ACADEMIC REGULATIONS

B.Tech. Regular Four Year Degree Programme
(For the batches admitted from the academic year 2014-15)
and
B.Tech. Lateral Entry Scheme
(For the batches admitted from the academic year 2015-16)

The following rules and regulations will be applicable for the batches of 4 year B.Tech degree admitted from the academic year 2014-15 onwards.

1. ADMISSION:

1.1 Admission into first year of Four Year B.Tech. Degree programme of study in Engineering:

As per the existing stipulations of A.P State Council of Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made into the first year of four year B.Tech Degree programme as per the following pattern.

a) Category-A seats will be filled by the Convener, EAMCET.
b) Category-B seats will be filled by the Management as per the norms stipulated by Govt. of Andhra Pradesh.

1.2 Admission into the Second Year of Four year B.Tech. Degree programme (lateral entry).

As per the existing stipulations of A.P State Council of Higher Education (APSCHE), Government of Andhra Pradesh.

2. PROGRAMMES OF STUDY OFFERED BY AITS LEADING TO THE AWARD OF B.TECH DEGREE:

Following are the four year undergraduate Degree Programmes of study offered in various disciplines at Annamacharya Institute of Technology and Sciences, Rajampet (Autonomous) leading to the award of B.Tech (Bachelor of Technology) Degree:

1. B.Tech (Computer Science & Engineering)
2. B.Tech (Electrical & Electronics Engineering)
3. B.Tech (Electronics & Communication Engineering)
4. B.Tech (Information Technology)
5. B.Tech (Mechanical Engineering)
6. B.Tech (Civil Engineering)

and any other programme as approved by the concerned authorities from time to time.

3. ACADEMIC YEAR:

The institute shall follow Year-wise pattern for First year course and Semester pattern for II, III and IV years. An academic year shall consist of a first semester and a second semester from second year onwards.

The first year of four year B.Tech programme shall have duration to accommodate a minimum of 180 instruction days. From second year onwards each semester shall have 90 instruction days.

4. COURSE STRUCTURE:

Each programme of study shall consist of:

4.1 General Courses comprising of the following: (5 to 10%)

i. Language / Communication Skills
ii. Humanities and Social Sciences : Environmental Science
iii. Economics and Accounting
iv. Principles of Management

4.2 Basic Science Courses comprising of the following: (15 to 25%)

i. Computer Literacy with Numerical Analysis
ii. Mathematics
iii. Physics
iv. Chemistry

4.3 Basic Engineering Courses comprising of the following (depending on the branch) :(15 to 25%)

i. Engineering Drawing
ii. Engineering and IT Workshop
iii. Engineering Mechanics
iv. Basic Mechanical Engineering
v. Electrical and Electronics Engineering
vi. Basic civil Engineering
vii. Computer Programming

4.4 Compulsory Discipline Courses :(45 to 55%)

The lists of professional subjects are chosen as per the suggestions of the experts, to impart broad based knowledge needed in the concerned branch of study.

4.5 Elective Courses: (10 to 15%)

Electives will be offered to the students to diversify the spectrum of knowledge, based on the interest of the student to broaden his individual skill and knowledge.

4.6 In the final year first semester a subjects like comprehensive viva, with 2 hours / week to be introduced.

4.7 Every programme of study shall be designed to have 42-44 theory courses and 19-22 laboratory/seminar/comprehensive courses.

4.8 Contact Hours: Depending on the complexity and volume of the course, the number of contact hours per week will be assigned.

5. CREDIT SYSTEM:

Credits are assigned based on the following norms.

	Year Pattern		Semester Pattern	
	Period(s)/ Week	Credits	Period(s)/ Week	Credit(s)
Theory	01	02	01	01
Practical	03	04	03	02
Comprehensive Mechanical Engineering	--	--	02	02
Seminar	--	--	01	01
Final Year Project	--	-	12	12

6. EXAMINATION SYSTEM: All components in any programme of study will be evaluated continuously through internal evaluation and an external evaluation component conducted as year-end/semester-end examination.

6.1 Distribution of Marks:

S. No		Marks	Examination and Evaluation	Scheme of Evaluation
1.	Theory	70	Year-end / Semester-end examination	The question paper shall be of descriptive type with 5 questions with internal choice are to be answered in 3hours duration of the examination.
		30	Mid - Examination of 120 Min. duration - Internal evaluation-20 marks. The question paper shall be of descriptive type with 4 questions with internal choice are to be answered. Remaining 10 marks for Assignments, 3-5 in number will be given and each assignment will be evaluated for 10 marks and average considered.	**For I B Tech:** Three (03) mid exams, each for 20 marks are to be conducted. Two best performances to be considered. **Mid-I:** After first spell of instructions (I Unit). **Mid-II:** After second spell of instructions (II & III Units) **Mid-III:** After third spell of instructions (IV & V Units) **For a Semester**: Two mid-exams 20 marks each are to be conducted. Better one to be considered. **Mid-I:** After first spell of instructions (I & II Units). **Mid-II:** After second spell of instructions (III to V Units).

S. No		Marks	Examination and Evaluation		Scheme of Evaluation
2	Laboratory, Design and / or drawing	70	Year-end / Semester-end Lab Examination		**For laboratory courses:** **3** hours duration – two examiners. For drawing and/ or Design: like for the theory examination.
		30	20	Day to Day evaluation	Performance in laboratory experiments
			10	Internal evaluation	Practical Tests (For first year one best out of two tests and for semester one best out of two tests)
3	Seminar	100	Internal Evaluation 20 Marks for Report 20 Marks for subject content 40 Marks for presentation 20 Marks for Question and Answers		Continuous evaluation during a semester by the Departmental Committee (DC)
4	Comprehensive Mechanical Engineering	100	The marks can be allotted based on the performance in viva-voce conducted by Head of the department and two senior faculty members in the department.		
5	Project Work	100	70	External evaluation	Semester-end Project Viva-Voce Examination by Committee as detailed under 6.2
			30	Internal evaluation	Continuous evaluation by the DC 15 Marks by DC as detailed under 6.2.1 15 Marks by Supervisor

6.2. Project Work Evaluation:

6.2.1 The Internal Evaluation shall be made by the Departmental Committee, on the basis of average of two seminars presented by each student on the topic of his project, the best one to be considered. The presentations shall be evaluated by the Departmental Committee (DC) consisting of Head of the Department, supervisor and a senior faculty member.

6.2.2 The Semester-End Examination (viva-voce) shall be conducted by a Committee consisting of External examiner nominated by the Chief Controller of Examinations, HOD and Supervisor. The evaluation of project work shall be conducted at the end of the IV year.

6.3. Eligibility to appear for the year-end / Semester-End examination:

6.3.1 A student shall be eligible to appear for end examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in the year/ semester.

6.3.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in first year or each semester may be granted by the Institute Academic Committee if the reason for shortage is convincing.

6.3.3 Shortage of Attendance below 65% in aggregate shall in no case be condoned.

6.3.4 A stipulated fee shall be payable towards condonation of shortage of attendance to the Institute as per following slab system

1st Slab: Less than 75% attendance but equal to or greater than 70% a normal condonation fee can be collected from the student.

2nd Slab: Less than 70% but equal to or greater than 65%, double the condonation fee can be collected from the student.

6.3.5 Students whose shortage of attendance is not condoned in First year/any semester are not eligible to take their End examination of that class and their registration for that semester / year shall stand cancelled.

6.3.6 A student will not be promoted to the next semester unless he satisfies the attendance requirements of the current year/semester, as applicable.

6.3.7 A student detained due to shortage of attendance, will have to repeat that year/semester when offered next.

6.4 Revaluation / Recounting:

Students shall be permitted to request for recounting/ revaluation of the end theory examination answer scripts within a stipulated period after payment of prescribed fee.

After recounting or revaluation, records are updated with changes if any and the student will be issued a revised memorandum of marks. If there *are* no changes, the student shall be intimated the same through a letter or a notice.

6.5 Supplementary Examination:

All Regular examinations are understood as Regular/Supplementary examinations. The supplementary students have to appear for the supplementary examinations along with their regular examinations conducted at the end of each semester. However, separate supplementary examinations will be conducted for the II-Semester subjects at the end of I-Semester and vice-versa.

7. ACADEMIC REQUIREMENTS FOR PROMOTION/ COMPLETION OF REGULAR B.TECH PROGRAMME OF STUDY:

The following academic requirements have to be satisfied in addition to the attendance requirements for promotion/ completion of regular B.Tech Programme of study.

7.1 For students admitted into B.Tech. (Regular) programme:

7.1.1 A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the End examination and a minimum of 40% of marks in the sum total of the internal evaluation and End examination taken together. For the seminar he should secure a minimum of 40% marks.

7.1.2 For promotion from I B.Tech to II B.Tech a student must satisfy the attendance requirements in I year.

7.1.3 A Student shall be promoted from II year to III year, if he fulfills the academic requirements of securing a minimum of 56 credits from I year, II year I-Semester and II year II-Semester examinations conducted till that time.

7.1.4 A student shall be promoted from III year to IV year if he fulfills the academic requirements of securing a minimum of 86 credits from I year, II year I and II-Semesters and the III year I and II-Semester examinations conducted till that time.

7.1.5 **A student shall register for all the subjects and earn all the 236 credits**. Marks obtained in all the credits shall be considered for the calculation of the class based on CCPA.

7.1.6 A student who fails to earn all the 236 credits as indicated in the course structure within **eight** academic years from the year of his admission shall forfeit his seat in B.Tech. Programme and his admission stands cancelled.

7.2 For Lateral Entry Students (batches admitted from 2015-2016):

7.2.1 Academic requirements for pass in a subject are the same as in 7.1.1 and attendance requirements as in 6.3.

7.2.2 A student shall be promoted from II year to III year if he fulfills the academic requirements of securing a minimum of 28 credits from II year I and II-Semesters examinations conducted till that time.

7.2.3 A student shall be promoted from III year to IV year if he fulfills the academic requirements of securing a minimum of 58 credits from II year I and II-Semesters and the III year I and II-Semester examinations conducted till that time.

7.2.4 A student shall register for all the subjects and earn all such credits. Marks obtained in all such credits shall be considered for the calculation of the class based on CCPA.

7.2.5 A student who fails to earn all the 180 credits as indicated in the course structure within **six** academic years from the year of his admission shall forfeit his seat in B.Tech. Programme and his admission stands cancelled.

8. TRANSITORY REGULATIONS:

Students who got detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the course in earlier regulations (or) have discontinued and wish to continue the course are eligible for admission into the unfinished semester/year from the date of commencement of class work for the next batch or later batches with the same (or) equivalent subjects as and when subjects are offered and they continue to be in the academic regulations of the batch he is joining later.

9. CREDIT POINT AVERAGE (CPA) AND CUMULATIVE CREDIT POINT AVERAGE (CCPA):

9.1 For a semester/year:

CREDIT POINT AVERAGE [CPA] $=\frac{1}{10}\frac{\sum_i C_i T_i}{\sum_i C_i}$

Where C_i= Credits earned for Course i in any semester/ year,

T_i= Total marks obtained for course i in any semester/year,

9.2 For the entire programme:

CUMULATIVE CREDIT POINT AVERAGE [CCPA] $=\frac{1}{10}\frac{\sum_n \sum_i C_{ni} T_{ni}}{\sum_n \sum_i C_{ni}}$

n -refers to the semester in which such courses were credited

9.3 Overall Performance:

CCPA	Classification of final result
7.0 and above	First Class with distinction
6.0 and above but below 7.0	First class
5.0 and above but below 6.0	Second class
4.0 and above but below 5.0	Pass class

10. TRANSCRIPTS:

After successful completion of the entire programme of study, a transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued, if required, after payment of requisite fee. Partial transcript will also be issued up to any point of study to a student on request.

11. ELIGIBILITY:

A student shall be eligible for the award of B.Tech Degree if he fulfills all the following conditions:

(i) Registered and successfully completed all the components prescribed in the programme of study to which he is admitted.
(ii) Successfully acquired all **236 credits** as specified in the curriculum corresponding to the branch of study within the stipulated time.
(iii) No disciplinary action is pending against him.

12. AWARD OF B.TECH DEGREE:

The B.Tech Degree will be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Anantapur on the recommendations of the Principal of Annamacharya Institute of Technology and Sciences (Autonomous).

13. AMENDMENTS TO REGULATIONS:

The chairman, Academic Council of Annamacharya Institute of Technology and Sciences, Rajampet (Autonomous) reserves the right to revise, amend, or change the Regulations, Scheme of Examinations, and / or Syllabi or any other policy relevant to the needs of the society or industrial requirements etc., without prior notice.

14. Any legal issues are to be resolved in Rajampet Jurisdiction.

15. GENERAL:

Where the words "he", "him", "his", "himself" occur in the regulations, they include "she", "her", "herself".

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Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2014
Department	Department of Mechanical Engineering
Programme Code & Name	G5, B.Tech Mechanical Engineering

I Year B.Tech

Subject Code	**Subject Name**	**Hours/ Week**			**C**	**Maximum marks**		
		L	**T**	**P**		**Internal**	**External**	**Total**
4GC11	English	2	0	0	4	30	70	100
4GC12	Engineering Physics	2	0	0	4	30	70	100
4GC13	Engineering Chemistry	2	0	0	4	30	70	100
4GC14	Mathematics – I	3	1	0	6	30	70	100
4G113	Programming in C and Introduction to data structures	3	1	0	6	30	70	100
4G511	Engineering Mechanics	3	1	0	6	30	70	100
4G512	Engineering Graphics	1	1	6	10	30	70	100
4GC16	Engineering Physics and Chemistry Lab	0	0	3	4	30	70	100
4GC17	English Language and Communication Skills Lab	0	0	3	4	30	70	100
4G114	Programming in C and Introduction to data structures Lab	0	0	3	4	30	70	100
4G411	Engineering and IT workshop	0	0	3	4	30	70	100
	Total	**16**	**4**	**18**	**56**	**330**	**770**	**1100**

Note: L - Lecture; T-Tutorial; P – Practical; C - Credits

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I Year B.Tech. CE

(4GC11) ENGLISH
(Common to all branches)

Course Objectives:

- To improve the language proficiency of the students in English with an emphasis on LSRW skills
- To enhance the vocabulary of the students in English through the use of diversified authentic materials
- To equip the students with comprehension skills to study academic subjects with greater felicity
- To develop English communication skills of the students in formal and informal situations
- To enable the students absorb the human values expressed in literature

Textbooks Prescribed:

- The books prescribed serve as students' handbooks. The reader for detailed study comprises essays which are particularly relevant to engineering students. Texts from open sources are also included in the syllabus to make the teaching-learning process more interesting. Also, the literary texts from open sources will allow the student learn language from literature. The book for the non-detailed study allows the student to have an insight into the lives and careers of some legendary personalities.
- The text for non-detailed study is meant for extensive reading by the students. They may be encouraged to read some select topics on their own, which could lead into a classroom discussion. In addition to the exercises from the texts done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements etc.
- The teacher should focus on developing LSRW skills of students while using the prescribed text and exercises. The classes should be interactive. The students should be encouraged to participate in the classroom proceedings and also to write short paragraphs and essays. The main aim is to encourage two-way communication in place of one-sided lecture.

Unit I

Detailed Study: a) Technology with a Human Face, b) *Cabuliwallah* by Rabindranath Tagore

Non-detailed Study: G. D. Naidu

Grammar: Kinds of Verbs and their Use; Writing: Official Letters; Vocabulary: Synonyms and Antonyms, Prefixes and Suffixes, Idioms and Phrases

Unit II

Detailed Study: a) Climatic Change and Human Strategy, b) *If* by Rudyard Kipling

Non-detailed Study: Sudha Murthy

Grammar: Tenses; Writing: Letters of Application; Vocabulary: One-word Substitutes

Unit III

Detailed Study: a) Emerging Technologies: Solar Energy in Spain, b) *The Gift of Magi* by O. Henry

Non-detailed Study: Vijay Bhatkar

Grammar: Types of Sentences: Simple, Compound and Complex; Declarative, Interrogative, Imperative and Exclamatory; Writing: E-mails; Vocabulary: Commonly Confused Words

Unit IV

Detailed Study: Water: a) The Elixir of Life, b) *Night of the Scorpion* by Nissim Ezekiel

Non-detailed Study: Jagadis Chandra Bose

Grammar: Subject-verb Agreement; Writing: Official Reports, Technical Reports; Vocabulary: English Spelling, Commonly misspelt words

Unit V

Detailed Study: a) The Secret of Work, b) *The Zoo Story*, a One-act Play by Edward Albee

Non-detailed Study: Homi Jehangir Baba

Grammar: Active and Passive Voice; Writing: Note-making; Vocabulary: Connotations

For Detailed study: ***Sure Outcomes*** published by Orient Black Swan, Texts from Open Sources (Available on Web)

For Non-detailed study: ***Trailblazers*** published by Orient Black Swan

REFERENCES:

1. Technical Communication, Principles and Practice, Meenakshi Raman and Sangita Sharma, OUP, 2011, 2nd edition
2. Essential Grammar in Use, (with CD), Raymond Murphy, 3/e, Cambridge University Press, 2009
3. Basic Communication Skills for Technology, Andrea J Ruthurford, Pearson Education, Asia.

4. English for Technical Communication, Aysha Viswamohan, Tata Mc-Graw Hill
5. English Grammar and Composition, David Green, Mc Millan India Ltd.
6. Murphy's English Grammar, Raymond Murphy, CAMBRIDGE
7. Everyday Dialogues in English by Robert J. Dixson, Prentice-Hall of India Ltd., 2006.
8. Communication Skills for Technical Students, Farhathullah, T.M., Orient Blackswan, 2008
9. Developing Communication Skills, 2/e. by Krishna Mohan &MeeraBanerji , Macmillan, 2009
10. English for Technical Communication, Vol. 1 & 2, by K. R. Lakshmi Narayanan, Sci tech. Publications.
11. Longman Dictionary of Contemporary English with DVD, Pearson Longman.

Course Outcomes:

- The student will appreciate the significance of silent reading and comprehension
- The student will demonstrate the ability to guess the contextual meaning of the words and grasp the overall message of the text to draw inferences
- The student develops critical thinking and creative writing skills through exposure to literary texts
- The student will understand the components of different forms of writing
- The student will exhibit effective writing skills through his understanding of English Grammar

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I Year B.Tech. CE

(4G112) ENGINEERING PHYSICS
(Common to All Branches)

COURSE OBJECTIVS:

- The mission of the Engineering Physics course is to prepare students for careers in engineering where physics principles can be applied to the advancement of technology.
- The Engineering Physics course educates the principles of optical science and engineering necessary to understand optical systems.
- The Crystallography, X-ray diffraction of crystals and crystal defects explains how basic structure modulate properties of materials.
- The principles of quantum mechanics and electron theory of metals gives an idea on basic development of energy in metals.
- The main objective of this course to provide basic understanding of different engineering materials (semiconductors, magnetic, superconducting and nano materials).

UNIT 1 PHYSICAL OPTICS, LASERS AND FIBRE OPTICS:

Physical Optics*:* Introduction - Interference in thin films by reflection – Newton's Rings – Fraunhofer diffraction due to single slit, double slit and diffraction grating.

Lasers: Introduction - Characteristics of laser – Spontaneous and stimulated emission of radiation – Einstein's coefficients - Population inversion – Ruby laser - He-Ne laser – Semiconductor laser - Applications of lasers.

Fibre optics: Introduction– Construction and working principle of optical fiber –Numerical aperture and acceptance angle – Types of optical fibers – Optical fiber communication system – Applications of optical fibers in communications, sensors and medicine.

UNIT II CRYSTALLOGRAPHY AND ULTRASONICS:

Crystallography*:* Introduction – Space lattice –Unit cell – Lattice parameters – Bravias lattice –Crystal systems – Packing fractions of SC, BCC and FCC - Directions and planes in crystals – Miller indices – Interplanar spacing in cubic crystals – X-ray diffraction - Bragg's law – Laue and Powder methods – Defects in solids: point defects, line defects (qualitative) - screw and edge dislocation, burgers vector.

Ultrasonics*:* Introduction – Properties – Production of ultrasonics by piezoelectric method and detection – Applications in non-destructive testing.

UNIT III QUANTUM MECHANICS AND FREE ELECTRON THEORY:

Quantum Mechanics*:* Introduction to matter waves – de'Broglie hypothesis - Heisenberg's uncertainty principle - Schrodinger's time independent and time dependent wave equation – Significance of wave function - Particle in a one dimensional infinite potential well - Eigen values and Eigen functions.

Free electron theory: Classical free electron theory –- Sources of electrical resistance – Equation for electrical conductivity - Quantum free electron theory – Fermi-Dirac distribution – Kronig - Penny model (qualitative) – Origin of bands in solids – Classification of solids into conductors, semiconductors and insulators.

UNIT IV SEMICONDUCTORS AND MAGNETIC MATERIALS:

Semiconductors*:* Introduction – Intrinsic and extrinsic semiconductors – Drift & diffusion currents and Einstein's equation – Hall effect - Direct and indirect band gap semiconductors – Working principle of p-n junction diode, LED and photodiode.

Magnetic materials: Introduction and basic definitions – Origin of magnetic moments – Bohr magneton – Classification of magnetic materials into dia, para, ferro, antiferro and ferri magnetic materials – Hysteresis - Soft and hard magnetic materials and applications.

UNIT V SUPERCONDUCTIVITY AND NANOMATERIALS:

Superconductivity*:* Introduction –Properties of superconductors - Meissner effect – Type I and type II superconductors – Flux quantization – London penetration depth – BCS theory(qualitative) - ac and dc Josephson effects - Applications of superconductors.

Nanomaterials: Introduction - Significance of nanoscale –Basic principles of nano materials (Surface area and quantum confinement) – Physical properties: optical, thermal, mechanical and magnetic properties –Synthesis of nanomaterials: ball mill, chemical vapour deposition, sol-gel, plasma arcing and thermal evaporation methods – Properties of Carbon nanotubes & CNT applications – Applications of nanomaterials.

Text Books:

1. Engineering physics – S. ManiNaidu, Pearson Education, I Edition, 2012.
2. Engineering Physics – V. Rajendran, MacGraw Hill Publishers, I Edition,2008.
3. Engineering physics –P.K.palanisamy, scietech publisher,Edition, 2013.

Reference Books:

1. Engineering Physics – V. Rajendran, K.Thyagarajan Tata MacGraw Hill Publishers, III Edition, 2012.
2. Engineering Physics – RV.S.S.N. Ravi Kumar and N.V. Siva Krishna, Maruthi Publications , 2013

3. Engineering Physics – D.K.Battacharya and A.Bhaskaran,OxfordHeigher Education I Edition, 2010.
4. Engineering Physics – D K Pandey, S. Chaturvedi, Cengage Learning, I Edition, 2012
5. Engineering Physics – D.K.Bhattacharya and A.Bhaskaran, Oxford University press
6. Engineering Physics – M. Arumugam, Anuradha Publications II Edition, 1997.
7. Engineering physics – M.N. Avadhanulu and P.G. KrshiSagar, Chand and Co, Revised Edition, 2013.
8. Solid State Physics – A.J. Dekkar, McMillan Publishers, Latest edition, 2012.
9. Engineering Physics – Gaur and Gupta Dhanapati, RaiPublishers , 7th Edition, 1992.
10. Text book of Nanoscience and Nanotechnology: B S Murthy, P.Shankar, Baldev Raj B B Rath, James Murday, University Press, I Edition, 2012.

Course Outcomes:

The student is able to

- Understand basic principles of optics, optical engineering materials and incorporation of optics in engineering field.
- Identify different types of crystal structures in materials and x-ray diffraction through crystals.
- Know about importance of ultrasonic's in engineering field.
- Analysis basic concepts of quantum mechanics and electron theory and consequences.
- Explain about basic mechanism of different types of advanced materials used in engineering field.
- Get brief idea about synthesis, properties and applications of nano materials.

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I Year B.Tech. CE

(4G113) ENGINEERING CHEMISTRY
(Common to all branches)

Course Objectives:

- The Engineering Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications.
- The course main aim is to impart in-depth knowledge of the subject and highlight the role of chemistry in the field of engineering.
- The lucid explanation of the topics will help students understand the fundamental concepts and apply them to design engineering materials and solve problems related to them. An attempt has been made to logically correlate the topic with its application.
- The extension of fundamentals of electrochemistry to energy storage devices such as commercial batteries and fuel cells is one such example.
- After the completion of the course, the student would understand about the concepts of chemistry in respect of Electrochemical cells, fuel cells, mechanism of corrosion and factors to influence, polymers with their applications, analytical methods, engineering materials and water chemistry.

UNIT I: WATER TREATMENT

Impurities in water, Hardness of water and its Units, Disadvantages of hard water, Estimation of hardness by EDTA method, Numerical problems on hardness, Estimation of dissolved oxygen, Alkalinity and chlorides in water, Water treatment for domestic purpose Disinfection- Chlorination.

Industrial Use of water: For steam generation, Boiler troubles: Scale & Sludge, Priming and Foaming, Caustic Embrittlement and Boiler Corrosion.

Treatment of Boiler Feed water: Internal Treatment: Colloidal, Phosphate, Carbonate, Calgon and sodium aluminate conditioning. External Treatment: Ion-Exchange process, Desalination of brackish water by Reverse Osmosis.

UNIT II: ELECTROCHEMISTRY

Review of electrochemical cells, Numerical calculations, Batteries: Rechargeable batteries (Lead acid, Ni-Cd, Lithium Ion Batteries) Fuels cells: (Hydrogen-Oxygen and Methanol-Oxygen)

Electrochemical sensors: Potentiometric Sensors and voltammetric sensors. Examples: analysis of Glucose and urea.

Corrosion: Definition & Types (dry & wet Corrosions) concentration cell, galvanic corrosion, Electrochemical Theory of corrosion, Factors affecting the corrosion, Prevention: Anodic and Catholic protection, Electroplating & Electrolessplating

UNIT III: POLYMERS

Introduction to polymers, Polymerization process- types, Elastomers (rubbers), Natural Rubber, Compounding of Rubber, Synthetic Rubber: Preparation, properties and engineering applications of Buna-S & Buna-N rubbers. Plastics: Thermosetting and Thermoplastics, Preparation, properties and Engineering applications of PVC, Bakelite, nylons.

Conducting polymers: Mechanism, synthesis and applications of polyacetylene, polyaniline.

Inorganic Polymers: Basic Introduction, Silicones.

UNIT IV: FUEL TECHNOLOGY

Classifications of Fuels – Characteristics of Fuels- Calorific Value – Units, its determination using bomb calorimeter, Numerical Problems. Solid Fuels-Coke: Manufacture of Metallurgical Coke by Otto Hoffmann's by product oven processes.

Liquid Fuels: Petroleum: Refining of Petroleum, Gasoline: Octane Number, Synthetic Petrol: Bergius Processes, Fischer Tropsch's synthesis. Power Alcohol: Manufacture, Advantages and Disadvantages of Power Alcohol

Gaseous Fuels: Origin, Production and uses of Natural gas, Producer gas, Water gas, Coal gas and Biogas. Flue Gas analysis by Orsat's apparatus, Solving of problems on Combustion.

UNIT V: CHEMISTRY OF ENGINEERING MATERIALS

Cement: Composition & manufacture of Portland cement, Setting and Hardening (Hydration and Hydrolysis), Refractories: Classification, properties and applications

Lubricants: Theory of lubrication, properties of lubricants and applications, Rocket Propellants: Classification, Characteristics of good propellant

Text Books:

1. Engineering Chemistry by K.N.Jayaveera, G.V.Subba Reddy and C. Ramachandraiah, McGraw Hill Higher Education, New Delhi, Fourth Edition, 2012.
2. A Text book of Engineering Chemistry by S.S Dhara, S.S.Umare, S. Chand Publications, New Delhi, 12th Edition, 2010.

Reference Books:

1. A Text Book of Enigneering Chemistry, Jain and Jain, DhanapathRai Publishing Company, New Delhi, 15th Edition, 2010.
2. Engineering Chemistry by K.B.ChandraSekhar, UN.Das and Sujatha Mishra, SCITECH, Publications India Pvt Limited, Chennai, 2nd Edition, 2012.
3. Concepts of Engineering Chemistry- Ashima Srivastava and N.N. Janhavi, Acme Learning Pvt Ltd, First Edition, 2013.
4. Text Book of Engineering Chemistry – C. Parameswara Murthy, C.V.AgarwalandAndra Naidu, BS Publications, Hyderabad, 3rd Edition, 2008.
5. Text Book of Engineering Chemistry, Shashichawla, DhanapathRai Publications, New Delhi, 4th Edition, 2011.
6. Engineering Chemistry, K. Sesha Maheswaramma and MrudulaChugh, Pearson Education, First Edition, 2013.

Course outcomes:

The student is expected to:

- Understand the electrochemical sources of energy
- Understand industrially based polymers, various engineering materials.
- Differentiate between hard and soft water.
- Understand the disadvantages of using hard water domestically and industrially.
- Select and apply suitable water treatment methods domestically and industrially.
- Understand the manufacture of synthetic petrol.
- Differentiate between thermoplastics and thermosetting plastics.
- Understand the manufacture, setting and hardening of cement.

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(4G114) MATHEMATICS – I
(Common to all branches)

Course Objectives:

The course aims to provide the student with the ability

- To understand the Differential equations of first, second and higher orders with their applications.
- To apply this knowledge to evaluate the multiple integrals in real life situations.
- To apply the knowledge of Laplace transforms and vector calculus for engineering problems

UNIT I

Linear and Bernoulli equations. Applications to Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax}, sinax /cosax, polynomials in x, e^{ax}V(x), xV(x), method of variation of parameters. Applications to oscillatory electrical circuits, Deflection of Beams, whirling of shafts.

UNIT II

Rolle's Theorem – Lagrange's Mean Value Theorem – (excluding proof). Simple examples of Taylor's and McLaurin's Series - Functions of several variables – Jacobian – Maxima and Minima of functions of two variables, Lagrangian method of Multipliers with three variables only.

UNIT III

Curve tracing – Cartesian, polar and parametric curves.

Multiple integral: –Double integral – Evaluation - Change of Variables - Change of order of integration- Area and volumes using double integral. Triple integral - Evaluation.

UNIT IV

Laplace transform of standard functions – Inverse transform – First shifting Theorem, Transforms of derivatives and integrals – Second shifting theorem – Convolution theorem – Laplace transform of Periodic function - Application of Laplace transforms to ordinary differential equations of first and second order.

UNIT V

Vector Calculus: Gradient – Divergence – Curl - Line integral - Area, Surface and volume integrals. **Vector integral theorems**: Green's theorem – Stoke's theorem and Gauss's Divergence Theorem (without proofs) and their applications.

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers-42 Edition (2012)

REFERENCES:

1. Higher Engineering Mathematics, by Kreyszig
2. A Text Book of Engineering Mathematics, B.V. Ramana, Tata Mc Graw Hill.
3. A Text Book of Engineering Mathematics, Vol – 1, T.K.V. Iyengar, B. Krishna Gandhi and others, S. Chand & Company.
4. A Text Book of Engineering Mathematics-1,E. Rukmangadachari, E. Keshava Reddy, Pearson Education.

Course Outcomes:

Upon completion of the course, students will

- Understand the various types of ordinary differential equations
- Have the knowledge on functions of several variables.
- Understand the concepts of curve tracing, applications of integration.
- Have the knowledge of Laplace transforms and their inverse.
- Learn about vector integral theorems.

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(4G113) PROGRAMMING IN C AND INTRODUCTION TO DATA STRUCTURES

(Common to CIVIL, EEE, ME & ECE)

Course Objectives:

1. Introduction to computer peripherals, Software development.
2. Describe when and how to use the stand C statement and to Write, Compile and Debug basic C programs using an IDE
3. Write and debug programs using an IDE and the principles of designing structured programs when and how to use the appropriate statements available in the C language
4. Write basic C programs using , Selection statements, Repetitive statements, Functions, Pointers, Arrays and Strings
5. Implementation of C applications for data structures, sorting and searching.

UNIT I: Introduction to Computers: Computer Systems, Computer Environments, Computer Languages, Creating and Running C programs, System Development-Algorithms, Flow Charts.

Introduction to C Language: Structure of a C Language program, Keywords, Identifiers, Types, typedef, enumerated Types variables, constants, input/output, simple example programs.

UNIT II

Operators and Expressions, precedence and associatively, Type Conversions, Bitwise Operators. C Program Statements, Selection and Decision making Statements-two way selection –if…else statements, multi way selection-switch statements. Loop Control Statements-concept of a loop, pretest and post test loops ,event and Counter Controlled loops, Loops in C-while loop, do…while loop, for loop, Other Related Statements -break, continue, goto, sample programs.

ARRAYS: Declaring and Referencing Arrays, Array Subscripts, Using for Loops for Sequential Access, Multidimensional Arrays.

Strings: String Basics, String Library Functions, Array of Strings.

UNIT III

Functions: Library Functions in C, User defined Functions,-declaration, definition, calling of function , types of User defined functions, Parameter passing methods-pass by value, pass by reference, Scope, Storage Classes - Auto, Register, Static, Extern, Scope rules, Type Qualifiers, Recursion - Recursive Functions, Preprocessor Commands. Using Array Elements as Function Arguments.

Pointers - Introduction, Features of Pointers, Pointer Declaration and Definition, Void Pointers, pointers for inter function communication, Pointers to Pointers, Pointer Applications: arrays and pointers, pointer arithmetic, Dynamic Memory Allocation, Pointers to Functions, pointer to void and command line arguments.

UNIT IV

Structures – Definition, initialization, accessing structures, nested structures, array of structures, structures and functions. pointer and Structures. Unions. Sample programs

Files: Introduction Streams and File, Standard library input/output functions, formatted input/output functions, character input/output functions, Text verses binary Streams, Standard library functions for files. File examples.

Searching and Sorting - Exchange (Bubble) Sort, Selection Sort, Quick Sort, Insertion Sort, Merge Sort, Searching- Linear and Binary Search Methods.

UNIT V

Data Structures: Overview of Data Structure. **Stack:** Representation of a Stack, Operation on a Stack, Implementation of a Stack using Arrays and Pointers, Representation of Arithmetic Expressions, Infix, Prefix, and Postfix Notations, Evaluation of Postfix Expression, Recursion.

Queues: Representation of Queue, Insertion, Deletion, Searching Operations, Circular Queues.

Text books:

1. C Programming and Data Structures. B.A Forouzan,R. F.Gilberg,Cengage learning, Indian edition.
2. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education.
3. C and Data Structures, E.Balaguruswamy, Tata Mc Graw Hill.

Reference books:

1. C and Data Structures, A snapshot oriented treatise with live engineering examples, Dr. N.B.Venkateswarlu, Dr. E.V.Prasad, S. Chand.
2. LET US C, Yeswanth Kanitkar, Ninth Edition, BPB Publication.
3. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI, Eighth Edition.

Course Outcomes:

1. Understand the importance of the software development process and System development tools.
2. Understand general principles of C programming language and able to write simple program in C. Able to develop programs based on arrays and functions.
3. Understand the purpose of pointers for parameter passing, referencing and dereferencing and understands the concepts of structures, unions and File management.
4. Understands what and how to design data structure programs using C programming language.
5. Understands how to solve applications like searching and sorting using C Programming language.

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(4G511) ENGINEERING MECHANICS
(Common to CIVIL & ME)

Course Objective:

This course will serve as a basic course by introducing the concepts of basic mechanics which will help as a foundation to various courses.

UNIT I

INTRODUCTION TO ENGINEERING MECHANICS: Basic concepts - System of forces–Resultant of a force system, Moment of forces and its Application & Couples, Equilibrium system of forces, Free body diagrams
Types of Supports – Support reactions for beams with different types of loading – concentrated, uniformly distributed and uniformly varying loading and couple.

UNIT II

Analysis of Frames (analytical Method)- Types of Frames – Assumptions for forces in members of a perfect frame. Method of Joints, Method of Sections, Cantilever trusses and simply supported trusses.

UNIT III

FRICTION: Types of friction– Static and Dynamic Frictions, laws of Friction– Limiting friction–Motion of bodies – Ladder friction-Wedge friction

UNIT IV

CENTROID AND CENTER OF GRAVITY: Centroids of simple figures – Centroids of Composite figures – Centre of Gravity of bodies –Theorem of Pappu's Centre of Gravity of Composite figures. (Simple problems only).
Area moment of Inertia - Parallel axis and perpendicular axis theorems - Moments of Inertia of Composite Figures.
MASS MOMENT OF INERTIA: Moment of Inertia of Simple solids, Moment of Inertia of composite masses. (Simple problems only)

UNIT V

KINEMATICS: Rectilinear and Curvilinear motion – Velocity and Acceleration – Motion of a Rigid Body – Types and their Analysis in Planar Motion.

KINETICS : Analysis as particles and Analysis as a Rigid Body in Translation –Equations of Plane Motion – Fixed axis of Rotation –D' Alembert's principle - Work Energy Method – Equation for Translation – Work – Energy application to Particle Motion. Virtual work (Elementary treatment).

Text books:

1. Engineering Mechanics-Statics and Dynamics, A.Nelson, Tata McGraw-Hill Company.
2. Engineering Mechanics, R.K Bansal - Laxmi Publications
3. Singer's Engineering Mechanics, B. Vijay kumar reddy – B.S. Publishers.
4. Engineering Mechanics, Bhavikatti and Rajasekharappa

References:

1. Engineering Mechanics by Timoshenko & young, Tata McGraw-Hill Company
2. Engineering Mechanics – B. Bhathacharya- Oxford University Publications
3. Engineering Mechanics –Arthur P. Boresi and Richard J. Schmidt. – Brooks/Cole – Cengage Learning
4. Engineering Mechanics-Statics & Dynamics—Johnson & Beer

Course Outcomes:

- The students are capable of using the concepts of force, moment and its application.
- The students are capable of drawing free body diagrams. Solution to problems using graphical methods and law of triangle of forces.
- Students are capable of finding centre of gravity, moment of inertia and polar moment of inertia including transfer methods and their applications.
- The students are capable of understanding the motion in straight line and in curvilinear paths, its velocity and acceleration computation and methods of representing plane motion
- The students are capable of applying the concepts of work, energy and particle motion

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(4G512) ENGINEERING GRAPHICS
(Common to CIVIL & ME)

Course objectives:

- By studying the engineering drawing, a student becomes aware of how industry communicates technical information. Engineering drawing teaches the principles of accuracy and clarity in presenting the information necessary about objects.
- This course develops the engineering imagination i.e., so essential to a successful design, By learning techniques of engineering drawing changes the way one things about technical images.
- It is ideal to master the fundamentals of engineering drawing first and to later use these fundamentals for a particular application, such as computer aided drafting.
- Engineering Drawing is the language of engineers, by studying this course engineering and technology students will eventually be able to prepare drawings of various objects being used in technology.

UNIT I – INTRODUCTION TO ENGINEERING GRAPHICS: Engineering Graphics and its Significance – Drawing Instruments and their Use – Conventions in Drawing – Lettering – BIS Conventions.

Curves used in Engineering Practice

a) Conic Sections – General method

b) i) Ellipse- oblong, arcs of circle, concentric circle methods.
ii) Parabola – rectangle, tangent methods.
iii) Rectangular hyperbola.

c) Cycloid, Epicycloids and Hypocycloid

d) Involutes.

PROJECTION OF POINTS AND LINES: Principles of Orthographic Projection – Conventions – First and Third Angle Projections.

Projections of Point, Projections of lines inclined to one plane.

UNIT II- PROJECTION OF LINES INCLINED TO BOTH PLANES: Lines inclined to both planes, Finding True lengths & traces.

PROJECTIONS OF PLANES: Projections of regular Plane surfaces/figures, Projection of lines and planes using auxiliary planes.

UNIT III – PROJECTIONS OF SOLIDS: Projections of Regular Solids – cylinder, cone, prism and pyramid - inclined to both planes – Auxiliary Views.
SECTION OF SOLIDS: Section Planes and Sectional views of Right Regular Solids–Prism, Cylinder, Pyramid and Cone. True shapes of the sections.

UNIT IV–DEVELOPMENT OF SURFACES: Development of Surfaces of Right Regular Solids – Prisms, Cylinder, Pyramid, Cone and their Sectioned parts.
INTERPENETRATION OF RIGHT REGULAR SOLIDS: Projections of curves of Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone, Square Prism Vs Square Prism.

UNIT V – ISOMETRIC AND ORTHOGRAPHIC PROJECTIONS: Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric projections of spherical parts. Conversion of Isometric views to Orthographic Views – Convertion of Orthographic views to Isometric views.

Text books:
1. Engineering Drawing, N.D. Bhatt, Charotar Publishers
2. Engineering Drawing, Johle, Tata McGraw-Hill
3. Engineering Drawing, K.L. Narayana, P. Kanniah, Scitech Pub.

References:
1. Engineering Drawing and Graphics, Venugopal/ New age
2. Engineering Drawing, Venkata Reddy, B.S.Publishers.
3. Engineering Drawing, Shah and Rana, 2/e, Pearson Education

Course Outcomes:
- Student gets knowledge on various drawing instruments and its usage.
- Students capable to draw various curves like conic curves, cycloidal curves and involutes.
- Student can understand about orthographic projection and able to draw points, lines, planes and solids according to orthographic projections.
- Student able to draw, when the simple solids are sectioned and their developments of surfaces.
- Student can imagine and construct the interpenetration of simple solids.
- Student can convert and draw the given orthographic view to isometric view and vice versa.

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(4GC16) ENGINEERING PHYSICS AND CHEMISTRY LAB
(Common to all branches)

PART A: ENGINEERING PHYSICS LAB

LIST OF EXPERIMENTS

Any 10 of the following experiments has to be performed

1. Determination of wavelengths of various colors of mercury spectrum using diffraction grating in normal incidence method
2. Determination of dispersive power of the prism
3. Determination of thickness of thin object by wedge method
4. Determination of radius of curvature of lens by Newton's Rings
5. Laser : Diffraction due to single slit
6. Laser : Diffraction due to double slit
7. Laser: Determination of wavelength using diffraction grating
8. Determination of Numerical aperture of an optical fiber
9. Meldes experiment: Determination of the frequency of tuning fork
10. Sonometer: Verification of the three laws of stretched strings
11. Energy gap of a material using p-n junction diode
12. Hall effect : Determination of mobility of charge carriers in semiconductor
13. B-H curve
14. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
15. Determination of rigidity modulus –Torsional pendulum

References:

1. Engineering Physics Practicals – Dr. B. Srinivasa Rao V.K.V. Krishna K.S Rudramamba
2. Engineering Practical Physics – S.L Kakani& Shubra Kakani

PART B: ENGINEERING CHEMISTRY LAB

LIST OF EXPERIMENTS

Any 10 of the following experiments has to be performed

1. Estimation of iron (II) using Diphenylamine indicator (Dichrometry – Internal indicator method)
2. Estimation of Chloride ion using potassium Chromite indicator (Mohr's method)
3. Determination of total hardness of water by EDTA method
4. Conductometric titration of strong acid Vs strong base (Neutralization titration)
5. Determination of Copper by EDTA method
6. Estimation of Dissolved Oxygen by Winkler's method
7. Determination of Alkalinity of Water.
8. Estimation of Iron in Cement by Colorimetry.
9. Determination of Calorific Value of fuel by using Bomb Calorimeter
10. Determination of Viscosity of oils using Redwood Viscometer I
11. Determination of Eutectic temperature of binary system (urea-benzoic acid)
12. Determination of Viscosity of oils using Redwood Viscometer II
13. Determination of Copper by Iodometry
14. Conductometric titration of Barium Chloride vs Sodium Sulphate (Precipitation Titration)
15. Determination of acidity of Water

References:

1. Vogel's Text book of Quantitative Chemical Analysis, J. Mendham et al, Pearson Education, Sixth Edition, 2012.
2. Chemistry Practical – Lab Manual by K.B.ChandraSekhar, G.V. Subba Reddy and K.N.Jayaveera, SM Publications, Hyderabad, 3rd Edition, 2012.

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(4G117) ENGLISH LANGUAGE & COMMUNICATION SKILLS LAB

(Common to all branches)

The **Language Lab** focuses on the production and practice of sounds of language and equips students with the use of English in everyday situations and contexts.

Course Objectives:

- To train students to use language effectively in everyday conversations
- To enable a learner sharpen his public speaking skills
- To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning
- To enable the student learn better pronunciation through emphasis on word accent, intonation, and rhythm

SYLLABUS:

The following course content is prescribed for the **English Language Laboratory** sessions:

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants
2. Introduction to Stress and Intonation
3. Situational Dialogues and Role-play
4. Telephone Skills
5. 'Just A Minute' (JAM)
6. Oral Presentations
7. Describing Objects / Situation / People
8. Information Transfer

Manual cum Record, prepared by the Faculty Members of English of the college will be used by Students.

Minimum Requirement:

The English Language Lab shall have two parts:

- **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.

- **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V. an LCD projector, a digital stereo –audio & video system and camcorder etc.

Suggested Software:

Sky Pronunciation Suite
Connected Speech from Clarity
Clarity Pronunciation Power – Part I
Mastering English in Vocabulary, Grammar, Spellings, Composition
English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge
Dorling Kindersley - Series of Grammar, Punctuation, Composition etc.
Language in Use, Foundation Books Pvt Ltd with CD
Learning to Speak English - 4 CDs
Microsoft Encarta with CD
Cambridge Advanced Learners' English Dictionary with CD.
Murphy's English Grammar, Cambridge with CD

Course Outcomes:

- The student will be able to express himself fluently in social and professional contexts
- The student will enhance his skills to make a presentation confidently
- The student will learn how to neutralize his accent
- The student will be able to decipher information from graphics and describe it professionally

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(4G114) PROGRAMMING IN C AND DATA STRUCTURES LAB

(Common to CIVIL, EEE, ME & ECE)

Course Objectives:

- To make the student learn a programming language.
- To teach the student to write programs in C to solve the problems.
- To introduce the student to simple linear data structures such as lists, stacks, queues.

Recommended Systems/Software Requirements:

• Intel based desktop PC with ANSI C Compiler and Supporting Editors

Exercise l.

a) Write a C program to calculate Simple Interest by accepting principle amount, rate of interest and time.
b) Write a C program to find the roots of a quadratic equation.
c) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Exercise 2.

a) Write a C program to find the sum of individual digits of a positive integer.
b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Exercise 3.

a) Write a C program to find the given number is Armstrong number or not.
($153 = 1^3 + 5^3 + 3^3$)
b) Write a C program to find the given number is Strong number or not.
(145 = 1!+4!+5!)
c) Write a C program to generate all the Armstrong numbers between 1 and n, and Strong number between 1 and n where n is a value supplied by the user

Exercise 4.

a) Write a C program to calculate the following Sum:

$$Sum = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \frac{x^8}{8!} - \frac{x^{10}}{10!}$$

b) Write a C program to read in two numbers, x and n, and then compute the sum of the geometric progression:

$$1 + x + x^2 + x^3 + \ldots\ldots\ldots\ldots\ldots + x^n$$

For example: if n is 3 and x is 5, then the program computes 1+5+25+125. Print x, n, the sum Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Find if any values of x are also illegal? If so, test for them too.

Exercise 5.

a) Write a C program to generate Pascal's triangle.

b) Write a C program to construct a pyramid of numbers.

Exercise 6.

a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.

b) Write a C program to convert a Roman number to its decimal equivalent.

Exercise 7.

a) Write a C program to find both the largest and smallest number in a list of integers.

b) Write a C program that uses functions to perform the following:

i) Addition of Two Matrices ii) Multiplication of Two Matrices

Exercise 8.

Write C programs that use both recursive and non-recursive functions

i) To find the factorial of a given integer.

ii) To find the GCD (greatest common divisor) of two given integers.

iii) To solve Towers of Hanoi problem.

Exercise 9.

a) Write a C program that uses functions to perform the following operations:

i) To insert a sub-string into a given main string from a given position.

ii) To delete n Characters from a given position in a given string.

b) Write a C program to determine if the given string is a palindrome or not.

Exercise 10.

a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.

b) Write a C program to count the lines, words and characters in a given text.

Exercise 11.

Write a C program that uses functions to perform the following operations:

i) Reading a complex number ii) Writing a complex number

iii) Addition of two complex numbers iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

Exercise 12

a) Write a C program which copies one file to another.

b) Write a C program to reverse the first n characters in a file.

(Note: The file name and n are specified on the command line.)

Exercise 13

a) Write a C programme to display the contents of a file.

b) Write a C programme to merge two files into a third file
(i.e., the contents of the first file followed by those of the second are put in the third file)

Exercise 14

Write C programs that implement stack (its operations) using

i) Arrays ii) Pointers

Exercise 15

Write C programs that implement Queue (its operations) using

i) Arrays ii) Pointers

Exercise 16

Write C programs that implement Circular Queue (its operations) using

i) Arrays ii) Pointers

Exercise 17

Write a C program that uses Stack operations to perform the following:

i) Converting infix expression into postfix expression

ii) Evaluating the postfix expression

Exercise 18

Write a C program that implements the following sorting methods to sort a given list of integers in ascending order

i) Bubble sort ii) Selection sort iii) Insertion sort

Exercise 19

Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:

i) Linear search ii) Binary search

Exercise 20

Write C program that implements the Quick sort method to sort a given list of integers in ascending order.

Exercise 21

Write C program that implement the Merge sort method to sort a given list of integers in ascending order.

REFERENCE BOOKS

1. The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.
2. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.
3. Computer Basics and C Programming, V. Rajaraman, PHI Publications.

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(4G411) ENGINEERING & I.T. WORKSHOP
(Common to all branches)

ENGINEERING WORKSHOP

Course Objectives:

The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially he should know the labor involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

1. TRADES FOR EXERCISES:

a. Carpentry shop– Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, cross lap joint, mortise and tenon T joint, Bridle T joint from out of 300 x 40 x 25 mm soft wood stock
b. Fitting shop– Two joints (exercises) from: square joint, V joint, half round joint or dove tail joint out of 100 x 50 x 5 mm M.S. stock.
c. Sheet metal shop– Two jobs (exercises) from: Tray, cylinder, hopper or funnel from out of 22 or 20 gauge G.I. sheet.
d. House-wiring– Two jobs (exercises) from: wiring for ceiling rose and two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, wiring for a water pump with single phase starter.
e. Foundry– Preparation of two moulds (exercises): for a single pattern and a double pattern.
f. Welding – Preparation of two welds (exercises): single V butt joint, lap joint, double V butt joint or T fillet joint

2. TRADES FOR DEMONSTRATION:

a. Plumbing
b. Machine Shop

c. Metal Cutting

Apart from the above the shop rooms should display charts, layouts, figures, circuits, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, Plastics, steels, meters, gauges, equipment, CD or DVD displays, First aid, shop safety etc. (though they may not be used for the exercises but they give valuable information to the student). In the class work or in the examination knowledge of all shop practices may be stressed upon rather than skill acquired in making the job.

I.T. WORKSHOP

Course Objectives:

- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations.
- To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system.
- To learn about Networking of computers and use Internet facility for Browsing and Searching.

Preparing your Computer (5 weeks)

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

Task 3: Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4: Operating system features: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

Networking and Internet (4 weeks)

Task 5: Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc should be done by the student. The entire process has to be documented.

Task 6: Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email. They should get acquaintance with applications like Facebook, skype etc. If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, search

process using different natural languages, and creating e-mail account. Draft syllabus, R13 regulations (UG)

Task 7: Antivirus: Students should download freely available Antivirus software, install it and use it to check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc.

Productivity tools (6 weeks)

Task 8: Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content

sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

Task 9: Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

Task 10: Presentations: creating, opening, saving and running the presentations, Selecting the style for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

Optional Tasks:

Task 11: Laboratory Equipment: Students may submit a report on specifications of various equipment that may be used by them for the laboratories in their curriculum starting from I B.tech to IV. B.Tech. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

- Desktop computer
- Server computer
- Switch (computer science related)
- Microprocessor kit
- Micro controller kit
- Lathe machine
- Generators
- Construction material
- Air conditioner
- UPS and Inverter
- RO system
- Electrical Rectifier
- CRO Draft syllabus, R13 regulations (UG)
- Function Generator
- Microwave benches

Task 12: Software: Students may submit a report on specifications of various software that may be used by them for the laboratories in their curriculum starting from I B.tech to IV. B.Tech. The software may be proprietary software or Free and Open source software. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

- Desktop operating system

- Server operating system
- Antivirus software
- MATLAB
- CAD/CAM software
- AUTOCAD

References:

1. Introduction to Computers, Peter Norton, Mc Graw Hill
2. MOS study guide for word, Excel, Powerpoint & Outlook Exams", Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI
5. Trouble shooting, Maintaining & Repairing PCs", Bigelows, TMH

Reference books:

1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009.
2. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.
3. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas.
4. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

Course Outcomes:

- Disassemble and Assemble a Personal Computer and prepare the computer ready to use.
- Prepare the Documents using Word processors
- Prepare Slide presentations using the presentation tool
- Interconnect two or more computers for information sharing
- Access the Internet and Browse it to obtain the required information
- Install single or dual operating systems on computer