rotation for Single slider crank mechanism.
4. Draw Klein's construction for Single slider crank mechanism.
5. To study the different type of the belt drives.
6. To study various type of cam and follower arrangements.
7. To plot follower displacement v/s cam rotation for various Cam Follower systems.
8. To study various types of gears-Spur, Helical, Double helical, Spiral, Bevel gear, Hypoid
9. To study various types of gear trains – Simple, Compound and Epicyclic
10. To find co-efficient of friction between belt and pulley.
11. To study the working of Screw Jack and determine its efficiency.
12. Draw the involute and cycloidal teeth profile.
13. To perform the experiment for static balancing on Static Balancing Machine
14. To perform the experiment for dynamic balancing on Dynamic Balancing machine
15. Determine the turning moment on crank shaft neglecting weight of the connecting rod in the reciprocating parts of an engine
16. To determine experimentally the unbalance forces and couples of reciprocating parts

NOTE:

1. Ten experiments are to be performed in the Semester.
2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the concerned institute as per the scope of the syllabus.

AE 214B AUTOMOBILE ENGINE COMPONENT LAB						
B. Tech. Semester – IV (Automobile Engineering)						
L	T	P	Credits		Class Work	: 20 Marks
-	-	2	1		Examination	: 30 Marks
					Total	: 50 Marks
					Duration of Examination	: 3 Hours

LIST OF EXPERIMENTS

1. Dismantling of 4 cylinder petrol engine.
2. Assembling of 4 cylinder petrol engine.
3. Dismantling of 6 cylinder diesel engine.
4. Assembling of 6 cylinder diesel engine.
5. Study of oil filter, fuel filter, fuel injection system, carburetor, MPFI
6. Study of ignition system components – coil, magneto and electronic ignition systems.
7. Study of engine cooling system components
8. Study of engine lubrication system components
9. Ovality and taper measurement of cylinder bore and comparison with standard specifications
10. Ovality and taper measurement of engine crank shaft and comparison with standard specification

NOTE:

1. Ten experiments are to be performed in the Semester.
2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the concerned institute as per the scope of the syllabus.

AE 216B COMBUSTION AND HEAT TRANSFER LAB						
B. Tech. Semester – IV (Automobile Engineering)						
L	T	P	Credits		Class Work	: 20 Marks
-	-	2	1		Examination	: 30 Marks
					Total	: 50 Marks
					Duration of Examination	: 3 Hours

LIST OF EXPERIMENTS

1. Experiments on Thermal conductivity of solids, liquids and liquids
2. Experiments on Natural convection and forced convection
3. Experiments on Boiling heat transfer and cooling tower
4. Experiments on emissivity and absorvity
5. Experiments on Heat exchangers
6. Experiments on LMTD methods
7. Experiments on mass transfer
8. Experiments on temperature distribution, thermal stresses and Heat transfer in piston, Cylinder liner, Cylinder head, fins and valves.
9. Experimental investigation of combustion and heat transfer in IC engines
10. Experimental Photographic studies of combustion processes, P- θ diagram in SI and CI engines
11. Experimental Anemometry

NOTE:

1. Ten experiments are to be performed in the Semester.
2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the concerned institute as per the scope of the syllabus.

AE 218B AUTOMOBILE ENGINEERING MATERIAL LAB						
B. Tech. Semester – IV (Automobile Engineering)						
L	T	P	Credits		Class Work	: 20 Marks
-	-	2	1		Examination	: 30 Marks
					Total	: 50 Marks
					Duration of Examination	: 3 Hours

LIST OF EXPERIMENTS

1. To study crystal structures with the help of ball model.
2. To study crystal structures and crystals imperfections using ball models.
3. To study microstructures of metals/ alloys through microscopic observation.
4. To study hardening (by quenching) of steel specimen by Jominy Test.
5. To observe effect of tempering temperature on the property of given steel specimen.
6. To study microstructure of heat-treated steel through microscopic observation.
7. To study thermo-setting of plastics.
8. To study the creep behavior of a given specimen.
9. To study the mechanism of chemical corrosion and its protection.
10. To study the properties of various types of plastics.
11. To study Bravais lattices with the help of models.

NOTE:

1. At least ten experiments are to be performed in the semester.
2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the department as per the scope of the syllabus.

GES 203B ENVIRONMENTAL STUDIES FIELD WORK						
B. Tech. Semester –III/IV (Common for all Branches)						
L	T	P	Credit		Field Work	: 25Marks
--	--	--	0		Total	: 25 Marks

FIELD WORK:

- Visit to a local area to document environmental assets – river/ forest/ grassland/ hill/ mountain.
- Visit to a local polluted site-Urban/ Rural/ Industrial/ Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems – pond, river, hill slopes, etc. (Field work equal to 5 lectures hours).

Note: The awards of this paper shall not be counted in the award of the Degree/DMC.

GPAAE 202B GENERAL PROFICIENCY & ETHICS						
B. Tech. Semester – IV(Automobile Engineering)						
L	T	P	Credits		Examination	: 75Marks
1	--	--	2		Total	: 75Marks

The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/ her performance / achievements in different walks of life.

A Faculty Counselor will be attached to a group of students which will remain associated with him /her during the entire period of the degree program in the University. Each faculty member will serve as a faculty counselor. They will act like a local guardian for the students associated with him / her and will help them in terms of career guidance, personal difficulties.

A. The student will present a written report before the committee with following in view:

The student will present before the committee his/her achievements during the current academic session in the form of a written report highlighting followings:

- | | | |
|-----|--|------------|
| I. | Academic Performance | ----- |
| II. | Extra Curricular Activities / Community Service, Hostel Activities | (8 Marks) |
| III | Technical Activities / Industrial, Educational tour | (8 Marks) |
| IV | Sports/games | (14 Marks) |
| V | Moral values & Ethics | (15 Marks) |

NOTE: Report submitted by the students should be typed on both sides of the paper.

C. A student will support his/her achievement and verbal & communicative skill through presentation before the committee.
(30 Marks)

C. Moral values & Ethics

Syllabus - Process for Value Education, self-evaluation concept and process.

A minor test will be conducted during the semester and It will be the duty of the concerned teacher assigned to teach Moral values & Ethics to submit the awards to respective chairman of the department / Director/Principal.

The evaluation of this course will be made by the following Committee.

University Departments:

- | | | |
|---|-------------------------------|----------|
| 1 | Chairperson of the Department | Chairman |
| 2 | Senior Most Faculty Counselor | Member |
| 3 | Vice- Chancellor's Nominee | Member |

Affiliated Colleges:

- | | | |
|---|---|----------|
| 1 | Director/Principal | Chairman |
| 2 | Head of the Department/Sr. Faculty | Member |
| 3 | External Examiner to be appointed by the University | Member |

Note: Remuneration will be paid to the external examiner only (at par with the other practical examinations).

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonapat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 3rd YEAR (SEMESTER – VI) AUTOMOBILE ENGINEERING
Credit Based Scheme w.e.f. 2014-15

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1	AE 302B	AUTOMOTIVE FUELS & LUBRICANTS	3	1		25	75	-	100	4	3
2	AE 304B	AUTOMOTIVE TRANSMISSION	3	1		25	75	-	100	4	3
3	AE 306B	AUTOMOTIVE INSTRUMENTATION & EMBEDDED SYSTEMS	3	1		25	75	-	100	4	3
4	AE 308B	AUTOMOTIVE CHASSIS DESIGN	3	1		25	75	-	100	4	3
5	AE 310B	AUTOMOTIVE POLLUTION & CONTROL	3	1		25	75	-	100	4	3
6	AE 312B	TWO & THREE WHEELERS	3	1		25	75	-	100	4	3
7	HUM 302B	REPORT WRITING SKILLS (Common for all branches)	1	-	-	25	50	-	75	1	2
7	AE 314B	TWO & THREE WHEELERS LAB	-	-	2	20		30	50	1	3
8	AE 316B	COMPUTER AIDED CHASSIS DESIGN LAB	-	-	2	20		30	50	1	3
9	AE 318B	COMPUTER AIDED ENGINE DESIGN LAB	-	-	2	20		30	50	1	3
10	AE 320B	AUTOMOTIVE ENGINE TESTING & POLLUTION MEASUREMENT LAB	-	-	2	20	-	30	50	1	3
11	HUM 304B	ORAL PRESENTATION SKILLS (Common for all branches)	-	-	2	20	-	30	50	1	2
12	GP AE 302B	GENERAL PROFICIENCY & ETHICS	1	-	-	-	-	75	75	2	-
Total			19	6	10	275	500	225	1000	32	

Note:

- 5 Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weight age of Sports is given in General Proficiency & Ethics Syllabus.
- 6 The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
- 7 Electronics gadgets including Cellular phones are not allowed in the examination
- 8 Each students has to undergo Professional Training of at least 4 weeks from the industry, institute, research lab, training center etc during summer vacation and its evaluation shall be carries out in the VII semester

AE 302B AUTOMOTIVE FUELS & LUBRICANTS						
B. Tech. Semester – VI (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

FUELS: Introduction, Structure of petroleum, Refining process, Product of refining process, Fuels for spark-ignition engines, Knock rating of SI engine Fuels, Octane number requirement, Diesel fuels, LPG as SI engine fuel, Non petroleum fuels, Additives.

UNIT II

ALTERNATIVE FUELS FOR IC ENGINES: Introduction, Manufacture of methanol, Manufacture of ethanol, Comparison of properties of alcohols and gasoline as engine fuels, Engine performance with pure alcohols, Alcohol-gasoline fuel blends, Alcohols as diesel fuels, Vegetable oils as diesel fuels, Bio-gas as diesel fuel.

UNIT III

ENGINE FRICTION AND LUBRICATION: Introduction, Total engine friction, Effect of engine variables on engine friction, Determination of engine friction, Lubrication principles, Bearing lubrication, Functions of lubricating system, Properties of lubricating oil, Additives, Classification of lubricating oils, Service rating of oils, Lubricating system, Oil filters, Crankcase ventilation, Engine performance and lubrication.

UNIT IV

TECHNIQUES AND PROCEDURE: To find Temperature dependence of viscosity of lubrication oil by Redwood viscometer, Viscosity index of lubricating oil by Say bolt viscometer, Flash and fire points of fuels, Flash and fire points of lubricants, ASTM distillation test of gasoline, Drop point of grease and Mechanical penetration in grease, Aniline distillation test of gasoline, Reid vapour pressure test, Study of Bomb Calorimeter, Study of Gas Calorimeter.

TEXT BOOKS:

1. Mathur and Sharma, "Internal Combustion Engine", Dhanpat Rai Publications
2. Ganesan, V- "Internal Combustion Engines"- Tata McGraw-Hill

REFERENCES:

3. Obert.E.F.- "Internal Combustion Engines"
4. Taylor. C.F., Internal Combustion Engines, MIT Press.
5. Heywood. J.B., Internal Combustion Engine Fundamentals, McGraw Hill Book

NOTE:

9. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
10. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 304B AUTOMOTIVE TRANSMISSION						
B. Tech. Semester – VI (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

CLUTCH AND GEAR BOX: Clutch- Different types of clutches, working principles and constructions, torque capacity and design aspects; Gear Box- method of calculation of gear ratios for vehicles, performance characteristics in different speeds, different types of gear boxes, speed synchronizing devices, gear materials, lubrication.

UNIT II

HYDRODYNAMIC DRIVE: All spur and internal gear type planetary gearboxes, Ford T-model, Cotal and Wilson Gear box, determination of gear ratios, automatic overdrives.

AUTOMOTIVE TRANSMISSION: Fluid coupling- advantages and limitations, construction details, torque capacity, slip in fluid coupling, performance characteristics; Means used to reduce drag torque in fluid coupling; Principal of torque conversion, single, multi stage and polyphase torque converters, performance characteristics, construction and operational details of typical hydraulic transmission drives.

UNIT III

HYDROSTATIC DRIVE AND ELECTRIC DRIVE: Automatic transmission relative merits and demerits when compared to conventional transmission, automatic control of gears, study of typical automatic transmissions, Ford and Chevrolet drive, and automatic control of gear box.

UNIT IV

AUTOMATIC TRANSMISSION APPLICATIONS: Hydrostatic drives- advantages and disadvantages, principles of hydrostatic drive systems, construction and working of typical hydrostatic drives, Janney Hydrostatic drive; Electrical drives- advantages and limitations, principles of Ward Leonard system of control Modern electric drive for buses and performance characteristics.

TEXT BOOKS:

1. Heldt P.M - Torque converters- Chilton Book Co
2. Newton and Steeds - Motor Vehicle- Illiff Publisher

REFERENCE:

1. Design Practices, passenger Car Automotive Transmissions- SAE Hand book

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 306B AUTOMOTIVE INSTRUMENTATION & EMBEDDED SYSTEMS					
B. Tech. Semester – VI (Automobile Engineering)					
L	T	P	Credits		Class Work
3	1	-	4		: 25 Marks
					Examination
					: 75 Marks
					Total
					: 100 Marks
					Duration of Examination
					: 3 Hours

UNIT I

MEASUREMENT CHARACTERISTICS: Instrument Classification, Characteristics of Instruments – Static and dynamic, experimental error analysis, Systematic and random errors, Statistical analysis, Uncertainty, Experimental planning and selection of measuring instruments, Reliability of instruments.

AUTOMOTIVE INSTRUMENTATION: Modern automotive instrumentation – computerized instrumentation system, multiplexing, sampling and advantages – Measurements – fuel quality, coolant temperature, oil pressure vehicles speed, Display devices – LED, LCD, VFD, CRT and types, CAN network, the glass cockpit and information system. Onboard diagnostics – fault code displays. Off board diagnostics – engine data display, expert system occupant protection system – Airbag deployment system security and warning systems.

UNIT II

MEASUREMENT ANALYSIS: Chemical, thermal, magnetic and optical gas analyzers, measurement of smoke, dust and moisture, gas chromatography, spectrometry, measurement of pH, Review of basic measurement techniques.

UNIT III

INTRODUCTION TO EMBEDDED SYSTEM: Introduction to functional building blocks of embedded systems – Register, memory devices, Instrument Classification, Characteristics of Instruments – Static and dynamic, experimental error analysis, Systematic and random errors, Statistical analysis, Uncertainty, Experimental planning and selection of measuring instruments, Reliability of instruments.

UNIT IV

REAL TIME OPERATING SYSTEM (RTOS) Introduction to basic concepts of RTOS, Basics of real time & embedded system operating systems, RTOS – Interrupt handling, task scheduling; embedded system design issues in system development process – Action plan, use of target system, emulator, use of software tools.

TEXT BOOKS:

1. William B.Riddens - Understanding Automotive Electronics, 5th edition- Butter worth Heinemann.
2. Rajkamal, 'Embedded System – Architecture, Programming, Design', Tata McGraw Hill.
3. Daniel W. Lewis 'Fundamentals of Embedded Software', Prentice Hall of India.
4. Holman, J.P., Experimental methods for engineers, McGraw-Hill.
5. Raman, C.S., Sharma, G.R., Mani, V.S.V., Instrumentation Devices and Systems, Tata McGraw Hill.

REFERENCES:

1. Bechhold- Understanding Automotive Electronics- SAE.
2. David E. Simon, 'An Embedded Software Primer', Pearson Education.
3. Frank Vahid, 'Embedded System Design – A Unified hardware & Software IntroductionWiley.
4. Sriram V. Iyer, Pankaj Gupte, 'Embedded Real Time Systems Programming', Tata McGraw Hill.
5. Steve Heath, 'Embedded System Design', II edition, Elsevier.
6. Doebelin, Measurement System Application and Design, McGraw Hill.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 308B AUTOMOTIVE CHASSIS DESIGN							
B. Tech. Semester – VI (Automobile Engineering)							
L	T	P	Credits		Class Work	:	25 Marks
3	1	-	4		Examination	:	75 Marks
					Total	:	100 Marks
					Duration of Examination	:	3 Hours

UNIT I

CLUTCH DESIGN CALCULATION: Design of single plate clutch, multi plate clutch, design of centrifugal clutch, cone clutch, energy dissipated, torque capacity of clutch, design of clutch components, design details of roller and sprang type of clutches

UNIT II

GEAR BOX: Performance of vehicle, total resistance to motion, traction and tractive effort, acceleration; calculation of gear ratio, design of three speed gear box, and design of four speed gear boxes.

UNIT III

VEHICLE FRAME AND SUSPENSION: Study of loads, moments and stresses on frame members, design of frame for Passenger and Commercial vehicles, design of leaf springs, coil springs and torsion bar springs.

UNIT IV

FRONT AXLE AND STEERING SYSTEMS: Analysis of loads, moments and stresses at different sections of front axle, determination of loads at kingpin bearings, wheel spindle bearings, choice of bearings, determination of optimum dimensions and proportions for steering linkages ensuring minimum error in steering.

FINAL DRIVE AND REAR AXLE: Design of propeller shaft, design details of final drive gearing, design details of full floating, Semi-floating and three quarter floating rear shafts and rear axle housings.

TEXT BOOKS:

1. Giri.N.K- "Automobile Mechanics"- Khanna Publisher, New Delhi
2. Heldt.P.M - "Automotive Chassis"- Chilton Co., New York

REFERENCES:

1. Steeds. W -"Mechanics of Road Vehicles"- Illiffe Books Ltd., London
2. Giles.K.G - Steering, Suspension and tyres"- Illiffe Books Ltd., London
3. Newton Steeds & Garret- "Motor Vehicle"- Illiffe Books Ltd., London
4. Heldt.P.M- "Torque converter" - Chilton Book Co., New York
5. Dean Averns - "Automobile Chassis Design"- Illiffe Books Ltd

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 310B AUTOMOBILE POLLUTION & CONTROL						
B. Tech. Semester – VI (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

INTRODUCTION: Vehicle population assessment in metropolitan cities and contribution to pollution, effects on human health and environment, global warming, types of emission, transient operational effects on pollution.

POLLUTANT FORMATION IN SI ENGINES: Pollutant formation in SI Engines, mechanism of HC and CO formation in four stroke and two stroke SI engines, NOx formation in SI engines, effects of design and operating variables on emission formation, control of evaporative emission. Two stroke engine pollution.

UNIT II

POLLUTANT FORMATION IN CI ENGINES: Pollutant formation in CI engines, smoke and particulate emissions in CI engines, effects of design and operating variables on CI engine emissions, Nox formation and control. Noise pollution from automobiles, measurement and standards.

UNIT III

CONTROL OF EMISSIONS FROM SI AND CI ENGINES: Design of engine, optimum selection of operating variables for control of emissions, EGR, Thermal reactors, secondary air injection, catalytic converters, catalysts, fuel modifications, fuel cells, two stroke engine pollution controls.

UNIT IV

MEASUREMENT TECHNIQUES EMISSION STANDARDS AND TEST PROCEDURE: NDIR, FID, Chemiluminescent analyzers, Gas Chromatograph, smoke meters, emission standards, driving cycles – USA, Japan, Euro and India. Test procedures – ECE, FTP Tests. SHED Test – chassis dynamometers, dilution tunnels.

TEXT BOOKS:

1. Paul Degobert – Automobiles and Pollution – SAE International ISBN-1-56091-563-3.
2. Ganesan, V- “Internal Combustion Engines”- Tata McGraw-Hill Co.

REFERENCES:

1. SAE Transactions- “Vehicle Emission”- 1982 (3 volumes).
2. Obert.E.F.- “Internal Combustion Engines”
3. Marco Nute- “Emissions from two stroke engines”, SAE Publication.
4. Springer and Patterson, Engine Emission, Plenum Press.
5. Taylor. C.F., Internal Combustion Engines, MIT Press.
6. Heywood. J.B., Internal Combustion Engine Fundamentals, McGraw Hill Book Co.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 312B TWO & THREE WHEELERS						
B. Tech. Semester –VI (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

POWER UNIT: Two stroke SI engine, four stroke SI engine; merits and demerits, Symmetrical and unsymmetrical port timing diagrams, Types of scavenging processes, merits and demerits, scavenging pumps, Rotary valve engine; Fuel system, Lubrication system. Magneto coil and battery coil spark ignition system, electronic ignition system; Starting system, Kick starter system.

UNIT II

CHASSIS AND SUB-SYSTEMS: Mainframe and its types. Chassis and shaft drive, Single, multiple plates and centrifugal clutches. Gear box and gear controls. Front and rear suspension systems; Shock absorbers; Panel meters and controls on handle bar.

UNIT III

BRAKES, WHEELS AND TYRES : Drum brakes, disc brakes, front and rear brake links, layouts, Spoked wheel, cast wheel, disc Wheel, disc types; Tyres and tubes.

UNIT IV

TWO WHEELERS: Case study of major Indian models of motorcycles, scooters and mopeds, TVS mopeds and motorcycles, Hero Honda motorcycles, Bajaj scooters and motorcycles, Yamaha, Enfield motorcycles; Servicing and maintenance.

THREE WHEELERS: Case study of Indian models, Auto rickshaws, pickup van, delivery van and trailer, Maintenance: daily, weekly, monthly, Fault tracing.

TEXT BOOK:

1. Irving.P.E. - Motor Cycle Engineering - Temple Press Book, London

REFERENCES:

1. The Cycle Motor Manual - Temple Press Limited, London
2. Encyclopedia of Motorcycling - 20 volume Marshall, Cavensih, UK
3. Brayant R.V, Vespa - Maintenance and Repair Series – S.Chand & Co., New Delhi
4. Raymond Broad Lambretta - A Practical Guide to maintenance and repair – S.Chand & Co., New Delhi

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

HUM 302 B REPORT WRITING SKILLS						
B. Tech. Semester – VI (Common for all branches)						
L	T	P	Credits		Class Work	: 25 Marks
1	-	-	1		Examination	: 50 Marks
					Total	: 75 Marks
					Duration of Examination	: 2 Hours

OBJECTIVE

The course aims at developing competence for report writing with a focus on its complex writing techniques and procedures.

COURSE CONTENT

UNIT I

Report Writing

Reports: meaning, their importance and types, Structure of reports, Formats of reports, Use of illustrations

UNIT II

Writing of Business and Technical Reports:

Preliminary steps and procedure of writing report, writing various types of reports on technical, business related topics

RECOMMENDED READING

1. Borowick, Jerome. N. *Technical Communication and its Applications*. New Delhi: PHI, 2000
2. Guffey, Mary Ellen. *Business Communication: Process & Product*. USA: South western College Publishing, 2000.
3. Kumar, Sanjay and Pushp Lata. *Communication Skills*. Delhi: OUP, 2011

SCHEME OF END SEMESTER EXAMINATION (MAJOR TEST) AND INSTRUCTIONS FOR THE EXAMINER

1. The duration of the exam will be 2 hours.
2. The Question Paper for this theory course shall have three questions in all covering both the units. All will be compulsory with internal choice.
3. Question no. 1 will be of 10 marks. The question may have two/three parts with enough internal choice, covering various components of both the Units.
4. Question no 2 with internal choice will be of 10 marks covering contents of the Unit I. It will be theoretical in nature.
5. Question no 3 will have two parts of 15 marks each. The student will be asked to write reports on business and technical subject/ issue covering contents of Unit II. The emphasis would be on testing the actual report writing on a given business and technical situation/ subject in letter format.

AE 314B TWO & THREE WHEELERS LAB						
B. Tech. Semester – VI (Automobile Engineering)						
L	T	P	Credits		Class Work	: 20 Marks
-	-	2	1		Examination	: 30 Marks
					Total	: 50 Marks
					Duration of Examination	: 3 Hours

LIST OF EXPERIMENTS

1. Road performance test of a two wheeler using chassis dynamometer.
2. Performance test of a shock absorber.
3. Performance test on coil spring.
4. Two wheeler chain tension test.
5. Brake and Clutch adjustment as per specification.
6. Dismantling and assembling of two wheeler gear box and finding gear ratio.
7. Dismantling and assembling of three wheeler gear box and finding gear ratios.
8. Three wheeler brake and clutch play adjustment
9. Dismantling and assembling of three wheeler steering system.
10. Study of three wheeler chassis frame and power transmission system.

NOTE:

1. Ten experiments are to be performed in the Semester.
2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the concerned institute as per the scope of the syllabus.

AE 316B COMPUTER AIDED CHASSIS DESIGN LAB						
B. Tech. Semester – VI (Automobile Engineering)						
L	T	P	Credits		Class Work	: 20 Marks
-	-	2	1		Examination	: 30 Marks
					Total	: 50 Marks
					Duration of Examination	: 3 Hours

The students will be required to carry out the following exercises using any one of the educational CAD softwares like Latest version of AutoCAD, I-DEAS, CATIA, SOLID EDGE, PRO-ENGINEER etc

LIST OF EXPERIMENTS/EXERCISES

UNIT I

1. Design and Drawing of clutches as given in Exercise Problems Sheet.
2. Design and Drawing of gear boxes as given in Exercise Problems Sheet.

UNIT II

3. Design and Drawing of vehicle frames as given in Exercise Problems Sheet.
4. Design and Drawing of suspension systems as given in Exercise Problems Sheet.
5. Design and Drawing of front axles as given in Exercise Problems Sheet.

UNIT III

6. Design and Drawing of steering systems as given in Exercise Problems Sheet.
7. Design and Drawing of final drives as given in Exercise Problems Sheet.
8. Design and Drawing of rear axles as given in Exercise Problems Sheet.

NOTE:

1. For class work, the students should be assigned to prepare at least ten drawing sheets covering all units and each topic/experiment/exercise of the syllabus.
2. For practical examination, the examiner should set a question paper containing total three questions, one questions from each unit covering all units and each topic/experiment/exercise of the syllabus; students are required to attempt all the three questions.

AE 318B COMPUTER AIDED ENGINE DESIGN LAB						
B. Tech. Semester –VI (Automobile Engineering)						
L	T	P	Credits		Class Work	: 20 Marks
-	-	2	1		Examination	: 30 Marks
					Total	: 50 Marks
					Duration of Examination	: 3 Hours

The students will be required to carry out the following exercises using any one of the educational CAD softwares like Latest version of AutoCAD, I-DEAS, CATIA, SOLID EDGE, PRO-ENGINEER etc
LIST OF EXPERIMENTS/EXERCISES

UNIT I

1. Design and Drawing of Cylinders as given in Exercise Problems Sheet.
2. Design and Drawing of Pistons as given in Exercise Problems Sheet.

UNIT II

3. Design and Drawing of Piston pins and Piston rings as given in Exercise Problems Sheet.
4. Design and Drawing of Connecting Rod Assembly as given in Exercise Problems Sheet.

UNIT III

5. Design and Drawing of Crankshafts, as given in Exercise Problems Sheet.
6. Design and Drawing of Flywheels as given in Exercise Problems Sheet.
7. Design and Drawing of Inlet and Exhaust Valves as given in Exercise Problems Sheet.
8. Design and Drawing of Cam and Camshafts as given in Exercise Problems Sheet.

NOTE:

1. For class work, the students should be assigned to prepare at least ten drawing sheets covering all units and each topic/experiment/exercise of the syllabus.
2. For practical examination, the examiner should set a question paper containing total three questions, one questions from each unit covering all units and each topic/experiment/exercise of the syllabus; students are required to attempt all the three questions.

AE – 320B AUTOMOTIVE ENGINE TESTING & POLLUTION MEASUREMENT LAB						
B. Tech. Semester –VI (Automobile Engineering)						
L	T	P	Credits		Class Work	: 20 Marks
-	-	2	1		Examination	: 30 Marks
					Total	: 50 Marks
					Duration of Examination	: 3 Hours

LIST OF EXPERIMENTS:

FOR ENGINE TESTING

1. Study of hydraulic, electrical and eddy current dynamometers
2. Valve timing and port timing diagram
3. Performance test on two wheeler SI engine
4. Performance test on automotive multi-cylinder SI engine
5. Performance test on automotive multi-cylinder CI engine
6. Performance test on variable compression ratio engine
7. Retardation test on I.C. Engines.
8. Heat balance test on automotive multi-cylinder SI engine
9. Heat balance test on automotive multi-cylinder CI engine
10. Morse test on multi-cylinder SI engine
11. Study of P-θ and P-V diagrams for IC engine with piezo-electric pick up, charge amplifier, angle encoder.

FOR POLLUTION MEASUREMENT

1. Pollutant formation in SI engines
2. Pollutant formation in CI engines
3. Control of emissions from SI and CI engines
4. Measurement techniques NDIR, FID, Chemiluminescent Analyzers, Gas Chromatograph, Smoke Meters
5. Emission standards driving cycles USA, Japan, Euro and India
6. Test procedures – ECE, FTP test; SHED test – Chassis Dynamometers, Dilution Tunnels.

NOTE:

1. Ten experiments five from each section are to be performed in the Semester.
2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the concerned institute as per the scope of the syllabus.

HUM- 304 B ORAL PRESENTATION SKILLS						
B. Tech. Semester – VI (Common for all branches)						
L	T	P	Credits		Class Work	: 20 Marks
-	-	2	1		Examination	: 30 Marks
					Total	: 50 Marks
					Duration of Examination	: 2 Hours

OBJECTIVE

To enable students to develop their speaking skills with professional proficiency

COURSE CONTENT

Oral Presentations:

Group Discussion; Mock interviews

Note for the Teacher:

The teacher concerned, by devising her/his method, must preview and review the student's spoken proficiency at the beginning and end of the semester respectively to find the efficacy of the course and degree of improvement in the student.

RECOMMENDED READING

1. Konar, Nira. *English Language Laboratories: A Comprehensive Manual*. Delhi: PHI, 2011
2. Kumar, Sanjay and Pushp Lata. *Communication Skills*. Delhi: OUP, 2011

SCHEME OF END SEMESTER EXAMINATION (Practical)

An external Practical exam of 30 marks of 2 hour duration for the course will be conducted by an external examiner appointed by the competent authority of the University's.

NOTE: Students will be tested for their oral communication competence making them participate in Group discussion, mock situations for interview. Students may also be evaluated through a viva conducted by an external examiner.

GPAE 302B GENERAL PROFICIENCY & ETHICS						
B. Tech. Semester – VI (Automobile Engineering)						
L	T	P	Credits	Examination	:	75 Marks
1	-	-	2	Total	:	75 Marks

The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/ her performance / achievements in different walks of life.

A Faculty Counselor will be attached to a group of students which will remain associated with him /her during the entire period of the degree program in the University. Each faculty member will serve as a faculty counselor. They will act like a local guardian for the students associated with him / her and will help them in terms of career guidance, personal difficulties.

B. The student will present a written report before the committee with following in view:

The student will present before the committee his/her achievements during the current academic session in the form of a written report highlighting followings:

- | | | |
|-----|--|------------|
| I. | Academic Performance | ----- |
| II. | Extra Curricular Activities / Community Service, Hostel Activities | (8 Marks) |
| III | Technical Activities / Industrial, Educational tour | (8 Marks) |
| IV | Sports/games | (14 Marks) |
| V | Moral values & Ethics | (15 Marks) |

NOTE: Report submitted by the students should be typed on both sides of the paper.

D. A student will support his/her achievement and verbal & communicative skill through presentation before the committee.
(30 Marks)

C. Moral values & Ethics

Syllabus - A few topics from the below mentioned books

- R.R.Gaur, R. Sangal and G.P. Bagaria, " Bagaria, " A foundation course in Human Values and Professional Ethics", Pub: Excel Books, New Delhi-110028.
- M. Govindrajan, S Natrajan & V.S. Senthil Kumar, " Engineering Ethics (including Human Values)" Eastern Economy Edition, Prentics Hall of India Ltd.

A minor test/Quiz will be conducted during the semester and It will be the duty of the concerned teacher assigned to teach Moral values & Ethics to submit the awards to respective chairman of the department / Director/Principal.

The evaluation of this course will be made by the following Committee.

University Departments:

- | | | |
|---|-------------------------------|----------|
| 1 | Chairperson of the Department | Chairman |
| 2 | Senior Most Faculty Counselor | Member |
| 3 | Vice- Chancellor's Nominee | Member |

Affiliated Colleges:

- | | | |
|---|---|----------|
| 1 | Director/Principal | Chairman |
| 2 | Head of the Department/Sr. Faculty | Member |
| 3 | External Examiner to be appointed by the University | Member |

Note: Remuneration will be paid to the external examiner only (at par with the other practical examinations).

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonapat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. Final YEAR (SEMESTER – VII) AUTOMOBILE ENGINEERING
Credit Based Scheme w.e.f. 2015-16

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1	AE 401B	AUTOMOTIVE SAFETY	4	-		25	75	-	100	4	3
2	AE 403B	VEHICLE PERFORMANCES AND TESTING	4	-		25	75	-	100	4	3
3	AE 405B	VEHICLE DYNAMICS	3	1		25	75	-	100	4	3
4	AE 407B	VEHICLE MAINTANANCE	4	-		25	75	-	100	4	3
5	*	OPEN ELECTIVE	4	-		25	75	-	100	4	3
6	AE 409B	AUTO SCANING & VEHICLE TESTING LAB	-	-	2	20		30	50	1	3
7	AE 411B	VEHICLE MAINTANANCE & RECONDITIONING LAB	-	-	2	20		30	50	1	3
8	AE 413B	PROJECT	-	-	4	100	-	-	100	4	-
9	AE 415B	PROFESSIONAL TRAINING-II	-	-	2	50	-	-	50	2	-
Total			19	1	10	315	375	60	750	28	

*** List of Open Electives**

1	MEI 623B	ENTREPRENEURSHIP	6	BT 401B	BIOINFORMATICS
2	BME 451B	MEDICAL INSTRUMENTATION	7	AE 417B	MODERN VEHICLE TECHNOLOGY
3	ECE 305B	CONSUMER ELECTRONICS	8	CE 451B	POLLUTION & CONTROL
4	EE 451B	ENERGY AUDIT	9	CSE 411B	MANAGEMENT INFORMATION SYSTEM
5	EEE 457B	ENERGY RESOURCES & TECHNOLOGY	10	IT 413 B	CYBER SECURITY

Note:

- 7 Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weight age of Sports is given in General Proficiency & Ethics Syllabus.
- 8 Students will be permitted to opt for any one elective run by the other department. However, the department shall offer those elective for which they have expertise. The choice of the students for any elective shall not be binding for the department to offer, if the department does not have expertise. The minimum strength of the students should be twenty to run an elective course.
- 9 Assessment of Professional Training-II, undergone at the end of VI semester, will be based on seminar, viva-voce, report and certificate of Professional Training obtained by the student from the industry, , institute, research lab, training center etc
- 10 The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
- 11 Electronics gadgets including Cellular phones are not allowed in the examination
- 12 The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher). Project coordinator will be assigned the project load of, maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her. The format of the cover page and the organization of the body of the report for all the B. Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

AE 401B AUTOMOTIVE SAFETY						
B. Tech. Semester –VII (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
4	-	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

INTRODUCTION: Design of the body for safety, energy equation, engine location, deceleration of vehicle inside passenger compartment, deceleration on impact with stationary and movable obstacle, concept of crumple zone, safety sandwich construction.

SAFETY CONCEPTS: Active safety, driving safety, conditional safety, perceptibility safety, operating safety- passive safety: exterior safety, interior safety, deformation behaviour of vehicle body, and speed and acceleration characteristics of passenger compartment on impact.

UNIT II

SAFETY EQUIPMENTS: Seat belt, regulations, automatic seat belt tightener system, collapsible steering column, tiltable steering wheel, air bags, electronic system for activating air bags, bumper design for safety.

UNIT III

COLLISION WARNING AND AVOIDANCE: Collision warning system, causes of rear end collision, frontal object detection, rear vehicle object detection system, object detection system with braking system interactions.

UNIT IV

COMFORT AND CONVENIENCE SYSTEM: Steering and mirror adjustment, central locking system , Garage door opening system, tyre pressure control system, rain sensor system, environment information system

TEXT BOOK:

1. Bosch - "Automotive Handbook" - 5th edition - SAE publication - 2000.

REFERENCES:

1. J.Powloski - "Vehicle Body Engineering" - Business books limited, London
2. Ronald.K.Jurgen - "Automotive Electronics Handbook" - Second edition- McGraw-Hill

NOTE:

11. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
12. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 403B VEHICLE PERFORMANCES AND TESTING						
B. Tech. Semester –VII (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
4	-	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

VEHICLE PERFORMANCE PARAMETERS: Vehicle Performance parameters, Fuel economy, acceleration, deceleration, grad ability, top speed, handling, comfort, life durability, EGR systems, and Vehicular systems: Suspension steering, Brakes & carriage unit testing, test procedure, Catalytic converters function & construction, Lambda close loop control system for gasoline vehicles.

DRIVE TRAIN AND TESTING: Vehicular transmission performance: Characteristics and comparison of automotive clutches, Epicyclic transmission, Torque converter, testing of clutch, final drive and differential. Test procedure for gear box noise and shifting force.

UNIT II

VEHICLE TESTING: Vehicle Testing - Road test, Free acceleration test, Coast down test, Passer by noise test, Wheel alignment and balancing test, Test tracks û proving ground testing, high speed track, pavement track, corrugated track, mud track, steering pad, gradient track, deep wading through shallow water, Laboratory testing û testing on chassis dynamometer transition testing- Euro III onwards, accelerated testing, Virtual testing, Evaporative emission testing, Oil consumption testing

UNIT III

SAFETY SYSTEMS AND AUXILIARIES: Safety: Motor vehicle safety standards, active safety, passive safety, bio-mechanics Structural safety, energy absorption, ergonomic consideration in safety, Occupants safety systems like seat belts, head restrain, air bags, GPS , roll-over protection system, Electronic stability program. Particulate traps Function & construction.

UNIT IV

COLLISIONS AND CRASH TESTING: Crash testing: Human testing, Dummies, crashworthiness, pole crash testing, rear crash testing, vehicle to vehicle impact, side impact testing, crash test sensors, sensor mounting, crash test data acquisition ,Braking distance test

NOISE VIBRATION AND EMI: Noise & vibration: Mechanism of noise generation, engine noise & vibration, causes and remedies, road shocks wind noise & measurement, vehicle measurement testing. Automobile testing instrumentation: Sensors types and selection, Instrumentation for functional tests, Battery testing, endurance test, model test and full scale

REFERENCES:

1. Wolt, Heinrich Hucho, Aerodynamics of road vehicles
2. Bosch, Automotive Handbook
3. George Pieters Barbara Pieters, Automotive Vehicle Safety
4. Michel Plint Engine Testing Theory and Practice
5. Gousha H. M., Engine performance Diagnosis & Tune Up Shop Manual
6. J.G .Giles, Vehicle Operation & Performance.
7. W. H. Crouse & D. L. Anglin, Motor Vehicle Inspection.
8. SAE Transaction Papers 831814/820346/820367/820371/820375
9. SAE handbook vol 2 & 3
10. Automobile Engineering by Ramlingam
11. Automobile engineering by Kripal Singh
12. Automotive Mechanics by Josepf Heitner
13. ARAI vehicle emission test manual
14. Automobile Engineering by Rangawala

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 405B VEHICLE DYNAMICS						
B. Tech. Semester –VII (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

INTRODUCTION: Single degree of freedom, two degree of freedom, free, forced and damped vibrations modelling and simulation studies, model of an automobile, magnification factor, transmissibility, vibration absorber.

MULTI DEGREE FREEDOM SYSTEMS: Closed and coupled far system, orthogonality of mode shapes, modal analysis.

UNIT II

STABILITY OF VEHICLES: Load distribution, stability on a curved track slope and a banked road, calculation of tractive effort and reactions for different drives.

UNIT III

SUSPENSION TYRES AND VEHICLES HANDLING: Requirements, sprung mass frequency, wheel hop, wheel wobble, wheel shimmy, choice of suspension spring rate, calculation of effective spring rate, vehicle suspension in fore and aft, roll axis and vehicle under the action of side forces, tyre, dynamics, ride characteristics power consumed by a tyre, Oversteer, under steer, steady state cornering, effect of braking, driving torques on steering, effect of camber, transient effects in cornering.

UNIT IV

NUMERICAL METHODS: Approximate methods for determining fundamental frequency, Dunkerleys lower bound, Rayleighs upper bound, Holzer method for closed coupled system and branched system.

TEXT BOOKS:

1. Giri N.K – Automotive Mechanics, Khanna Publishers
2. Rao J.S and Gupta. K “Theory and Practice of Mechanical Vibrations”, Wiley Eastern Ltd

REFERENCES:

1. Heldt.P.M -”Automotive Chassis”- Chilton Co., New York
2. Ellis.J.R - “Vehicle Dynamics”- Business Books Ltd., London
3. Giles.J.G.Steering - “Suspension and Tyres”, Illiffe Books Ltd., London
4. Ham B, Pacejka - Tyre and Vehicle Dynamics - SAE Publication
5. Gillespie T.D, “Fundamentals of Vehicle Dynamics”, SAE USA

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 407B VEHICLE MAINTANANCE						
B. Tech. Semester –VII (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
4	-	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

MAINTENANCE OF RECORDS AND SCHEDULES: Importance of maintenance, preventive (scheduled) and breakdown(unscheduled) maintenance, requirements of maintenance, preparation of check lists, Inspection schedule, maintenance of records, log sheets and other forms, safety precautions in maintenance.

ENGINE MAINTENANCE, REPAIR AND OVERHAULING: Dismantling of engine components and cleaning, cleaning methods, visual and dimensional inspections, minor and major reconditioning of various components, reconditioning methods, engine assembly, special tools used for maintenance overhauling, engine tune up.

UNIT II

CHASSIS MAINTENANCE, REPAIR AND OVERHAULING: Mechanical and automobile clutch and gear box, servicing and maintenance, maintenance servicing of propeller shaft and differential system, Maintenance servicing of suspension systems. Brake systems, types and servicing techniques, Steering systems, overhauling and maintenance. Wheel alignment, computerized alignment and wheel balancing.

UNIT III

ELECTRICAL SYSTEM MAINTENANCE, SERVICING AND REPAIRS: Testing methods for checking electrical components, checking battery, starter motor, charging systems, DC generator and alternator, ignitions system, lighting systems, Fault diagnosis and maintenance of modern electronic controls, checking and servicing of dash board instruments.

UNIT IV

MAINTENANCE OF FUEL SYSTEM, COOLING SYSTEMS, LUBRICATION SYSTEM AND VECHICLE BODY: Servicing and maintenance of fuel system of different types of vehicles, calibration and tuning of engine for optimum fuel supply, Cooling systems, water pump, radiator, thermostat, anticorrosion and antifreeze additives, Lubrication maintenance, lubricating oil changing, greasing of parts, Vehicle body maintenance, minor and major repairs; Door locks and window glass actuating system maintenance.

TEXT BOOK:

1. John Doke "Fleet Management", McGraw-Hill Co
2. James D Halderman - Advanced Engine Performance Diagnosis
3. Service Manuals from Different Vehicle Manufacturers.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

MEI 623B ENTREPRENEURSHIP							
B. Tech. Semester – VII (Automobile Engineering)- Open Elective							
L	T	P	Credits		Class Work	:	25 Marks
4	-	-	4		Examination	:	75 Marks
					Total	:	100 Marks
					Duration of Examination	:	3 Hours

UNIT I

ENTREPRENEURIAL DEVELOPMENT PERSPECTIVE: Concepts of Entrepreneurship Development, Evolution of the concept of Entrepreneur, Entrepreneur Vs. Intrapreneur, Entrepreneur Vs. Entrepreneurship, Entrepreneur Vs Manager, Attributes and Characteristics of a successful Entrepreneur, Role of Entrepreneur in Indian economy and developing economies with reference to Self-Employment Development, Entrepreneurial Culture

UNIT II

CREATING ENTREPRENEURIAL VENTURE: Business Planning Process, Environmental Analysis - Search and Scanning, Identifying problems and opportunities, Defining Business Idea, Basic Government Procedures to be complied with.

UNIT III

ENTREPRENEURSHIP DEVELOPMENT AND GOVERNMENT: Role of Central Government and State Government in promoting Entrepreneurship - Introduction to various incentives, subsidies and grants - Export Oriented Units - Fiscal and Tax concessions available; Role of Central/State agencies in the Entrepreneurship Development - District Industries Centers (DIC), Small Industries Service Institute (SISI), Entrepreneurship Development Institute of India (EDII), National Institute of Entrepreneurship & Small Business Development (NIESBUD), National Entrepreneurship Development Board (NEDB).

UNIT IV

PROJECT MANAGEMENT AND CASE STUDIES: Technical, Financial, Marketing, Personnel and Management Feasibility, Estimating and Financing funds requirement - Schemes offered by various commercial banks and financial institutions like IDBI, ICICI, SIDBI, SFCs, Venture Capital Funding, Why do Entrepreneurs fail - The Four Entrepreneurial Pitfalls (Peter Drucker), Case studies of Successful Entrepreneurial Ventures, Failed Entrepreneurial Ventures and Turnaround Ventures.

TEXTS AND REFERENCES:

1. Entrepreneurship: New Venture Creation - David H. Holt.
2. Entrepreneurship - Hisrich Peters.
3. The Culture of Entrepreneurship - Brigitte Berger.
4. Project Management - K. Nagarajan.
5. Dynamics of Entrepreneurship Development - Vasant Desai.
6. Entrepreneurship Development - Dr. P.C.Shejwalkar.
7. Thought Leaders - Shrinivas Pandit.
8. Entrepreneurship, 3rd Ed. - Steven Brandt.
9. Business Gurus Speak - S.N.Char.
10. The Entrepreneurial Connection - Gurmit Narula.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

BME 451B MEDICAL INSTRUMENTATION							
B. Tech. Semester – VII (Automobile Engineering) – Open Elective							
L	T	P	Credits		Class Work	:	25 Marks
4	-	-	4		Examination	:	75 Marks
					Total	:	100 Marks
					Duration of Examination	:	3 Hours

UNIT I

PHYSIOLOGY AND TRANSDUCERS: Cell and its structure – Action and resting – Potential propagation of action potential – Sodium pump – Nervous system – CNS – PNS – Nerve cell – Synapse – Cardio pulmonary system – Physiology of heart and lungs – Circulation and respiration – Transducers – Different types – Piezo-electric, ultrasonic, resistive, capacitive, inductive transducers – Selection criteria.

UNIT II

ELECTRO – PHYSIOLOGICAL AND NON-ELECTRICAL PARAMETER MEASUREMENTS: Basic components of a biomedical system – Electrodes – Micro, needle and surface electrodes – Amplifiers – Preamplifiers, differential amplifiers, chopper amplifiers – Isolation amplifier. ECG – EEG – EMG – ERG – Lead systems and recording methods – Typical waveforms. Measurement of blood pressure – Cardiac output – Cardiac rate – Heart sound – Respiratory rate – Gas volume – Flow rate of CO₂, O₂ in exhaust air - PH of blood, ESR, GSR measurements – Plethysmography.

UNIT III

MEDICAL IMAGING AND PATIENT MONITORING SYSTEMS: X-ray machine - Radio graphic and fluoroscopic techniques – Computer tomography – MRI – Ultrasonography – Endoscopy – Thermography – Different types of biotelemetry systems and patient monitoring – Electrical safety. Biological effects of X-rays and precautions.

UNIT IV

ASSISTING AND THERAPEUTIC EQUIPMENTS: Pacemakers – Defibrillators – Ventilators – Nerve and muscle stimulators – Diathermy – Heart – Lung machine – Audio meters – Dialyzers. Respiratory Instrumentation - Mechanism of respiration, Spirometry, Pneumotachograph Ventilators.

TEXT BOOKS:

1. Biomedical Instrumentation and Measurements – Leslie Cromwell and F.J. Weibell, E.A. Pfeiffer, PHI, 2nd Ed, 1980.
2. Medical Instrumentation, Application and Design – John G. Webster, John Wiley, 3rd Ed., 1998.

REFERENCE BOOKS:

1. Principles of Applied Biomedical Instrumentation – L.A. Geoddes and L.E. Baker, John Wiley, 1975.
2. Hand-book of Biomedical Instrumentation – R.S. Khandpur, TMH, 2nd Ed., 2003.
3. Biomedical Telemetry – Mackay, Stuart R., John Wiley, 1

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

ECE 305B CONSUMER ELECTRONICS						
B. Tech. Semester – VII (Automobile Engineering) – Open Elective						
L	T	P	Credits		Class Work	: 25 Marks
4	-	--	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

MONOCHROME TV (INTRODUCTION): Elements of a TV System, Picture transmission, Sound transmission, Picture reception, Sound reception, Synchronization, Receiver control, Image continuity, Scanning Process, Aspect Ratio, Flicker, Composite Video Signal, Picture Elements, Kell factor, Vertical Resolution, Horizontal Resolution, Video bandwidth, Interlacing, 625 Line System, Bandwidths for TV Transmission, Vertical and horizontal synch detail, Vestigial Side Band transmission (Advantages and Disadvantages)

MONOCHROME TV (PICTURE AND CAMERA TUBES): Monochrome picture tube, beam reflection, Beam focussing, Screen Phosphor, Face plate, Picture tube characteristics, picture tube circuit controls, Monochrome Camera Tubes: Basic principle, Image Orthicon, Vidicon, Plumbicon

UNIT II

COLOUR TV ESSENTIALS: Compatibility, Colour perception, Three Colour theory, Luminance, Hue and Saturation, Dispersion and Recombination of light, Primary and secondary colours, luminance signal, Chrominance Signal, Colour picture tube, colour TV Camera, Colour TV display Tubes, colour Signal Transmission, Bandwidth for colour signal transmission, Colour TV controls. Cable TV, Block Diagram and principle of working of cable TV.

PLASMA AND LCD: Introduction, liquid crystals, types of LCD's, TN, STN, TFT, Power requirements, LCD working, Principle of operation of TN display, Construction of TN display, Behaviour of TN liquid crystals, Viewing angle, colour balance, colour TN display, limitations, advantages, disadvantages, applications.

UNIT III

LED AND DMD : Introduction to LED Television, comparison with LCD and Plasma TV's, schematic of DMD, introduction to Digital MicroMirror device, Diagram of DMD, principle of working, emerging applications of DMD.

MICROWAVE OVENS AND AIR CONDITIONERS: Microwaves, Transit Time, Magnetron, Waveguides, Microwave Oven, Microwave Cooking. Air conditioning, Components of air conditioning systems, all water Air conditioning systems, all air air conditioning Systems, Split air conditioner.

UNIT IV

MICROPHONES: Introduction, characteristics of microphones, types of microphone: carbon, moving coil, wireless, crystal, introduction to tape recorder.

LOUDSPEAKER: Introduction to ideal and basic loudspeaker, loudspeaker construction types of loudspeaker: Dynamic and permanent magnet, woofers, tweeters, brief introduction to baffles, equalisers.

TEXT BOOKS :

1. Consumer Electronics by S. P. Bali (Pearson Education)
2. Complete Satellite and Cable T.V by R.R. Gulati (New Age International Publishers)

REFERENCE BOOKS:

1. Monochrome and Colour Television by R. R. Gulati

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

EE 451B ENERGY AUDIT							
B. Tech. Semester – VII (Automobile Engineering) – Open Elective							
L	T	P	Credits		Class Work	:	25 Marks
4	-	-	4		Examination	:	75 Marks
					Total	:	100 Marks
					Duration of Examination	:	3 Hours

UNIT I

INTRODUCTION TO THE POWER DISTRIBUTION SYSTEM: Description of the power distribution system- voltage levels, Components of the distribution system- Substation, Transformer, feeders, distribution system planning, operation & maintenance objectives, activities involved in O&M, grid management, load scheduling & dispatch, load balancing, 66-33/11 KV substation equipment, 11/0.4 KV substation equipment, Distribution transformers- reasons for DT failures.

UNIT II

ENERGY ACCOUNTING & ENERGY AUDIT: Need for energy accounting, objectives & functions of energy accounting, Energy flow diagram in power distribution system, energy accounting procedure- Energy measurement, and problems in energy accounting & overcoming these problems in energy accounting, Definition, need and types of energy audit, energy audit instruments, procedure for conducting an energy audit.

UNIT III

AT&C LOSS REDUCTION & EFFICIENCY IMPROVEMENT: Concepts and principles of distribution losses- transmission & distribution losses, AT&C losses in power distribution network, factors contributing to high technical & commercial losses. Technical loss reduction- Short term measures for technical loss reduction, long term plans for technical loss reduction, Commercial loss reduction- reasons for commercial losses, measures for commercial loss reduction.

UNIT IV

DEMAND SIDE MANAGEMENT: An introduction, Why DSM?, Benefits of DSM, DSM in power systems: load management, DSM techniques and emerging trends, EC Act 2001, DSM on consumer side – the industrial sector, the agricultural sector, the domestic & commercial sectors, ESCO-a route for DSM.

TEXT BOOKS:

1. Handbook of Energy Engineering, The Fairmont Press, INC.-Albert Thumann& Paul Mehta.
2. Energy Management Supply & Conservation, Butterworth Heinemann, 2002-dr. Clive Beggs.

REFERENCE BOOKS:

1. Hand book on energy audit & environment management by ISBN 81-1993.0920 TERI

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

EEE 457B ENERGY RESOURCES & TECHNOLOGY						
B. Tech. Semester – VII (Automobile Engineering) – Open Elective						
L	T	P	Credits		Class Work	: 25 Marks
4	-	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

ENERGY SOURCES & AVAILABILITY: World energy situation. Indian energy scenario. Comparative study of thermal, hydro, nuclear and gas power plants. Impact of thermal, gas, hydro and nuclear power stations on environment, air and water pollution, green house effect (global warming), Plasma confinement - magnetic confinement and inertial confinement, geothermal, hydrogen energy, fuel cells, Alkaline fuel cells (AFC), Solid oxide fuel cell (SOFC), Molten carbonate fuel cells (MCFC), thermo-electric power, MHD power generation OTEC & tidal waves.

UNIT II

SOLAR ENERGY: Solar constant, solar radiation geometry, local solar time, day length, solar radiation measurement, radiation on inclined surface, solar radiation data & solar charts. Flat plate collectors , liquid and air type. Theory of flat plate collectors, advanced collectors, optical design of concentrators, selective coatings, solar water heating, solar dryers, solar stills, solar cooling and refrigeration. Thermal storage. Conversion of heat into mechanical energy. Active and passive heating of buildings. Solar cells.

UNIT III

WIND ENERGY: Wind as a Source of Energy, Characteristics of wind, wind data. Horizontal & Vertical axis wind Mills, Wind Energy: Wind energy potential measurement, general theories of wind machines, basic laws and concepts of aerodynamics, wind mill and wind electric generator. Basic electric generation schemes- constant speed constant frequency, variable speed constant frequency and variable speed variable frequency schemes. Applications of wind energy.

UNIT IV

BIOMASS ENERGY: Introduction to biomass, biofuels & their heat content, biomass conversion technologies. Aerobic & anaerobic digester, Factors affecting biogas production, biogas plants - types & description. Utilisation of biogas - Gasifiers, direct thermal application of Gasifiers. Advantages & problems in development of Gasifiers, use in I.C. engines , Energy plantation. Pyrolysis scheme. Alternative liquid fuels –ethanol and methanol. Ethanol production.

TEXT BOOKS:

1. Electric Power Generation, B.R.Gupta
2. Power Generation, Operation and Control, Wood and Wollenberg, John Wiley & Sons,1984.
3. Power Plant Engg: G.D. Rai

REFERENCE BOOKS:

1. Renewable Energy Resources: John Twidell and Tony Weir
2. Renewable Energy Resources Conventional & Non- Conventional: M.V.R Koteswara Rao
3. Science & Technology of Photovoltaics: Jayarama Reddy P.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

BT 401B BIOINFORMATICS						
B. Tech. Semester – VII (Automobile Engineering) – Open Elective						
L	T	P	Credits		Class Work	: 25 Marks
3	1	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

INTRODUCTION: Internet, intranet and extranet, networking, protocols, genomic data, organization, representation, data base management systems.

SEQUENCING DATA BANK: Introduction, collecting and storing sequence in laboratory, nucleic acid data bank – Gen Bank, EMBL, AIDS and RNA, protein data bank (PDB), cambridge structural database CSD, genome data bank, hybridoma data bank structure and others.

UNIT II

SEQUENCE ANALYSIS: Analysis tools for sequence data banks, pair wise alignment: NEEDLEMAN and WUNSCH algorithms, Smith Waterman, multiple alignment – CLUSTAL-W, BLAST, FASTA, sequence patterns and motifs and profiles.

Predictions: Secondary and tertiary structure: algorithms Chao-Fasman algorithm, hidden Markov model, neural networking, protein classification, fold libraries, fold recognition (threading), homology detection, SRS-access to biological data banks.

UNIT III

PHYLOGENETIC ANALYSIS: Basic concepts in systematics, taxonomy and phylogeny, phylogenetic trees- various types and their construction, tree building methods, distance methods, multiple alignment character based method, phylogenetic software.

Managing Scientific Data: Introduction, challenges faced in integration of biological information, SRS, Kleisli Query System TAMBIS, P/FDM mediator for a bioinformatics database, federation, discovery link and data management.

UNIT IV

GENOMICS & PROTEOMICS: Genome mapping, assembly and comparison, functional genomics: sequence based approaches & microarray based approaches, proteomics: technology of protein expression analysis & posttranslational modifications, protein sorting, protein-protein interaction.

TEXT / REFERENCE BOOKS:

1. Developing Bioinformatics Computer Skill, ed. Gibes & Jombeck, Shroff Publication
2. Bioinformatics, ed. David W. Mount

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 417B MODERN VEHICLE TECHNOLOGY							
B. Tech. Semester – VII (Automobile Engineering) – Open Elective							
L	T	P	Credits		Class Work	:	25 Marks
4	-	-	4		Examination	:	75 Marks
					Total	:	100 Marks
					Duration of Examination	:	3 Hours

UNIT I

TRENDS IN POWER PLANTS: Hybrid vehicles – stratified charged / lean burn engines – Hydrogen engines – battery vehicles – Electric propulsion with cables – magnetic track vehicles.

UNIT II

SUSPENSION BRAKES AND SAFETY: Air suspension – Closed loop suspension – antiskid braking system, Retarders, Regenerative braking safety cage – air bags – crash resistance – passenger comfort

UNIT III

NOISE & POLLUTION: Reduction of noise – Internal & external pollution control through alternate fuels / power plants – Catalytic converters and filters for particulate emission.

UNIT IV

VEHICLE OPERATION AND CONTROL: Computer control for pollution and noise control and for fuel economy – Transducers and actuators – Information technology for receiving proper information and operation of the vehicle like optimum speed and direction.

VEHICLE AUTOMATED TRACKS: Preparation and maintenance of proper road network – National highway network with automated roads and vehicles – Satellite control of vehicle operation for safe and fast travel.

TEXT BOOKS:

1. Heinz Heisler, “Advanced Vehicle Technology” - Arnold Publication.

REFERENCES:

1. Beranek.L.L., Noise reduction, McGraw Hill Book Co., Inc., Newyork, 1993.
2. Bosch Hand Book, 3rd Edition, SAE, 1993.

NOTE:

- 1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.**
- 2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.**

CE 451B POLLUTION & CONTROL							
B. Tech. Semester – VII (Automobile Engineering) – Open Elective							
L	T	P	Credits		Class Work	:	25 Marks
4	-	-	4		Examination	:	75 Marks
					Total	:	100 Marks
					Duration of Examination	:	3 Hours

UNIT I

WATER POLLUTION: Classification of water pollutants, water characteristics, effluent standards, primary treatment, secondary treatment – aerobic (activated sludge, aerated lagoons, trickling filter, roughing filter, rotating biological contactor) anaerobic (contact process, UASB).

UNIT II

AIR POLLUTION: Classification of air pollutants, Particulates: Physical characteristics, mode of formation, setting properties, Control measures.

HYDROCARBONS: Nature; sources, control, Carbon Monoxide: Source, harmful effects on human health, control measures. Oxides of Sulphur and Nitrogen Sources, effects on human health and plants. Control measure.

UNIT III

SOLID WASTE: Types, sources and properties of solid waste, methods of solid waste treatment and disposal

SOLID WASTE MANAGEMENT: Generation, Collection and techniques for ultimate disposal, Elementary discussion on resource and energy recovery.

UNIT IV

TREATMEN: Elementary treatment of nuclear pollution, metal pollution, noise pollution their effects & control. Trace element: Mechanism of distribution, essential and non essential elements, trace of element in marin environment, its ecological effects and biological effects.

SUGGESTED BOOKS:

1. Environmental Engg.: by Howard s. Peavy & Others, MGH International.
2. Metacaf – EDDY – Waste-water engineering revised by George Teholonobus (TMH)
3. Environmental Chemistry by B.K. Sharma, Goel Publishing, Meerut.
4. Environmental Chemistry, A.K.DE, Wiley Eastern.
5. Air Pollution: H.C. Perking – Mc Graw Hill.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

CSE 411B MANAGEMENT INFORMATION SYSTEM						
B. Tech. Semester – VII (Automobile Engineering) – Open Elective						
L	T	P	Credits		Class Work	: 25 Marks
4	-	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

INFORMATION SYSTEM: Introduction to Information System and MIS, Decision support and decision making systems, systems approach, the systems view of business, Managing the digital firm, Electronic Commerce and Electronic business, DBMS, RDBMS, introduction to Telecommunication and Networks

I.T.INFRASTRUCTURE: Managing Hardware Assets, Managing Software Assets, Managing Data Resources. Internet And New It Infrastructure.

UNIT II

CONCEPTUAL SYSTEM DESIGN: Define the problems, set systems objective, establish system constraints, determine information needs determine information sources, develop alternative conceptual design and select one document the system concept, and prepare the conceptual design report. Information Systems Security and Control, Ethical and Social Impact of Information Systems.

UNIT III

DETAILED SYSTEM DESIGN: Inform and involve the organization, aim of detailed design, project management of MIS detailed design, identify dominant and trade of criteria, define the sub systems, sketch the detailed operating sub systems and information flow, determine the degree of automation of each operation, inform and involve the organization again, inputs outputs and processing, early system testing, software, hardware and tools propose an organization to operate the system, documentation of detailed design

UNIT IV

IMPLEMENTATION, EVALUATION AND MAINTENANCE OF THE MIS: Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train the operating personnel, computer related acquisitions, develop forms for data collection and information dissemination, develop the files test the system, cut-over, document the system, evaluate the MIS control and maintain the system. Pitfalls in MIS development, redesigning the organization with Information systems, Managing Knowledge Work.

TEXT BOOKS:

1. Management Information System by W. S. Jawadekar, 2002, Tata McGraw Hill.
2. Management Information System by K.C. Laudon & J.P. Laudon 7th Edition 2003 Pearson Education Publishers Indian Reprint.
3. Information System for Modern Management (3rd edition)- Robert G. Murdick, Loel E. Ross & James R. Claggett. PHI

REFERENCE BOOKS:

1. Management Information System; O Brian; TMH
2. Management Information System by Davis Olson Mac Graw Hill
3. Management Information System by Stallings,(Maxwell Mc Millman Publishers)

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

IT 413B CYBER SECURITY						
B. Tech. Semester – VII (Automobile Engineering) – Open Elective						
L	T	P	Credits		Class Work	: 25 Marks
4	-	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

INTRODUCTION TO CYBERCRIME: Cybercrime and Information Security, Classifications of Cybercrimes, The need for Cyberlaws, The Indian IT Act Challenges to Indian Law and Cybercrime Scenario in India, Weakness in Information Technology Act and its consequences, Digital Signatures and the Indian IT Act, Cybercrime and Punishment; Technology, Students and Cyberlaw; Survival tactics for the Netizens, Cyber-offenses: Cyberstalking, Cybercafe and Cybercrimes, Botnets, Attack Vector, Cloud Computing;

UNIT II

TOOLS AND METHODS USED IN CYBERCRIME: Proxy Servers and Anonymizers, Phishing and identity theft, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow; Cybercrime: Mobile and Wireless Devices: Trends in Mobility, Attacks on Wireless Networks, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones.

UNIT III

UNDERSTANDING COMPUTER FORENSICS: The Need for Computer Forensics, Cyberforensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Computer Forensics and Steganography, Relevance of the OSI 7 Layer Model to Computer Forensics, Forensics and Social Networking Sites: The Security/Privacy Threats, Challenges in Computer Forensics, Forensics Auditing, Antiforensics.

UNIT IV

CYBERSECURITY: ORGANIZATIONAL IMPLICATIONS: Cost of Cybercrimes and IPR Issues, Web Threats for Organizations, Security and Privacy Implications from Cloud Computing, Social Media Marketing, Social Computing and the Associated Challenges for Organizations, Protecting People's Privacy in the Organization, Organizational Guidelines for Internet Usage, Safe Computing Guidelines and Computer Usage Policy, Incident Handling, Forensics Best Practices, Media and Asset Protection, Importance of Endpoint Security in Organizations.

TEXT BOOKS:

1. "Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Nina Godbole, Sunit Belapur, Wiley India Publications, April, 2011

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two questions from each unit & students will be required to attempt only five questions, at least one question from each unit.
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AE 409B AUTO SCANNING & VEHICLE TESTING LAB							
B. Tech. Semester – VII (Automobile Engineering)							
L	T	P	Credits		Class Work	:	20 Marks
-	-	2	1		Examination	:	30 Marks
					Total	:	50 Marks
					Duration of Examination	:	3 Hours

LIST OF EXPERIMENTS

1. Computerized engine analyzer study and practice
2. Computerized wheel balancing machine study and practice
3. Computerized wheel alignment machine study and practice
4. Exhaust emission test of petrol and diesel engine
5. Two wheeler chassis dynamometer study and practice
6. Road worthiness test: Acceleration, Gradability, Maximum speed,
7. Constant Speed fuel consumption, City drive fuel consumption tests
8. Head light focusing test
9. Visibility test;
- 10 Braking distance test

NOTE:

1. Ten experiments are to be performed in the Semester.
2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the concerned institute as per the scope of the syllabus.

AE 411B VEHICLE MAINTANANCE & RECONDITIONING LAB						
B. Tech. Semester – VII (Automobile Engineering)						
L	T	P	Credits		Class Work	: 20 Marks
-	-	2	1		Examination	: 30 Marks
					Total	: 50 Marks
					Duration of Examination	: 3 Hours

LIST OF EXPERIMENTS

VEHICLE MAINTENANCE LABORATORY

1. Study and Layout of Automobile Repair Shop.
2. Study and Preparation of Workshop Statements.
3. Study and List of Tools and Instruments.
4. Minor and Major Tuning Of Diesel and Petrol Engines.
5. Fault Diagnosis of Ignition, Starting And Charging System.
6. Fault Diagnosis of Petrol and Diesel Fuel System And Filters & Air Cleaners.
7. Fault Diagnosis of Lighting System Horn & Wiper.
8. Performing Body Repair Works.
9. Adjustment Of Pedal Play In Clutch Brake, Hand Brake And Steering Wheel.
10. Bleeding Of Hydraulic Brake System and Diesel Fuel System.

RE-CONDITIONING LABORATORY

1. Cylinder reboring – checking the cylinder bore.
2. Valve grinding, valve lapping.
3. Setting the valve angle and checking for valve leakage Calibration of fuel injection pump
5. Wheel alignment – testing of camber, caster.
6. Testing kingpin inclination, toe-in and toe-out.
7. Brake adjustment
8. Brake bleeding

NOTE:

1. Ten experiments are to be performed in the Semester.
2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the concerned institute as per the scope of the syllabus.

AE 413B PROJECT						
B. Tech. Semester –VII (Automobile Engineering)						
L	T	P	Credits		Class Work	: 100 Marks
-	-	4	4			

The primary objective of this course is to develop in students the professional quality of synthesis employing technical knowledge obtained in the field of Engineering & Technology through a project work involving design, analysis augmented with creativity, innovation and ingenuity.

Project involving design/ fabrication/ testing/ computer simulation/ case studies etc. which commences in the VII Semester will be completed in VIII Semester and will be evaluated through a panel of examiners consisting of the following:

Chairman of Department	: Chairperson
Project coordinator	: Member Secretary
Respective project supervisor	: Member

The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher).

Project coordinator will be assigned the project load of maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her.

The format of the cover page and the organization of the body of the report for all the B.Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

AE 415B PROFESSIONAL TRAINING II						
B. Tech. Semester – VII (Automobile Engineering)						
L	T	P	Credits		Class Work	: 50 Marks
-	-	2	2		Total	: 50 Marks

- At the end of 6th semester each student would undergo four weeks Professional Training in an Industry/ Institute/ Professional / Organization/ Research Laboratory etc. with the prior approval of the Training and Placement Officer of the University and submit in the department a typed report along with a certificate from the organization.
- The typed report should be in a prescribed format.
- The report will be evaluated in the VII Semester by a Committee consisting of three teachers from different specialization to be constituted by the Chairperson of the department. The basis of evaluation will primarily be the knowledge and exposure of the student towards different processes and the functioning of the organization.
- The student will interact with the committee through presentation to demonstrate his/her learning.
- Teachers associated with evaluation work will be assigned 2 periods per week load.

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonapat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. Final YEAR (SEMESTER – VIII) AUTOMOBILE ENGINEERING
Credit Based Scheme w.e.f. 2015-16

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1	AE 402B	EMERGING AUTOMOTIVE TECHNOLOGIES	4	0		25	75	-	100	4	3
2	AE 404B	AUTOMOTIVE WORKSHOPS TOOLS AND EQUIPMENTS	4	0		25	75	-	100	4	3
3		ELECTIVE I	4	-		25	75	-	100	4	3
4		ELECTIVE II	4	-		25	75	-	100	4	3
5	AE 406B	AUTOMOTIVE WORKSHOPS TOOLS AND EQUIPMENTS LAB	-	-	2	20		30	50	1	3
6	AE 408B	SEMINAR	-	-	2	50			50	2	3
7	AE 413B	PROJECT	-	-	8	75	-	125	200	8	3
8	GFAE 402B	GENERAL FITNESS FOR THE PROFESSION	1	-	-		-	100	100	4	3
Total			17	0	12	245	300	255	800	31	

ELECTIVE I		ELECTIVE II	
AE 432B	AUTOMOTIVE AERODYNAMICS	AE 442B	TRANSPORT MANAGEMENT AND AUTOMOTIVE INDUSTRY
AE 434B	SPECIAL TYPE OF VEHICLE	AE 444B	ERGONOMICS ENGINEERING
AE 436B	AUTOMOTIVE AIR CONDITIONING	AE 446B	VIBRATION AND NOISE CONTROL
AE 438B	MECHATRONICS	AE 448B	DESIGN OF JIGS, FIXTURE AND PRESS TOOLS
AE 440B	NON DESTRUCTIVE TESTING METHODS	AE 450B	QUALITY CONTROL AND RELIABILITY ENGINEERING

Note:

- 6 Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weight age of Sports is given in General Fitness For The Profession Syllabus.
- 7 The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
- 8 Electronics gadgets including Cellular phones are not allowed in the examination
- 9 The choice of the students for any elective shall not be binding for the department to offer, if the department does not have expertise. The minimum strength of the students should be twenty to run an elective course.
- 10 The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher). Project coordinator will be assigned the project load of, maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her. The format of the cover page and the organization of the body of the report for all the B. Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

AE 402B EMERGING AUTOMOTIVE TECHNOLOGIES						
B. Tech. Semester –VIII (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
4	-	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

THE FUTURE OF THE AUTOMOTIVE INDUSTRY: Challenges and Concepts for the 21st century, crucial issues facing the industry and approaches to meet these challenges.

FUEL CELL TECHNOLOGY FOR VEHICLES: What is fuel cell, Type of fuel cell, Advantages of fuel cell? current state of the technology, potential and challenges, advantages and disadvantages of hydrogen fuel.

UNIT II

LATEST ENGINE TECHNOLOGY FEATURES: Advances in diesel engine technology. Direct fuel injection Gasoline engine, Diesel particulate emission control, Throttling by wire. Variable Valve Timing, Method used to affect variable Valve Timing, Electromagnetic Valves, and Cam less engine actuation.

42 VOLT SYSTEM: Need, benefits, potentials and challenges, Technology Implications for the Automotive Industry, Technological revolution that will occur as a result of the adoption of 42 volt systems.

UNIT III

ELECTRICAL AND HYBRID VEHICLES: Types of hybrid systems, Objective and Advantages of hybrid systems. Current status, Future developments and Prospects of Hybrid Vehicles

INTEGRATED STARTER ALTERNATOR: Starts stop operation, Power Assist, Regenerative Braking, Advanced lead acid batteries, alkaline batteries, and Lithium batteries, Development of new energy storage systems, Deep discharge and rapid charging ultra capacitors.

UNIT IV

X-BY WIRE TECHNOLOGY: What is X-By Wire, Advantage over hydraulic systems? Use of Automotive micro controllers, Types of sensors, Use of actuators in an automobile environment.

VEHICLES SYSTEMS: Constantly Variable Transmission, Benefits, Brake by wire, Advantages over power Braking System, Electrical assist steering, Steering by wire, Advantages of Steering by wire, Semi-active and fully-active suspension system, Advantages of fully active suspension system.

TEXT & REFERENCE BOOKS:

1. Advanced Vehicle Technologies by Heinz Heisler- SAE International Publication.
2. Electric and Hybrid Electric vehicles by Ronald K. Jurgen.- SAE International Publication
3. Electronic Braking, Traction and Stability control- SAE Hardbound papers.
4. Electronics steering and suspension systems- SAE Hardbound papers.
5. 42 Volt system by Daniel J. Holt- SAE International Publication
6. Diesel Particulate Emission by J.H. Johnson- SAE Hardbound papers.
7. Fuel Cell Technologies for vehicles by Richard Stobart- SAE Hardbound papers.

NOTE:

13. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
14. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 404B AUTOMOTIVE WORKSHOPS TOOLS AND EQUIPMENTS						
B. Tech. Semester –VIII (Automobile Engineering)						
L	T	P	Credits		Class Work	: 25 Marks
4	-	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

INTRODUCTION: Measuring Observation, Disassembly, Machining, Installing New Part, Reassembly, Adjustments.

AUTOMOTIVE SERVICE TOOLS: Measuring Tools, Hand Tools, Special Service Tools, and Shop Cutting Tools, various Power Tools.

WORK SHOP TOOLS AND EQUIPMENT: Hydraulic Jack, Axle Stand, Hydraulic Lift, Creeper, Hydraulics Press, Lubricating Equipment, Cleaning Equipment, Electrical Equipment and Tools, Pneumatic Equipment and Tools.

MACHINES USED IN AUTOMOTIVE MACHINING WORKSHOP: Lathe, Drilling Machine, Boring Machine, Grinding Machine, Valve Seat Cutter or Grinder, Lapping Machine, Honing Machine.

LIFTING EQUIPMENT: Electromechanical Auto Lift, Four Post Hoist, Hydraulic Hoist, Work Shop Crane, Mechanical Hoist

UNIT II

ENGINE CARE EQUIPMENT: Cylinder Leakage Tracer, Ridge Reamer, Cylinder Hones, Piston Ring Tools, Piston Ring Expander, Engine Compression Gauge, Radiator Pressure Gauge, Tachometer, Engine Analyzer, Monitor Scan Tool Systems, Perception 2 Channel Scope and Graphics Multi meter, Infra Red Thermometer, Digital Oscilloscope, Spark Plug Cleaner And Tester

WHEEL CARE EQUIPMENT: Wheel Balancing Machine, Wheel Alignment Equipment, Turning Radius Gauge, Camber Caster King Pin Gauge, Toe in Gauge, Tyre Changer, Tyre Inflator

UNIT III

BODY AND FRAME REPAIR TOOLS AND EQUIPMENT: Overview, Body and Frame Repair Equipment, Bench Type, Floor Type, Platform Type, Intermediate Type, Measuring Equipment, Cutting Equipment, Sanding Equipment, Tools for Panel Repairs, Tools for Removal and Mounting, Tools for Clamping, Safety Devices, Consumable Materials, Others.

WELD SHOP EQUIPMENT: Welding Equipment, Spot Welding Machine, Plasma Cutting Machine, MIG Welding Machine, TIG Welding Machine.

PAINT SHOP EQUIPMENT: Spray Paint Booth, Sun Scanners

UNIT IV

CLEANING EQUIPMENT: Pressure Automatic Touch Free Car Wash System, High Pressure Steam Jet Cleaning, Vehicle Washers, Hose Reels, Auto Service Unit, Two/ Three Wheeler Washers,

INJECTOR SERVICING EQUIPMENT: Nozzle Tester, Nozzle Cleaning Tool Set, Vacuum Fuel Pump Pressure Gauge, Fuel Injector Cleaning, Injector Cleaner

AIR CONDITION SERVICE EQUIPMENT: A/C Recovery Units, UV Leak Detection Kit, Refrigerant Identifier

BATTERY TESTER EQUIPMENT: Flash Timing Light, Battery Starter Tester, Battery Hydrometer Set, Battery Charger

GAS & SMOKE ANALYZER EQUIPMENT: Automotive Emission Analyzer, Smoke Opacity Meter

BRAKE TOOLS: Brake Tester, High Thermal Brake Tester, Brake Lath, Brake Bleeder

WORK SAFETY: Description, Work Cloth, Safe and Tidy Work, Fire Prevention, Electrical Equipment

TEXT & REFERENCE BOOKS:

1. Automobile Engineering, Vol I- VI, by Anil Chhikara, Satya Prakashan, New Delhi.
2. Symphony in Automotive Care Catalogue by Precision Testing Machines Pvt Limited, Delhi

NOTE:

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2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 432B AUTOMOTIVE AERODYNAMICS						
B. Tech. Semester –VIII (Automobile Engineering) ELECTIVE I						
L	T	P	Credits		Class Work	: 25 Marks
4	-	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

INTRODUCTION: Scope, historical developments, fundamental of fluid mechanics, flow phenomenon related to vehicles, external and Internal flow problem, resistance to vehicle motion, performance, fuel consumption and performance potential of vehicle aerodynamics, engine cooling requirement, air flow to passenger compartment, duct for air conditioning, cooling of transverse engine and rear engine.

UNIT II

AERODYNAMIC DRAG OF CARS: Cars as a bluff body, flow field around car, drag force, types of drag force, analysis of aerodynamic drag, drag coefficient of cars, strategies for aerodynamic development, low drag profiles.

UNIT III

SHAPE OPTIMIZATION OF CARS: Front end modification, front and rear wind shield angle, boat tailing, hatch back, fast back and square back, dust flow patterns at the rear, effects of gap configuration, effect of fasteners.

UNIT IV

VEHICLE HANDLING: The origin of forces and moments on a vehicle, lateral stability problems, methods to calculate forces and moments – vehicle dynamics under side winds, the effects of forces and moments, characteristics of forces and moments, dirt accumulation on the vehicle, wind noise, drag reduction in commercial vehicles.

UNIT V

WIND TUNNELS FOR AUTOMOTIVE AERODYNAMICS: Introduction, principle of wind tunnel technology, limitation of simulation, stress with scale models, full scale wind tunnels, measurement techniques, equipment and transducers, road testing methods, numerical methods.

TEXT BOOK:

1. Hucho.W.H. - "Aerodynamic of Road Vehicles" - Butterworth Co., Ltd

REFERENCES:

1. A. Pope - "Wind Tunnel Testing"- John Wiley & Sons - 2nd Edition, New York
2. Automotive Aerodynamic: Update SP-706 - SAE
3. Vehicle Aerodynamics - SP-1145 - SAE

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 434B SPECIAL TYPES OF VEHICLES						
B. Tech. Semester –VIII (Automobile Engineering) ELECTIVE I						
L	T	P	Credits		Class Work	: 25 Marks
4	-	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

TRACTORS AND FARM EQUIPMENTS: Classification and power required - Design consideration - Ride and stability characteristics power plants and transmission, Farm equipments.

UNIT II

EARTH MOVING MACHINES: Construction and operation aspects of Bull dozers, scrapers, Dumpers, Loaders, Mobile cranes, Road rollers, Elevators and Elevating graders.

UNIT III

MILITARY AND COMBAT VEHICLES: Special requirements like power, fuel strength and impact resistance tanker, Gun carrier and transport vehicle.

UNIT IV

CLASSIFICATION AND REQUIREMENTS OF HEAVY VEHICLES: Power plants, chassis and transmission.

TEXT BOOK:

1. Construction planning, Equipment and Methods – Robert L. Peurifoy, William B. Ledbrtter, Clifford J. Schexnayder - McGrawHill, Fifth

REFERENCES:

2. A. Gurevich and E.Soreking, Tractors Mir Publishers, Moscow
3. V. Rodichev & G. Rodicheva, Tractors and automobiles, MIR Publishers, Moscow.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 436B AUTOMOTIVE AIR CONDITIONING						
B. Tech. Semester –VIII (Automobile Engineering) ELECTIVE I						
L	T	P	Credits		Class Work	: 25 Marks
4	-	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

AIRCONDITIONING FUNDAMENTALS: Basic air conditioning system - location of air conditioning components in a car, schematic layout of a refrigeration system, compressor components, condenser and high pressure service ports, thermostatic expansion valve, expansion valve calibration, controlling evaporator temperature, evaporator pressure regulator, evaporator temperature regulator.

UNIT II

AIR CONDITIONER – HEATING SYSTEM: Automotive heaters, manually controlled air conditioner, heater system, automatically controlled air conditioner and heater systems, automatic temperature control, air conditioning protection, engine protection.

UNIT III

REFRIGERANT: Containers handling refrigerants, tapping into the refrigerant container, refrigeration system diagnosis, diagnostic procedure, ambient conditions affecting system pressures.

UNIT IV

AIR ROUTING AND TEMPERATURE CONTROL: Objectives, evaporator airflow through the recirculating unit, automatic temperature control, duct system, controlling flow, vacuum reserve, testing the air control and handling systems.

UNIT V

AIR CONDITINING SERVICE: Air conditioner maintenance and service, servicing heater system removing and replacing components, trouble shooting of air controlling system, compressor service.

TEXT BOOK:

1. William H. Crouse and Donald I. Anglin “Automotive Air conditioning” McGraw Hill

REFERENCES:

1. Mitchell information Services, Inc “Mitchell Automatic Heating and Air Conditioning Systems” - Prentice Hall.
2. Paul Weiser “Automotive Air Conditioning” Reston Publishing Co.
3. MacDonald, K.I., “Automotive Air Conditioning”, Theodore Audel series
4. Goings L.F. “Automotive Air Conditioning” American Technical services
5. Boyce H. Dwigins “Automotive Air Conditioning”, Delmar

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
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AE 438B MECHATRONICS							
B. Tech. Semester –VIII (Automobile Engineering) ELECTIVE I							
L	T	P	Credits		Class Work	:	25 Marks
4	-	-	4		Examination	:	75 Marks
					Total	:	100 Marks
					Duration of Examination	:	3 Hours

UNIT I

INTRODUCTION AND BASICS: What is Mechatronics?; A Measurement System with its constituent elements; Open and Closed Loop Systems; Sequential Controllers; Micro-processor Based Controllers; Mechatronic Approach.

HARDWARE OF MEASUREMENT SYSTEMS: A review of Displacement, Position Velocity, Motion, Force, Fluid Pressure, Liquid Flow, Liquid Level, Temperature, Light Sensors / along with Performance Terminology; Selection of Sensors; Input Data by Switches; Signal Conditioning; Brief Review of Operational Amplifier; Protection; Filtering; Wheat Stone Bridge; Digital Signals; Multiplexers; Data Acquisition; Digital Signal Processing; Pulse Modulation; Data Presentation Systems – Displays; Data Presentation Elements; Magnetic Recording; Data Acquisition Systems; Testing & Calibration; Problems.

UNIT II

PNEUMATIC, HYDRAULIC, MECHANICAL AND ELECTRICAL ACTUATION SYSTEMS: Pneumatic and Hydraulic Systems; Directional Control Valves; Valve Symbols; Pressure Control Valves; Cylinder Sequencing; Process Control Valves; Rotary Actuators; Mechanical Systems – Types of Motion, Kinematic Chains, Cams, Gear Trains, Ratchet & Pawl, Belt & Chain Drives, Bearings, Mechanical Aspect of Motor Selection; Electrical Systems; Mechanical & Solid State Switches; Solenoids; D.C. & A.C. Motors; Stepper Motors; Problems.

SYSTEM MODELING AND PERFORMANCE: Engineering, Systems; Rotational – Translational Systems; Electro-mechanical Systems; Hydraulic – Mechanical Systems; A review of modeling of First and Second Order Systems and Performance Measures; Transfer Functions for first order System, Second Order System, Systems in series & Systems with Feedback Loops; Frequency Response of First Order and Second Order Systems; Bode Plots: Performance Specifications: Stability; Problems.

UNIT III

CLOSED LOOP CONTROLLERS: Continuous and Discrete Processes – Lag, Steady State Error; Control Modes; Two- step Mode; Proportional Mode – Electronic Proportional Controllers; Derivative Control – Proportional plus Derivative Control; Integral Control - Proportional plus Integral Control; PID Controller – Operational Amplifier PID Circuits; Digital Controllers – Implementing Control Modes; Control System Performance; Controller Tuning – Process Reaction Method & Ultimate Cycle Method; Velocity Control; Adaptive Control; Problems.

DIGITAL LOGIC AND PROGRAMMABLE LOGIC CONTROLLERS : A Review of Number Systems & Logic Gates; Boolean Algebra; Karnaugh Maps; Sequential Logic; Basic Structure of Programmable Logic Controllers; Input/ Output Processing; Programming; Timers, Internal Relays and Counters; Master & Jump Controls; Data Handling; Analogue Input/ Output; Selection of a PLC; Problems.

UNIT IV

MICROPROCESSORS AND INPUT/OUTPUT SYSTEMS: Control; Microcomputer Structure; Micro- controllers; Applications; Programming Languages; Instruction Sets; Assembly Language Programs; Subroutines; Why C Language ? A review of Program Structure, Branches, Loops, Arrays, Pointer; Examples of Programs; Interfacing; Input/ Output; Interface Requirements; Peripheral Interface Adaptors; Serial Communication Interface; Examples of Interfacing; Problems.

DESIGN AND MECHATRONICS: Design Process; Traditional and Mechantronics Design; Possible Mechatronics design solutions for Timed Switch, Wind Screen Wiper Motion, Bath Room Scale, A Pick & Place Robot, Automatic Camera, Engine Management System & Bar Code Recorder.

TEXT BOOKS:

1. Mechatronics by W. Bolton, Published by Addition Wesley.
2. Mechatronics System Design, Devdas Shetty and Richard A. Kolx Brooks

REFERENCE BOOKS:

1. Introduction to Mechatronics and Measuring System : david G. Alciation and Michael B. Hist and Tata McGraw Hill
2. Mechtronics – Sensing to Implementation - C.R.Venkataraman, Sapna

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 440B NON DESTRUCTIVE TESTING METHODS						
B. Tech. Semester –VIII (Automobile Engineering) ELECTIVE I						
L	T	P	Credits		Class Work	: 25 Marks
4	-	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

NON-DESTRUCTIVE TESTING: Introduction, classification of NDT techniques,
VISUAL EXAMINATION: Bore-scopes, video devices,
MAGNETIC PARTICLE TESTING: Operating principal, magnetising technique.

UNIT II

LIQUID PENETRATING TECHNIQUE: Principle, process description.
ULTRASONIC TESTING: Definition, advantages and applications, inspection methods.
RADIOGRAPHY: Electromagnetic radiation sources, process description.

UNIT III

THERMOGRAPHY: Infrared theory, contact, non-contact methods.
ACCOUSTIC EMISSION TESTING, eddy current testing,
LEAK TESTING: Bubble emission testing, Air leak testing.

UNIT IV

CASE STUDIES: on defects in casting, rolling, welding, and heat-treating.

REFERENCES:

1. Non-Destructive Testing by Warren J.Mcgomnagle, McGraw hill.
2. Non-Destructive Testing by Baldev Raj , Narosa Publishing House.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
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AE 442B TRANSPORT MANAGEMENT & AUTOMOTIVE INDUSTRY						
B. Tech. Semester –VIII (Automobile Engineering) ELECTIVE II						
L	T	P	Credits		Class Work	: 25 Marks
4	-	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

MOTOR VEHICLE ACT: Short titles & definitions, Laws governing to use of motor vehicle & vehicle transport, Licensing of drivers & conductors, Registration of vehicle, State & interstate permits, Traffic rules, Signals & controls, Accidents, Causes & analysis, Liabilities & preventive measures, Rules & regulations, Responsibility of driver, Public & public authorities, Offences, penalties & procedures, Different types of forms, Government administration structure, Personnel, Authorities & duties, Rules regarding construction of motor vehicles.

UNIT II

TAXATION: Objectives, Structure & methods of laying taxation, Onetime tax, Tax exemption & tax renewal
INSURANCE: Insurance types & significance, Comprehensive, Third party insurance, Furnishing of particulars of vehicles involved in accident, MACT (Motor Accident Claims Tribunal), Solatium Fund, Hit & Run case, Duty of driver in case of accident, Surveyor & Loss Assessor, Surveyor's report

UNIT IV

PASSENGER TRANSPORT OPERATION: Structure of passenger transport organizations, Typical depot layouts, Requirements and Problems on fleet management, Fleet maintenance, Planning - Scheduling operation & control, Personal & training-training for drivers & conductors, Public relations, Propaganda, publicity and passenger amenities, Parcel traffic., Theory of fares-Basic principles of fare charging, Differential rates for different types of services, Depreciation & debt charges, Operation cost and Revenues, Economics & records
GOODS TRANSPORT OPERATION: Structure of goods transport organizations, Scheduling of goods transport, Management Information System in passenger , goods transport operation, Storage & transportation of petroleum products

UNIT IV

ADVANCE TECHNIQUES IN TRAFFIC MANAGEMENT: Traffic navigation, Global positioning system
AUTOMOBILE INDUSTRY: History and development of the automobile industry, market trends, current scenario in Indian auto industry, Auto ancillary industries, Role of the automobile industry in national growth.

TEXTBOOK:

1. John Duke - Fleet Management – McGraw-Hill Co, USA
2. Kadiyali. L.R., Traffic Engineering and Transport Planning.

REFERENCES:

1. Government Motor Vehicle Act – Eastern Book Company, Lucknow
2. Kitchin.L.D., - Bus Operation - Illiffie and Sons Co., London, III edition
3. The motor vehicle Act 1939 - Ejaz Ahemad, Ashok law house, India
4. S.K. Shrivastava, "Economics of Transport"
5. "Transport Development in India", S. Chand & Co. Pvt. Ltd., New Delhi.
6. Santosh Sharma, "Productivity in Road Transport", 2nd Edition, Association of State Road Transport Undertakings, New Delhi.
7. P.G.Patankar, "Road Passenger Transport in India", CIRT, Pune.

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
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AE 444B ERGONOMICS ENGINEERING							
B. Tech. Semester –VIII (Automobile Engineering) ELECTIVE II							
L	T	P	Credits		Class Work	:	25 Marks
4	-	-	4		Examination	:	75 Marks
					Total	:	100 Marks
					Duration of Examination	:	3 Hours

UNIT I

BASIC PRINCIPLES OF ERGONOMICS: Anthropometry, Posture and Health; Anthropometry Practical; Displays, Controls and HMI; Tools and Equipment Design; Workplace Design and Assessment; Task Analysis; Questionnaire and Interview Design; Product Design and Evaluation; Designing for manufacture and maintenance; Health and Safety Legislation and Ergonomics.

UNIT II

APPLICATION OF ERGONOMICS PRINCIPLES: Cognitive Ergonomics, Human Information Processing; Memory; Reading; Perception; Navigation; Problem Solving; Decision Making, Human-Computer Interaction, Input/Output Technology, Usability; Evaluation; Health problems.

UNIT III

FUTURE SYSTEMS: Job Design, Scientific Management, Enrichment, Enlargement, Rotation, Cells, Shift work, Management Style and Job Design, Change Management, New Technology, Unemployment, Deskilling, Introducing new technology, Questionnaire design and assessment. Task analysis techniques, Measurement of human error and risk, Use of simulation and prototypes, Product Evaluation, Experimental Design.

UNIT IV

CASE STUDIES: A set of case studies will be used to demonstrate how ergonomics has lead to changes in work activity, safety and product design. Case studies will include advanced computer applications, workplace assessment and re-design, accident analysis and industrial inspection, and in manufacturing. Students will be required to apply the principles to a real life ergonomic design as applied to a product, service or computer application.

TEXT BOOKS:

1. Work Design: Industrial Ergonomics – Knoz, Stephan A., Johnson, Steven, Holcomb Hathaway, Scottsdale, AZ.
2. Human factors in engineering and design – Sanders, M.S. & McCormick, E.J., 6th ed., McGraw-Hill, New York.

REFERENCE BOOKS:

1. Ergonomics: Man in his working environment- Murrell, K.F.H, Champan & Hall, London.
2. Man – Machine Engineering – Chapanis A: Wordsworth Publishing Co.
3. The Practice and Management of Industrial Ergonomics – Alexander, D.C., Prentice-Hall, Englewood Cliffs, NJ.
4. Textbook of Work Physiology – Astrand, P.O. & Rhodahl, K.– McGraw-Hill, New York.
5. Human Factors in Lighting – Boyce, P.R. Macmillan, New York.
6. The Ergonomics of Workspaces and Machines : A design manual – Clark, T.S. & Corlett, E.N. Taylor & Francis, London.
7. Ergonomics at work. Osborne, D Wiley, London.
8. Bodyspace–Anthropometry, Ergonomics and Design. – Pheasant, S. Taylor & Francis,.

NOTE:

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AE 446B VIBRATION & NOISE CONTROL						
B. Tech. Semester –VIII (Automobile Engineering) ELECTIVE II						
L	T	P	Credits		Class Work	: 25 Marks
4	-	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

BASICS OF VIBRATION: Introduction, classification of vibration: free and forced vibration, undamped and damped vibration, linear and non linear vibration, response of damped and undamped systems under harmonic force, analysis of single degree and two degree of freedom systems, torsional vibration, determination of natural frequencies.

UNIT II

BASICS OF NOISE: Introduction, amplitude, frequency, wavelength and sound pressure level, addition, subtraction and averaging decibel levels, noise dose level, legislation, measurement and analysis of noise, measurement environment, equipment, frequency analysis, tracking analysis, sound quality analysis.

UNIT III

AUTOMOTIVE NOISE SOURCES: Noise Characteristics of engines, engine overall noise levels, assessment of combustion noise, assessment of mechanical noise, engine radiated noise, intake and exhaust noise, engine accessory contributed noise, transmission noise, aerodynamic noise, tyre noise, brake noise.

UNIT IV

CONTROL TECHNIQUES: Vibration isolation, tuned absorbers, untuned viscous dampers, damping treatments, application dynamic forces generated by IC engines, engine isolation, crank shaft damping, modal analysis of the mass elastic model shock absorbers.
SOURCE OF NOISE AND CONTROL: Methods for control of engine noise, combustion noise, mechanical noise, predictive analysis, palliative treatments and enclosures, automotive noise control principles, sound in enclosures, sound energy absorption, sound transmission through barriers

TEXT BOOKS:

1. Singiresu S.Rao , “Mechanical Vibrations”, Pearson Education, ISBN –81-297-0179-0
2. Kewal Pujara “Vibrations and Noise for Engineers, Dhanpat Rai & Sons

REFERENCES:

1. Bernard Challen and Rodica Baranescu - “Diesel Engine Reference Book” – Second edition - SAE International - ISBN 0-7680-0403-9
2. Julian Happian-Smith - “An Introduction to Modern Vehicle Design”- Butterworth- Heinemann, ISBN 0750-5044-3
3. John Fenton, “Handbook of Automotive body Construction and Design Analysis”, Professional Engineering Publishing, ISBN 1-86058-073

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
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AE 448B DESIGN OF JIGS, FIXTURES & PRESS TOOLS						
B. Tech. Semester –VIII (Automobile Engineering) ELECTIVE II						
L	T	P	Credits		Class Work	: 25 Marks
4	-	-	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

UNIT I

PURPOSE TYPES AND FUNCTIONS OF JIGS AND FIXTURES: Tool design objectives - Production devices - Inspection devices - Materials used in Jigs and Fixtures – Types of Jigs - Types of Fixtures-Mechanical actuation-pneumatic and hydraulic actuation-Analysis of clamping force-Tolerance and error analysis.

UNIT II

JIGS: Drill bushes –different types of jigs-plate latch, channel, box, post, angle plate, angular post, turnover, pot jigs-Automatic drill jigs-Rack and pinion operated. Air operated Jigs components, Design and development of Jigs for given components.

FIXTURES: General principles of boring, lathe, milling and broaching fixtures- Grinding, planning and shaping fixtures, assembly, Inspection and welding fixtures- Modular fixtures, Design and development of fixtures for given component.

UNIT III

PRESS WORKING TERMINOLOGIES AND ELEMENTS OF DIES AND STRIP LAY OUT: Press working terminology-Presses and press accessories-Computation of capacities and tonnage requirements, Elements of progressive combination and compound dies, Die block-die shoe. Bolster plate-punch holder-guide pins and bushes – strippers –knockouts-stops –pilots-Selection of standard die sets strip lay out-strip lay out calculations

UNIT V

DESIGN AND DEVELOPMENT OF DIES: Design and development of progressive and compound dies for Blanking and piercing operations, Bending dies – development of bending dies-forming and drawing dies-Development of drawing dies. Design considerations in forging, extrusion, casting and plastic dies

TEXT BOOKS:

1. Edward G Hoffman, Jigs & Fixture Design, Thomson – Delmar Learning, Singapore
2. Donaldson. C, Tool Design, Tata McGraw-Hill

REFERENCES:

1. Kempster, “Jigs & Fixtures Design”, the English Language Book Society
2. Joshi, P.H., “Jigs & Fixtures, Second Edition”, Tata McGraw-Hill Publishing Company Limited, New Delhi
3. Hiram E Grant, ‘ Jigs and Fixture’ Tata McGraw-Hill, New Delhi
4. Fundamentals of Tool Design, CEEE Edition, ASTM
5. PSG College of Technology, Coimbatore - Design Data Handbook

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

AE 450B QUALITY CONTROL & RELIABILITY ENGINEERING					
B. Tech. Semester –VIII (Automobile Engineering) ELECTIVE II					
L	T	P	Credits		Class Work
4	-	-	4		: 25 Marks
					Examination
					: 75 Marks
					Total
					: 100 Marks
					Duration of Examination
					: 3 Hours

UNIT I

INTRODUCTION AND PROCESS CONTROL FOR VARIABLES: Introduction, definition of quality, basic concept of quality, definition of SQC, benefits and limitation of SQC, Quality assurance, Quality cost-Variation in process- factors – process capability – process capability studies and simple problems – Theory of control chart- uses of control chart – Control chart for variables – X chart, R chart and e chart.

UNIT II

PROCESS CONTROL FOR ATTRIBUTES: Control chart for attributes –control chart for proportion or fraction defectives – p chart and np chart – control chart for defects – C and U charts, State of control and process out of control identification in charts.

ACCEPTANCE SAMPLING: Lot by lot sampling – types – probability of acceptance in single, double, multiple sampling techniques – O.C. curves – producer’s Risk and consumer’s Risk. AQL, LTPD, AOQL concepts standard sampling plans for AQL and LTPD- uses of standard sampling plans.

UNIT III

LIFE TESTING – RELIABILITY: Life testing – Objective – failure data analysis, Mean failure rate, mean time to failure, mean time between failure, hazard rate, system reliability, series, parallel and mixed configuration – simple problems. Maintainability and availability – simple problems, Acceptance sampling based on reliability test – O.C Curves.

UNIT IV

QUALITY AND RELIABILITY: Reliability improvements – techniques- use of Pareto analysis – design for reliability – redundancy unit and standby redundancy – Optimization in reliability – Product design – Product analysis – Product development – Product life cycles.

TEXT BOOKS:

1. Grant, Eugene .L “Statistical Quality Control”, McGraw-Hill.
2. L.S.Srinath, “Reliability Engineering”, Affiliated East west press

REFERENCES:

1. Monohar Mahajan, “Statistical Quality Control”, Dhanpat Rai & Sons
2. R.C.Gupta, “Statistical Quality control”, Khanna Publishers
3. Besterfield D.H., “Quality Control”, Prentice Hall, 1993.
4. Sharma S.C., “Inspection Quality Control and Reliability”, Khanna Publishers
5. Danny Samson, “Manufacturing & Operations Strategy”, Prentice Hall
6. Connor, P.D.T.O., “Practical Reliability Engineering”, John Wiley

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
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AE 406B AUTOMOTIVE WORKSHOPS TOOLS AND EQUIPMENTS LAB							
B. Tech. Semester –VIII (Automobile Engineering)							
L	T	P	Credits		Class Work	:	20 Marks
-	-	2	1		Examination	:	30 Marks
					Total	:	50 Marks
					Duration of Examination	:	3 Hours

LIST OF EXPERIMENTS

To study the construction, working and operation with or on the following tools and equipments for given task

1. AUTOMOTIVE SERVICE TOOLS: Measuring Tools, Hand Tools, Special Service Tools, and Shop Cutting Tools, various Power Tools.
2. WORK SHOP TOOLS AND EQUIPMENT: Hydraulic Jack, Axle Stand, Hydraulic Lift, Creeper, Hydraulics Press, Lubricating Equipment, Cleaning Equipment, Electrical Equipment and Tools, Pneumatic Equipment and Tools.
3. MACHINES USED IN AUTOMOTIVE MACHINIG WORKSHOP: Lathe, Drilling Machine, Boring Machine, Grinding Machine, Valve Seat Cutter or Grinder, Lapping Machine, Honing Machine.
4. LIFTING EQUIPMENT: Electromechanical Auto Lift, Four Post Hoist, Hydraulic Hoist, Work Shop Crane, Mechanical Hoist
5. ENGINE CARE EQUIPMENT: Cylinder Leakage Tracer, Ridge Reamer, Cylinder Hones, Piston Ring Tools, Piston Ring Expander, Engine Compression Gauge, Radiator Pressure Gauge, Tachometer, Engine Analyzer, Monitor Scan Tool Systems, Perception 2 Channel Scope and Graphics Multi meter, Infra Red Thermometer, Digital Oscilloscope, Spark Plug Cleaner And Tester
6. WHEEL CARE EQUIPMENT: Wheel Balancing Machine, Wheel Alignment Equipment, Turning Radius Gauge, Camber Caster King Pin Gauge, Toe in Gauge, Tyre Changer, Tyre Inflator
7. BODY AND FRAME REPAIR TOOLS AND EQUIPMENT: Overview, Body and Frame Repair Equipment, Bench Type, Floor Type, Platform Type, Intermediate Type, Measuring Equipment, Cutting Equipment, Sanding Equipment, Tools for Panel Repairs, Tools for Removal and Mounting, Tools for Clamping, Safety Devices, Consumable Materials, Others.
8. WELD SHOP EQUIPMENT: Welding Equipment, Spot Welding Machine, Plasma Cutting Machine, MIG Welding Machine, TIG Welding Machine.
9. PAINT SHOP EQUIPMENT: Spray Paint Booth, Sun Scanners
10. CLEANING EQUIPMENT: Pressure Automatic Touch Free Car Wash System, High Pressure Steam Jet Cleaning, Vehicle Washers, Hose Reels, Auto Service Unit, Two/ Three Wheeler Washers,
11. INJECTOR SERVICING EQUIPMENT: Nozzle Tester, Nozzle Cleaning Tool Set, Vacuum Fuel Pump Pressure Gauge, Fuel Injector Cleaning, Injector Cleaner
12. AIR CONDITION SERVICE EQUIPMENT: A/C Recovery Units, UV Leak Detection Kit, Refrigerant Identifier
13. BATTERY TESTER EQUIPMENT: Flash Timing Light, Battery Starter Tester, Battery Hydrometer Set, Battery Charger
14. GAS & SMOKE ANALYZER EQUIPMENT: Automotive Emission Analyzer, Smoke Opacity Meter
15. BRAKE TOOLS: Brake Tester, High Thermal Brake Tester, Brake Lath, Brake Bleeder
16. WORK SAFTY: Description, Work Cloth, Safe and Tidy Work, Fire Prevention, Electrical Equipment

NOTE:

3. At least ten experiments are to be performed in the semester.
4. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the department as per the scope of the syllabus.

AE 408B SEMINAR

B. Tech. Semester –VIII (Automobile Engineering)

L	T	P	Credits		Class Work	:	50 Marks
-	-	2	2				

The objectives of the course remains

- To learn how to carry out literature search
- To learn the art of technical report writing
- To learn the art of verbal communication with the help of modern presentation techniques

A student will select a topic in emerging areas of Engineering & Technology and will carry out the task under the observation of a teacher assigned by the department.

He/ She will give a seminar talk on the same before a committee constituted by the chairperson of the department. The committee should comprise of three faculty members from different specializations. The teacher associated in the committee will be assigned 2 hours teaching load per week.

However, guiding students' seminar will not be considered towards teaching load.

The format of the cover page and the organization of the body of the seminar report for all the undergraduate programs will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

AE 413B PROJECT						
B. Tech. Semester –VIII (Automobile Engineering)						
L	T	P	Credits		Class Work	: 75 Marks
-	-	8	8		Examination	: 125 Marks
					Total	: 200 Marks
					Duration of Examination	: 3 Hours

The project started in VII Semester will be completed in VIII Semester and will be evaluated through a panel of examiners consisting of the following:

Chairperson of Department	: Chairperson
Project coordinator	: Member
External expert	: To be appointed by the University

The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher).

Project coordinator will be assigned the project load of, maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her.

The format of the cover page and the organization of the body of the report for all the B. Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

GPAE 402B GENERAL FITNESS FOR THE PROFESSION						
B. Tech. Semester –VIII (Automobile Engineering)						
L	T	P	Credits		Examination	: 100 Marks
1	-	-	4		Total	: 100 Marks

The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/ her performance / achievements in different walks of life.

The evaluation will be made by the committee of examiners constituted as under:

1. Dean, Faculty of Engineering & Technology/ Director
/Principal of affiliated college : Chairperson
2. Chairperson of the department : Member
3. External expert : Appointed by the university

A. The student will present a written report before the committee with following in view:

The student will present before the committee his/her achievements during the current academic session in the form of a written report highlighting followings:

- I. Academic Performance
- II. Extra Curricular Activities / Community Service, Hostel Activities **(12 Marks)**
- III. Technical Activities / Industrial, Educational tour **(12 Marks)**
- IV. Sports/games **(16Marks)**

NOTE: Report submitted by the students should be typed on both sides of the paper.

- B.** A student will support his/her achievement and verbal & communicative skill through presentation before the examiners. **(40 Marks)**

C. Faculty Counselor Assignment (20 Marks)

It will be the duty of the student to get evaluated by respective faculty counselor and to submit the counselor assessment marks in a sealed envelope to the committee.

A counselor will assess the student which reflects his/her learning graph including followings:

1. Discipline throughout the year
2. Sincerity towards study
3. How quickly the student assimilates professional value system etc.
4. Moral values & Ethics