Bapatla Engineering College

(*Autonomous*)

BAPATLA

ACADEMIC RULES & REGULATIONS and SYLLABUS
(R18 REGULATIONS)

HAND BOOK

(2019-2020)

First & Second Year B.Tech.

Bapatla Engineering College:: Bapatla

(Autonomous under Acharya Nagarjuna University)

(Sponsored by Bapatla Education Society)

BAPATLA-522102, Guntur District, A.P.

www.becbapatla.ac.in

Vision & Mission of the College

Vision:

To build centers of excellence, impart high quality education and instill high standards of ethics and professionalism through strategic efforts of our dedicated staff, which allows the college to effectively adapt to the ever changing aspects of education.

To empower the faculty and students with the knowledge, skills and innovative thinking to facilitate discovery in numerous existing and yet to be discovered fields of engineering, technology and interdisciplinary endeavors.

Mission:

Our mission is to impart the quality education at par with global standards to the students from all over India and in particular those from the local and rural areas. We continuously try to maintain high standards so as to make them technologically competent and ethically strong individuals who shall be able to improve the quality of life and economy of our country.

Profile of the College

Year of Start	1981
Courses offered	**B.Tech.:** 1. Civil Engineering (CE), 2. Computer Science & Engineering (CSE), 3. Electronics & Communication Engineering (ECE), 4. Electrical & Electronics Engineering (EEE), 5. Electronics & Instrumentation Engineering (EIE), 6. Information Technology (IT), 7. Mechanical Engineering (ME)
	M.Tech.: 1. CE (Structural Engineering), 2. ME (CAD/CAM), 3. ECE (Communication Engineering & Signal Processing), 4. EEE (Power Systems Engineering) & 5. C.S.E.
	Master of Computer Applications (MCA)
	M.Sc.: Mathematics, Physics, Electronics, Chemistry (Organic & Analytical) & Computer Science
Accredited by NBA in the years	07.05.2003 (CE, CSE, ECE, EEE, EIE, ME) 16.03.2007 (CH, CE, CSE, ECE, EEE, EIE, IT & ME) 04.01.2013 (CH, CE, CSE, ECE, EEE, EIE & ME)
Autonomous Status	2010
Accredited by NAAC	2015
Research Park	Innovation Centres: 1) Kuka Robotic Technology Centre 2) Bosch Rexroth Centre of Competence in Automation Technologies 3) Siemens Centre of Excellence 4)Industry Institute Interaction Cell 5) Centre for Continuing Education 6) Incubation Skill Development Cell
Library	Titles: 28,323; Books: 75,317, Journals: International Online-523, Print-30, National Print-90, Educational CDs- 3,237; No. of Staff: 8
Sports facilities	Cricket, Basket Ball, Volley Ball, Ball Badminton, Hockey, Tennis, Foot Ball, Table Tennis, Chess, Caroms & Weight Lifting, Weight Training
Area	30 Acres; Built-up Area: 56102 Sq.mt.
Awards	Best Library (2011, 14, 18), Best laboratory (2009, 10, 11), Best UG Performance College (2011, 12) ,Best Eco Friendly Campus (2016) from Acharya Nagarjuna University
CISCO	A two-way interactive CISCO Digital Media System that is first of its kind in the South Asia Pacific Region at a cost of Rs.3 Crores
Placement/Training	No. of Students placed in 2018-19: 450, No. of Companies visited: 50
Students Activities	Suryodhaya Society for Awakening Community **(SAC)** for social service, Centre for Creative Arts **(CCA)** for cultural & arts and **AWAAZ** the literary club with the main motto of nurturing the inherent talents in the students.
NCC / NSS	NCC (Army wing) unit with 50 cadets. Training will be given by the P.I. Staff from 1(A) Engr. Coy, Guntur. NSS with 300 volunteers.
Facilities	Hostel for girls, Food court, Own Transport, 24x7 power supply, Mineral water, Bank, Post Office

ABOUT THE BAPATLA EDUCATION SOCIETY

BAPATLA EDUCATION SOCIETY was established in the year 1962 registered No: 58/1962 under societies act XXI of 1860 with the objectives to found and run the Educational & Cultural Institutions.

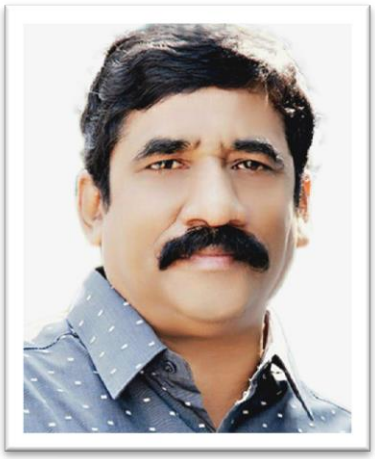
Distinguished Office Bearers of the Society:

Sri M. Seshagiri Rao
President

Sri Paladugu Paparao
Vice President-1

Sri Burle Venkata Siva Rama Krishna
Vice President-2

Sri Manam Nageswara Rao
Secretary



Sri Panguluri Bhavannarayana Chowdary
Jt. Secretary & Correspondent

Sri Chandrapati Venkaiah
Treasurer

The management members are imbued with a spirit of selfless service and believe in the principle of Academic autonomy. Transparency of all financial transactions is strictly adhered and all payments and receipts are through bank transactions only. The Management obtains objective feedback about all aspects of the college and suitably advises and motivates employees in a discrete manner. As a mark of commitment to good management, rules and regulations are applied with justice and fair play. Above all, the management makes all out effort to provide healthy environment on the campus. (Lawns, Greenery including 1000 neem trees and CC roads provided)

MESSAGE FROM PRINCIPAL

Dr. V. Damodara Naidu
B.TECH. (Mech.), M.TECH. (Prod), IIT-Kgp, PH.D., JNTUH

A warm welcome to NAAC accredited Bapatla Engineering College (BEC). The Bapatla Engineering College (Autonomous), one of the seven educational institutions sponsored by the Bapatla Education Society, was established in 1981 with a vision to impart quality technical education and is affiliated to Acharya Nagarjuna University. The College is credited with beautifully laid out and thoughtfully designed. The college has well qualified faculty members from IITs, NITs and reputed universities and has 63 doctorates and more than 60 faculty pursuing Doctorate degrees.

The college is one of the first generation self-financed engineering colleges started in the year 1981 and is regarded as one of the best engineering colleges in the state of Andhra Pradesh.

The teaching learning process in the campus is meticulously planned and effectively implemented by the Heads of the Departments with the able support of the staff members. Continuous evaluation backed by remedial classes, student counseling and parent interactions, form the nucleus of the teaching learning process.

The college is chosen by several world renowned leaders such as Bosch Rexroth Center of Competence in Automation Technologies, Siemens Center of Excellence and Kuka Robotic Technology Center to have their centers of research and innovation under one roof in a unique Research Park established at a cost of Rs.20 Crores.

BEC has taken the class room teaching to world class level through the two-way interactive Digital Media System. We are member of Indian Society for Technical Education (ISTE), Computer Society of India (CSI) etc. Various workshops, seminars, conferences, and Faculty Development Programs (FDP) are conducted through ISTE, and add-on courses and several skill development programs are being organized by the college.

The Department of Training and Placement facilitates the maximum employment opportunities to all the deserving candidates of final and pre-final year students. Many of our Alumni are decorating the top positions at many reputed Multi-National Companies.

We always look at the employability skills and try to perfectly match with the requirements of the Industry. We impart training in Technical Skills and Life Skills (Soft Skills) as a part of our curriculum to mould and shape the personalities and make the students employable. In order to shape the life skills (soft skills), we are imparting regular training internally and through external resources as well.

We emphasize mainly on Assessment and Evaluation, analyzing the training needs of each candidate, and provide Career Guidance and Counseling. The college provides Training on Business English Communication Skills, Aptitude, Domain skills as needed by the Industry. We promote industrial visits and knowledge sessions to make students familiar with industrial practices. The college encourages students to pursue internships to gain work experience in industries and increase their employability. EDP Cell conducts various programs to develop entrepreneurship culture among students. Over 50 companies visited our college, and more than 65% of eligible students have been placed in various reputed companies for the academic year 2018-19. The students of the college continuously excel in national and international competitive examinations like GATE, IELTS, GRE and TOEFL. We have several Industry MoUs which will help to train faculty and students on latest trends in the technology. Some of the MOUS are listed below:

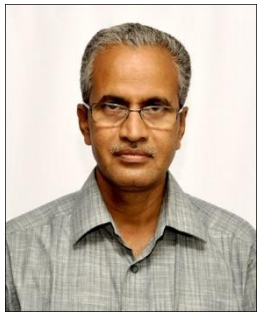
1.	NASSCOM, Delhi.	CSE/IT
2.	New Mexican State University, NEW Mexico, USA.	All Depts.
3.	Acer Engineers Private Limited, Hyderabad.	Civil Engg.
4.	ICT Academy, Chennai	All Depts.
5.	Caddy Code Solutions Pvt Ltd., Bangalore	IT
6.	APHRDI, Govt. of AP	All Depts.
7.	Sri Lakshmi Ganapathi Engineering Works (to be signed), Tenali.	Mech. Engg.
8.	Satyam Ventures Engineering Services Private Limited, Hyderabad (to be signed)	Mech. Engg.
9.	Construction Industry Development Council, Delhi	Civil Engg.
10.	Microlink Peripheral Controls Pvt. Ltd., Vijayawada	ECE
11.	SRC E-Solutions, Vijayawada	ECE
12.	BT & BT Management consultancy Pvt. Limited. (to be signed)	All Depts.

The college is enriched with Centre for Innovation Incubation and Entrepreneurship (CIIE) and well-established library with Digital Library facility that caters to the needs of student. The institution is a hub of Student clubs that helps them to gratify their creative and innovative minds and weaving social responsibility with leadership qualities among students. The college also provides amenities like subsidized transportation, food court, mineral water, internet, Bank, Post office, Ladies Hostel and Dispensary equipped with an ambulance for the convenience of faculty, staff and students.

We have Governing body (Autonomous), College Academic Council for the continuous improvement of academic performance. We have formed several Committees for Grievance and Redressal, Examination, Admission, Library, Student Welfare, Internal Complaints, Extra-Curricular Activities, Academic Audit, Disciplinary, Research, Sports, Training and Placement, Alumni Affairs, Anti-Ragging, Campus Facilities, and Maintenance under Planning and Evaluation Committee.

We wish all the students to utilize the infrastructure and the experienced faculty of our institution to equip themselves with emerging technologies and innovative skills that make them lead the nation in to new heights of advancement and development to enrich every citizen’s life.

Heads of Departments



Dr. J. S. Rao
Head, Chemical Engg. & COE

Dr. Naga Satish
Head, Civil Engineering

Dr. Shaik Nazeer
Head, CSE

Dr. B. Chandra Mohan, Head, ECE

Dr. N. Rama Devi
Head, EEE

Prof. Ch. Ramesh
Head, EIE

Prof. N. Siva Rama Prasad
Head, IT

Dr. T Nancharaiah
Head, Mechanical Engg.

Dr. P. Vijaya Saradhi
Head, Mathematics

Dr. K. Rama Krishna
Head, Physics

Dr. V. Madhava Rao
Head, Chemistry

Dr. P. AshaMadhavi
Head, English

Mr. K.N. Prasad
Head, MCA

Mr. A. Rama Mohana Rao
Librarian

Mr. Justin Chako
Head, Placements

Dr.T.Chandrasekhara Rao, Warden, Campus Hostel

Mr. Meeravali Shaik
Physical Director

Mr. D. Gopala Krishna
Office Superintendent

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)

Academic Rules & Regulations for B. Tech Program

(Approved by Academic Council & Governing Body of the College held on August 2018)

(Amended in August 2019; Effective for students admitted into First year B.Tech from the academic year 2018-2019 onwards – R18 Regulations).

1.0 EXTENT: All the rules and regulations, specified herein after, shall be read as a whole for the purpose of interpretation and when a doubt arises, the interpretation of the Chairman, Academic Council, Bapatla Engineering College (Autonomous) is final. As per the requirements of the Statutory Bodies, The Principal, Bapatla Engineering College (Autonomous), shall be the Chairman of the College Academic Council.

1.1DURATION OF THE PROGRAMME AND MEDIUM OF INSTRUCTION: The duration of the B.Tech. Programme is for four academic years consisting of two semesters in each academic year. The medium of instruction and examinations is English.

2.0 ADMISSIONS:

2.1 Admission into the First year of any Four Year B.Tech. Programmes of study in Engineering: Admissions into the first year of B.Tech. Programme of Bapatla Engineering College (Autonomous) (***Subsequently referred to as*** **B.E.C**) will be as per the norms stipulated by the Govt. of Andhra Pradesh from time to time.

2.2 Admission into the Second year of any Four year B.Tech. Programmes of study in Engineering as Lateral Entry Student**:** Admissions into the second year of B.Tech. Programme of B.E.C will be as per the norms stipulated by the Govt. of Andhra Pradesh from time to time.

2.3 Admissions with advance standing: These may arise in the following cases:

1) When a student seeks transfer from other colleges to B.E.C and intends to pursue B.Tech at B.E.C in an eligible branch of study.
2) When students of B.E.C get transferred from one regulation to another regulation or from previous curriculum to revised curriculum.
3) When a student, after long discontinuity, rejoins the college to complete his/her Programme of study for the award of the degree.

These admissions may be permitted by the Academic Council of B.E.C as per the norms stipulated by the statutory bodies and the Govt. of Andhra Pradesh from time to time. In all such cases for admission, when needed, permissions from the statutory bodies are to be obtained and the Programme of study at B.E.C will be governed by the transitory regulations stipulated in ***4.3.3 and 4.3.4.***

3.0 Details of the Program:

S.No	Activity	Description
1.	Number of Semesters in an Academic Year	Two
2.	Course Work	15 Weeks. 90 instructional days.
3.	Evaluation	As per the Assessment and Examination Policy.

4.0 Programmes of study in B.Tech:

4.1 The Four year B.Tech Programme is offered in the following branches of study:

S.No.	Title of the UG Programme	Abbreviation
1.	Civil Engineering	CE
2.	Computer Science & Engineering	CS
3.	Electrical & Electronics Engineering	EE
4.	Electronics & Communication Engineering	EC
5.	Electronics & Instrumentation Engineering	EI
6.	Information Technology	IT
7.	Mechanical Engineering	ME

4.2 Structure of the Programme:

As per the Program Review Policy & AICTE model curriculum guidelines.

4.3 **Transitory Regulations**: For students admitted under advance standing (mentioned in 2.3) these transitory regulations will provide the *modus operandi*.

At the time of such admission, based on the Programme pursued (case by case)

1) Equivalent courses completed by the student are established by the BOS concerned.
2) Marks/Credits are transferred for all such equivalent courses and treated as successfully cleared in the Programme of study prescribed by the concerned BOS.
3) A Programme chart of residual courses not cleared will be derived and a Programme of study with duration specified will be prescribed for pursuit at B.E.C.
4) Marks obtained in the previous system, if the case be, are converted to grades and CGPA is calculated accordingly.

All other modalities and regulations governing shall be the same as those applicable to the stream of students with whom such a candidate is included into.

4.4 Curriculum for each Programme of study:

1) The Four year curriculum of any B.Tech Programme of study in any branch of engineering is formulated based on the guidelines mentioned in 4.2 and will be recommended by the Board of Studies concerned and is approved by the Academic council of the college.
2) In the case of students admitted through lateral entry, the respective regular curriculum from the second year onwards is to be pursued by such students. Foundation courses may be added if necessary.
3) In the case of students admitted under advanced standing, the equivalency will be prepared by the Department Committee and to be approved by the Board of Studies concerned and the Academic Council.
4) After approval from the Academic Council, Department informs the courses to be taken by all the students along with the academic regulations.

Table below shows a typical curriculum frame work for B.Tech Degree program.

S.No.	Subject Area	Average no. of credits
1.	Humanities & Social Sciences courses	12 - 14
2.	Basic Science Courses	21 – 28
3.	Engineering Science	18 - 21
4.	Professional Core courses	65 – 78
5.	Professional Elective Courses	15 - 21
6.	Open Electives	6 – 12
7.	Major Project / Seminar, etc	12
8.	MOOCs	2
9.	Summer Internship	2
10.	Mandatory courses (2 courses)*	0
	TOTAL	165 - 170

The students admitted through the **Lateral Entry scheme** have to complete **125 – 130** credits.

*For mandatory courses as suggested by UGC / AICTE no credits are allocated but obtaining pass grade in these subjects is compulsory to obtain degree.

4.5 The Maximum duration permitted to pursue the programme and cancellation of admission:

4.5.1 The maximum duration permitted for any student to successfully complete any four year B.Tech. Programme of study shall be:

1) Eight academic years in sequence from the year of admission for a normal student admitted into the first year of any Programme,
2) Six academic years in sequence from the year of admission for a Lateral entry student admitted into the second year of any Programme, and
3) For students admitted with advanced standing, the maximum time for completion of Programme study shall be twice the period in terms of academic years in sequence, stipulated in the Programme curriculum defined at the time of admission.

4.5.2 In case, any student fails to meet the applicable conditions for the eligibility of degree in the maximum stipulated period as mentioned in ***4.5.1***, his/her admission stands cancelled and no degree will be awarded.

5.0 EXAMINATION& EVALUATION:

The performance of the students in each semester shall be assessed course wise. All assessments will be done on absolute mark basis. However, for the purpose of reporting the performance of a candidate, letter grades and grade points will be awarded as per section ***9.1.***

EVALUATION:

The performance of the students in each semester shall be assessed course wise. All assessments will be done on absolute mark basis. However, for the purpose of reporting the performance of a candidate, letter grades and grade points will be awarded. The performance of a student in each course is assessed with alternate assessment methods, term examinations on a continuous basis during the semester called Continuous Internal Evaluation (CIE) and a Semester End Examination (SEE) conducted at the end of the semester. For each theory, design and/or drawing course, there shall be a comprehensive Semester End Examination (SEE) of three hours duration at the end of each Semester, except where stated otherwise in the detailed Scheme of Instruction.

The distribution of marks between Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) to be conducted at the end of the semester will be as follows:

Nature of the Course	**CIE**	**SEE**
Theory subjects	50	50
Drawing	50	50
Practical	50	50
Term Paper	50	50
Project work	75	75

5.1 Continuous Internal Evaluation (CIE) in Theory and Drawing subjects:

In each Semester there shall be two Term examinations and some ***Alternate Assessment Tools (AAT)*** like Home Assignment, Class Test, Problem Solving, Group Discussion, Quiz, Seminar and Field Study in every theory course. The Alternate Assessment Tools with detailed modality of evaluation for each course shall be finalized by the teacher concerned before beginning of the course. It will be reviewed and approved by the Department Committee.

The Term Examination is conducted in the regular mode according to a schedule which will be common for a particular year of study. The maximum weightage for Term Examinations, AATs and the calculation of marks for CIE in a theory course is given in the following table.

Particulars	Term Exams (Max. 20 marks)	AAT (Max. 30 marks)
Better Performed exa	75% of marks obtained	Continuous assessment by teacher as per the predetermined course delivery & assessment plan. (Min. two assessments)
Other exam	25% of marks obtained	

A minimum of 25 (50%) marks are to be secured exclusively in the Continuous Internal Evaluation (CIE) in order to be declared as passed in that course and eligible to write the SEE of that course.

Semester End Examination (SEE) in Theory, Design and/or Drawing course:

a) For each theory, design and/or drawing course, there shall be a comprehensive Semester End Examination (SEE) of three hours duration at the end of each Semester for 50 marks, except where stated otherwise in the detailed Scheme of Instruction. Question paper setting shall be set by the teacher or teachers together in a multi section courses and to be verified as described in policy document.

b) A minimum of 20 (40%) marks are to be secured exclusively in the Semester End Examination (SEE) of theory, design and/or drawing course in order to be declared as passed in that course and for the award of the grade in the course.

5.3 Continuous Internal Evaluation (CIE) in laboratory courses:

The evaluation for Laboratory course is based on CIE and SEE. The CIE for 50 marks comprises of 20 marks for day to day laboratory work, 15 marks for record submission and 15 marks for a laboratory examination at the end of the semester.

In any semester, a minimum of 90 percent of prescribed number of experiments / exercises specified in the syllabi for laboratory course shall be taken up by the students. They shall

complete these experiments / exercises in all respects and get the record certified by the internal lab teacher concerned and the Head of the Department concerned to be eligible to appear for the Final Examination in that laboratory course.

A minimum of 25 (50%) marks are to be secured exclusively in the Continuous Internal Evaluation (CIE) in order to be declared as passed in that lab course and eligible to write the SEE of that lab course.

5.4 Semester End Examination (SEE) in laboratory courses:

a) For each laboratory course, the Semester End Examination (SEE) shall be conducted by one internal and one external examiner appointed by the Principal and the duration of the exam shall be for three hours. The SEE is for 50 marks which include 10 marks for write up, 20 marks for lab experiment/exercise, 15 marks for Viva-voce and 5 marks for general impression.

b) A minimum of 20 (40%) marks shall be obtained in SEE of a laboratory course in order to be declared as passed and for the award of the grade in that laboratory course.

5.5 Evaluation of Term Paper:

a) A term paper is to be submitted by each student in the 7^{th} semester which would be a precursor to the project work to be done in the 8^{th} semester. The evaluation is based on CIE for 50 marks, which includes a minimum of two seminars/presentations for 20 marks and the report submitted at the end of the semester which is evaluated for 30 marks.

b) A minimum of 25 (50%) marks are to be secured exclusively in the Continuous Internal Evaluation (CIE) in order to be declared as passed in the Term Paper and eligible to write the SEE in the Term Paper.

c) The Semester End Examination (SEE) shall be conducted for 50 marks by one internal and one external examiner appointed by the Principal. The SEE contains Viva-voce and the demonstration of the model developed or work performed as a part of the term paper.

d) A minimum of 20 (40%) marks shall be obtained in SEE of the term paper in order to be declared as passed and for the award of the grade in the term paper.

5.6 Evaluation of the Project

a) In case of the Project work, the evaluation shall be based on CIE and SEE. The CIE for 50 marks consists of a minimum of two Seminars / presentations for 20 marks and the Project Report submitted at the end of the semester which is evaluated for 30 marks.

b) A minimum of 25 (50%) marks are to be secured exclusively in the Continuous Internal Evaluation (CIE) in order to be declared as passed in the Project Work and eligible to write the SEE in the Project Work.

c) SEE shall be evaluated in the form of a Viva- voce and the demonstration of the thesis work for 100 marks. Viva-voce Examination in Project Work shall be conducted by one internal examiner and one external examiner to be appointed by the Principal.

d) A minimum of 40 marks shall be obtained in SEE exclusively in order to be declared as passed in the Project and for the award of the grade.

NOTE : A student who is absent for any Test / Exam / Seminar / Presentation as a part of Continuous Internal Evaluation (CIE), for any reason whatsoever, shall be deemed to have scored zero marks in the respective component and no provision for make-up shall be provided.

5.7 Course Repetition (Repeater course)

The students not qualified to write SEE in a course may register for the repeater courses through course repetition and summer semester. The students have to apply to the Principal through the respective HOD by paying prescribed fees.

Course repetition: A student can take up a maximum of two theory courses in a semester immediately after the semester end examinations of that particular semester in accordance with the guidelines recommended by the Academic Council. The students who are not taking regular semester courses may additionally register for one more theory course.

Summer semester: Further the students can register maximum three (theory + lab courses together) courses in the summer semester. Summer semester courses shall be of both even & odd semesters. Summer semester shall be conducted immediately after completion of even semester end examinations.

The HODs concerned have to allot a teacher related to that course to conduct class work. The minimum number of periods to be conducted should not be less than 75% of the total prescribed periods for that course. The classes will be conducted in the vacation period or in the weekends or in the afternoons as decided by the HOD concerned. Teacher has to evaluate the student for his performance in CIE as per the autonomous norms and the qualified students should appear for a semester end examination. The pass criteria in both CIE & SEE should be as per autonomous norms.

The documents for monitoring the candidates registered for course repetition are available with the Heads of the Departments and Exam Section.

6.0 ATTENDANCE REGULATIONS:

All students shall maintain a minimum attendance of 75% in each course registered. The attendance percentage is computed by considering total number of periods conducted in a course as the denominator and the total number of periods actually attended by the student in that course, as the numerator.

In case of shortfall in this, the Principal of the College shall consider and may condone deficiency up to a limit of 10% in special cases for reasons such as medical emergencies, participation in sport, cultural activities, seminars, workshops and paper presentation etc. at the level of University, State, and National after due recommendation by the concerned Head of the Department.

For the above cases student must take prior permission from the head of the department to participate in such events and in case of medical emergencies intimation should be given immediately and submit the medical certificate to the concerned Head of the Department. Any student failing to meet the above standard of attendance in any course(s) registered, shall not be allowed to appear for SEE of such course(s). The student seeking condonence of attendance on the above grounds has to pay the condonence fee as specified by the college.

Further a student, who could not satisfy the minimum attendance of average 75% in all the courses put together (or 65% in special cases as mentioned above) in any semester, is not eligible to appear for the Semester End examinations and shall have to repeat that semester in the subsequent year.

6.1 Attendance at CIE and SEE: Attendance at all examinations, both CIE and SEE of each course registered shall be compulsory for the students and there shall not be any provision for re-examinations/consideration.

6.2 Any student against whom any disciplinary action by the College is imposed shall not be permitted to attend any SEE in that Semester.

6.3 The basis for the calculation of the attendance shall be the period prescribed by the College by its calendar of events. For the first semester students, the same is reckoned from the date of admission to the course.

6.4 The students shall be informed about their attendance position periodically by the College so that the students can strive to make up the shortage. However, non-receipt of such information from the college will not be considered as valid reason for exemption from the attendance requirements.

6.5 If a student does not fulfil the attendance requirements in any subject, he/she is not permitted to attend the Semester End Examination in that subject and is deemed to have been awarded “F’ grade in that subject.

7.0 DETENTION: A student is said to have been detained and not allowed to appear for Semester End Examination (SEE) at the end of the semester when

7.1 The student does not have a minimum average 75% attendance or 65% attendance with condonation in all subjects put together in that semester.

7.2 Such a student shall have to repeat the same semester subsequently and satisfy the above requirements afresh to become eligible to appear for the Semester End Examination (SEE), conducted at the end of the semester.

8.0 CONDITIONS FOR PROMOTION:

8.1 A student not detained in the first semester of a year of study shall be promoted to second semester of that year of study.

8.2 A student shall be eligible for promotion to III semester of B.Tech. Programme, if he/she is not detained in the second semester (of first year B.Tech. Programme) irrespective of the number of backlog courses (in terms of credits not earned) in I year B.Tech. (i.e. I & II semesters together).

8.3 A student shall be eligible for promotion to V semster of B.Tech. Programme, if he/she is not detained in the IV semester and also must secure 50% of the credits of the subjects (including laboratory courses, MOOC courses etc as per curriculum) that have been studied in I & II semesters irrespective of whether the candidate takes the end examination or not as per the normal course of study. At the time of commencement of class work for the V semester, student must secure the required credits.

8.4 A student shall be eligible for promotion to VII semester of B.Tech. Programme, if he/she is not detained in the VI semester of B.Tech. Programme and also must secure 50% of the credits of the subjects (including laboratory courses, MOOC courses etc as per curriculum) that have been studied upto IV semester. At the time of commencement of class work for the VII semester, student must secure the required credits.

And in case of getting detained for shortage of earned credits as per above, the student may make up the credits through supplementary exams for the failed courses before the date of commencement of class work for V or VII semester respectively.

7.0 Reregistration of not qualified courses in CIE for lack of attendance or lack of marks:

Students who failed to secure minimum attendance (75%) and minimum percentage of marks (50%) in CIE specified in any course, he / she will not be allowed to write SEE of that course. Such students have to register and qualify in CIE for those courses through course repletion and summer semester.

Students, who failed after final regular examination (SEE), must appear for the supplementary examinations to be conducted as per the college examination schedule.

Registration: Every eligible student has to register himself / herself at the beginning of every semester indicating all the Courses taken up for pursuit by him / her during that Semester and mentor's signature is mandatory.

8.1 When a student is debarred for one or more semesters, his / her registration in the present semester is cancelled and the student is debarred from registering in future during the debarred period.

8.2 In any case, while re-registering in any semester, he or she will have to pay the requisite fee once again.

For extended years of study, students must pay the tuition fees as per the college regulations.

9.0 GRADING SYSTEM

Based on the student performance during a given semester, a final letter grade will be awarded at the end of the semester for each course.

Letter Grades: A letter grade is basically a qualitative measure (an alphabet/letter) giving the performance of a student, such as,

Performance	Grade
Extraordinary	A+
Excellent	A
Very Good	B+
Good	B
Average	C
Pass	P
Unsatisfactory/Fail	F

The above grades are based on the marks obtained by the student in both CIE and SEE.

9.1 Grade Points

Depending on the letter grades assigned, a student earns certain grade points. The Colleges follow the 10-point grading system, as given below for absolute grading system.

The letter grades and the corresponding grade points are as given in the Table.

Table: Grades & Grade Points

Grade	Grade Points	% of Marks
A+	10	≥90% – 100%
A	9	≥80% –< 90%
B+	8	≥70% – <80%
B	7	≥60% – <70%
C	6	≥50% –< 60%
P	5	≥45% – <50%
F(Fail)	0	< 45%

9.1.1 The grade points given in above tables help in the evaluation of credit points earned by the student in a Course as the credit points are equal to the number of credits assigned to the Course multiplied by the grade points awarded to the student in that Course. This shall be used in arriving at the Semester Grade Point Average (SGPA) of the student for that semester, as it is the sum of all the credit points earned by the student for all the Courses registered in that semester.

9.1.2 Earning of Credit: A student shall be considered to have completed a Course successfully and earned the credits if he/she secures an acceptable letter grade in the range A+ to P. Letter grade 'F' in any Course implies failure of the student in that Course and no credits earned.

9.2 A student who earns a minimum of 5 grade points (P grade) in a course is declared to have successfully completed the course, and is deemed to have earned the credits assigned to that course.

However it should be noted that a pass in any course/term paper/Project shall be governed by the rules mentioned Assessment and Examination Policy.

10.0 GRADE POINT AVERAGE

10.1 The Grade Point Average (GPA) will be calculated according to the formula:

$$GPA = \frac{\sum C_i G_i}{\sum C_i}$$

Where C_i = number of credits for the course *i*,

G_i = grade points obtained by the student in the course.

10.2 Semester Grade Point Average (SGPA) is awarded to candidates considering all the courses of the semester. Zero grade points are also included in this computation.

10.3 To arrive at Cumulative Grade Point Average (CGPA), the formula is used considering the student's performance in all the courses taken in all the semesters completed up to that particular point of time.

10.4 Example

Semester	Course Code.	Credits	Grade	Grade Point	Credit Points	SGPA	CGPA
III	18EC301	3	C	6	18		
III	18EC302	3	B	7	21		
III	18EC303	3	A	9	27		
III	18EC304	4	P	5	20		
III	18EC305	4	C	6	24		
III	18EC306	2	B+	8	16	**6.72 (148/22)**	**6.72 (148/22)**
III	18ECL301	1	P	5	5		
III	18ECL302	1	B	7	7		
III	18ECL303	1	A+	10	10		
Total		**22**			**148**		
IV	18EC401	3	P	5	15		
IV	18EC402	3	B	7	21		
IV	18EC403	4	A+	10	40		
IV	18EC404	4	C	6	24		
IV	18EC405	2	A	9	18	**7.40 (163/22)**	**7.06 (311/44)**
IV	18EC406	3	B+	8	24		
IV	18ECL401	1	P	5	5		
IV	18ECL402	1	C	6	6		
IV	18ECL403	1	A+	10	10		
Total		**22**			**163**		

11.0 ELIGIBILITY FOR AWARD OF B.TECH. DEGREE: A student shall be eligible for award of the B.Tech degree if he/she fulfils all the following conditions:

1) Registered and successfully completed all the components prescribed in the Programme of study to which he/she is admitted
2) Obtained CGPA greater than or equal to 6.0 (Minimum requirements for Pass)
3) Has no dues to the Institute, hostels, Libraries, NCC/NSS etc., and
4) No disciplinary action is pending against him/her

12.0 AWARD OF CLASS: A candidate who becomes eligible for the award of B.Tech. Degree shall be placed in one of the following Classes based on CGPA.

Table: CGPA required for award of Degree

Distinction	**≥ 8.0***
First Class	≥ 6.5 < 8.0
Second Class	≥ 5.5 < 6.5
Pass Class	< 5.5

* In addition to the required CGPA of 8.0, the student must have necessarily passed all the courses of every semester **in the minimum stipulated period for the Programme**.

If the student did not obtain a CGPA of 6.0 after completing all courses of study, he/she should repeat some courses and obtain higher grade till his/her CGPA is 6.0. Unless he/she obtains a CGPA of 6.0, degree will not be awarded.

12.1 **Grade Sheet:** A grade sheet (Memorandum) will be issued to each student indicating his performance in all courses taken in that semester and also indicating the Grades and SGPA.

12.2 **Transcripts**: After successful completion of the total 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 the payment of requisite fee. Partial transcript will also be issued up to any point of study to any student on request and by paying the stipulated fee in force.

12.3 The Academic council of the College approves and recommends the same to Acharya Nagarjuna University for the award of a degree to any student.

13.0 IMPROVEMENT OF CLASS:

13.1 A candidate, after becoming eligible for the award of the Degree, may reappear for the Final Examination in any of the theory courses as and when conducted, for the purpose of improving the class. But this reappearance shall be only once and within a period of two academic years after becoming eligible for the award of the Degree.

However, this facility shall not be availed by a candidate who has taken the Original Degree Certificate. Candidates shall not be permitted to reappear either for CIE in any course or for Semester End Examination (SEE) in laboratory courses (including Project Viva-voce) for the purpose of improvement.

14.0 SUPPLEMENTARY EXAMINATIONS: In addition to the Regular Final Examinations held at the end of each semester, Supplementary Final Examinations will be conducted during the academic year. Candidates taking the Regular / Supplementary examinations as Supplementary candidates may have to take more than one Final Examination per day.

15.0 INSTANT SUPPLEMENTARY EXAMINATIONS: Candidates who fail in one theory course of VIII semester can appear for Instant Supplementary Examination conducted after declaration of the revaluation results of the said exam.

16.0 MALPRACTICES:

The Principal shall refer the cases of malpractices in Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) to an Enquiry Committee constituted by him / her. The Committee will submit a report on the malpractice allegedly committed by the student to the Principal. The Principal along with the members of the Committee is authorized to award a punishment as per the norms, if the student is found guilty.

16.1 To prevent the students indulging in Malpractices through latest electronic gadgets such as Cell-phones, Pagers, Organizer PDAs and Palmtops in addition to chits, printed material etc. in the examination halls, students shall be thoroughly checked at the main entrance as well as in the examination halls by the invigilators. The senior staff members appointed as internal flying squad has greater and decisive role to play in this regard.

16.2 A notice displaying the 'SCALE OF PUNISHMENT' shall prominently be displayed at the Main Entrance to the Examination Halls, preferably near the 'Seating Plan Display'.

16.3 If any student is found resorting to malpractice, the matter shall immediately be brought to the notice of Chief/Additional chief superintendent, Flying squad by the invigilator concerned.

16.4 The above staff members will then prepare a detailed report on the spot in proforma-I (copy enclosed) of the case. The full details of the offence and the details of supporting material must be written in establishing the case. The residential addresses of the students involved in malpractice shall be noted with contact telephone numbers in the malpractice report.

16.5 A written statement is to be obtained from the candidate. If any candidate refuses to give the written statement, the same shall be recorded by the invigilator with the signature of another invigilator as witness.

16.6 Whatever be the supporting material for establishing the case of malpractice, the same are to be confiscated immediately for sending the same to the Malpractices prosecuting committee as a proof.

16.7 The supporting materials so confiscated shall be signed by the chief superintendent and flying squad/invigilator and shall be attached and tagged properly to the scripts of the malpractice cases and are to be sent toMalpractices prosecuting committeealong with the report (proforma enclosed).

16.8 Any representation to relax the punishment will not be entertained by Malpractices prosecuting committee.

16.9 The answer scripts of the candidates who resorted to mal-practice shall be packed in a separate sealed cover duly subscribing on the cover as "MAL-PRACTICE" and send the same to Malpractices prosecuting committee.

16.10 Any student who is arrogant and does not follow the examination rules shall be sent out of the examination hall after collecting his question paper and answer book. Complaints on such cases shall be lodged to the Principal irrespective of imposter is an examinee or an outsider.

SCALE OF PUNISHMENT FOR MAL-PRACTICE CASES

Rule No.	Nature of Offence	Scale of Punishment
01	Writing unparliamentary / vulgar / obscene / words or Language in the answer book. OR Refusing to obey instructions of Chief Superintendent / Invigilator.	The performance of the candidates in that subject shall be cancelled. Further the case should be referred to the disciplinary committee by Chief Superintendent / Malpractices prosecuting committee. If the student repeat the same offence, the performance of the candidate in the semester examination in ALL SUBJECTS (whole/part examination, as the case may be, including Practicals) shall be cancelled
02	A candidate found in possession of any relevant material pertaining to the day of examination such as Papers, Books, Notes OR Notes written on any part of the clothes dressed by the candidate or any part of his/her body or any part of Table or Desk; OR Foot rule, instruments like setsquare, protractor, calculator, mobile phones, etc., with notes written on them. OR Mass copying at the examination centre detected during the conduct of examination or during valuation.	The candidate is to be sent out of the examination hall immediately after obtaining his/her written explanation and duly confiscating his/her Hall-ticket. He/she shall be allowed to appear for the remaining subjects in that examination by obtaining duplicate hall ticket. The performance of the candidates in that subject shall be cancelled. Further depending on severity of offence or reoccurrence of the offence by the student, the Malpractices prosecuting committee may impose the cancellation of performance of the candidate in two or more or ALL SUBJECTS (whole/part examination, as the case may be, including Practicals) in that semester examination.
03	A candidate found having copied or indulging in copying from any paper, book or notes or any other source or allowed or is found allowing any other candidate to	The candidate is to be sent out of the examination hall immediately after obtaining his/her written explanation and duly confiscating his/her Hall-ticket. He/she shall be allowed to appear for the remaining subjects in that examination by

	copy any matter from his/her answer book or to have in any manner rendered any assistance to another candidate, or if he/she is found to have been receiving assistance from another candidate. OR Destruction or suppression of the evidence of the forbidden material in any way like swallowing, tearing or throwing outside etc.	obtaining duplicate hall ticket. The performance of the candidates in that subject shall be cancelled. Further depending on severity of offence or reoccurrence of the offence by the student, the Malpractices prosecuting committee may impose the cancellation of performance of the candidate in two or more or ALL SUBJECTS (whole/part examination, as the case may be, including Practicals) in that semester examination.
04	Copying detected on the basis of internal evidence such as during valuation/special scrutiny	The performance of the candidates in that subject shall be cancelled. Further depending on severity of offence or reoccurrence of the offence by the student, the Malpractices prosecuting committee may impose the cancellation of performance of the candidate in two or more or ALL SUBJECTS (whole/part examination, as the case may be, including Practicals) in that semester examination. Note for MPC: "The Malpractice Prosecuting Committee which awards the punishment to the candidates involved in the malpractice has to make sure of the involvement of the Candidate/s in the offence before any punishment is awarded to the candidate/s."
05	Throwing of Question paper after writing the answers on it to the other candidate(s) with the intention to help the other candidate(s). OR Throwing / Sending the Question paper/ questions contained in the question paper on any sheet/article out during the period of examination with an intention to receive assistance and caught by the Invigilator or by an Officer involved in the conduct of examinations	The candidate is to be sent out of the examination hall immediately after obtaining his/her written explanation and duly confiscating his/her Hall-ticket. He/she shall be allowed to appear for the remaining subjects in that examination by obtaining duplicate hall ticket. The performance of the candidates in that subject shall be cancelled. Further depending on severity of offence or reoccurrence of the offence by the student, the Malpractices prosecuting committee may impose the cancellation of performance of the candidate in two or more or ALL SUBJECTS (whole/part examination, as the case may be, including Practicals) in that semester examination.
06	Exchanging intentionally the answer scripts with a view to give or take help from another examinee.	The candidates (both who helps and who takes help) are to be sent out of the examination hall immediately after obtaining his/her written explanation and duly confiscating his/her Hall-ticket. The performance of all the candidates involved in the act in all subjects in that particular year/semester examination (whole/ part examination, as the case may be, including Practicals) shall be cancelled.

07	Taking away the answer book or leaving the examination hall without handing over the answer book to the Invigilating Staff whether returned Subsequently or tearing the answer Book.	The performance of the candidate in all subjects in that semester examination (whole/part examination, as the case may be, including Practicals) shall be cancelled and shall not be permitted to appear for whole/part examination, as the case may be, for next subsequent semester examinations.
08	Writing of answers in the answer book by his/her associates in the examination hall or at any other level.	The performance of all the candidates involved in the act in all subjects in that particular year/semester examination (whole/part examination, as the case may be, including Practicals) shall be cancelled and the candidates shall not be permitted to appear for TWO subsequent semesters examinations and they shall not be permitted to study the next higher class (debarred for one semester).
09	Obstructing the Chief Superintendent from performing his/her duties, abusing, threatening and showing disrespect towards Invigilator/ Chief Superintendent/ any other official connected with the conduct of examination within the institution premises.	The culprits are to be handed over to the Police immediately and a Criminal case is to be booked against them. The performance of the candidate in the particular year/ semester examination in ALL SUBJECTS (whole/part examination, as the case may be, including Practicals) shall be cancelled and the candidates shall not be permitted to appear for TWO subsequent semesters examinations and they shall not be permitted to study the next higher class (debarred for one semester).
10	Substitution of answer book. OR Insertion of drawing sheets or replacement of main answer book written outside with one written inside the examination hall.	The performance of the candidate in all subjects in that semester examination (whole/ part examination, as the case may be, including Practicals) shall be cancelled and the candidate shall not be permitted to appear for TWO subsequent examinations and he/she is not permitted to study next higher class (debarred for one semester).
11	Impersonation.	The performance of both the candidates, i.e., the impostor and the candidate, who is being impersonated, in all subjects in that semester examination (whole/ part examination, as the case may be, including Practicals) shall be cancelled and they are not permitted to study and appear for any examination for the next THREE semesters (including academic year in which the impersonation has taken place) in respect of either or both the candidates. A Criminal case may be lodged in the Police Station if the impostor is an outsider
12	Physical assault within the institution premises on personnel connected with the conduct of examinations.	The performance of the candidate in all the subjects in that semester examination (whole/part examination, as the case may be, including Practicals) shall be cancelled and the

		candidate shall not be permitted to appear for THREE subsequent examinations and he/she is not permitted to study next higher class (debarred for two semester), if any, till he/she completes the punishment period. A Criminal / Disciplinary case is to be booked against the culprits involved in the act.
13	Possession of blank main answer book/ additional answer book/ drawing sheet/ graph sheet which have not been issued in the Examination hall on the day of exam.	A Criminal / Disciplinary case is to be booked against the candidate. The matter should be brought to the notice of the authorities for initiation of appropriate action against all the guilty. The performance of the candidate in all subjects in that semester examination (whole/part examination, as the case may be, including Practicals) shall be cancelled.
14	Other offences, if any, not covered under the above provisions.	The Malpractice Prosecuting Committee shall make specific recommendations on the punishment to be awarded keeping in view the gravity of offence and also the scale of punishment, as above.

N O T E:

1. No re-examination shall be conducted, where candidates resort to boycott of examinations on any pretext.
2. In case a candidate resorting to malpractice by copying from any material in his/her possession and/or by any means is caught by the Flying Squad or Observers or any other Officer posted for duty for the examination, the explanation of the Invigilator in that particular hall of examination shall be called for, for not detecting the same and appropriate disciplinary action be initiated against him/her, after examining his/her explanation in the matter.
3. In all the malpractice cases the report made by the Invigilators should be thoroughly enquired into by the Chief Superintendent concerned and he/she should satisfy himself/herself with all the details in the Invigilators report and record the same in his/her report.
4. In cases where there is a laxity on the part of invigilators and chief superintendents and other officials connected with the conduct of examinations in the discharge of their duties properly, such as in cases where mass copying is reported in an examination hall or where the candidate involved in malpractice in an examination hall is booked by flying squad or others but not the invigilator, then appropriate disciplinary action should be taken against all the staff members involved, after giving them notice and considering their explanations, if any, offered.
5. Punishment for different offences committed in all cases and its duration is mentioned above. It is quite possible that in few cases, the punishment recommended to the candidates, may exceed, the validity of the Curriculum in existence. In such cases, the punishment period should be limited to that extent within which the candidate has to obtain his/her B.Tech. In certain cases, the candidate may not get any more chances to appear for examination and qualify for the award of B.Tech. The candidate will have to suffer the consequence for his/her misdemeanor.
6. In all cases of Malpractice, the hall ticket of the candidate is to be confiscated and shall be sent to the Malpractices prosecuting committee along with the answer script in separate cover. The candidate shall not be permitted to appear for the remaining subjects if any, in that examination.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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PROFORMA - I

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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MAL-PRACTICE CASE REPORT

1. Examination Hall : _____

2. Date of Examination : _____

3. Time of Examination : _____

4.a) Course : _____

b) Year/Semester : _____

c) Scheme : _____

5. Subject in which candidate is booked:

a) Subject Code : _____

b) Subject : _____

6. Particulars of the candidate booked:

a) Regd. No. : _____

b) Name : _____

c) Residential address : _____

: _____

: _____

7. (a) Case booked by : Invigilator / Squad Members / Surprise Check Squad / Other Invigilator / Chief superintendent / Examination officers (Strike out whichever is not applicable)

(b) Name & Designation of the Staff who booked the case : _____

(c) Name & Designation of the Other invigilators in the Hall : _____

as witness. : _____

8. Give Full Details of the Offence : _____

_____

_____

_____

_____

_____

9. Give full details of Supporting material like Written Chits, Printed material, Mobile Phones, Books, Matter written on Scale, Calculator case etc., (matter should be related to the subject of examination on that day). If copied, the copied matter is to be marked in the supporting material and write Regd. No. of the candidate on the supporting material and should be sent to this office along with the answer booklet.

11. Signature of the Invigilator : _____
(whether the case is booked by him or by other officials)

12. Whether the student has given : YES / NO
the statement or not ?

13. Signature of the candidate : _____

14. Remarks of the : _____

Chief Superintendent _____

_____

_____

SIGNATURE OF THE CHIEF SUPERINTENDENT

Encl: 1) Answer-script
2) Forbidden confiscated material
3) Statement of Student.

17.0 AMENDMENTS TO REGULATIONS:

The Academic Council of Bapatla Engineering College (Autonomous) reserves the right to revise, amend, change or nullify the Regulations, Schemes of Examinations, and/ or Syllabi or any other matter pertained that meets to the needs of the students, society and industry without any notice and the decision is final.

DISCIPLINE AND CODE OF CONDUCT FOR STUDENTS

The following are some of the important rules of discipline. All students are required to be aware of and act consistently with these values.

1. Students must punctually attend all lectures, practicals, tutorials, assignments, tests, examinations, etc. A student whose attendance and/or progress in the various tests and examinations are not satisfactory and who does not perform the required number of assignments, tutorials and/or practicals are likely to lose their terms. Prolonged absence even on ground of ill health may also lead to loss of terms. Defaulters will not be sent up for Final /University Examinations.
2. The identity card is meant for identifying bonafide students and is used for permitting the students to participate in various activities and programs of the college. Every student must wear Identity card as long as he/she is in the college campus. It must be produced by the student whenever demanded by the member of the teaching or non-teaching staff of the college. Every student must wear his/her Identity card in the college every day. He/She must take proper care of it to avoid its misuse by other students and outsiders. In case the Identity card is lost, the matter should be immediately reported to the Principal and an application should be made for a duplicate Identity card, which will be issued on payment of charges.
3. The conduct of the students in the classes and in the premises of the college shall be such as will cause no disturbance to teachers, fellow students or other classes.
4. Every student shall wear a clean formal dress while coming to the college also when representing the college for various activities out station.
5. No Society or Association shall be formed in the College and no person should be invited in the college campus without the specific permission of the Principal.
6. No student is allowed to display any Notice/Circular/Poster/Banner in the College premises without the prior permission of the Principal.
7. Using foul language in the college campus is prohibited. If any student is caught using foul language, disciplinary action shall be initiated against the student.
8. Use of **BEC name tag or logo** by the students for their caste, political, religious, personal reasons is prohibited. Further placing banners on caste, political, religious, personal reasons, promoting cinema heroes & political leaders, taking possessions and burning fire crackers in front of the college is strictly prohibited. If any student is involved in such activities in and around the campus, severe disciplinary action will be taken including rusticating from the college and filing a criminal case.
9. Outsiders are not permitted in the college premises without the prior permission of the Principal. College students are not allowed to bring their relatives/friends to the college premises without the permission of the principal.

10. All meetings, cultural programs, debates, elocutions etc. organized on the college premises must be held in presence of teaching staff members and with the prior permission of the Principal. The subjects of debates/elocutions must have the prior approval of the principal.
11. Conducting fresher's meet, farewell meets etc. by the students outside the campus are prohibited. If any student is involved in such activities (organizing as well as participating), severe disciplinary action will be taken including rusticating from the college.
12. Students must take proper care of the college property. Strict action will be taken against students damaging College property and will be required to compensate the damage.
13. Students should not be involved in academic offences including cheating or plagiarism in academic course work malpractices at the College/Board/University Examinations
14. Smoking is strictly prohibited in the college premises.
15. If, for any reason, the continuance of a student in the College is found detrimental to the best interest of the college, the Management may ask the student to leave the college without assigning any reasons and the decision will be final and binding on the student.
16. Playing music on Transistors, Tape-Recorders, Car Stereos, Mobile phones or any other similar gadgets with or without earphones is strictly prohibited in the college premises. Defaulters will be punished and their instrument shall be confiscated.
17. Use of Mobile phones is strictly prohibited in the academic area of the college, Defaulters will be penalized and their instrument confiscated.
18. Students who are travelling to college on personal vehicles (2/4 wheelers) need to have valid driving license issued by RTO and follow all the rules listed by RTO. Students have to park the vehicle in the parking area of the college.
19. Students must not hang around in the college premises while the classes are at work.
20. Students must not attend classes other than their own without the permission of the authority concerned.
21. Students shall do nothing inside or outside the college that will interface with the discipline of the college or tarnish the image of the college.
22. Students are not allowed to communicate any information about college matters to Press.
23. Matters not covered above will be decided at the discretion of the Principal.

Acts of misbehavior, misconduct, indiscipline or violation of the Rules of Discipline mentioned above liable for one more punishments as stated below:

A. Warning to the students.
B. Warning to the student as well as inform the parents.
C. Imposition of a fine.

D. Denial of gymkhana, library, laboratory, N.C.C., N.S.S. student aid or any other facility for a specified period or for the whole Term/Year.
E. Expulsion from College for a specified period
F. Cancellation of Terms.
G. Refusal of admission in the term or academic year.
H. Cancellation of admission.
I. Rustication.

Anti Ragging Rules and Regulations
(As per AICTE Norms)

1. What constitutes Ragging: - Ragging constitutes one or more of any of the following acts:

a. any conduct by any student or students whether by words spoken or written or by an act which has the effect of teasing, treating or handling with rudeness a fresher or any other student;
b. indulging in rowdy or undisciplined activities by any student or students which causes or is likely to cause annoyance, hardship, physical or psychological harm or to raise fear or apprehension thereof in any fresher or any other student;
c. asking any student to do any act which such student will not in the ordinary course do and which has the effect of causing or generating a sense of shame, or torment or embarrassment so as to adversely affect the physique or psyche of such fresher or any other student;
d. any act by a senior student that prevents, disrupts or disturbs the regular academic activity of any other student or a fresher;
e. exploiting the services of a fresher or any other student for completing the academic tasks assigned to an individual or a group of students.
f. any act of financial extortion or forceful expenditure burden put on a fresher or any other student by students;
g. any act of physical abuse including all variants of it: sexual abuse, homosexual assaults, stripping, forcing obscene and lewd acts, gestures, causing bodily harm or any other danger to health or person;
h. any act or abuse by spoken words, emails, posts, public insults which would also include deriving perverted pleasure, vicarious or sadistic thrill from actively or passively participating in the discomfiture to fresher or any other student;
i. any act that affects the mental health and self-confidence of a fresher or any other student with or without an intent to derive a sadistic pleasure or showing off power, authority or superiority by a student over any fresher or any other student.

2. Actions to be taken against students for indulging and abetting ragging in technical institutions Universities including Deemed to be University imparting technical education:-

1. The punishment to be meted out to the persons indulged in ragging has to be exemplary and justifiably harsh to act as a deterrent against recurrence of such incidents.
2. Every single incident of ragging a First Information Report (FIR) must be filed without exception by the institutional authorities with the local police authorities.
3. The Anti-Ragging Committee of the institution shall take an appropriate decision, with regard to punishment or otherwise, depending on the facts of each incident of ragging and nature and gravity of the incident of ragging.
4. a) Depending upon the nature and gravity of the offence as established the possible punishments for those found guilty of ragging at the institution level shall be any one or any combination of the following:-
    - (i) Cancellation of admission
    - (ii) Suspension from attending classes
    - (iii) Withholding/withdrawing scholarship/fellowship and other benefits
    - (iv) Debarring from appearing in any test/examination or other evaluation process
    - (v) Withholding results
    - (vi) Debarring from representing the institution in any regional, national or international meet, tournament, youth festival, etc.
    - (vii) Suspension/expulsion from the hostel
    - (viii) Rustication from the institution for period ranging from 1 to 4 semesters
    - (ix) Expulsion from the institution and consequent debarring from admission to any other institution.
    - (x) Collective punishment: when the persons committing or abetting the crime of ragging are not identified, the institution shall resort to collective punishment as a deterrent to ensure community pressure on the potential raggers.

BAPATLA ENGINEERING COLLEGE :: BAPATLA

(Autonomous)

Important Contact Numbers (In case of Ragging)

Sl.No.	Member Category	Name of the Member	Phone No
1.	Principal	Dr. V. Damodara Naidu, M.Tech., Ph.D.	8332857027
2.	**HODs:** Chemical Engg. Civil Engg. CSE ECE EEE EIE IT Mechanical Engg. M.C.A. Mathematics Physics Chemistry English T& P Warden, Campus Hostel Coordinator for anti ragging	 Dr. J.S.Rao, M.Tech., Ph.D. Dr. Ch.Naga Satish Kumar, M.Tech., Ph.D. Dr. Shaik Nazeer, M.Tech., Ph.D., Dr. B. Chandramohan, M.Tech., Ph.D. Dr. N.Rama Devi, M.Tech.,Ph.D., Prof. Ch.Ramesh M.Tech., (Ph.D.) Prof. N.Sivarama Prasad, M.Tech.,(Ph.D.) Dr. T.Nanacharaiah, M.Tech., Ph.D. Sri. K.N.Prasad, M.C.A.,M.Tech., Dr. P.VijayaSaradhi, M.Sc.,M.Phil.,Ph.D. Dr. K.Rama Krishna, M.Sc., Ph.D. Dr. V.Madhava Rao, M.Sc., Ph.D. Dr. P.Asha Madhavi, M.A.,M.Phil.,Ph.D. Mr. Justin Chako Dr. T.Chandrasekhara Rao Mr. Y. Narendra	 9490224100 9440110124 9642302577 9491112477 9703374075 9701407595 9885882200 9492715018 8121708069 9949559288 9441207751 8374498399 9951507742 9845787354 9848276672 9704090941
4.	Police Department	Crime Stopper SP, Guntur Rural SP Camp Office DSP, Bapatla CI, Bapatla Town CI, Bapatla Rural PS, Bapatla Town SI, Bapatla Rural **Anti-Ragging Toll Free**	1090 9440796200 08632234828 9440796165 9440796171 9440796221 08643-224036 9440796258 **18004255314**

BAPATLA ENGINEERING COLLEGE (AUTONOMOUS)

ACADEMIC CALANDER

ACADEMIC CALANDER FOR I & II B.TECH CLASSES

FOR THE ACADEMIC YEAR - 2019-20

I B.TECH. CLASSES

DESCRIPTION	I SEMESTER	II SEMESTER
COMMENCEMENT OF SEMESTER	**05-08-2019**	**02-01-2020**
ORIENTATION PROGRAM	05-08-2019 TO 17-08-2019	---
COMMENCEMENT OF CLASS WORK	19-08-2019	02-01-2020
FIRST MID-TERM EXMINATIONS	15-10-2019 TO 19-10-2019	26-02-2020 TO 02-03-2020
LAST INSTRUCTION DAY	07-12-2019	20-04-2020
SECOND MID-TERM EXAMINATIONS	09-12-2019 TO 13-12-2019	22-04-2020 TO 26-04-2020
PREPARATION HOLIDAYS	14-12-2019 TO 18-12-2019	27-04-2020 TO 01-05-2020
PROPOSED DATE OF SEMESTER END EXAMINATIONS	19-12-2019 TO 31-12-2019	02-05-2020 TO 15-05-2020

II B.TECH. CLASSES: -

DESCRIPTION	I SEMESTER	II SEMESTER
COMMENCEMENT OF CLASS WORK	**24.06.2019**	**02.12.2019**
FIRST TERM EXMINATIONS	04.09.2019 - 11.09.2019	03.02.2020 - 08.02.2020
LAST INSTRUCTION DAY	02.11.2019	28.03.2020
SECOND TERM EXAMINATIONS	04.11.2019 - 09.11.2019	30.03.2020 - 04.04.2020
PREPARATION HOLIDAYS	10.11.2019 - 13.11.2019	05.04.2020 - 08.04.2020
SEMESTER END EXAMINATIONS	**14.11.2019 - 30.11.2019**	**09.04.2020 - 25.04.2020**

Dasara Vacation : 06.10.2019 to 13.10.2019
Pongal Vacation : 12.01.2020 to 19.01.2020

Commencement of class work for the academic year 2020-21 for II & III B.Tech: 15.06.2020

PRINCIPAL

Library resources, facilities & services

The Central Library of Bapatla Engineering College, one of the biggest Libraries in the state with 22,000 Sq feet has been playing a vital role as information centre catering to the academic and learning needs of the students & faculty. The Library received Best Library Award Four times from Acharya Nagarjuna University.

Library Timings: The Central Library functions from 7AM to 7 PM on all working days.

Resources: As a knowledge bank, the Central Library of BEC has a rich collection of 75,317 books, 523 online International technical journals (Science Direct-275 ,IEEE-ASPP-183 ,ASME- 30 ,ASCE-35) and 120 print journals.

Library Automation: The Library catalogue of books (OPAC) & Circulation of Books (Issue & Return of Books) have been fully computerized with SOUL Library Software & Bar coding system for well maintenance and effective functioning of the Library.

Circulation of Books: All the students are allowed to borrow 2 books per head from the Library on their borrower tickets for a period of one week. Students are required to pay fine for the late return of books as per the Library rules.

Reference book service: A separate reference section is maintained in the Central Library with a stack of 14,970 books including encyclopedias, subject hand books & reference text books.

Issue of reference text books: Students may borrow the reference text books half an hour before closing the Library and return the same by 7.30 AM in the next day.

Book Bank facility: A Book Bank is maintained in the Central Library with 20,634 text books for the benefit of SC, ST & BC category students. All SC & ST category students (scholarship holders) are eligible to borrow 12 books per head from Book Bank for each semester. BC category students are allowed to borrow 2 books per head from Book Bank for each semester.

No Dues Certificate: The student who completed the course of study in the College should get a no dues certificate from the Library by returning all the tickets& books borrowed from the College Library & Book Bank.

Library staff: The Central Library has 08 well experienced staff including the Librarian having more than 10 to 25 years of working experience.

Digital Library: A separate Digital Library is maintained in the Central Library with the infrastructure of 28 computers and 3,237 educational CDs. The Digital Library provides internet facility to the students and faculty.

Students can access the full text of the following e resources in the Digital Library.

- International e journals (Science Direct, IEEE, ASME & ASCE)
- NPTEL Video courses developed by all IITs. (Total 236 Courses - 9,173 Lessons)
- e – books and e – journals of DELNET Digital Library

Xeroxing facility: The Library is providing reprographic facility to students to disseminate material quickly and cost effectively at 50ps. per copy.

Bapatla Engineering College **(Autonomous) :: BAPATLA**

DEPARTMENT OF ……..

Academic Year 2019-2020

Schedule for Class Work (*w.e.f. 19-08-2019)*

SEMESTER - I

(Commencement of class work: 19-8-2019)

DAY/TIME	7.30 to 8.15	8.15 to 9.00	9.00 to 9.45	9.45 to 10.30	10.30 to 11.00	11.00 to 11.45	11.45 to 12.30	12.30 to 1.15
MON					Break			
TUE								
WED								
THU								
FRI								
SAT								

Subjects & Staff

SUJECT CODE	FACULTY NAME	PHONE NO	SUJECT CODE	FACULTY NAME	PHONE NO
S1			S6		
S2			L1		
S3			L2		
S4			L3		
S5					

Bapatla Engineering College **(Autonomous) :: BAPATLA**

DEPARTMENT OF ……..

Academic Year 2019-2020

Schedule for Class Work (*w.e.f. 02-01-2020)*

SEMESTER - II

(Commencement of class work: 02-01-2020)

DAY/TIME	7.30 to 8.15	8.15 to 9.00	9.00 to 9.45	9.45 to 10.30	10.30 to 11.00	11.00 to 11.45	11.45 to 12.30	12.30 to 1.15
MON					Break			
TUE								
WED								
THU								
FRI								
SAT								

Subjects & Staff

SUJECT CODE	FACULTY NAME	PHONE NO	SUJECT CODE	FACULTY NAME	PHONE NO
S1			S6		
S2			L1		
S3			L2		
S4			L3		
S5					

Bapatla Engineering College **(Autonomous) :: BAPATLA**

DEPARTMENT OF ……..

Academic Year 2019-2020

Schedule for Class Work (*w.e.f. 24-06-2019)*

SEMESTER - III

(Commencement of class work: 24-6-2019)

DAY/TIME	7.30 to 8.15	8.15 to 9.00	9.00 to 9.45	9.45 to 10.30	10.30 to 11.00	11.00 to 11.45	11.45 to 12.30	12.30 to 1.15
MON					Break			
TUE								
WED								
THU								
FRI								
SAT								

Subjects & Staff

SUJECT CODE	FACULTY NAME	PHONE NO	SUJECT CODE	FACULTY NAME	PHONE NO
S1			S6		
S2			L1		
S3			L2		
S4			L3		
S5					

Bapatla Engineering College **(Autonomous) :: BAPATLA**

DEPARTMENT OF ……..

Academic Year 2019-2020

Schedule for Class Work (*w.e.f. 02-12-2019)*

SEMESTER - IV

(Commencement of class work: 02-12-2019)

DAY/TIME	7.30 to 8.15	8.15 to 9.00	9.00 to 9.45	9.45 to 10.30	10.30 to 11.00	11.00 to 11.45	11.45 to 12.30	12.30 to 1.15
MON					Break			
TUE								
WED								
THU								
FRI								
SAT								

Subjects & Staff

SUJECT CODE	FACULTY NAME	PHONE NO	SUJECT CODE	FACULTY NAME	PHONE NO
S1			S6		
S2			L1		
S3			L2		
S4			L3		
S5					

Notes

Notes

Notes

Bapatla Engineering College:: Bapatla
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Department of
Electronics and Communications Engineering

R18 Regulations

Course Structure

&

Syllabus For
1st & 2nd Year B.Tech.

Bapatla Engineering College:: Bapatla
(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Electronics and Communications Engineering

Effective from the Academic Year 2018-2019 (R18 Regulations)

First Year B.Tech (SEMESTER – I)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18MA001	Linear Algebra and ODE	4	0	0	4	50	50	100	3
18PH001	Waves and Modern Physics	4	0	0	4	50	50	100	3
18CY001	Engineering Chemistry	4	0	0	4	50	50	100	3
18CE001	Environmental Studies	3	0	0	3	50	50	100	2
18CS001	Problem Solving with Programming	4	0	0	4	50	50	100	3
18CYL01	Engineering Chemistry Lab	0	0	3	3	50	50	100	1
18ECL12	Hardware Lab	0	0	3	3	50	50	100	1
18CSL01	Problem Solving with Programming Lab	0	0	3	3	50	50	100	1
	TOTAL	19	0	9	28	400	400	800	17

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

Bapatla Engineering College:: Bapatla
(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Electronics and Communications Engineering

Effective from the Academic Year 2018-2019 (R18 Regulations)

First Year B.Tech (SEMESTER – II)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18MA002	Numerical Methods and Advanced Calculus	4	0	0	4	50	50	100	3
18EC202	Basic Instrumentation	4	0	0	4	50	50	100	3
18EC203	Programming with C ++	4	0	0	4	50	50	100	3
18EL001	Communicative English	3	0	0	3	50	50	100	2
18EC205	Circuit Theory	4	1	0	5	50	50	100	4
18PHL01	Physics lab	0	0	3	3	50	50	100	1
18ECL22	Programming with C ++ Lab	0	0	3	3	50	50	100	1
18ELL01	English Communication and Skills Lab	0	0	3	3	50	50	100	1
	TOTAL	19	1	9	29	400	400	800	18

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

Bapatla Engineering College:: Bapatla
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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Electronics and Communications Engineering

Effective from the Academic Year 2018-2019 (R18 Regulations)

Second Year B.Tech (SEMESTER – III)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18MA003	Probability and Statistics	3	1	0	4	50	50	100	3
18EC302	Data Structures using Python	4	0	0	4	50	50	100	3
18EC303	Electronic Devices and Circuits	4	0	0	4	50	50	100	3
18EC304	Electromagnetic Field Theory	4	1	0	5	50	50	100	4
18EC305	Digital Electronics	4	1	0	5	50	50	100	4
18EL002	Technical English	3	0	0	3	50	50	100	2
18ECL31	Data Structures using Python Lab			3	3	50	50	100	1
18ECL32	Electronic Devices & Digital Electronics Lab			3	3	50	50	100	1
18ECL33	PSPICE Lab			3	3	50	50	100	1
	TOTAL	22	3	9	34	450	450	900	22

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

Bapatla Engineering College:: Bapatla
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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Electronics and Communications Engineering

Effective from the Academic Year 2018-2019 (R18 Regulations)

Second Year B.Tech (SEMESTER – IV)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18MA004	Complex Variables and Special Functions	3	1	0	4	50	50	100	3
18EC402	Electronic Circuit Analysis	4	0	0	4	50	50	100	3
18EC403	EM Waves and Transmission Lines	4	1	0	5	50	50	100	4
18EC404	Signals & Systems	4	1	0	5	50	50	100	4
18EC405	Digital Design Using HDL	4	1	0	5	50	50	100	4
18EC406	Professional Ethics and Human Values	4	0	0	4	50	50	100	3
18ECL41	Electronic Circuits Lab			3	3	50	50	100	1
18ECL02	HDL Lab			3	3	50	50	100	1
18ECL43	Signals and Systems lab			3	3	50	50	100	1
	TOTAL	23	4	9	36	450	450	900	24

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

Bapatla Engineering College:: Bapatla
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Linear Algebra and ODE
I B.Tech –I Semester (Code: 18MA001)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: None

Course Objectives:

CO1: To learn about solving a system of linear homogeneous and non-homogeneous equations, finding the inverse of a given square matrix and also its Eigen values and Eigen vectors.

CO2: Identify the type of a given differential equation and select and apply the appropriate Analytical technique for finding the solution of first order and higher order ordinary Differential equations.

CO3: Create and analyze mathematical models using first and second order differential equations To solve application problems that arises in engineering.

CO4: To learn about solving linear Differential equations with constant coefficients with the given initial conditions using Laplace transform technique.

Course Outcomes: Students will be able to

CLO-1: Apply elementary row operations to find the rank of a matrix, to solve a system of linear Equations and to find the inverse of a matrix.

CLO-2: Find the Eigen values and Eigen vectors of the given square matrix and also compute the higher Powers of the given matrix.

CLO-3: Solve separable, linear, exact differential equations with and without initial conditions.

CLO-4: Distinguish between linear and non-linear differential equation.

CLO-5: Write the piecewise continuous functions in terms of unit step functions and hence find its Laplace transforms.

CLO-6: Solve linear differential equation with constant coefficients and unit step input functions using Laplace transforms technique.

SYLLABUS

UNIT - I

Linear Algebra: Rank of a Matrix; Elementary transformations of a matrix; Gauss-Jordan method of finding the inverse; Consistency of linear System of equations: Rouches theorem, System of linear Non-homogeneous equations, System of linear homogeneous equations; vectors; Eigen values; properties of Eigen values(without proofs); Cayley-Hamilton theorem (without proof).

[Sections: 2.7.1; 2.7.2; 2.7.6; 2.10.1; 2.10.2; 2.10.3; 2.12.1; 2.13.1; 2.14; 2.15.]

[12 Hours]

UNIT - II

Differential Equations of first order: Definitions; Formation of a Differential equation; Solution of a Differential equation; Equations of the first order and first degree; variables separable; Linear Equations; Bernoulli's equation; Exact Differential equations; Equations reducible to Exact equations: I.F found by inspection, I.F of a Homogeneous equation, In the equation M dx+ N dy=0.

Applications of a first order Differential equations: Newton's law of cooling; Rate of decay of Radio-active materials.

[Sections: 11.1; 11.3; 11.4; 11.5; 11.6; 11.9; 11.10; 11.11; 11.12.1; 11.12.2; 11.12.4; 12.6; 12.8]

[12 Hours]

UNIT – III

Linear Differential Equations: Definitions; Theorem; Operator D; Rules for finding the complementary function; Inverse operator; Rules for finding the Particular Integral; Working procedure to solve the equation; Method of Variation of Parameters; Applications of Linear Differential Equations: Oscillatory Electrical Circuits.

[Sections: 13.1; 13.2.1; 13.3; 13.4; 13.5; 13.6; 13.7;13.8.1;14.1;14.5] [12 Hours]

UNIT – IV

Laplace Transforms: Definition; conditions for the existence; Transforms of elementary functions; properties of Laplace Transforms; Transforms of derivatives; Transforms of integrals; Multiplication by t^n; Division by t; Inverse transforms- Method of partial fractions; Other methods of finding inverse transforms; Convolution theorem(without proof); Application to differential equations: Solution of ODE with constant coefficients using Laplace transforms.

[Sections:21.2.1; 21.2.2; 21.3; 21.4; 21.7; 21.8; 21.9; 21.10; 21.12; 21.13; 21.14; 21.15.1]

[12 Hours]

TEXT BOOK:

B.S.Grewal, "Higher Engineering Mathematics", 44thedition, Khanna publishers, 2017.

REFERENCE BOOKS:

[1] ErwinKreyszig, "Advanced Engineering Mathematics", 9th edition, John Wiley & Sons.

[2] N.P.Bali and M.Goyal, "A Text book of Engineering Mathematics" Laxmi Publications, 2010.

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WAVES AND MODERN PHYSICS
(ENGINEERING PHYSICS-1)
I B.TECH – I SEMESTER (CODE-18PH001)
(Common for ECE, EEE, EIE)

Lectures	**4**	Tutorial	**0**	Practical	**0**	Credits	**3**
Continuous Internal Assessment			**50**	Semester End Examination (3hours)			**50**

COURSE OBJECTIVES

CO1: To familiarize the students in getting knowledge about modern optics and their Engineering applications.
CO2: To make aware of the students to obtain circuit knowledge regarding electrical, Electronics and Magnetism.
CO 3: To make the students to understand the quantum theory and solving the various Physical problems using quantum mechanics.
CO 4: To get the knowledge of various methods of analytical techniques for material testing.

COURSE OUTCOMES:

Student will be able to
CLO1: Learn about principle and working of different types of lasers and their applications.
CLO2: Know about principle, types of optical fibers of their importance in communication.
CLO3: Analyze the electromagnetic principles in electrical and electronic circuits and Maxwell's equations.
CLO4: Study about quantum mechanics and its applications.
CLO5: Read about properties and applications of ultrasonics in various fields.
CLO6: Know about radio isotopes and their applications.

SYLLABUS

UNIT-I (ADVANCED OPTICS)

Lasers: Interaction of radiation with matter. Einstein coefficients, Properties of laser, Population inversion, LASER principle, pumping schemes-Three level and four level laser, types of lasers: solid-state lasers (Ruby), gas lasers (He-Ne), Semiconductor lasers; applications of lasers in industry and medicine.
Fibre Optics: Importance of optical fibre, Structure and principle of optical fibre, acceptance angle and numerical aperture, Types of optical fibres based on modes and refractive index, V-number, losses associated with optical fibres, fibre optical communication, advantages of optical fibres

UNIT-II (ELECTRO-MAGNETIC INDUCTION AND MAXWELL'S EQUATIONS)

Maxwell's equations in vacuum and conducting medium. Velocity of electromagnetic wave in vacuum. Electromagnetic oscillations in LC circuit, LCR series resonance in A.C circuit and resonant frequency, Quality factor. Concept of skin effect, Energy in an electromagnetic field; Flow of energy and Poynting vector. Principle of circulating charge and cyclotron, Hall Effect.

UNIT-III (MODERN PHYSICS)

Dual nature of light, DE Broglie concept of matter waves, Davisson-Germer experiment, Heisenberg uncertainty principle and applications (nonexistence of electron in nucleus and finite width of spectral lines), one dimensional time independent and dependent Schrodinger wave equation, physical significance of wave

function, application of Schrödinger wave equation to particle in a one dimensional potential box, concept of quantum tunneling and construction and working of Scanning Tunneling Electron Microscope.

UNIT-IV (ANALYTICAL TECHNIQUES)

Ultrasonics: Properties of ultrasonics, Production of ultrasonic waves by magnetostriction and piezo-electric method, Determination of velocity of ultrasonic wave in liquids by Ultrasonic interferometer. Medical applications, Ultrasonic Imaging technique (Doppler Ultrasound Imaging advantages and limitations), industrial applications, NDT : Pulse echo technique, Time of flight diffraction technique.
Nuclear Techniques: Radio isotopes and its applications (medical and Industrial), GM counter, Scintillation counter.

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Books:
1. Engineering physics M.V. Avadhanulu, P.G.Kshirsagar S.Chand& Company Pvt. Ltd.
2. Engineering physics, PalaniSwamy, Scitech publication
Reference books: 1. Basic engineering physics – Dr. P.srinivasa Rao, Dr.K.Muralidhar, Himalaya Publication
3. Applied physics - Dr. P. Srinivasa Rao, Dr. K. Muralidhar, Himalaya publication

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ENGINEERING CHEMISTRY

I B.TECH – I SEMESTER (Code: 18CY001)

Lecture :	3 hours/week	**Continuous Assessment:**	50 M
Credits :	3	**Semester Exam :**	50M
Code :	18CY001	**Time of SEE :**	3 hrs

PREREQUISITES: None

COURSE OBJECTIVES:

The student should be conversant:

CO1: With the principles of water characterization and treatment of water for industrial purposes and methods of producing water for potable purposes.
CO2: To understand the thermodynamic concepts, energy changes, concept of corrosion & its Control.
CO3: With the conventional energy sources, solid, liquid and gaseous Fuels & knowledge of Knocking and anti-knocking characteristics.
CO4: With aim to gain good knowledge of organic reactions, plastics, conducting polymers & Biodegradable polymers.

COURSE OUTCOME:

After studying this course, students will be able to:

CLO-1: Develop innovative methods to produce soft water for industrial use and potable water at Cheaper cost.
CLO-2: Apply their knowledge in converting various energies of different systems and protection of different metals from corrosion.
CLO-3: Have the capacity of applying energy sources efficiently and economically for various needs.
CLO-4: Design economically and new methods of organic synthesis and substitute metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution.

SYLLABUS

UNIT I: Water Chemistry **12 hrs**

Introduction: water quality parameters
Characteristics: Alkalinity, Hardness - Estimation & simple numerical problems,
Boiler Troubles - Sludges, Scales, Caustic embrittlement, boiler corrosion, Priming and foaming;
Internal conditioning - phosphate, calgon and carbonate methods.
External conditioning - Ion exchange process & Zeolite process
WHO Guidelines, Potable water, Sedimentation, Coagulation, Filtration. Disinfection methods: Chlorination, ozonization and UV treatment.
Salinity – Treatment of Brackish water by Reverse Osmosis and Electro dialysis.

UNIT II **12 hrs**

Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications.

Corrosion: Types of corrosion - Chemical or dry corrosion, Electrochemical or wet corrosion; Galvanic, stress, pitting and differential aeration corrosion; Factors effecting corrosion, **Corrosion control** – Cathodic protection, and electro plating (Au) & electro less Ni plating.

UNIT III: Fuels **12 hrs**

Classification of fuels; Calorific value of fuels (lower, higher)
Solid fuels: Determination of calorific value (Bomb Calorimeter) & related problems, Coal ranking,
Liquid Fuels: Petroleum refining and fractions, composition and uses. Knocking and anti- knocking Agents, Octane number and Cetane number; Bio fuels- Biodiesel, general methods of preparation and advantages
Gaseous fuels: CNG and LPG,
Flue gas analysis – Orsat apparatus.

UNIT IV: **12 hrs**

Organic reactions and synthesis of a drug molecule
Introduction to reactions involving substitution (SN^1, SN^2), addition (Markownikoff's and anti-Markwnikoff's rules), elimination (E_1& E_2), Synthesis of a commonly used drug molecule (Aspirin and Paracetamol)

Polymers: Conducting polymers: Classification, Intrinsic and Extrinsic conducting polymers and their applications**.** Plastics: Thermoplasts and thermosetting plastics, Bakelite and PVC.
Bio degradable polymers: types, examples-Polyhydroxybuterate (PHB), Polyhydroxybuterate-co-β-hydroxyvalerate (PHBV), applications.

TEXT BOOKS:

1. P.C. Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi 17th edition (2017).
2. Seshi Chawla, "Engineering Chemistry" Dhanpat Rai Pub, Co LTD, New Delhi 13 th edition, 2013.

REFERENCES:

1 Essential Of Physical Chemistry by Arun Bahl, B.S. Bahl, G.D.Tuli, by Arun Bahl, B.S. Bahl, G.D.Tuli, Published by S Chand Publishers, 12th Edition, 2012.

2 Text Book of Engineering Chemistry by C.P. Murthy, C.V. Agarwal, A. Naidu B.S. Publications, Hyderabad (2006).
3 Engineering Chemistry by K. Maheswaramma, Pearson publishers 2015.

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Environmental Studies

I B.Tech – I/II Semester (Code: 14CE001)

Lectures	4	Tutorial	0	Practical	0	Credits	2		
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50				

Prerequisites: None

Course Objectives: To learn

CO1: To develop an awareness, knowledge, and appreciation for the natural environment.
CO2: To understand different types of ecosystems exist in nature.
CO3: To know our biodiversity.
CO4: To understand different types of pollutants present in Environment.
CO5: To know the global environmental problems.

Course Outcomes: Students will be able to

CLO 1: Develop an appreciation for the local and natural history of the area.
CLO 2: Hope for the better future of environment in India which is based on many positive factors like Biodiversity, successive use of renewable energy resources and other resources, increasing number of people's movements focusing on environment.
CLO 3: Know how to manage the harmful pollutants.
CLO 4: Gain the knowledge of Environment.
CLO 5: Create awareness among the youth on environmental concerns important in the long-term interest of the society

SYLLABUS

UNIT – I

Introduction: Definition, Scope and Importance, Need for public awareness. Ecosystems: Definition, Structure and Functions of Ecosystems, types - Forest, Grassland, Desert, Aquatic (Marine, ponds and estuaries). *6 periods*

Biodiversity: Definition and levels of Biodiversity; Values of Biodiversity - Consumptive, Productive, Social, Aesthetic, Ethical and Optional; Threats and Conservation of Biodiversity; Hot Spots of Biodiversity, Bio-geographical Classification of India, India as a mega diversity nation. *Chipko movement case study* *6 periods*

UNIT – II

Natural resources: Land: Land as a resource, Causes and effects of land degradation - Soil erosion, Desertification. **Forest**: Use of forests, Causes and effects of deforestation, Afforestation, Mining - benefits and problems. **Water**: Uses, floods and drought, Dams -

benefits and problems.

Energy: Importance of energy, Environmental Impacts of Renewable and Non-renewable energy resources. *Silent Valley Project and Narmada Bachao Andolan case studies8 periods*

Sustainability: Definition, Concept and Equitable use of resources for sustainable development; Rain water harvesting and Watershed management. Fieldwork on Rain water harvesting and Water shed management. *6 periods + 6 hours field work/Demonstration*

UNIT – III

Pollution: Definition; Causes, effects and control of air, water and nuclear pollution; *Chernobyl Nuclear Disaster* case study; Solid Waste: urban, Industrial and hazardous wastes; Integrated waste management - 3R approach, composting and vermicomposting. *12 periods*

Environmental acts: Water and air (Prevention and Control of pollution) acts, Environmental protection act, Forest Conservation act. *6 periods*

UNIT – IV

Environmental issues: Greenhouse effect & Global warming, Ozone layer depletion, Acid rains, Green Revolution, Population Growth and environmental quality, Environmental Impact Assessment. Environmental Standards (ISO14000, etc.) *12 periods*

Case Studies: Bhopal Tragedy, Mathura Refinery and TajMahal, and Ralegan Siddhi (Anna Hazare). *6periods*

Field work: Visit to a local area to document environmental assets – Pond/Forest/Grassland. Visit to a local polluted site- Urban and industry/ Rural and Agriculture. *6 hrs.*

TEXT BOOKS:

1. –Environmental Studies ‖by Benny Joseph, Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. –Comprehensive environmental studies‖-JP Sharma, Laxmi Publications.
3. Text Book of environmental Studies – Erach Bharucha

REFERENCE BOOKS:

1. –Environmental studies‖, R. Rajagopalan, Oxford University Press.
2. –Introduction to Environmental Science‖, Anjaneyulu Y,BS Publications
3. –Environmental Science‖, 11th Edition – Thomson Series– by Jr. Tyler Miller.

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PROBLEM SOLVING USING PROGRAMMING
(Common for all branches except Civil Engineering)

I B.Tech – II Semester (Code: 18CS001)

Lectures	4	Tutorial	0		Practical	0	Credits	3	
Continuous Internal Assessment		:	50		Semester End Examination (3 Hours)		:	50	

Prerequisites: BASIC MATHEMATICS

Course Objectives: Students will be able to

1. Understand basic concepts of C Programming such as: C-tokens, Operators, Input/output, and Arithmetic rules.
2. Develop problem-solving skills to translate _English'described problems into programs written using C language.
3. Use Conditional Branching, Looping, and Functions.
4. Apply pointers for parameter passing, referencing and differencing and linking data structures.
5. Manipulate variables and types to change the problem state, including numeric, character, array and pointer types, as well as the use of structures and unions, File.

Course Outcomes:

After the course the students are expected to be able to

1. Choose the right data representation formats based on the requirements of the problem.
2. Analyse a given problem and develop an algorithm to solve the problem.
3. Use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand.
4. Write the program on a computer, edit, compile, debug, correct, recompile and run it.
5. Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task.

SYLLABUS

UNIT I (17 Periods)

Overview of C, Constants, Variables and Data Types, Operators and Expressions, Managing I/O Operations. Decision Making and Branching.

Programming Exercises for Unit I: C-expressions for algebraic expressions, evaluation of arithmetic and Boolean expressions. Syntactic and logical errors in a given program, output of a given program, values of variables at the end of execution of a program fragment, Programs using Scientific and Engineering formulae. Finding the largest of the three given numbers. Computationofdiscountamountondifferenttypesofproductswithdifferent discount percentages. Finding the class of an input character, finding the type of triangle formed with the given sides, computation of income-tax, finding given year is leap year or not, and conversion of lower case character to its upper case.

UNIT II (17 Periods)

Decision Making and Looping, Arrays, Character Arrays and Strings.

Programming Exercises for Unit II: To print the sum of the digits of a given number and to display the image of a given number. To find whether a given number is prime, printing Fibonacci sequence and to find prime factors of a given number. To print graphic patterns of symbols and numbers. To find the length of a string, compare strings, reverse a string, copy a string and to find whether the given string is palindrome or not with and without using String Handling Functions. Transpose of a matrix and sorting of names using arrays.

UNIT III (18 Periods)

User-defined Functions, Structures and Unions, Pointers

Programming Exercises for Unit - III: Functions - Recursive functions to find factorial & GCD (Greatest Common Divisor), string operations using pointers and pointer arithmetic. Swapping two variable values. Sorting a list of student records on register number using array of pointers

UNIT IV (18 Periods)

File Management in C, Dynamic Memory Allocation, Preprocessor

Programming Exercises for Unit - IV: Operations on complex numbers, and to read an input file of marks and generate a result file, sorting a list of names using command line arguments. Copy the contents of one file to another file. Allocating memory to variables dynamically.

Text Book:

1. Programming in ANSI C by E.Balaguruswamy, Fifth Edition. References:

1. Kernighan BW and Dennis Ritchie M, ‑C programming language‖, 2nded, Prentice Hall.
2. Yashavant P. Kanetkar,‑Let us C‖,BPB Publications.
3. Herbert Schildt, ―C: The Complete Reference‖, 4th edition, Tata Mc graw-Hill.
4. Ashok N. Kamthane,‑Programming in C‖, PEARSON2nd Edition.

Bapatla Engineering College:: Bapatla
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ENGINEERINGCHEMISTRY LABORATORY

(Common to all branches)

I B.Tech – I/II Semester (Code: 18CYL01)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

LIST OF EXPERIMENTS

1. **Introduction to Chemistry Lab** (the teachers are expected to teach fundamentals like Calibration of Volumetric Apparatus, Primary, Secondary Solutions, Normality, Molarity, Molality etc. and error, accuracy, precision, theory of indicators, use of volumetric iterations).

2. Volumetric Analysis:
   a. Estimation of Washing Soda.
   b. Estimation of Active Chlorine Content in Bleaching Powder
   c. Estimation of Mohr's salt by permanganometry.
   d. Estimation of given salt by using Ion-exchange resin usingDowex-50.
3. Analysis of Water:
   a. Determination of Alkalinity of Tap water.
   b. Determination of Total Hardness of ground water sample by EDTA method
   c. Determination of Salinity of water sample
4. Estimation of properties of oil:
   a. Estimation of Acid Value
   b. Estimation of Saponification value
5. Preparations:
   a. Preparation of Soap
   b. Preparation of Urea-formal dehydration
   c. Preparation of Phenyl benzoate
6. Demonstration Experiments (Any two of the following):
   a. Determination of p^H of given sample.
   b. Determination of conductivity of given sample by conduct meter.
   c. Potentiometric Determination of Iron.

TEXT BOOKS (for Chemistry 1 and 2):

1. Practical Engineering Chemistry by K. Mukkanti, Etal, B.S. Publications, Hyderabad, 2009.
2. Inorganic quantitative analysis, Vogel, 5th edition, Longman group Ltd. London, 1979.

REFERENCE BOOKS:

Text Book of engineering chemistry by R.n.Goyal and Harrmendra Goel.

1. A text book on experiments and calculations- Engineering Chemistry. S.S. Dara.
2. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

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HARDWARE LAB

I B.Tech – I Semester (Code: 18ECL12)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

List of Lab Experiments

1. Identification and testing of various circuit elements
2. Study of CRO and Function Generator.
3. Study of RPS and Multimeter.
4. Verification of KCL and KVL.
5. Testing of basic gates.
6. Realization of basic gates using discrete components.
7. V-I characteristics of Diode.
8. V-I characteristics of Zener Diode.
9. Verification of Thevenin‘s Theorem.
10. Component testing using CRO.

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Problem Solving using Programming Lab

I B.Tech – II Semester (Code: 18CSL01)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Lab Examination (3 Hours)			:	50

1. A program for electricity bill taking different categories of users, different slabs in each category. (Using nested if-else statement).

Domestic Customer:		
Consumption Units	**Rate of Charges(Rs.)**	
0 – 200	0.50 per unit	
201 – 400	100 plus	0.65 per unit
401 – 600	230 plus	0.80 per unit
601 and above	390 plus	1.00 per unit
Commercial Customer:		
Consumption Units	**Rate of Charges(Rs.)**	
0 – 100	0.50 per unit	
101 – 200	50 plus	0.6 per unit
201 – 300	100 plus	0.70 per unit
301 and above	200 plus	1.00 per unit

2. Write a C program to evaluate the following(using loops):
   a) $1 + x^2/2! + x^4 / 4! + \ldots$upto ten terms
   b) $x + x^3/3! + x^5/5! + \ldots$ upto ten terms
3. Write a C program to check whether the given number is
   a) Prime or not.
   b) Perfect or Abundant or Deficient.
4. Write a C program to display statistical parameters (using one –dimensional array).
   a) Mean
   b) Mode
   c) Median
   d) Variance.
5. WriteaCprogramtoreadalistofnumbersandperformthefollowingoperations
   a) Print the list.
   b) Delete duplicates from the list.
   c) Reverse the list.
6. Write a C program to read a list of numbers and search for a given number using Binary search algorithm and if found display its index otherwise display the message “Element not found in the List”.

7. Write a C program to read two matrices and compute their sum and product.

8. Write a C program to read list of student names and perform the following operations

a) To print the list of names.
b) To sort them in ascending order.
c) To print the list after sorting.

9. Write a C program that consists of recursive functions to

a) Find factorial of a given number
b) Solve towers of Hanoi with three towers (A, B & C) and three disks initially on tower A.

10. A Bookshop maintains the inventory of books that are being sold at the shop. The list includes details such as author, title, price, publisher and stock position. Whenever a customer wants a book the sales person inputs the title and the author, and the system searches the list and displays whether it is available or not. If it is not, an appropriate message is displayed, if it is, then the system displays the book details and request for the number of copies required ,if the requested copies are available the total cost of the requested copies is displayed otherwise the message "required copies not in stock" is displayed. Write a program for the above in structures with suitable functions.

11. Write a C program to read a data file of students' records with fields (Reg. no, Name, M1, M2, M3, M4, M5) and write the successful students data (percentage > 40%) to a data file.

12. Write a C program to read a file as command line argument and count the given word frequency in a file

Bapatla Engineering College:: Bapatla (Autonomous)

Numerical Methods and Advanced Calculus I
B.Tech –II Semester (Code: 18MA002)

Lectures	4	Tutorial	0	Practical	0	Credits	3		
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50				

Prerequisites: None

Course Objectives:

CO1: To learn about some advanced numerical techniques e.g. solving a nonlinear equation, linear system of equations, Interpolation and Approximation techniques.
CO2: To learn about evaluation of double and triple integrals and their applications.
CO3: To learn some basic properties of scalar and vector point functions and their applications to line, surface and volume integrals.

Course Outcomes: Students will be able to

CLO-1: Solve non-linear equations in one variable and system of linear equations using iteration methods.
CLO-2: Choose appropriate interpolation formulae based on the given data.
CLO-3: Compute the value of a definite integral using numerical integration techniques.
CLO-4: Predict the numerical solution of the derivative at a point from the given initial value problem using appropriate numerical method.
CLO-4: Evaluate the double and triple integrals using change of variables.
CLO-5: Transform line integrals to surface and surface to volume integrals and evaluate them.

SYLLABUS

UNIT - I

Numerical Solution of Equations: Introduction; Solution of algebraic and transcendental equations: Bisection method, Method of false position, Newton-Raphson method; Useful deductions from the Newton-Raphson formula; Solution of linear simultaneous equations; Direct methods of solution: Gauss elimination method, Gauss-Jordan method, Factorization method; Iterative methods of solution: Jacobi‘s iterative method, Gauss-Seidel iterative method.

[Sections: 28.1; 28.2; 28.3; 28.5; 28.6; 28.7.1; 28.7.2]. [12 Hours]

UNIT - II

Finite differences and Interpolation: Finite differences: Forward differences, Backward differences; Newton‘s interpolation formulae: Newton‘s forward interpolation formula, Newton‘s backward interpolation formula; Interpolation with unequal intervals; Lagrange‘s interpolation formula; Divided differences; Newton‘s divided difference formula; Numerical integration; Trapezoidal rule; Simpson‘s one-third rule; Simpson‘s three-eighth rule; Numerical solution of ODE‘s: Introduction; Picard‘s method; Euler‘s method; Runge-Kutta method.

[Sections:29.1; 29.1-1; 29.1.2; 29.6; 29.9; 29.10; 29.11; 29.12; 30.4; 30.6; 30.7; 30.8; 32.1; 32.2; 32.4; 32.7]. [12 Hours]

UNIT – III

Multiple Integrals: Double integrals; Change of order of integration; double integrals in polar coordinates; Area enclosed by plane curves; Triple integrals; Volumes of solids: Volume as Triple integrals, Change of variables.

[Sections: 7.1; 7.2; 7.3; 7.4; 7.5; 7.6.2; 7.7.2]. [12 Hours]

UNIT – IV

Vector calculus and its Applications: Scalar and vector point functions; Del applied to scalar point functions-Gradient: Definition, Directional derivative; Del applied to vector point functions: Divergence, Curl; Line integral; Surfaces: Surface integral, Flux across a surface; Green‘s theorem in the plane (without proof); Stokes theorem (without proof); Gauss divergence theorem (without proof).

[Sections: 8.4; 8.5.1; 8.5.3; 8.6; 8.11; 8.12; 8.13;8.14; 8.16] [12 Hours]

TEXT BOOK:

B.S. Grewal, ―Higher Engineering Mathematics‖, 44th edition, Khanna publishers, 2017.

REFERENCE BOOKS:

[1] Erwin Kreyszig, –Advanced Engineering Mathematics, 9thedition, John Wiley & Sons.
[2] N.P.Baliand M.Goyal, ― A Textbook of Engineering Mathematics, Laxmi Publications, 2010.

Bapatla Engineering College:: Bapatla
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BASIC INSTRUMENTATION

I B.Tech – II Semester (Code: 18EC202)

Lectures	4	Tutorial	0	Practical	0	Credits	3		
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50				

Prerequisites: None

Course Objectives: To learn

CO1: Explain basic concepts and definitions in measurement.
CO2: Describe the bridge configurations and their applications.
CO3: Elaborate discussion about the importance of signal generators and analyzers in Measurement.
CO4: Describe the different types of transducers and data acquisition systems.

Course Outcomes: Students will be able to

CLO-1: Recognize the evolution and history of units and standards in Measurements.
CLO-2: Identify the various parameters that are measurable in electronic instrumentation.
CLO-3: To have a deep understanding about instrumentation concepts which can be applied to Control systems.
CLO-4: Relate the usage of various instrumentation standards.

SYLLABUS

UNIT-I

Measurement and Error: Definitions, Accuracy and Precision, Significant figures, Types of error, Statistical analysis, Probability of errors, Limiting Errors.
Electromechanical Indicating Instruments: Torque and Deflection of the Galvanometer, Permanent Magnet Moving Coil Mechanism, DC Ammeters, DC Voltmeters, Voltmeter Sensitivity, Series type Ohmmeter, Shunt type Ohmmeter, Calibration of DC Instruments, Alternating Current indicating Instruments.

UNIT-II

Bridge Measurements: Introduction, Wheatstone Bridge, Kelvin Bridge, AC Bridges and their Application-Maxwell Bridge, Hay Bridge, Schering Bridge, Wein Bridge.
Electronic Instruments for measuring Basic Parameters: AC voltmeter using rectifiers, True RMS-Responding voltmeter, Electronic Multimeter, Digital voltmeters, Q Meter, Vector Impedance Meter, Vector Voltmeter, RF Power and Voltage measurement.

UNIT-III

Oscilloscopes: Oscilloscope Block diagram, Cathode Ray Tube, Oscilloscope Techniques. **Special Oscilloscopes**: Storage Oscilloscope, Sampling Oscilloscope, Digital Storage Oscilloscopes.

Signal Analysis: Wave Analyzers, Harmonic Distortion Analyzers, Spectrum Analysis. **Frequency Counter and Time-Interval Measurements**: Simple Frequency counter, Display Counter, Time Base, Input Signal Processing, Period Measurement.

UNIT-IV

Transducers as Input Elements to Instrumentation Systems: Classification of Transducers, Selecting a Transducer, Strain gauges, Displacement Transducers, Temperature Measurements.

Analog and Digital Data Acquisition Systems: Instrumentation systems.

TEXT BOOK:

1. Modern Electronic Instrumentation and Measurement Techniques by W.D Cooper & A.D Hel frick PHI, 2008.

REFERENCE BOOKS:

1. A Course in Electrical and Electronics Measurements and Instrumentation by Sawhney. A.K**,** 18th Edition, Dhanpat Rai& Company Private Limited, 2007.

2. Electronic Instrumentation by H S Kalsi, Tata McGraw-Hill Education, 1995.

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PROGRAMMING WITH C++

I B.Tech – II Semester (Code: 18EC203)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Prerequisites: None

Course Objectives: To learn

CO1: Develop a greater understanding of the issues involved in programming language design and implementation.
CO2: Develop an in-depth understanding of functional, logic, and object-oriented programming paradigms.
CO3: Implement several programs in languages other than the one emphasized in the core curriculum (C++).
CO4: Understand design/implementation issues involved with variable allocation and binding, control flow, types, subroutines, parameter passing.

Course Outcomes: Students will be able to

CLO-1: Understand the features of C++ supporting object oriented programming.
CLO-2: Understand the relative merits of C++ as an object oriented programming language.
CLO-3: Understand how to apply the major object-oriented concepts to implement object. Oriented programs in C++, encapsulation, inheritance and polymorphism.
CLO-4: Understand advanced features of C++ specifically stream I/O, templates and operator overloading.

SYLLABUS

UNIT I

Introduction: Basic concepts of OOP, benefits and applications of OOP, what is C++, applications of C++, C++ statements, structure of a C++ program, creating the source file, compiling and linking. C++ tokens, keywords, identifiers and constants, data types in C++, operators in C++,symbolic constants, type compatibility, declaration of variables, dynamic initialization of variables, reference variables, scope resolution operator, member dereferencing operator, memory management operator, type cast operator, expressions and their types, special assignment expressions, implicit conversions, operator overloading, operator precedence, control structures. C++ streams and stream classes, unformatted I/O operations, formatted I/O operations, managing output with manipulators

UNIT II

Functions in C++: main function, function prototyping, call by reference, return by reference, inline functions, default arguments, const arguments, function overloading, friend and virtual functions. **Classes and objects**: specifying a class, defining member functions,

nesting member functions, private member functions, static data members and member functions, arrays of objects, objects as function arguments, returning objects, local classes.

UNIT III

Constructors and Destructors: constructors, parameterized constructors, multiple constructors in a class, constructors with default arguments, dynamic initialization of objects, copy constructor, dynamic constructor, const objects, destructors. Defining Operator overloading, overloading unary and binary operators, overloading binary operators using friends, rules for operator overloading, manipulation of strings using operators.

UNIT IV

Pointers, pointers to objects, this pointer, pointers to derived classes, pure virtual functions. Inheritance: single inheritance, making a private member inheritance, multilevel inheritance, hierarchical inheritance, hybrid inheritance, virtual base classes, abstract classes.

TEXT BOOK

1. Object oriented programming with C++, Balagurusamy , 4th edition, Tata McGraw-Hill publications, 2008.

REFERENCE BOOKS 2. Object oriented programming with ANSI and turbo C++, Ashok N.Kamthane, Pearson Education, 2005. 3. C++ programming language by Bjarne Stroustup, 3rd edition, Pearson education, 2009.

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CIRCUIT THEORY

I B.Tech – II Semester (Code: 18EC205)

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Prerequisites: None

Course Objectives: To learn

CO1: Basics of circuit analysis-KVL, KCL, Mesh analysis and Nodal analysis.
CO2: Analysis of dc/ac electric circuits and important theorems of circuit analysis.
CO3: To expose the students to the concept of resonance and its applications.
CO4: To familiarize the students to the Laplace transform concept for applying it to obtain transient response for DC & AC inputs.

Course Outcomes: Students will be able to

CLO-1: Identify the main circuit elements and apply Kirchhoff‘s Laws to calculate currents, voltages and powers in typical linear electric circuits using a variety of analytical methods.
CLO-2: Reduce more complicated circuits into the Thevenin‘s and Norton‘s equivalent circuits.
CLO-3: Obtain the transient responses of RC, RL and RLC circuits.
CLO-4: know the application of Laplace transform to circuit analysis.

UNIT – I

Voltage and current Laws: Introduction, nodes, paths, loops and branches, Kirchhoff‘s current and voltage laws, series and parallel connected sources, resistors in series and parallel, voltage and current division.
Basic Nodal and Mesh Analysis: Nodal analysis, the super node, Mesh analysis, and The super mesh, Nodal vs. Mesh analysis: A comparison

UNIT II

Useful circuit analysis techniques: Linearity and superposition, source transformations, Thevenin and Norton equivalent circuits, maximum power transfer Theorem, Reciprocity Theorem, and delta-wye conversion.

UNIT III

Basic RL and RC Circuits: The source free RL circuit, properties of the exponential response, the source free RC circuit, driven RL circuits, natural and forced response, driven RC circuits
The RLC Circuit: The source free Parallel circuit, the over damped Parallel RLC circuit, Critical damping, the under damped parallel RLC circuit, the complete response of the RLC circuit.

Sinusoidal steady state Analysis: Characteristics of sinusoids, forced response to sinusoidal functions, the complete forcing function, the phasor, phasor relationships for R, L and C, impedance, admittance, phasor diagrams.

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UNIT IV

Complex frequency and the Laplace transform: complex frequency, the damped sinusoidal Forcing function, Application of Laplace transform to circuit analysis

Frequency Response: Parallel Resonance, Bandwidth and High Q circuits, Series resonance, other resonant forms, scaling.

TEXT BOOK:

1. William H. Hayt, Jack E. Kemmerly and Steven M. Durbin, Engineering Circuit Analysis, 8th Edition, Tata McGraw Hill, 2016.

REFERENCE BOOKS:

1. Circuits & Networks: Analysis and Synthesis, A. Sudhakar and Shyammohan S. Pilli, Tata McGraw Hill, 2007.
2. Network Analysis, M. E. Van valkenburg, 3rd Edition, PHI, 2003

Bapatla Engineering College:: Bapatla
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Communicative English
18EL001

Lectures: 3Periods/Week | Continuous Assessment: 50M
Sem End Exam Duration: 3 hours | Sem End Exam : 50M

Credits: 2

UNIT-I

Vocabulary Development: Word formation-Formation of Nouns, Verbs & Adjectives from Root words-Suffixes and Prefixes
Essential Grammar: Prepositions, Conjunctions, Articles
Basic Writing Skills: Punctuation in writing
Writing Practices: Mind Mapping, Paragraph writing (structure-Descriptive, Narrative, Expository &Persuasive)

UNIT-II

Vocabulary Development: Synonyms and Antonyms
Essential Grammar: Concord, Modal Verbs, Common Errors
Basic Writing Skills: Using Phrases and clauses
Writing Practices: Hint Development, Essay Writing

Unit III

Vocabulary Development: One word Substitutes
Essential Grammar: Tenses, Voices
Basic Writing Skills: Sentence structures (Simple, Complex, Compound)
Writing Practices: Note Making

Unit IV

Vocabulary Development: Words often confused
Essential Grammar: Reported speech, Common Errors
Basic Writing Skills: Coherence in Writing: Jumbled Sentences
Writing Practices: Paraphrasing & Summarising

Reference Books

- Communication Skills, Sanjay Kumar & Pushpa Latha. Oxford University Press: 2011.
- Practical English Usage, Michael Swan. Oxford UniversityPress: 1995.
- Remedial English Grammar, F.T.Wood. Macmillan: 2007.
- Study Writing, Liz Hamplyons& Ben Heasley. Cambridge UniversityPress:2006

Bapatla Engineering College:: Bapatla
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Physics Laboratory

I B.Tech– Semester (Code: 18PHL01)

(COMMON TO ALL BRANCHES)

Lectures	**0**	Tutorial	0	Practical	**3**	Credits	**1**
Continuous Internal Assessment			**50**	Semester End Examination (3hours)			**50**

LIST OF EXPERIMENTS

1. Determination of acceleration due to gravity at a place using compound pendulum.
2. Study the variation of intensity of magnetic field along the axis of a circular coil using Stewart-Gee‘s apparatus.
3. Determination of thickness of thin wire using air wedge interference bands.
4. Determination of radius of curvature of a Plano convex lens using Newton's rings.
5. Determination of wavelengths of mercury spectrum using grating normal incidence method.
6. Determination of dispersive power of a given material of prism using prism minimum deviation method.
7. Draw the resonant characteristic curves of L.C.R. series circuit and calculate the resonant frequency.
8. Draw the characteristic curves of a photocell and calculate the maximum velocity of electron.
9. Verify the laws of transverse vibration of stretched string using sonometer.
10. Determine the rigidity modulus of the given material of the wire using Torsional pendulum.
11. Draw the load characteristic curves of a solar cell.
12. Determination of Hall coefficient of a semiconductor.
13. Determination of voltage and frequency of an A.C. signal using C.R.O.
14. Determination of Forbidden energy gap of Si & Ge.
15. Determination of wavelength of laser source using Diode laser.

Any three experiments are virtual TEXT BOOK:

1. Engineering physics laboratory manual by P.Srinivasa rao & K.Muralidhar, Himalaya publications.

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PROGRAMMING WITH C++ LAB

I B.Tech – II Semester (Code: 18ECL22)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

List of Lab Programs Write C++ programs to illustrate the concept of the following:

1. Arrays
2. Structures
3. Pointers
4. Objects and Classes
5. Console I/O operations
6. Scope resolution and memory management operators
7. Inheritance
8. Polymorphism
9. Virtual Functions
10. Friend Functions
11. Operator overloading
12. Function overloading
13. Constructors and Destructors
14. *This* pointer
15. File I/O operations

Note: A minimum of ten programs are to be executed and recorded to attain eligibility for University Practical examination.

Bapatla Engineering College:: Bapatla (Autonomous)

English Communication Skills Laboratory

18ELL01

Lectures:3 Periods/Week | Continuous Assessment: 50M

Sem End Exam Duration: 3 hours | Sem End Exam : 50M

Credits: 1

UNIT-I

Listening Skills; Importance – Purpose- Process-Types
Barriers to Listening
Strategies for Effective Listening

UNIT-II

Phonetics; Introduction to Consonant, Vowel and Diphthong sounds
Stress
Rhythm
Intonation

UNIT-III

Formal and Informal Situations
Expressions used in different situations
Introducing Yourself & Others-Greeting & Parting-Congratulating-Giving Suggestions & Advices-Expressing Opinions-Inviting People-Requesting-Seeking Permission-Giving
Information- Giving Directions- Sympathizing- Convincing People-Complaining & Apologizing-Thanking Others- Shopping- Travelling-Conversational Gambits

UNIT-IV

JAM Session
Debates
Extempore

Reference Books:

- Communication Skills, Sanjay Kumar and Pushpa Lata. Oxford University Press.2011
- Better English Pronunciation, J.D. O‘ Connor. Cambridge UniversityPress:1984
- New Interchange (4rth Edition), Jack C Richards. Cambridge UniversityPress:2015
- English Conversation Practice, Grant Taylor. McGrawHill:2001

Software:

- Buzzers for conversations, New Interchange series
- English in Mind series, Telephoning in English
- Speech Solutions, A Course in Listening and Speaking

Bapatla Engineering College:: Bapatla (Autonomous)

ENGINEERINGCHEMISTRY LABORATORY

With effect from 2018-19 **3 periods: Credits; 1.5**

LIST OF EXPERIMENTS

1. **Introduction to Chemistry Lab** (the teachers are expected to teach fundamentals like Calibration of Volumetric Apparatus, Primary, Secondary Solutions, Normality, Molarity, Molality etc. and error, accuracy, precision, theory of indicators, use of volumetric titrations).

2. **Volumetric Analysis:**
    a. Estimation of Washing Soda.
    b. Estimation of Active Chlorine Content in Bleaching Powder
    c. Estimation of Mohr's salt by permanganometry.
    d. Estimation of given salt by using Ion-exchange resin using Dowex-50.
3. **Analysis of Water:**
    a. Determination of Alkalinity of Tap water.
    b. Determination of Total Hardness of ground water sample by EDTA method
    c. Determination of Salinity of water sample
4. **Estimation of properties of oil**:
    a. Estimation of Acid Value
    b. Estimation of Saponification value
5. **Preparations:**
    a. Preparation of Soap
    b. Preparation of Urea-formaldehyde resin
    c. Preparation of Phenyl benzoate
6. **Demonstration Experiments (Any two of the following):**
    a. Determination of p^H of given sample.
    b. Determination of conductivity of given sample by conducto-meter.
    c. Potentiometric Determination of Iron.

TEXT BOOKS (for Chemistry 1 and 2):

1. Practical Engineering Chemistry by K.Mukkanti, Etal, B.S. Publications, Hyderabad, 2009.
2. Inorganic quantitative analysis, Vogel, 5^{th} edition, Longman group Ltd. London, 1979.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R.n.Goyal and Harrmendra Goel.
2. A text book on experiments and calculations- Engineering Chemistry. S.S. Dara.

Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications

Bapatla Engineering College:: Bapatla (Autonomous)

Numerical Methods and Advanced Calculus
I B.Tech –II Semester (Code: 18MA002)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: None

Course Objectives:
CO1: To learn about some advanced numerical techniques e.g. solving a nonlinear equation, Linear system of equations, Interpolation and Approximation techniques.
CO2: To learn about evaluation of double and triple integrals and their applications.
CO3: To learn some basic properties of scalar and vector point functions and their applications to Line, surface and volume integrals.

Course Outcomes: Students will be able to
CLO-1: Solve non-linear equations in one variable and system of linear equations using iteration Methods.
CLO-2: Choose appropriate interpolation formulae based on the given data.
CLO-3: Compute the value of a definite integral using numerical integration techniques.
CLO-4: Predict the numerical solution of the derivative at a point from the given initial value Problem using appropriate numerical method.
CLO-4: Evaluate the double and triple integrals using change of variables.
CLO-5: Transform line integrals to surface and surface to volume integrals and evaluate them.

SYLLABUS

UNIT - I

Numerical Solution of Equations: Introduction; Solution of algebraic and transcendental equations: Bisection method, Method of false position, Newton-Raphson method; Useful deductions from the Newton-Raphson formula; Solution of linear simultaneous equations; Direct methods of solution: Gauss elimination method, Gauss-Jordan method, Factorization method; Iterative methods of solution: Jacobi's iterative method, Gauss-Seidel iterative method.
[Sections: 28.1; 28.2; 28.3; 28.5; 28.6; 28.7.1; 28.7.2]. [12 Hours]

UNIT - II

Finite differences and Interpolation: Finite differences: Forward differences, Backward differences; Newton's interpolation formulae: Newton's forward interpolation formula, Newton's backward interpolation formula; Interpolation with unequal intervals; Lagrange's interpolation formula; Divided differences; Newton's divided difference formula; Numerical

integration; Trapezoidal rule; Simpson's one-third rule; Simpson's three-eighth rule; Numerical solution of ODE's: Introduction; Picard's method; Euler's method; Runge-Kutta method.
[Sections:29.1; 29.1-1; 29.1.2; 29.6; 29.9; 29.10; 29.11; 29.12; 30.4; 30.6; 30.7; 30.8; 32.1; 32.2; 32.4; 32.7]. [12 Hours]

UNIT – III

Multiple Integrals: Double integrals; Change of order of integration; double integrals in polar coordinates; Area enclosed by plane curves; Triple integrals; Volumes of solids: Volume as Triple integrals, Change of variables.
[Sections: 7.1; 7.2; 7.3; 7.4; 7.5; 7.6.2; 7.7.2]. [12 Hours]

UNIT – IV

Vector calculus and its Applications: Scalar and vector point functions; Del applied to scalar point functions-Gradient: Definition, Directional derivative; Del applied to vector point functions: Divergence, Curl; Line integral; Surfaces: Surface integral, Flux across a surface; Green's theorem in the plane (without proof); Stokes theorem (without proof); Gauss divergence theorem (without proof).
[Sections: 8.4; 8.5.1; 8.5.3; 8.6; 8.11; 8.12; 8.13; 8.14; 8.16] [12 Hours]

TEXT BOOK:

B.S.Grewal, "Higher Engineering Mathematics", 44thedition, Khanna publishers, 2017.

REFERENCE BOOKS:

[1] Erwin Kreyszig, "Advanced Engineering Mathematics", 9th edition, John Wiley & Sons.

[2] N.P.Bali and M.Goyal, "A Text book of Engineering Mathematics" Laxmi Publications, 2010.

Bapatla Engineering College:: Bapatla (Autonomous)

BASIC INSTRUMENTATION

I B.Tech – II Semester (Code: 18EC202)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: None

Course Objectives: To learn

CO1: Explain basic concepts and definitions in measurement.
CO2: Describe the bridge configurations and their applications.
CO3: Elaborate discussion about the importance of signal generators and analyzers in Measurement.
CO4: Describe the different types of transducers and data acquisition systems.

Course Outcomes: Students will be able to

CLO-1: Recognize the evolution and history of units and standards in Measurements.
CLO-2: Identify the various parameters that are measurable in electronic instrumentation.
CLO-3: To have a deep understanding about instrumentation concepts which can be applied to Control systems.
CLO-4: Relate the usage of various instrumentation standards.

UNIT-I

Measurement and Error: Definitions, Accuracy and Precision, Significant figures, Types of error, Statistical analysis, Probability of errors, Limiting Errors.

Electromechanical Indicating Instruments: Torque and Deflection of the Galvanometer, Permanent Magnet Moving Coil Mechanism, DC Ammeters, DC Voltmeters, Voltmeter Sensitivity, Series type Ohmmeter, Shunt type Ohmmeter, Calibration of DC Instruments, Alternating Current indicating Instruments.

UNIT-II

Bridge Measurements: Introduction, Wheatstone Bridge, Kelvin Bridge, AC Bridges and their Application-Maxwell Bridge, Hay Bridge, Schering Bridge, Wein Bridge.

Electronic Instruments for measuring Basic Parameters : AC voltmeter using rectifiers, True RMS-Responding voltmeter, Electronic Multimeter, Digital voltmeters, Q Meter, Vector Impedance Meter, Vector Voltmeter, RF Power and Voltage measurement.

UNIT-III

Oscilloscopes: Oscilloscope Block diagram, Cathode Ray Tube, Oscilloscope Techniques. **Special Oscilloscopes**: Storage Oscilloscope, Sampling Oscilloscope, Digital Storage Oscilloscopes.

Signal Analysis: Wave Analyzers, Harmonic Distortion Analyzers, Spectrum Analysis. **Frequency Counter and Time-Interval Measurements**: Simple Frequency counter, Display Counter, Time Base, Input Signal Processing, Period Measurement.

UNIT-IV

Transducers as Input Elements to Instrumentation Systems: Classification of Transducers, Selecting a Transducer, Strain gauges, Displacement Transducers, Temperature Measurements.

Analog and Digital Data Acquisition Systems: Instrumentation systems.

TEXT BOOK:

1. Modern Electronic Instrumentation and Measurement Techniques by W.D Cooper & A.D Helfrick PHI, 2008.

REFERENCE BOOKS:

1. A Course in Electrical and Electronics Measurements and Instrumentation by Sawhney. A.K**,** 18th Edition, Dhanpat Rai& Company Private Limited, 2007.
2. Electronic Instrumentation by H S Kalsi, Tata McGraw-Hill Education, 1995.

Bapatla Engineering College:: Bapatla (Autonomous)

PROGRAMMING WITH C++

I B.Tech – II Semester (Code: 18EC203)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: None

Course Objectives: To learn

CO1: Develop a greater understanding of the issues involved in programming language design and implementation.

CO2: Develop an in-depth understanding of functional, logic, and object-oriented programming paradigms.

CO3: Implement several programs in languages other than the one emphasized in the core curriculum (C++).

CO4: Understand design/implementation issues involved with variable allocation and binding, control flow, types, subroutines, parameter passing.

Course Outcomes: Students will be able to

CLO-1: Understand the features of C++ supporting object oriented programming.

CLO-2: Understand the relative merits of C++ as an object oriented programming language.

CLO-3: Understand how to apply the major object-oriented concepts to implement object-oriented programs in C++, encapsulation, inheritance and polymorphism.

CLO-4: Understand advanced features of C++ specifically stream I/O, templates and operator overloading.

UNIT I

Introduction: Basic concepts of OOP, benefits and applications of OOP, what is C++, applications of C++, C++ statements, structure of a C++ program, creating the source file, compiling and linking. C++ tokens, keywords, identifiers and constants, data types in C++, operators in C++,symbolic constants, type compatibility, declaration of variables, dynamic initialization of variables, reference variables, scope resolution operator, member dereferencing operator, memory management operator, type cast operator, expressions and their types, special assignment expressions, implicit conversions, operator overloading, operator precedence, control structures. C++ streams and stream classes, unformatted I/O operations, formatted I/O operations, managing output with manipulators

UNIT II

Functions in C++: main function, function prototyping, call by reference, return by reference, inline functions, default arguments, const arguments, function overloading, friend and virtual functions. **Classes and objects**: specifying a class, defining member functions, nesting member

functions, private member functions, static data members and member functions, arrays of objects, objects as function arguments, returning objects, local classes.

UNIT III

Constructors and Destructors: constructors, parameterized constructors, multiple constructors in a class, constructors with default arguments, dynamic initialization of objects, copy constructor, dynamic constructor, const objects, destructors. Defining Operator overloading, overloading unary and binary operators, overloading binary operators using friends, rules for operator overloading, manipulation of strings using operators.

UNIT IV

Pointers, pointers to objects, this pointer, pointers to derived classes, pure virtual functions. Inheritance: single inheritance, making a private member inheritance, multilevel inheritance, hierarchical inheritance, hybrid inheritance, virtual base classes, abstract classes.

TEXT BOOK

1. Object oriented programming with C++, Balagurusamy, 4th edition, Tata McGraw-Hill publications, 2008.

REFERENCE BOOKS 2. Object oriented programming with ANSI and turbo C++, Ashok N.Kamthane, Pearson Education, 2005. 3. C++ programming language by Bjarne Stroustup,3rd edition, Pearson education,2009.

Bapatla Engineering College:: Bapatla (Autonomous)

Communicative English
I B.Tech (Theory)

Lectures: 3 Periods/Week | Continuous Assessment: 50M
Sem End Exam Duration: 3 hours | Sem End Exam : 50M

Credits: 2

UNIT-I

1.1 **Vocabulary Development**: Word formation-Formation of Nouns, Verbs & Adjectives from Root words-Suffixes and Prefixes
1.2 **Essential Grammar:** Prepositions, Conjunctions, Articles
1.3 **Basic Writing Skills**: Punctuation in writing
1.4 **Writing Practices**: Mind Mapping, Paragraph writing (structure-Descriptive, Narrative, Expository & Persuasive)

UNIT-II

2.1 **Vocabulary Development**: Synonyms and Antonyms
2.2 **Essential Grammar**: Concord, Modal Verbs, Common Errors
2.3 **Basic Writing Skills**: Using Phrases and clauses
2.4 **Writing Practices**: Hint Development, Essay Writing

Unit III

3.1 **Vocabulary Development**: One word Substitutes
3.2 **Essential Grammar**: Tenses, Voices
3.3 **Basic Writing Skills**: Sentence structures (Simple, Complex, Compound)
3.4 **Writing Practices**: Note Making

Unit IV

4.1 **Vocabulary Development**: Words often confused
4.2 **Essential Grammar**: Reported speech, Common Errors
4.3 **Basic Writing Skills**: Coherence in Writing: Jumbled Sentences
4.4 **Writing Practices**: Paraphrasing & Summarising

Reference Books

- Communication Skills, Sanjay Kumar & Pushpa Latha. Oxford University Press: 2011.
- Practical English Usage, Michael Swan. Oxford University Press: 1995.
- Remedial English Grammar, F.T. Wood. Macmillan: 2007.
- Study Writing, Liz Hamplyons & Ben Heasley. Cambridge University Press:2006

Bapatla Engineering College:: Bapatla (Autonomous)

CIRCUIT THEORY

I B.Tech – II Semester (Code: 18EC205)

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: None

Course Objectives: To learn

CO1: Basics of circuit analysis-KVL, KCL, Mesh analysis and Nodal analysis.
CO2: Analysis of dc/ac electric circuits and important theorems of circuit analysis.
CO3: To expose the students to the concept of resonance and its applications.
CO4: To familiarize the students to the Laplace transform concept for applying it to obtain transient response for DC & AC inputs.

Course Outcomes: Students will be able to

CLO-1: Identify the main circuit elements and apply Kirchhoff's Laws to calculate currents, voltages and powers in typical linear electric circuits using a variety of analytical methods.
CLO-2: Reduce more complicated circuits into the Thevenin's and Norton's equivalent circuits.
CLO-3: Obtain the transient responses of RC, RL and RLC circuits.
CLO-4: know the application of Laplace transform to circuit analysis.

UNIT – I

Voltage and current Laws: Introduction, nodes, paths, loops and branches, Kirchhoff's current and voltage laws, series and parallel connected sources, resistors in series and parallel, voltage and current division.

Basic Nodal and Mesh Analysis: Nodal analysis, the super node, Mesh analysis, and The super mesh, Nodal vs. Mesh analysis: A comparison

UNIT II

Useful circuit analysis techniques: Linearity and superposition, source transformations, Thevenin and Norton equivalent circuits, maximum power transfer Theorem, Reciprocity Theorem, and delta-wye conversion.

UNIT III

Basic RL and RC Circuits: The source free RL circuit, properties of the exponential response, the source free RC circuit, driven RL circuits, natural and forced response, driven RC circuits

The RLC Circuit: The source free Parallel circuit, the over damped Parallel RLC circuit, Critical damping, the under damped parallel RLC circuit, the complete response of the RLC circuit.

Sinusoidal steady state Analysis: Characteristics of sinusoids, forced response to sinusoidal functions, the complete forcing function, the phasor, phasor relationships for R, L and C, impedance, admittance, phasor diagrams.

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UNIT IV

Complex frequency and the Laplace transform: complex frequency, the damped sinusoidal Forcing function, Application of Laplace transform to circuit analysis

Frequency Response: Parallel Resonance, Bandwidth and High Q circuits, Series resonance, other resonant forms, scaling.

TEXT BOOK:

1. William H. Hayt, Jack E. Kemmerly and Steven M. Durbin, Engineering Circuit Analysis, 8th Edition, Tata McGraw Hill, 2016.

REFERENCE BOOKS:

1. Circuits & Networks: Analysis and Synthesis, A.Sudhakar and ShyammohanS.Pilli, Tata McGraw Hill, 2007.
2. Network Analysis, M. E. Van valkenburg, 3rd Edition, PHI, 2003.

Bapatla Engineering College:: Bapatla (Autonomous)

PROGRAMMING WITH C++ LAB

I B.Tech – II Semester (Code: 18ECL23)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

List of Lab Programs Write C++ programs to illustrate the concept of the following:

1. Arrays
2. Structures
3. Pointers
4. Objects and Classes
5. Console I/O operations
6. Scope resolution and memory management operators
7. Inheritance
8. Polymorphism
9. Virtual Functions
10. Friend Functions
11. Operator overloading
12. Function overloading
13. Constructors and Destructors
14. *this* pointer
15. File I/O operations

Note: A minimum of ten programs are to be executed and recorded to attain eligibility for University Practical examination.

Bapatla Engineering College:: Bapatla (Autonomous)

Probability and Statistics

Common to All Branches

18 MA 003

II B.Tech, III Semester

Lectures	:	3 Hours/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

UNIT – I

Continuous Random Variables, Normal Distribution, Normal Approximation to the Binomial Distribution, Uniform Distribution, Gamma Distribution and its applications, Beta Distribution and its applications, Joint Distributions (Discrete),Joint Distributions (Continuous).Populations and Samples, Law of large numbers, Central limit theorem and its applications, The sampling distribution of the mean (σ unknown),The sampling distribution of the variance.

[12 Hours]

(Sections 5.1, 5.2, 5.3, 5.5, 5.7, 5.8, 5.10, 6.1, 6.2, 6.3, 6.4 of Text Book [1])

UNIT – II

Point estimation, Interval estimation, Tests of Hypotheses, Null Hypothesis and Tests of hypotheses, Hypothesis concerning one mean, Comparisons-Two independent large samples, Comparisons-Two independent small samples, Paired sample t test.

[12 Hours]

(Sections 7.1, 7.2, 7.4, 7.5, 7.6, 8.2, 8.3, 8.4 of Text Book [1])

UNIT-III

The estimation of variances, Hypotheses concerning one variance, Hypotheses concerning two variances, Estimation of proportions, Hypotheses concerning one proportion, Hypotheses concerning several proportions, Procedure for Analysis of Variance (ANOVA) for comparing the means of k (>2) groups- one way classification(Completely randomized designs), Procedure for Analysis of Variance (ANOVA) for comparing the means of k (>2) groups- two way classification(Randomized block designs). [12 Hours]

(Sections 9.1, 9.2, 9.3, 10.1, 10.2, 10.3, 12.2, 12.3 of Text Book [1])

UNIT -IV

Multivariate Analysis: The concept of bivariate relationship, scatter diagram, Pearson's correlation and correlation matrix. Simple linear regression model and assumptions, Least Squares Estimation of the parameters of the model, testing the significance of the model. Regression versus Correlation, Multiple linear regression model with k explanatory variables and assumptions of the model. Least Square Estimation of regression coefficients. Concept of the coefficient of determination R^2. Test for significance of the regression model and individual regression coefficients. Applications of multiple regression analysis.

[12 Hours]

(1^{st} and 2^{nd} Chapters of Text Book [2])

TEXT BOOKS:

1. Miller & Freund's "Probability and Statistics for Engineers", Richard A. Johnson, 8th Edition, PHI.
2. Introduction to Linear Regression Analysis, Douglas C. Montgomery, E.A. Peck and G.G. Vining, 3rdedition, Wiley.

REFERENCE BOOKS:

1. R.E Walpole, R.H. Myers & S.L. Myers 'Probability & Statistics for Engineers and Scientists', 6th Edition, PHI.
2. Fundamentals of Mathematical Statistics, S.C. Gupta and V.K.Kapoor, 11th Edition, Sultan Chand & Sons.
3. Murray R Spiegel, John J.Schiller, R. Alu Srinivasa, 'Probability & Satistics', Schaum's outline series.
4. K.V.S.Sarma, 'Statistics Made Simple – Do it yourself on PC', Prentice Hall India, Second Edition, 2015.

Bapatla Engineering College:: Bapatla
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Data Structures using 'Python'
II B.Tech – I Semester (Code: 18EC302)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

UNIT – I

Python Primer: Python overview, objects in Python, Expressions, operators and precedence, Control flow, functions, simple Input and Output, Iterators and generators, additional python conveniences, Scopes and namespaces, Modules and the import statement.

Array-Based Sequences: python's sequence types, low- level arrays, dynamic arrays and amortization, efficiency of python's sequence types: python's list and tuple classes, python's string class.

UNIT – II

Linked lists: Singly linked list, circularly linked list, doubly linked list

Stacks: The stack abstract data type, Simple array-based stack implementation, reversing data using a stack, implementing stack with a linked list

Queues: the queue abstract data type, Array based queue implementation, implementing queue with a linked list.

Double-ended queues: the DE queue abstract data type, implementing a de queue with a circular array, implementing de queue with a linked list, de queues in the python collections module

UNIT – III

Trees: tree definitions and properties, tree abstract data type, computing depth and height, binary trees, linked structure for binary tree, Array-based representation of a binary tree, tree traversal algorithms, binary search trees, AVL trees.

UNIT – IV

Graph: The graph ADT, Edge list structure, Adjacency list structure, Adjacency map structure, Adjacency matrix structure, Graph traversal algorithms: depth first search, breadth first search, minimum spanning trees.

TEXT BOOKS

1. "Data Structures & Algorithms", Michael T. Good Rich, Roberto Tamassia, Michael H. Goldwasser. John Wiley & sons ,2013

REFERENCES

1. "Introduction to programming using python", Y.Daniel Liang, Pearson, 2013.
2. "Introducing Python- Modern Computing in Simple Packages", Bill Lubanovic ,O.Reilly Publication, 1st Edition, 2015.
3. "Core python Programming",R. Nageswara Rao, Dream tech, 2017.
4. "Programming in Python 3", Mark Summerfield, Pearson Education, 2nd Edition
5. "Beginning Python –From Novice to Professional", Magnus Lie Hetland, A Press Publication, 3rdEdition, 2017

Bapatla Engineering College:: Bapatla
(Autonomous)

ELECTRONIC DEVICES AND CIRCUITS
II B.Tech – III Semester (Code: 18EC303)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

UNIT – I

The P-N Diode Volt-Ampere equation, The Temperature Dependence of P-N characteristics, Diode Resistance(Static and Dynamic), Space Charge Capacitance, Diffusion Capacitance.

Special Diodes: Varactor Diode, Break Down diodes, Tunnel Diode, V-I characteristics of Tunnel Diode with the help of Energy Band Diagrams, Photo Diode, Light emitting diode.

UNIT II

Rectifiers: Half wave, Full wave and Bridge Rectifiers without filter and with inductor filter, Capacitor filter, L section and π- section filters.

UNIT III

Transistors Characteristics: The Junction transistor, Transistor current components, Transistor as an amplifier, Common Base Configuration, Common Emitter Configuration, CE cutoff region, CE Saturation region, CE current gain, Common Collector Configuration, Photo Transistor.

Transistor Biasing and Thermal Stabilization : Operating point, Bias Stability, Self-Bias, Stabilization against variations in ICO, VBE, and β, Bias Compensation, Thermistor and Sensistor compensation, Thermal runaway, Thermal stability.

UNIT IV

Field Effect Transistors: The Junction Field Effect Transistor, Pinch-Off voltage, JFET V-I Characteristics, FET Small signal model, Metal-Oxide-Semiconductor FET.

PNPN and Other Devices: SCR, DIAC, TRIAC, UJT and The Phototransistor (their characteristics only).

TEXT BOOK:

1. Integrated Electronics-Jacob Millman, Chritos C. Halkies, Tata Mc- Graw Hill, 2009.
2. Electronic Devices and Circuits – Salivahanan, Kumar, Vallavaraj, Tata McGraw Hill, Second Edition.

REFERENCE BOOKS:

1. Electronic Devices and Circuits – J. Millman, C. C. Halkias, Tata Mc-Graw Hill.
2. Robert L Boylested and Louis Nashelsky, Electronic Devices and Circuit Theory, 8th Edition, PHI, 2003.

Bapatla Engineering College:: Bapatla (Autonomous)

Electromagnetic field theory

II B.Tech – I Semester (Code: 18EC304)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

UNIT – I

Electrostatics –I: The experimental law of coulomb, Electric field intensity, Field due to a continuous volume charge distribution, Field of a line charge, sheet of charge. Electric Flux Density, Gauss's law , Applications of Gauss law, Divergence, Maxwell's First equation (Electrostatics), Energy expended in moving a point charge in an electric field, The line integral, Definition of potential and potential difference. The potential field of a point charge, system of charges, potential gradient, the dipole and Energy density in electrostatic field.

UNIT II

Electrostatics – II: The nature of dielectric materials, boundary conditions for perfect dielectric materials. Capacitance. Several capacitance examples. Capacitance of a two wire line. Derivations of Poisson's and Laplace's equations, Examples of the solution of Laplace's equation. Current and current density, continuity of current, conductor properties and boundary conditions.

UNIT III

The Steady Magnetic Field: Biot-Savart Law, Ampere's Circuital Law, Magnetic Flux and Magnetic Flux Density, The scalar and vector magnetic potentials. Magnetic Forces and Materials: Force on a moving charge, Force on a differential current element, Force between differential current elements, Force and torque on a closed circuit, the nature of magnetic materials, Magnetization and Permeability. Magnetic boundary conditions. Potential energy in magnetic fields.

UNIT IV

Time Varying Fields and Maxwell's Equations: Faraday's law, Displacement current, Maxwell's equations in point form, integral form.

The Uniform Plane Wave: Wave propagation in free space, dielectrics. Poynting theorem and wave power. Propagation in good conductors: skin effect. Wave polarization.

TEXT BOOK:

1. W H Hayt, J A Buck, J Akhtar Engineering Electromagnetics, 8th Edition McGraw Hill Education, 2014.

REFERENCE BOOKS:

1. Mathew NO Sadiku, Elements of Electromagnetics, Oxford University Press, 2003.
2. Joseph A Edminister, Theory and Problems of Electromagnetics, 2nd Edition, Schaum's Outline Series, Mc-Graw Hill International, 1993
3. EC Jordan and KG Balmain, Electromagnetic Waves and Radiating Systems, 2nd Edition, Prentice Hall of India.

Bapatla Engineering College:: Bapatla (Autonomous)

Digital Electronics
II B.Tech – I Semester (Code: 18EC305)

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

UNIT – I

Binary Systems: Complements: The r's complement, the (r-1)'s complement, subtraction using method of complements. Binary codes: Decimal codes, Reflected code, Error detecting codes, alphanumeric codes.

Sign magnitude representation: Signed Magnitude form, Signed 1's complement form, Signed 2's complement form.

Boolean Algebra and Logic Gates: Basic definitions, Axiomatic definitions of Boolean algebra, Basic Theorems and properties of Boolean algebra, Boolean functions. Canonical and standard forms, Digital Logic gates.

UNIT II

Simplification of Boolean Functions: The map method, Two-and Three-variable Maps, Four variable Maps, Five variable Maps, POS simplification, NAND and NOR implementation, Other Two-level implementations, Don't care conditions, The Tabulation Method, Determination of prime - implicants, Selection of prime – implicants.

Combinational Logic: Introduction, Design procedure, Adders, Sub tractors, Code conversion, Multilevel NAND circuits, Multilevel NOR circuits, EX-OR and EX-NOR circuits.

UNIT III

Combinational Logic with MSI and LSI: Binary parallel adder, Carry propagation, Decimal adder, Magnitude comparator, Decoders, Demultiplexers, Encoders, Multiplexers.

Sequential Logic: Flip-flops, Triggering of Flip-Flops, Analysis of clocked Sequential Circuits, state reduction and assignment, Flip-Flop excitation tables, Conversions of Flip-Flops, Design of Sequential circuits.

UNIT IV

Registers, Counters and Memory Unit: Registers, shift registers, Ripple counters, Synchronous counters.

Digital Integrated Circuits: Introduction, Characteristics of logic families, RTL and DTL circuits, I2 L, TTL, MOS, CMOS Logic families. Programmable Logic Devices: PLA, PAL, ROM.

TEXT BOOK:

1. Digital Logic and Computer Design, **M Morris Mano**, PHI/Pearson Education.

REFERENCE BOOKS:

"1. Digital Integrated Electronics, **Taub and Schilling**, Mc-Graw Hill.
2. Fundamental of Digital Circuits, **A.Anand Kumar**, Pearson Education, 4th Edition.

Bapatla Engineering College:: Bapatla (Autonomous)

Technical English
II B.Tech (Theory) 18EL002

Lectures: 3 Periods/Week | Continuous Assessment: 50M
Sem End Exam Duration: 3 hours | Sem End Exam : 50M

Course Schedule: II B.Tech – I Semester (CIV, CSE, EEE & EI)
II B.Tech – II Semester (ECE, IT & Mech)
Credits: 2

UNIT-I
- 1.1 Vocabulary Development: Familiarising Idioms & Phrases
- 1.2 Grammar for Academic Writing: Making Requests
- 1.3 Language Development: Using Transition & Link words
- 1.4 Technical Writing: Letter Writing & Email Writing

UNIT-II
- 2.1 Vocabulary Development: Analogous words, Gender Sensitive language
- 2.2 Grammar for Academic Writing: Tenses: Simple Past /Present Perfect, The Future: Predicting & Proposing
- 2.3 Language Development: Cloze tests
- 2.4 Technical Writing: Technical Reports

UNIT-III
- 3.1 Vocabulary Development: Abbreviations& Acronyms
- 3.2 Grammar for Academic Writing: Describing(People/Things/Circumstances) : Adjectival & Adverbial groups
- 3.3 Language Development: Transcoding (Channel conversion from chart to text)
- 3.4 Technical Writing: Circular, Memos, Minutes of Meeting

UNIT-IV
- 4.1 Vocabulary Development: Corporate vocabulary
- 4.2 Grammar for Academic Writing: Inversions & Emphasis
- **4.3** Language Development: Reading Comprehension
- **4.4** Technical Writing: Resume Preparation

Reference Books

- Communication Skills, Sanjay Kumar &Pushpa Latha. Oxford University Press: 2011.
- Technical Communication Principles and Practice. Oxford University Press: 2014.
- Advanced Language Practice, Michael Vince. Mac Milan Publishers: 2003.
- Objective English (Third Edition), Edgar Thorpe & Showick. Pearson Education: 2009
- English Grammar: A University Course (Second Edition), Angela Downing & Philip Locke, Routledge Taylor & Francis Group: 2016

Bapatla Engineering College:: Bapatla (Autonomous)

DATA STRUCTURES USING PYTHON LAB
II B.Tech (Lab) 18ECL 31

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

List of Lab Programs

1. Python program to implement bubble sort, selection sort, insertion sort.
2. Python program to implement merge sort, quick sort
3. Python program on linear search and binary search.
4. Python program to implement Singly Linked List
5. Python program to implement Doubly Linked List
6. Python program to implement Circular Linked List
7. Python programs to implement stacks using arrays and linked lists.
8. Python programs to implement queues using arrays and linked lists.
9. Python program to perform Binary Tree traversal operations.
10. Python programs to perform Binary search tree operations.
11. Python program to Travers in a graph using Depth first search.
12. Python program to Travers in a graph using breadth first search.

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Electronic Devices and Digital Electronics Lab

II B.Tech (Lab) 18ECL32

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

List of Lab Experiments:

Cycle 1:

1. Characteristics of Common Base Configuration
2. Characteristics of Common Emitter Configuration
3. Characteristics of Emitter Follower circuit
4. Design and verification of self-bias circuit
5. Characteristics of Silicon Controlled Oscillator
6. Characteristics of DIAC
7. Design and Verification of Collector to Base bias circuit Characteristics of Photo transistor

Cycle 2:

8. Design of Combinational Logic Circuits like Half-Adder, Full-Adder, Half- Sub tractor and Full-Sub tractor
9. Design of Multiplexers/De Multiple
10. Applications of IC Parallel Adder(1's and 2's compliment addition)
11. Design of Shift register (To verify Serial to Parallel, Parallel to Serial ,Serial to Serial and Parallel to Parallel Converters) using Flip-Flops
12. Conversion of Flip-Flops (JK-T, JK-D)
13. Design of Binary/Decade Counter
14. Design Asynchronous Counter, Mod Counter, Up Counter, Down Counter and Up/Down Counter
15. Design Synchronous Counter, Mod Counter, Up Counter, Down Counter and Up/Down Counter

Bapatla Engineering College:: Bapatla (Autonomous)

Electronic Devices and Digital Electronics Lab using PSPICE

II B.Tech (Theory) **18ECL33**

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

List of Lab Programs:

Cycle 1:

1. Simulate and study active low-pass & high-pass filter using PSPICE.
2. Simulate and study V-I characteristics of a Diode using PSPICE.
3. Simulate and study Diode Clipper circuits using PSPICE.
4. Simulate and study Diode Clamper circuits using PSPICE.
5. Simulate and study Half-wave and Full-wave Rectifier using PSPICE.
6. Simulate and study V-I characteristics of a NPN-BJT using PSPICE.

Cycle 2:

7. Simulate and study basic AND, OR, NOT, NOR, NAND, EX-OR gates using PSPICE.
8. Simulate and study diode resistor logic gates using PSPICE.
9. Simulate and study resistor transistor logic gates using PSPICE.
10. Simulate and study Half Adder and Full Adder using PSPICE.
11. Simulate and study Digital Multiplexer using PSPICE.
12. Simulate and study FLIP-FLOP’s logic gates using PSPICE.

Bapatla Engineering College:: Bapatla (Autonomous)

Complex Analysis and Special functions (CSE/ECE & EIE)

18 MA 401 (3Th, 3 Credits)

II B.Tech, II Semester

Lectures	:	3 Hours/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

UNIT – I

Complex Numbers and functions: Complex Numbers; Geometric Representation of Imaginary numbers; Roots of a complex number; Complex function; Real and imaginary parts of circular and hyperbolic functions; **Calculus of complex functions:** Introduction; Limit of a complex function; Derivative of f(z); Analytic functions; Harmonic functions; Complex integration; Cauchy's theorem; Cauchy's integral formula.

[Sections: 19.1; 19.2; 19.5; 19.7; 19.12; 20.1; 20.2; 20.3; 20.4; 20.5;20.12; 20.13; 20.14]

[12 Hours]

UNIT – II

Calculus of complex functions: Series of complex terms; Taylor series; Laurent's series; Zeros of an analytic function; Singularities of an analytic function; Residues; Residue theorem; Calculation of residues; Evaluation of real definite integrals: Evaluation around the unit circle, Evaluation around a small semi-circle.

[Sections: 20.16.1; 20.16.2; 20.16.3; 20.17.1; 20.17.2; 20.18.1; 20.18.2; 20.19; 20.20]

[12 Hours]

UNIT – III

Fourier transforms: Introduction; Definition; Fourier integral theorem (without proof); Fourier sine and cosine integrals; Complex form of Fourier integrals; Fourier integral representation of a function; Fourier transforms ; Properties of Fourier transforms; Convolution theorem(without proof); Fourier transforms of the derivative of a function.

[Sections: 22.1; 22.2; 22.3.1; 22.3.3; 22.3.4; 22.4; 22.5; 22.6.2; 22.9] [12 Hours]

UNIT – IV

Series Solution of Differential Equations and Special Functions: Introduction; Validity of series solution; Series solution when x = 0 is ordinary point of the equation; Frobenius method; Bessel's function; recurrence formula for $J_n(x)$; expansions for J_0 and J_1; value of $J_{1/2}$; generating function for $J_n(x)$; orthogonality of Bessel functions.

[Sections: 16.1;16.2;16.3;16.4;16.;,16.6;16.7;16.8;16.9;16.11] [12 Hours]

TEXT BOOK:

1. B.S.Grewal, "Higher Engineering Mathematics", 44thedition, Khanna publishers, 2017.

REFERENCE BOOKS:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", 9th edition, John Wiley & Sons.

2. N.P.Bali and M.Goyal, "A Text book of Engineering Mathematics", Laxmi publications, 2010.

Bapatla Engineering College:: Bapatla (Autonomous)

ELECTRONIC CIRCUIT ANALYSIS
II B.Tech – II Semester (Code: 18EC402)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: Electronic Devices and circuits

Course Objectives: The objective of this course is to
CO 1: Analyze Wave shaping circuits using discrete components.
CO 2: Design and analyze single stage and multi stage Amplifiers
CO 3: Interpret the concept of feedback and classify various types of feedback amplifiers.
CO 4: Understand the concept of power amplifier and identify different power amplifiers.

Course Outcomes: Students will be able to
1. Design and analyze clippers and clampers using discrete components.
2. Understand the operation of MOSFET circuits and analyze different applications using MOSFET.
3. Design various amplifier circuits using MOSFET in different configurations.
4. Understand the concept of OP-AMP and characteristics of OP-AMP.
5. Analyse the importance of negative feedback in electronic circuits.
6. Analyze various types of feedback amplifiers like voltage series, current series, current shunt and Voltage shunt.
7. Understand types of power amplifiers based on position of Quiescent or operating point on Load lines and also understand its parameters.
8. Design different types of power amplifiers for practical applications of desired specifications Like efficiency, output power, distortion etc.

UNIT – I

WAVE SHAPING CIRCUITS & REGULATORS: Diode clippers, clampers, Discrete Transistor Voltage Regulation.
The Field-Effect Transistor: MOSFET DC Circuit Analysis, Basic MOSFET Applications: Switch, Digital Logic Gate, and Amplifier, Constant-Current Biasing, Multistage MOSFET Circuits.

UNIT II

Basic FET Amplifiers: The MOSFET Amplifier, Basic Transistor Amplifier Configurations: The Common-Source Amplifier ,The Common-Drain (Source-Follower) Amplifier , The Common-Gate Configuration , The Three Basic Amplifier Configurations, Single-Stage Integrated Circuit MOSFET Amplifiers, Multistage Amplifiers. The Differential Amplifier, Basic FET Differential Pair, Differential Amplifier with Active Load.

UNIT III

Introduction to OP-Amp, Equivalent circuit of OP-AMP,
Feedback Amplifiers: Introduction to Feedback, Basic Feedback Concepts, Ideal Feedback Topologies, Voltage (Series–Shunt) Amplifiers, Current (Shunt–Series) Amplifiers, Trans conductance (Series–Series) Amplifiers, Trans resistance (Shunt–Shunt) Amplifiers.

UNIT IV

Power Amplifiers: Power Amplifiers, Power Transistors, Classes of Amplifiers, Class-A Power Amplifiers, Class-AB Push–Pull Complementary Output Stages.

TEXT BOOK:

1. Electronic devices and circuit theory", Robert L. Boylestad and Louis Nashelsky.
2. Microelectronics: Circuit Analysis and Design, DONALD A. NEAMEN, 4th Edition, McGraw-Hill, 2010.

REFERENCE BOOKS:

3. Microelectronic Circuits, 7th Edition, Sedra /Smith, Oxford University Press, 2010.
4. "Integrated electronics", Jacob Millman and Christos C Halkias.

Bapatla Engineering College:: Bapatla (Autonomous)

EM waves and Transmission Lines
II B.Tech – II Semester

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Prerequisites: Electromagnetic field theory

Course Objectives: To learn
CO1: The concepts related reflections and transmission of plane wave at different interfaces
CO2: the fundamentals of different types of transmission lines
CO3: impedance matching techniques using smith chart and transients associated with different Transmission lines
CO4: the theory of waveguides and different modes of propagation of the wave

Course Outcomes: Students will be able to
CLO-1: Solve problems related to waves crossing interface formed by different media
CLO-2: Analyze the different types of transmission lines and losses associated with them
CLO-3: Understand impedance matching using smith chart and analyze the transients present in Transmission lines
CLO-4: Derive wave equations for different modes of propagation in waveguides

UNIT – I

Reflection and Transmission of Plane Waves: Reflection and Transmission at a general dielectric interface: Normal incidence, Reflection and transmission at an interface: oblique incidence on a conductor, Oblique incidence on dielectric interfaces, reflection and transmission for layered materials at normal incidence, applications.

UNIT II

Theory of Transmission Lines: The transmission line, transmission line parameters, the transmission line equations, types of transmission lines, the field approach to transmission lines, finite transmission lines, power relations on a general transmission line, resonant transmission line circuits, applications.

UNIT III

The Smith Chart, Impedance Matching and Transmission Line circuits: Smith Chart, The Smith Chart as an Admittance Chart, impedance matching and the Smith Chart, Quarter wavelength transformer matching

Transients on Transmission Lines: Propagation of narrow pulses on finite, lossless transmission lines, propagation of narrow pulses on finite, distortion less transmission lines.

UNIT IV

Waveguides: The concept of a waveguide, Transverse Electromagnetic, Transverse Electric, Transverse Magnetic waves, TE propagation in parallel plate waveguides, TM propagation in

parallel plate waveguides, Rectangular Waveguides, Circular Waveguides, TE and TM modes and their characteristics.

Text Books:

1. Engineering Electromagnetic by Ida, Second Edition, Springer Publications (BSP Publications)

2. Microwave & Radar Engineering, M.Kulkarni, Umesh Publications, 3r^{d} edition. (For circular waveguides only)

Reference Books:

1. Electromagnetic waves by R.K.Shevgaonkar, Tata McGraw Hill.
2. P A Rizzi, Micro Wave Engineering: Passive Circuits, PHI, 2002

Bapatla Engineering College:: Bapatla (Autonomous)

SIGNALS & SYSTEMS
II B.Tech – IV Semester (Code: 18EC404)

Lectures	4	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: Linear Algebra and ODE

Course Objectives: To learn

CO1: Describe the signals mathematically and understand how to perform mathematical operations on signals.
CO2: Understand system properties and model it mathematically.
CO3: Understand the process of convolution between signals and its implication for analysis of LTI systems. Understand the notion of an impulse response.
CO4: Develop trigonometric& exponential Fourier series representations.
CO5: Understanding of the Nyquist sampling theorem and the process of converting continuous time signals to its samples.

Course Outcomes: Students will be able to

CLO-1: Perform basic mathematical operations on basic signals and classifying the systems
CLO-2: Analyze the LTI system, Can evaluate systems response and Represent a continuous time periodic signal as a Fourier series and determine response of the LTI system to any input signal
CLO-3: Use the Fourier transform to analyze continuous time signals and systems
CLO-4: Perform sampling of low pass signals; verify correlation and computation of spectral Densities.

UNIT-I

Introduction: Signals and systems defined types of signals, systems.
Mathematical description of Continuous–Time Signals: Functions and functional notation, signal functions, scaling and shifting, differentiation and integration, even and odd functions, periodic functions, signal energy and power.
Properties of Continuous –Time systems: Block diagram and system terminology, system modeling, system properties.

UNIT-II

Time-Domain Analysis of Continuous-Time Systems: The convolution integral, block diagram realization of differential equations.
The Continuous-Time Fourier Systems: Periodic excitation and response of LTI systems, Basic concepts and development of the Fourier series, Numerical computation of the Fourier

series, convergence of the Fourier series, properties of the Fourier series, band limited signals, responses of LTI systems with periodic excitation.

UNIT-III

The Continuous-Time Fourier Transform: Aperiodic excitation and response of LTI systems, Basic concepts and development of the Fourier transform, Convergence and the generalized Fourier transform, Numerical computation of the Fourier transform, Properties of the continuous time Fourier transform.
Continuous-Time Fourier Transform analysis of signals and systems: Frequency response, Ideal filters, Practical passive filters.

UNIT-IV

Sampling: Representing a continuous time signal by samples, Impulse sampling.
Correlation, Energy Spectral Density and Power Spectral Density: correlation and the correlogram, autocorrelation, cross correlation, correlations and the Fourier series, energy spectral density, power spectral density.

TEXT BOOK:

1. Fundamentals of Signals and Systems, 2nd Edition, Michael J Roberts, Govind Sharma, Tata McGraw Hill, 2010.

REFERENCE BOOKS:

1. Signals and Systems, Simon Haykin, John Wiley, 2004.
2. Signals and Systems, A V Oppenheim, A S Wilsky & IT Young, PHI/ Pearson, 2003.
3. Signals, Systems and Communications, B P Lathi, BSP, 2003.

Bapatla Engineering College:: Bapatla (Autonomous)

Digital Design Using HDL
III B.Tech – VI Semester (Code: 18EC405)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: Digital Electronics

Course Objectives: To learn
CO1: Hardware Description Language
CO2: Combinational Logic Circuits design using HDL
CO3: Sequential Logic Circuits design using HDL
CO4: Design of Counters and Programmable Logic Circuits using HDL
CO5: Design of Algorithmic State Machines using HDL

Course Outcomes: Students will be able to
CLO-1: Understand various modeling methods in HDL.
CLO-2: Design Combinational and Sequential Logic Circuits using HDL.
CLO-3: Design Programmable Logic Circuits using HDL.
CLO-4: Design State Machines using HDL

UNIT – I

Hardware Description Language – Overview of Digital Design with Verilog HDL, Hierarchical Modeling Concepts, Basic Concepts – Lexical Conventions, Data Types, System Tasks And Compiler Directives.
Combinational Logic -Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder–Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, HDL Models of Combinational Circuits

UNIT II

Synchronous Sequential Logic - Sequential Circuits, Storage Elements: Latches, Storage Elements: Flip- Flops, Analysis of Clocked Sequential Circuits, Synthesizable HDL Models of Sequential Circuits, State Reduction and Assignment, Design Procedure.
Registers – Registers, Shift Registers, HDL for Registers.

UNIT III

Counters – Ripple Counters, Synchronous Counters, Other Counters, HDL for Counters.
Memory and Programmable Logic – Random Access Memory, Memory Decoding, Error Detection and Correction, Read Only Memory, Programmable Logic Array, Programmable Array Logic, Sequential Programmable Devices.

UNIT IV

Design at the Register Transfer Level - Register Transfer Level Notation, Register Transfer Level in HDL, Algorithmic State Machines (ASMs), Design Example (ASMD Chart), HDL Description of Design Example, Sequential Binary Multiplier, Control Logic, HDL Description of Binary Multiplier, Design with Multiplexers.

TEXT BOOK:

1. "Verilog HDL A Guide to Digital Design and Synthesis" by Samir Palnitkar. Pearson Education India.
2. "Digital Design with an Introduction to Verilog HDL", M. Morris Mano, Michael D.Ciletti, (Fifth Edition Pearson Education India).

REFERENCE BOOKS:

3. "A VHDL Primer" by J. Bhasker, Pearson Education, Third edition, 1999.
4. "Fundamentals of Digital Logic with VHDL Design" by Stephen Brown and Z Vonko Vranesic. TMH publications
5. "Digital Design: Principles and Practices" by Jon F Wakerly. Fourth edition Pearson Education India.

Bapatla Engineering College:: Bapatla (Autonomous)

Professional ethics and human values
II B.Tech – II Semester (Code: 18EC406)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: None

Course Objectives:

- To create awareness on professional ethics and Human Values.
- To create awareness on Engineering Ethics providing basic knowledge about engineering Ethics, Variety of moral issues and Moral dilemmas, Professional Ideals and Virtues.
- To provide basic familiarity about Engineers as responsible Experimenters, Research Ethics, Codes of Ethics, Industrial Standards
- To inculcate knowledge and exposure on Safety and Risk, Risk Benefit
- Analysis and have an idea about the Collective Bargaining, Confidentiality, Professional, Employee, Intellectual Property Rights
- To have an adequate knowledge about MNCS, Business, Environmental, Computer Ethics, Honesty, Moral Leadership, sample Code of Conduct.

Course Outcomes:

Understand the core values that shape the ethical behavior of an engineer and Exposed awareness on professional ethics and human values.
understand the basic perception of profession, professional ethics, various moral issues & uses of ethical theories
understand various social issues, industrial standards, code of ethics and role of professional ethics in engineering field
Aware of responsibilities of an engineer for safety and risk benefit analysis, professional rights and responsibilities of an engineer.
acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives

UNIT – I

HUMANVALUES:Morals,ValuesandEthics,Integrity,WorkEthic,ServiceLearning,Civic Virtue,RespectforOthers,LivingPeacefully,caring,Sharing,honesty,Courage,ValuingTime,Co-operation,Commitment,Empathy,SelfConfidence,Character,Spirituality.

UNIT – II

ENGINEERING ETHICS: Senses of 'Engineering Ethics', Variety of model issues, Types of inquiry,Moraldilemmas,MoralAutonomy,Kohlberg'stheory,Gilligan'stheory,Consensus

andControversy,ProfessionsandProfessionalism,ProfessionalIdealsandVirtues,Theories aboutrightaction,Self-interest,customsandReligion,UsesofEthicalTheories.

UNIT – III

ENGINEERINGASSOCIALEXPERIMENTATION:EngineeringasExperimentation,Engineersas responsibleExperimenters,CodesofEthics,ABalancedOutlookonLaw.Safety,Responsibility andRights:SafetyandRisk-AssessmentofSafetyandRisk,riskBenefitanalysisandreducing risk.CollegialityandLoyalty,RespectforAuthority,CollectiveBargaining,Confidentiality, ConflictsofInterest,OccupationalCrime,ProfessionalRights,employeeRights,Intellectual Property Rights(IIPR),Discrimination.

UNIT – IV

GLOBAL ISSUES: Multinational Corporations , Environmental Ethics, Computer Ethics, WeaponsDevelopment,EngineersasManagers,consultingEngineering,EngineersasExpert WitnessesandAdvisors,MoralLeadership,SampleCodeofEthicslikeASME,ASCE,IEEE, Institution of engineers (India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers(IETE),India, etc.

TEXT BOOKS:

1. R. Subramanian, Professional ethics, Oxford higher Education, 2013.
2. Mike Martin and Roland Schinzinger, Ethics in Engineering, Mc Graw Hill, NewYork1996.

REFERENCE BOOK:

1. Govindarajan. M, Natarajan. S, Senthil kumar. V.S, Engineering Ethics, PHI, 2004.

Bapatla Engineering College:: Bapatla (Autonomous)

Electronic Circuits Lab
II B.Tech – IV Semester (Code: 18ECL41)

Lectures		Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: Electronic devices and circuits lab

Course Objectives: To learn

CO1: Design and test rectifiers, clipping circuits, clamping circuits and voltage regulators..
CO2: Design and test MOSFET amplifiers.
CO3: Design and test multistage amplifiers using MOSFET.
CO4: Design and test various power amplifiers
CO5: Design and know the essence of negative feedback using op-amp.

Course Outcomes: Students will be able to

CLO-1: Acquire a basic knowledge in solid state electronics including diodes, MOSFET and opamp
CLO-2: Develop the ability to analyze and design analog electronic circuits using discrete components.
CLO-3: Observe the amplitude and frequency responses of amplification circuits using MOSFET.
CLO- 4: Know about the multistage amplifier using MOSFET determine frequency response and concept of voltage gain.
CLO- 5: Design, construct, and take measurement of various analog circuits to compare experimental results in the laboratory with theoretical analysis.

LIST OF EXPERIMENTS:

1. RECTIFIERS AND VOLTAGE REGULATORS
2. CLIPPERS AND CLAMPERS
3. DRAIN AND TRANSFER CHARACTERISTICS OF MOSFET
4. NMOS INVERTER CIRCUIT AND A TWO-INPUT NMOS NOR LOGIC GATE
5. COMMON-SOURCE AMPLIFIER USING MOSFET
6. THE COMMON-DRAIN (SOURCE-FOLLOWER) AMPLIFIER USING MOSFET
7. COMMON-SOURCE AMPLIFIER IN CASCADE WITH SOURCE FOLLOWER.
8. CLASS A POWER AMPLIFIER
9. COMPLEMENTARY SYMMETRY PUSHPULL POWER AMPLIFIER
10. OP-AMP SERIES–SHUNT FEEDBACK CIRCUIT

TEXT BOOK:

5. Electronic devices and circuit theory", Robert L. Boylestad and Louis Nashelsky.
6. Microelectronics: Circuit Analysis and Design, DONALD A. NEAMEN, 4th Edition, McGraw-Hill, 2010.

REFERENCE BOOKS:

7. Microelectronic Circuits, 7th Edition, Sedra/Smith, Oxford University Press, 2010.
8. "Integrated electronics", Jacob Millman and Christos C Halkias.

Bapatla Engineering College:: Bapatla (Autonomous)

VERILOG HDL

Lectures	4	Tutorial	1	Practical	0	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Course objective

1. Describe the importance of modern programmable logic devices
2. Demonstrate different styles of writing HDL code
3. Use vivado tools in digital circuits modelling, simulation, functional verification in Verilog
4. Validate and synthesize a digital circuit to FPGA board using Verilog HDL

Course outcome

1. Design basic digital circuit
2. Write HDL code for a given digital circuit
3. Synthesize and verify functionality digital circuit

LIST OF PROGRAMS

1. Logic Gates.
2. Multiplexers/ De-Multiplexers.
3. Encoders/ Decoders.
4. Comparators.
5. Adders/ Subtractors.
6. Multipliers.
7. Parity Generators.
8. Design of ALU.
9. Latches.
10. Flip-Flops.
11. Synchronous Counters.
12. Asynchronous Counters.
13. Shift Registers. 14. Memories.
15. CMOS Circuits.

NOTE: A minimum of 10 (Ten) programs are to be executed and recorded to attain eligibility for Semester End Examination.

Bapatla Engineering College:: Bapatla (Autonomous)

SIGNALS & SYSTEMS LAB
II B.Tech – IV Semester (Code: 18ECL43)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: Linear Algebra and ODE

Course Objectives: To learn

CO1: Describe the signals mathematically and understand how to perform mathematical operations on signals.
CO2: Understand system properties and model it mathematically.
CO3: Understand the process of convolution between signals and its implication for analysis of LTI systems. Understand the notion of an impulse response.
CO4: Develop trigonometric& exponential Fourier series representations.
CO5: Understanding of the Nyquist sampling theorem and the process of converting continuous time signals to its samples.

Course Outcomes: Students will be able to

CLO-1: Perform basic mathematical operations on basic signals and classifying the systems
CLO-2: Analyze the LTI system, Can evaluate systems response and Represent a continuous Time periodic signal as a Fourier series and determine response of the LTI system to any input signal
CLO-3: Use the Fourier transform to analyze continuous time signals and systems
CLO-4: Perform sampling of low pass signals; verify correlation and computation of spectral Densities.

LIST OF LAB PROGRAMS

1. Basic Operations on Matrices.
2. Generation of basic continuous time signals namely unit impulse, step, ramp, exponential and Sinusoidal signals.
3. Generation of basic discrete time signals namely unit impulse, step, ramp, exponential and Sinusoidal signals.
4. Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
5. Finding the Even and Odd Parts of Signal or Sequence and Real and Imaginary Parts of Signal.
6. Verification of linearity and time invariance properties of a given continuous /discrete system.
7. Convolution between Signals and Sequences.
8. Autocorrelation and Cross correlation between Signals and Sequences.
9. Verification of Linearity and Time Invariance Properties of a Given Continuous/Discrete

system.
10. Computation of Unit Sample, Unit Step and Sinusoidal Responses of the Given LTI System and Verifying its Physical Realizability and Stability Properties.
11. Finding the Trigonometric Fourier Series of a given Signal.
12. Finding the Fourier Transform of a given Signal and plotting its Magnitude and Phase Spectrum.
13. Sampling Theorem Verification.
14. Program to find frequency response of analog LP/HP/BP/BS filters.
15. Program to find the impulse response of a system defined by a difference equation.

NOTE: A minimum of 10 (Ten) Programs have to be performed and recorded by the candidate To attain eligibility for Semester End Examination.

Bapatla Engineering College:: Bapatla
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Quotations for the Students

- Concerned about Environment: If you plan for 1 year -*Plant rice*; If you plan for 10 years - *Plant trees*; If you plan for 100 year - *Educate people*
- All great leaders are great readers
- Knowledge is a treasure but practice is the key to it
- Be a light, not a judge. Be a model not a critic. Be part of the solution, not part of the problem
- Self-trust is the first secret of success
- Success is a journey not a destination
- There are no shortcuts for success. The only route is hard work
- There is nothing impossible because the word says itself I am possible
- Reading is to the mind what exercise is to the body
- Obstacles are great incentives
- Imagination is more important than knowledge
- An ounce of knowledge is more precious than tons of gold
- The one who wants to climb the ladder, must begin at the bottom
- Happiness is a habit - cultivate it
- Ability will get you success, Character will keep you successful

ADMINISTRATIVE & LIBRARY BLOCK

RESEARCH PARK

CIVIL & MECHANICAL BLOCK

LADIES HOSTEL

GENERAL ENGINEERING BLOCK

GUEST HOUSE

Bapatla Engineering College (Autonomous)

(Approved by AICTE, under the jurisdiction of Acharya Nagarjuna University, Guntur)
Thrice Accredited by NBA
Mahatmajipuram, GBC Road, Bapatla-522102,
Guntur District, Andhra Pradesh