PROGRAM STRUCTURE
AND
SYLLABUS

COMPUTER SCIENCE AND ENGINEERING

For

B. Tech FOUR YEARS DEGREE PROGRAM

(Applicable for batches admitted from 2024-2025)

D. N. R. COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

(Approved by AICTE, New Delhi & Affiliated to JNTUK, Kakinada)

(Accredited with A^{++} Grade by NAAC & Accredited by NBA (B. Tech- CSE, ECE & EEE))

BALUSUMUDI, BHIMAVARAM, W.G. Dist., A.P., PIN-534 202

Ph: 08816-221238, Email: dnrcet@gmail.com , Website: https://dnrcet.org

Vision & Mission of the Institute

Vision of the Institution:

To evolve as a Quality Institution in Teaching, Innovative Research, Entrepreneurship and Consultation in Engineering & Technology, empower rural youth globally competent and self-disciplined technocrats.

Mission of the Institution:

IM_1: Inculcate technical knowledge, soft skills through student centric teaching & learning.

IM_2: Strengthen industry institute interaction, provide solutions to the ever-changing requirements.

IM_3: Implant entrepreneurial attitude and ethical values.

IM_4: Create work culture towards learning, Research & Development.

IM_5: Develop a unique practice that instills responsibility and accountability among the stakeholders

Vision & Mission of the Department

Vision of the Department:

To become an identified development center for high quality professionals in the area of Computer Science and Engineering serving the societal needs.

Mission of the Department:

DM_1: Train the stakeholders in the area of Computer Science and Engineering.

DM_2: Organize innovative technical training and leadership activities to groom professionals.

DM_3: Provide quality resources towards research and development on Artificial Intelligence.

Program Educational Objectives (PEOs)

Graduates of the Program will be

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)	
PEO-1	Apply engineering knowledge in the chosen fields with ethics and professional values.
PEO-2	Continue to learn and solve real life problems inculcate with interdisciplinary teams.
PEO-3	Face the challenges in industry and purse higher studies.

Program Outcomes (POs)

After successful completion of the Program, the graduates will be able to

PROGRAM OUTCOMES (POS)		
1	**Engineering knowledge:**	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	**Problem analysis:**	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	**Design/development of solutions:**	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	**Conduct investigations of complex problems:**	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5	**Modern tool usage:**	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6	**The engineer and society:**	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7	**Environment sustainability:**	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8	**Ethics:**	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	**Individual and team work:**	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	**Communication:**	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	**Project management and finance:**	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12	**Lifelong learning**	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

After successful completion of the Program, the graduates will be able to

PROGRAM SPECIFIC OUTCOMES (PSOS)	
PSO-1	Develop Computer Applications by applying Artificial Intelligence
PSO-2	Demonstrate the skills in the field of Networks, Web – Design, Cloud Computing and Data Analytics.

Mission of the Department – PEOs mapping

PEO Statements	DM1	DM2	DM3
PEO1: Apply engineering knowledge in the chosen fields with ethics and professional values.	3	3	3
PEO2: Continue to learn and solve real life problems inculcate with interdisciplinary teams.	3	3	2
PEO3: Face the challenges in industry and pursue higher studies.	2	3	3

Note:

Blooms Taxonomy Knowledge Level	Knowledge Level Representation
6 : Create	L6
5 : Evaluate	L5
4: Analyze	L4
3: Apply	L3
2: Understand	L2
1: Remember	L1

Mapping or Correlation Levels
1: Slight (Low)
2: Moderate (Medium)
3: Substantial (High)

Consistency or Justification of Co-relation parameters of the above matrix

Mapping Justification			
PEOs	**Mission Element**	**Mapping Level**	**Justification**
PEO1 **(Core Skills)**	DM1 **(Engineering Knowledge)**	3	PEO1 has high correlation with DM 1 as the Mission1 focuses on the quality teaching learning processes to acquire engineering Professional skills.
PEO1 **(Core Skills)**	DM2 **(Technical Knowledge)**	3	PEO1 has high correlation with DM 2 as the Mission 2 focuses on leadership capabilities of the graduates through various activities.
PEO1 **(Core Skills)**	DM3 (**Professional Knowledge)**	3	PEO1 has high correlation with DM 3 as the Mission 3 focuses on innovative research follows development on AI.
PEO2 **(Ethical and Professional Skills)**	DM1 **(Engineering Knowledge)**	3	PEO2 has high correlation with DM 1 as the Mission1 focuses on the application development in computer science & engineering.

PEO2 **(Ethical and Professional Skills)**	DM2 **(Technical Knowledge)**	3	PEO2 has high correlation with DM 2 as the Mission 2 focuses on seminars and workshops on practices /duties conducted for the students to train them about their duties and responsibilities.
PEO2 **(Ethical and Professional Skills)**	DM3 (**Professional Knowledge)**	2	PEO2 has moderate correlation with DM 3 as the Mission 3 focuses on the student participation for consultancy activities and real time projects are encouraged.
PEO3 (**Problem Solving and Lifelong Learning)**	DM1 **(Engineering Knowledge)**	2	PEO3 has moderate correlation with DM 1 as the Mission1 focuses on the quality education imparted through academically proficient teachers trained in institutes of repute would prepare graduates to evolve into professionally ethically sound engineers to meet the current technical challenges.
PEO3 **(Problem Solving and Lifelong Learning)**	DM2 **(Technical Knowledge)**	3	PEO3 has high correlation with DM 2 as the Mission 2 focuses on the Organize of activities to nurture graduates into ethically strong and responsible engineers capable of addressing global challenges in the area of Computer Science & engineering.
PEO3 **(Problem Solving and Lifelong Learning)**	DM3 (**Professional Knowledge)**	3	PEO3 has high correlation with DM 3 as the Mission3 focuses on the knowledge, practical skills and research aptitude sharpen at the institution would enable the graduates to have an urge for the lifelong learning.

PEOs mapping with department mission statements and justification of mapping

PEOs	**DM1**	**Justification**
PEO1	3	PEO1 has high correlation with DM1 as the Mission1 focuses on the quality teaching learning processes to acquire engineering professional skills.
PEO2	3	PEO1 has high correlation with DM1as the Mission 1 focuses on leadership capabilities of the graduates through various activities.
PEO3	2	PEO1 has moderate correlation with DM1 as the Mission 1 focuses on innovative research follows development on AI.
PEOs	**DM2**	**Justification**
PEO1	3	PEO2 has moderate correlation with DM2 as the Mission2 focuses on the application development in Computer Science & Engineering.
PEO2	3	PEO2 has high correlation with DM2 as the Mission2 focuses on seminars and workshops on practices /duties conducted for the students to train them about their duties and responsibilities.
PEO3	2	PEO2 has moderate correlation with DM2 as the Mission2 focuses on the student participation for consultancy activities and real time projects are encouraged.
PEOs	**DM3**	**Justification**
PEO1	3	PEO3 has high correlation with DM3 as the Mission3 focuses on the quality education imparted through academically proficient teachers trained in institutes of repute would prepare graduates to evolve into

		professionally ethically sound engineers to meet the current technical challenges.
PEO2	3	PEO3 has moderate correlation with DM3 as the Mission3 focuses on the Organize of activities to nurture graduates into ethically strong and responsible engineers capable of addressing global challenges in the arena of Computer Science & Engineering.
PEO3	2	PEO3 has high correlation with DM3 as the Mission3 focuses on the knowledge, practical skills and research aptitude sharpen at the institution would enable the graduates to have an urge for the lifelong learning.

Graduate Accomplishments

Graduate Accomplishments:

GA1. Preparation – Employment/Higher studies
GA2. Core competence – Discipline knowledge
GA3. Core competence – 'T' shaped Engineer
GA4. Professionalism – 3 Ps – Professional value – knowledge – development
GA5. Lifelong learning - Environment

PEOs Mapping with Graduate Accomplishments:

	GA1	GA2	GA3	GA4	GA5
PEO1	3	3	2	3	3
PEO2	2	2	3	2	2
PEO3	3	3	2	2	3

Justification for Department PEOs with Graduate Accomplishments

Department PEOs	Graduate Accom-plishments	Mapping level	JUSTIFICATION
PEO1	**GA1**	3	Apply engineering knowledge for improving placements and Higher studies
PEO1	**GA2**	3	Apply engineering knowledge for improving placements and Higher studies
PEO1	**GA3**	2	Apply engineering knowledge for improving placements and Higher studies
PEO1	**GA4**	3	Apply engineering knowledge for improving placements and Higher studies
PEO1	**GA5**	3	Apply engineering knowledge for improving placements and Higher studies
PEO2	**GA1**	2	Continue to learn Core & interdisciplinary knowledge
PEO2	**GA2**	2	Continue to learn Core & interdisciplinary knowledge
PEO2	**GA3**	3	Continue to learn Core & interdisciplinary knowledge
PEO2	**GA4**	2	Continue to learn Core & interdisciplinary knowledge
PEO2	**GA5**	2	Continue to learn Core & interdisciplinary knowledge

PEO3	**GA1**	3	Improve the Professional values and Face the challenges in industry
PEO3	**GA2**	3	Improve the Professional values and Face the challenges in industry
PEO3	**GA3**	2	Improve the Professional values and Face the challenges in industry
PEO3	**GA4**	2	Improve the Professional values and Face the challenges in industry
PEO3	**GA5**	3	Improve the Professional values and Face the challenges in industry

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE STRUCTURE & SYLLABUS B. Tech CSE for COMPUTER SCIENCE & ENGINEERING PROGRAMME

(Applicable for batches admitted from 2024-2025)

D.N.R. COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous)

BALUSUMUDI, BHIMAVARAM, W.G. Dist., A.P., PIN-534 202

DR24

ENGINEERING CURRICULUM

(Applicable for batches admitted from 2024-2025)

B.Tech. REGULAR/ HONORS

D.N.R. COLLEGE OF ENGINEERING & TECHNOLOGY

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B. Tech (Regular-Full time)

(Effective for the students admitted into I year from the Academic Year **2024-25** onwards)

&

B.Tech.(Lateral Entry Scheme)

(Effective for the students admitted into II year through Lateral Entry Scheme from the Academic Year **2025 - 26** onwards)

D.N.R. COLLEGE OF ENGINEERING & TECHNOLOGY(Autonomous)
BALUSUMUDI, BHIMAVARAM, W.G. Dist., A.P., PIN-534 202

Academic Regulations (DR24) for B. Tech (Regular-Full time)

(Effective for the students admitted into I year from the Academic Year **2024-25** onwards)

DNR College of Engineering & Technology 2024 Regulations (DR24 Regulations) applicable to all programmes given hereunder. These regulations govern the B. Tech. programmes offered by all the Departments with effect from the students admitted into the programmes from academic year 2024-25.

1. Courses of Study

The following programmes of study are offered at present as specializations for the B. Tech. programmes in DNR College of Engineering & Technology, Bhimavaram.

S. No.	Programme	Code	Short Name
1	Civil Engineering	01	CE
2	Electrical & Electronics Engineering	02	EEE
3	Mechanical Engineering	03	ME
4	Electronics & Communication Engineering	04	ECE
5	Computer Science & Engineering	05	CSE
6	Information Technology	12	IT
7	Artificial Intelligence and Data Science	54	B.Tech-AIDS
8	Artificial Intelligence and Machine Learning	42	CSE(AIML)

2. Award of the Degree

a. Award of the B.Tech. Degree / B.Tech. Degree with a Minor if he/she fulfills the following:

i. Pursues a Programme of study for not less than four academic years and not more than eight academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Eight years).

ii. Registers for 160 credits and secures all 160 credits.

b. Award of B.Tech. degree with Honors: A student will be declared eligible for the award of the B.Tech with Honors if he/she fulfills the following:

i. Student secures additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 160 credits.
ii. Registering for Honors is optional.
iii. Honors is to be completed simultaneously with B.Tech. programme.

3. *Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech. course and their admission stands cancelled. This clause shall be read along with clause 2 a) i).*

4. *Admissions*

Admission to the B. Tech Program shall be made subject to the eligibility, qualifications and specialization prescribed by the A.P. State Government/JNTUK University from time to time. Admissions shall be made either based on the merit rank obtained by the student in the common entrance examination conducted by the A.P. Government/University or any other order of merit approved by the A.P. Government/University, subject to reservations as prescribed by the Government/University from time to time.

5. *Program related terms*

Credit: A unit by which the course work is measured. It determines the number of hours of instruction required per week. One credit is equivalent to one hour of teaching (Lecture/Tutorial) or two hours of practical work/field work per week.

Credit Definition:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credit
2 Hrs. Practical (Lab) per week	1 credit

a. ***Academic Year:*** Two consecutive (one odd + one even) semesters constitute one academic year.
b. ***Choice-Based Credit System (CBCS):*** The CBCS provides a choice for students to select from the prescribed courses.

6. *Semester/Credits:*

a. A semester comprises 90 working days and an academic year is divided into two semesters.

b. The summer term is for eight weeks during summer vacation. Internship/ apprenticeship / work-based vocational education and training can be carried out during the summer term, especially by students who wish to exit after two semesters or four semesters of study.

c. Regular courses may also be offered during the summer on a fast-track mode to enable students to do additional courses or complete backlogs in a course work.

d. The college can decide on the courses to be offered in the summer term depending on

the availability of the faculty and the number of students.

7. *Structure of the Undergraduate Programme*

All courses offered for the undergraduate program (B. Tech) are broadly classified as follows

S. No	*Category*	*Breakup of Credits (Total 160)*	*Percentage of total Credits*	*AICTE Recommendations (%)*
1	*Humanities and Social Science including Management (HM)*	*13*	*8%*	*8 – 9 %*
2	*Basic Sciences (BS)*	*20*	*13%*	*12 – 16%*
3	*Engineering Sciences (ES)*	*23.5*	*14%*	*10 – 18%*
4	*Professional Core (PC)*	*54.5*	*34%*	*30 – 36%*
5	*Electives – Professional (PE) & Open (OE); Domain Specific Skill Enhancement Courses (SEC)*	*33*	*21%*	*19 – 23%*
6	*Internships & Project work (PR)*	*16*	*10%*	*8 – 11%*
7	*Mandatory Courses (MC)*	*Non-Credit*	*Non-Credit*	

8. *Course Classification:*

All subjects/ courses offered for the undergraduate programme in Engineering & Technology (B.Tech. degree programmes) are broadly classified as follows:

S.No.	Broad Course Classification	Course Category	Description
1.	Foundation Core Courses	Foundation courses	Includes Mathematics, Physics and Chemistry; fundamental engineering courses; humanities, social sciences and management courses
2.	Core Courses	Professional Core Courses (PC)	Includes courses related to the parent discipline/department/branch of Engineering
3.	Elective Courses	Professional Elective Courses (PE)	Includes elective courses related to the parent discipline/department/ branch of Engineering
		Open Elective Courses (OE)	Elective courses which include interdisciplinary subjects or subjects in an area outside the parent discipline/ department/ branch of Engineering
		Domain specific skill enhancement courses (SEC)	Interdisciplinary/job-oriented/domain courses which are relevant to the industry
4.	Project & Internships	Project	B.Tech. Project or Major Project
		Internships	Summer Internships – Community based and Industry Internships; Industry oriented Full Semester Internship
5.	Audit Courses	Mandatory non-credit courses	Covering courses of developing desired attitude among the learners

9. *Programme Pattern*

i. Total duration of the of B. Tech (Regular) Programme is four academic years.
ii. Each academic year of study is divided into two semesters.

iii. Minimum number of instruction days in each semester is 90 days.

iv. There shall be mandatory student induction program for freshers, with a three-week duration before the commencement of first semester. Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, visits to local Areas, Familiarization to Dept./Branch & Innovations etc., are included as per the guidelines issued by AICTE.

v. Health/wellness/yoga/sports and NSS /NCC /Scouts & Guides / Community service activities are made mandatory as credit courses for all the undergraduate students.

vi. Courses like Environmental Sciences, Indian Constitution, Technical Paper Writing & IPR are offered as non-credit mandatory courses for all the undergraduate students.

vii. Design Thinking for Innovation & Tinkering Labs are made mandatory as credit courses for all the undergraduate students.

viii. Increased flexibility for students through an increase in the elective component of the curriculum, with 05 Professional Elective courses and 04 Open Elective courses.

ix. Professional Elective Courses, include the elective courses relevant to the chosen specialization/branch. Proper choice of professional elective courses can lead to students specializing in emerging areas within the chosen field of study.

x. A total of 04 Open Electives are offered in the curriculum. A student can complete the requirement for B.Tech. Degree with a Minor within the 160 credits by opting for the courses offered through various verticals/tracks under Open Electives.

xi. While choosing the electives, students shall ensure that they do not opt for the courses with syllabus contents similar to courses already pursued.

xii. A pool of interdisciplinary/job-oriented/domain skill courses which are relevant to the industry are integrated into the curriculum of all disciplines. There shall be 05 skill-oriented courses offered during III to VII semesters. Among the five skill courses, four courses shall focus on the basic and advanced skills related to the domain/interdisciplinary courses and the other shall be a soft skills course.

xiii. Students shall undergo mandatory summer internships, for a minimum of eight weeks duration at the end of second and third year of the programme. The internship at the end of second year shall be community oriented and industry internship at the end of third year.

xiv. There shall also be mandatory full internship in the final semester of the programme along with the project work.

xv. Undergraduate degree with Honors is introduced by the College for the students having good academic record.

xvi. The College shall take measures to implement Virtual Labs (https://www.vlab.co.in) which provide remote access to labs in various disciplines of Engineering and will help student in learning basic and advanced concept through remote experimentation. Student shall be made to work on virtual lab experiments during the regular labs.

xvii. Each Department shall assign a faculty advisor/mentor after admission to a group of students from same department to provide guidance in courses registration/career growth/placements/opportunities for higher studies/GATE/other competitive exams etc.

xviii. Preferably 25% of course work for the theory courses in every semester shall be conducted in the blended mode of learning.

10. *Evaluation Process*

The performance of a student in each semester shall be evaluated course wise with a maximum of 100 marks for theory and 100 marks for practical subject. Summer Internships shall be evaluated for 50 marks, Full Internship & Project work in final semester shall be evaluated for 200 marks, mandatory courses with no credits shall be evaluated internally for 30 marks.

A student has to secure not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and semester end examination marks taken together for the theory, practical, design, drawing subject or project etc. In case of a mandatory course, he/she should secure 40% of the total marks.

Theory Courses:

Assessment Method	Marks
Continuous Internal Assessment	30
Semester End Examination	70
Total	**100**

i. For theory and practical courses, the distribution shall be 30 marks for continuous Internal Evaluation and 70 marks for the Semester End-Examination.
ii. If any course contains two different branch subjects, the syllabus shall be written in two parts with 3 units each (Part-A and Part-B) and semester end examination question paper shall be set with two parts each for 35 marks.
iii. If any course is having both theory and practical components, they will be evaluated separately as theory course and practical course. However, they will be given same course code with an extension of 'T' for theory subject and 'P' for practical subject.

a) *Continuous Internal Evaluation*

i. For theory courses, during the semester, there shall be two internal examinations. Each internal examination shall be evaluated for 30 marks of which 10 marks for objective paper (20 minutes duration), 15 marks for subjective paper (90 minutes duration) and 5 marks for assignment.
ii. Objective paper shall contain for 05 short answer questions with 2 marks each or maximum of 20 bits for 10 marks. Subjective paper shall contain 3 either or type questions (totally six questions from 1 to 6) of which student has to answer one from each either-or type of questions. Each question carries 5 marks.
iii. Note:
   - The objective paper shall be prepared in line with the quality of competitive examinations questions.
   - The subjective paper shall contain 3 either or type questions of equal weightage of 5 marks. Any fraction shall be rounded off to the next higher mark.
   - The objective paper shall be conducted on the day of subjective paper test.
   - Assignments shall be in the form of problems, mini projects, design problems, slip tests, quizzes etc., depending on the course content. It should be continuous assessment throughout the semester and the average marks shall be considered.
iv. If the student is absent for the internal examination, no re-exam shall be conducted and internal marks for that examination shall be considered as zero.

v. The first internal examination shall be conducted for I, II and half of the III unit syllabus with one either or type question from each unit. The second internal examination shall be conducted for remaining half of the syllabus from III unit, IV and V units with one either or type question from each unit

vi. Final internal marks shall be arrived at by considering the marks secured by the student in both the internal examinations with 80% weightage given to the better mid exam and 20% to the other.

For Example:

Marks obtained in first internal : 25
Marks obtained in second internal : 20
Final internal Marks: (25x0.8) + (20x0.2) = 24

If the student is absent for any one internal examination, the final internal marks shall be arrived at by considering 80% weightage to the marks secured by the student in the appeared examination and zero to the other.

For Example:

Marks obtained in first internal : Absent
Marks obtained in second internal : 25
Final internal Marks: (25x0.8) + (0x0.2) =20

b) *End Examination Evaluation:*

End examination of theory courses shall have the following pattern:

i. Part-A shall contain 10 compulsory short answer questions for a total of 20marks such that each question carries 2 marks.
ii. There shall be 2 short answer questions from each unit.
iii. In each of the questions in Part-B, there shall be either/or type questions of 10 marks each. Student shall answer any one of them.
iv. The questions from 2 to 11 in part-B shall be set by covering one unit of the syllabus for each question either/or type.

End examination of theory courses consisting of two parts of different courses, ***for Example:*** Basic Electrical & Electronics Engineering shall have the following pattern:

i. Question paper shall be in two parts viz., Part A and Part B with equal weightage of 35 marks each.
ii. Part-A shall contain 10 compulsory short answer questions for a total of 10 marks such that each question carries 1mark.
iii. Part-B contains Six either/or type questions of 10 marks each. Students shall answer any one of them.
iv. All the questions in Part-B shall be set by covering one unit of the syllabus for each question.

Practical Courses:

Assessment Method	Marks
Continuous Internal Assessment	30
Semester End Examination	70

Total	**100**

a) For practical courses, there shall be a continuous evaluation during the semester for 30 sessional marks and end examination shall be for 70 marks.

b) Day-to-day work in the laboratory shall be evaluated for 15 marks by the concerned laboratory teacher based on the record/viva and 15 marks for the internal test.

c) The end examination shall be evaluated for 70 marks, conducted by the concerned laboratory teacher and a senior expert in the subject from the same department.

- Procedure: 20 marks
- Experimental work & Results: 30 marks
- Viva voce: 20 marks.

In a practical course consisting of two parts (Eg: Basic Electrical &Electronics Engineering Lab), the end examination shall be conducted for 70 marks as a single laboratory in 3 hours. Internal examination shall be evaluated for 30 marks in each part and final internal marks shall be arrived by considering the average of marks obtained in two parts.

d) For the course having design and/or drawing, such as Engineering Drawing/Graphics, the distribution of marks shall be 30 for continuous evaluation and 70 for semester end examination.

Assessment Method	Marks
Continuous Internal Assessment	30
Semester End Examination	70
Total	**100**

Day-to-day work shall be evaluated for 15 marks by the concerned subject teacher based on the reports/submissions prepared in the class. And there shall be two internal examinations in a semester for duration of 2 hours each for 15 marks with weightage of 80% to better internal exam marks and 20% for the other. The subjective paper shall contain 3 either or type questions of equal weightage of 5 marks. There shall be no objective paper in internal examination. The sum of day-to-day evaluation and the internal exam marks will be the final internal marks for the course.

The end examination pattern for Engineering Drawing/Graphics, shall consists of 5 questions, either/or type, of 14 marks each. There shall be no objective type questions in the end examination. However, the end examination pattern for other courses related to design/drawing, multiple branches, etc. is mentioned along with the syllabus.

e) There shall be no external examination for mandatory courses with zero credits. However, attendance shall be considered while calculating aggregate attendance and student shall be declared to have passed the mandatory course only when he/she secures 40% or more in the internal examinations. In case, the student fails, a re-examination shall be conducted for failed candidates for 30 marks satisfying the conditions mentioned in item 1 & 2 of the regulations.

f) The laboratory records and internal exam test papers shall be preserved for a

minimum of 3 years in the respective Departments as per the College/University norms and shall be produced to the Committees of the College/University as and when the same are asked for.

11. *Skill oriented Courses*

a) There shall be five skill-oriented courses offered during III to VII semesters.

b) Out of the five skill courses two shall be skill-oriented courses from the same domain of the remaining three skill courses, one shall be a soft skill course and the remaining two shall be skill-advanced courses from the same domain/Interdisciplinary/Job oriented.

c) The course shall carry 100 marks and shall be evaluated through continuous assessments during the semester for 30 internal marks and end examination shall be for 70 marks. Day-to-day work in the class / laboratory shall be evaluated for 30 marks by the concerned teacher based on the regularity/assignments/viva/mid semester test. The end examination similar to practical examination pattern shall be conducted by the concerned teacher and an expert in the subject nominated by the Controller of Examinations/Principal.

d) The Head of the Department shall identify a faculty member as coordinator for the course. A committee consisting of the Head of the Department, coordinator and a senior Faculty member nominated by the Head of the Department shall monitor the evaluation process. The marks/grades shall be assigned to the students by the above committee based on their performance.

e) The student shall be given an option to choose either the skill courses being offered by the college or to choose a certificate course being offered by industries/Professional bodies or any other accredited bodies. If a student chooses to take a Certificate Course offered by external agencies, the credits shall be awarded to the student upon producing the Course Completion Certificate from the agency. A committee shall be formed at the level of the Department/ College to evaluate the grades/marks given for a course by external agencies and convert to the equivalent marks/grades.

f) The recommended courses offered by external agencies, conversions and appropriate grades/marks are to be approved by the College at the beginning of the semester.

g) If a student prefers to take a certificate course offered by external agency, the concerned department shall mark attendance of the student for the remaining courses in that semester excluding the skill course in all the calculations of mandatory attendance requirements upon producing a valid certificate as approved by the College.

12. *Massive Open Online Courses (MOOCs):*

A Student has to pursue and complete one course compulsorily through MOOCs approved by the Institution. A student can pursue courses other than core through MOOCs and it is mandatory to complete one course successfully through MOOCs for awarding the degree. A student is not permitted to register and pursue core courses through MOOCs.

A student shall register for the course (Minimum of either 8 weeks or 12 weeks) offered through MOOCs with the approval of Head of the Department. The Head of the Department shall appoint one mentor to monitor the student's progression. The student needs to earn a certificate by passing the exam. The student shall be awarded the credits assigned in the curriculum only by submission of the certificate. Examination fee, if any, will be borne by the student.

Students who have qualified in the proctored examinations conducted through MOOCs platform can apply for credit transfer as specified and are exempted from appearing internal as well as external examination (for the specified equivalent credit course only) conducted by the university.
Necessary amendments in rules and regulations regarding adoption of MOOC courses would be proposed from time to time.

13. *Credit Transfer Policy*

Adoption of MOOCs is mandatory, to enable Blended model of teaching-learning as also envisaged in the NEP 2020. As per University Grants Commission (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016, the Institution shall allow up to a maximum of 20% of the total courses being offered in a particular programme i.e., maximum of 32 credits through MOOCs platform.

i) The College shall offer credit mobility for MOOCs and give the equivalent credit weightage to the students for the credits earned through online learning courses.
ii) Student registration for the MOOCs shall be only through the respective department of the institution, it is mandatory for the student to share necessary information with the department.
iii) Credit transfer policy will be applicable to the Professional & Open Elective courses only.
iv) The concerned department shall identify the courses permitted for credit transfer.
v) The Institution/Department shall notify at the beginning of semester the list of the online learning courses eligible for credit transfer.
vi) The institution/Department shall designate a faculty member as a Mentor for each course to guide the students from registration till completion of the credit course.
vii) The Institution shall ensure no overlap of MOOC exams with that of the semester end examinations. In case of delay in results, the university will re-issue the marks sheet for such students.
viii) Student pursuing courses under MOOCs shall acquire the required credits only after successful completion of the course and submitting a certificate issued by the competent authority along with the percentage of marks and grades.
ix) The concerned Departments shall submit the following to the examination section of the Institution:
    a) List of students who have passed MOOC courses in the current semester along with the certificate of completion.
    b) Undertaking form filled by the students for credit transfer.
x) The Institution shall resolve any issues that may arise in the implementation of this policy from time to time and shall review its credit transfer policy in the light of periodic changes brought by UGC, SWAYAM, NPTEL and state government.

Note: Students shall be permitted to register for MOOCs offered through online platforms approved by the Department/Institution from time to time.

14. Academic Bank of Credits (ABC)

The Institution has implemented Academic Bank of Credits (ABC) to promote flexibility in curriculum as per NEP 2020 to

i) provide option of mobility for learners across the universities of their choice
ii) provide option to gain the credits through MOOCs from approved digital platforms.
iii) facilitate award of certificate/diploma/degree in line with the accumulated credits in ABC
iv) execute Multiple Entry and Exit system with credit count, credit transfer and credit acceptance from students' account.

15. Mandatory Internships

Summer Internships: Two summer internships either onsite or virtual each with a minimum of 08 weeks' duration, done at the end of second and third years, respectively are mandatory. It shall be completed in collaboration with local industries, Govt. Organizations, construction agencies, Power projects, software MNCs or any industries in the areas of concerned specialization of the Undergraduate program. One of the two summer internships at the end of second year (Community Service Project) shall be society oriented and shall be completed in collaboration with government organizations/NGOs & others. The other internship at the end of third year is Industry Internship and shall be completed in collaboration with Industries. The student shall register for the internship as per course structure after commencement of academic year. The guidelines issued by the APSCHE / Institution shall be followed for carrying out and evaluation of Community Service Project and Industry Internship.

Evaluation of the summer internships shall be through the departmental committee. A student will be required to submit a summer internship report to the concerned department and appear for an oral presentation before the departmental committee comprising of Head of the Department, supervisor of the internship and a senior faculty member of the department. A certificate of successful completion from industry shall be included in the report. The report and the oral presentation shall carry 50% weightage each. It shall be evaluated for 50 external marks. There shall be no internal marks for Summer Internship. A student shall secure minimum 40% of marks for successful completion. In case, if a student fails, he/she shall reappear as and when semester supplementary examinations are conducted by the Institution.

Full Semester Internship and Project work: In the final semester, the student should mandatorily register and undergo internship (onsite/virtual) and in parallel he/she should work on a project with well-defined objectives. At the end of the semester the candidate shall submit an internship completion certificate and a project report. A student shall also be permitted to submit project report on the work carried out during the internship.

The project report shall be evaluated with an external examiner. The total marks for project work 200 marks and distribution shall be 60 marks for internal and 140 marks for external evaluation. The supervisor assesses the student for 30 marks (Report: 15 marks, Seminar: 15 marks). At the end of the semester, all projects shall be showcased at the department for the benefit of all students and staff and the same is to be evaluated by the departmental Project Review Committee consisting of supervisor, a senior faculty and HOD for 30 marks. The external evaluation of Project Work is a Viva-Voce Examination conducted in the presence of internal examiner and external examiner appointed by the

Institution and is evaluated for 140 marks.

The concerned Department shall facilitate and monitor the student internship programs. Completion of internships is mandatory, if any student fails to complete internship, he/she will not be eligible for the award of degree. In such cases, the student shall repeat and complete the internship.

16. Guidelines for offering a Minor

To promote interdisciplinary knowledge among the students, the students admitted into B.Tech. in a major stream/branch are eligible to obtain degree in Minor in another stream.

i) The Minor program requires the completion of 12 credits in Minor stream chosen.
ii) Two courses for 06 credits related to a Minor are to be pursued compulsorily for the minor degree, but maybe waived for students who have done similar/equivalent courses. If waived for a student, then the student must take an extra elective course in its place. It is recommended that students should complete the compulsory courses (or equivalents) before registering for the electives.
iii) Electives (minimum of 2 courses) to complete a total of 12 credits.

Note: A total of 04 Open Electives are offered in the curriculum. A student can complete the requirement for Minor by opting for the courses offered through various verticals/tracks under Open Electives.

17. Guidelines for offering Honors

The objective of introducing B.Tech. (Hons.) is to facilitate the students to choose additionally, the specialized courses of their choice and build their competence in a specialized area in the UG level. The programme is a best choice for academically excellent students having good academic record and interest towards higher studies and research.

i) Honors is introduced in the curriculum of all B. Tech. programs offering a major degree and is applicable to all B. Tech (Regular and Lateral Entry) students admitted in Engineering & Technology.
ii) A student shall earn additional 15 credits for award of B.Tech.(Honors) degree from same branch/department/discipline registered for major degree. This is in addition to the credits essential for obtaining the Undergraduate degree in Major Discipline (i.e., 160 credits).
iii) A student is permitted to register for Honors in IV semester after the results of III Semester are declared and students may be allowed to take maximum two subjects per semester pertaining to the Honors from V Semester onwards.
iv) The concerned HOD shall arrange separate class work and timetable of the courses offered under Honors program.
v) Courses that are used to fulfil the student's primary major may not be double counted towards the Honors. Courses with content substantially equivalent to courses in the student's primary Major may not be counted towards the Honors.
vi) Students can complete the courses offered under Honors either in the college or in online platforms like SWAYAM with a minimum duration of 12 weeks for a 3-credit course and 8 weeks' duration for a 2-credit course satisfying the criteria for credit mobility. If the courses under Honors are offered in conventional mode, then the teaching and evaluation procedure shall be similar to regular B. Tech courses.
vii) The attendance for the registered courses under Honors and regular courses offered for Major degree in a semester are to be considered separately.

viii) A student shall maintain an attendance of 75% in all registered courses under Honors to be eligible for attending semester end examinations.

ix) **A student registered for Honors shall pass in all subjects that constitute the requirement for the Honors** degree program**.** No class/division (i.e., second class, first class and distinction, etc.) shall be awarded for Honors degree programme.

x) If a student drops or is terminated from the Honors program, the additional credits so far earned cannot be converted into open or core electives; they will remain extra. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.

xi) The Honors will be mentioned in the degree certificate as Bachelor of Technology (Honors) in XYZ. For example, B.Tech. (Honors) in Mechanical Engineering

Enrolment into Honors:

i) Students of a Department/Discipline are eligible to opt for Honors program offered by the same Department/Discipline

ii) The enrolment of student into Honors is based on the CGPA obtained in the major degree program. CGPA shall be taken up to III semester in case of regular entry students and only III semester in case of lateral entry students. Students having 7 CGPA without any backlog subjects will be permitted to register for Honors.

iii) If a student is detained due to lack of attendance either in Major or in Honors, registration shall be cancelled.

iv) Transfer of credits from Honors to regular B. Tech degree and vice-versa shall not be permitted.

v) Honors is to be completed simultaneously with a Major degree program.

Registration for Honors:

i) The eligible and interested students shall apply through the HOD of his/her parent department. The whole process should be completed within one week before the start of every semester. Selected students shall be permitted to register the courses under Honors.

ii) The selected students shall submit their willingness to the principal through his/her parent department offering Honors. The parent department shall maintain the record of student pursuing the Honors.

iii) The students enrolled in the Honors courses will be monitored continuously. An advisor/mentor from parent department shall be assigned to a group of students to monitor the progress.

iv) There is no fee for registration of subjects for Honors program offered in offline at the respective institutions.

18. *Attendance Requirements*

i) A student shall be eligible to appear for the external examinations if he/she acquires a minimum of 40% attendance in each subject and 75% of attendance in aggregate of all the subjects. Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.

ii) Shortage of Attendance below 65% in aggregate shall in NO CASE be condoned.

iii) A stipulated fee shall be payable towards condonation of shortage of attendance to the College.

iv) Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall

stand cancelled.

v) A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester. They may seek readmission for that semester from the date of commencement of class work.

vi) If any candidate fulfils the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.

vii) If the learning is carried out in blended mode (both offline & online), then the total attendance of the student shall be calculated considering the offline and online attendance of the student.

viii) For induction programme attendance shall be maintained as per AICTE norms.

19. *Promotion Rules*

The following academic requirements must be satisfied in addition to the attendance requirements mentioned in section 16.

i) A student shall be promoted from first year to second year if he/she fulfils the minimum attendance requirement as per institution norms.

ii) A student will be promoted from II to III year if he/she fulfils the academic requirement of securing 40% of the credits (any ***decimal*** fraction should be ***rounded off*** to ***lower*** digit) up to in the subjects that have been studied up to III semester.

iii) A student shall be promoted from III year to IV year if he/she fulfils the academic requirements of securing 40% of the credits (any ***decimal*** fraction should be ***rounded off*** to ***lower*** digit) in the subjects that have been studied up to V semester.

And in case a student is detained for want of credits for a particular academic year by ii) & iii) above, the student may make up the credits through supplementary examinations and only after securing the required credits he/she shall be permitted to join in the V semester or VII semester respectively as the case may be.

iv) When a student is detained due to lack of credits/shortage of attendance he/she may be re-admitted when the semester is offered after fulfilment of academic regulations. In such case, he/she shall be in the academic regulations into which he/she is readmitted.

20. *Grading*

As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades and corresponding percentage of marks shall be followed:

After each course is evaluated for 100 marks, the marks obtained in each course will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student fall.

Structure of Grading of Academic Performance

Range in which the marks in the subject fall	**Grade**	**Grade points Assigned**
90 & above	S (Superior)	10

80 - 89	A (Excellent)	9
70 - 79	B (Very Good)	8
60 - 69	C (Good)	7
50 - 59	D (Average)	6
40 - 49	E (Pass)	5
< 40	F (Fail)	0
Absent	Ab (Absent)	0

i) A student obtaining Grade 'F' or Grade 'Ab' in a subject shall be considered failed and will be required to reappear for that subject when it is offered the next supplementary examination.
ii) For non-credit audit courses, "Satisfactory" or "Unsatisfactory" shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA/Percentage.

Computation of Semester Grade Point Average (SGPA) and Cumulative GradePoint Average (CGPA): The Semester Grade Point Average (SGPA) is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.,

$$SGPA = \Sigma (Ci \times Gi)/\Sigma Ci$$

where, Ci is the number of credits of the ith subject and Gi is the grade point scored by the student in the ith course.

The Cumulative Grade Point Average (CGPA) will be computed in the same manner considering all the courses undergone by a student over all the semesters of a program, i.e.,

$$CGPA = \Sigma (Ci \times Si)/ \Sigma Ci$$

where "Si" is the SGPA of the ith semester and Ci is the total numberof credits up to that semester.

Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.
While computing the SGPA the subjects in which the student is awarded Zero grade points will also be included.

Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.
Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by the letters S, A, B, C, D and F.

Award of Class:

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree, he/she shall be placed in one of the following four classes:

Class Awarded	CGPA Secured

First Class with Distinction	≥ 7.5
First Class	≥ 6.5 < 7.5
Second Class	≥ 5.5 < 6.5
Pass Class	≥ 5.0 < 5.5

CGPA to Percentage Conversion Formula – (CGPA – 0.5) x 10

21. Withholding of Results

If the candidate has any dues not paid to the institution or if any case of indiscipline or malpractice is pending against him/her, the result of the candidate shall be withheld in such cases.

22. Multiple Entry / Exit Option

a. Exit Policy:

The students can choose to exit the four-year programme at the end of first/second/third year.

i) **UG Certificate in (Field of study/discipline)** - Programme duration: First year (first two semesters) of the undergraduate programme, 40 credits followed by an additional exit 10-credit bridge course(s) lasting two months, including at least 6-credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

ii) **UG Diploma (in Field of study/discipline)** - Programme duration: First two years (first four semesters) of the undergraduate programme, 80 credits followed by an additional exit 10-credit bridge course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

iii) **Bachelor of Science (in Field of study/discipline)** i.e., **B.Sc. Engineering in (Field of study/discipline)-** Programme duration: First three years (first six semesters) of the undergraduate programme, 120 credits.

b. Entry Policy:

Modalities on multiple entry by the student into the B.Tech. programme will be provided in due course of time.

Note: The Institution/University shall resolve any issues that may arise in the implementation of Multiple Entry and Exit policies from time to time and shall review the policies in the light of periodic changes brought by UGC, AICTE and State government.

23. Gap Year Concept

Gap year concept for Student Entrepreneur in Residence is introduced and outstanding students who wish to pursue entrepreneurship / become entrepreneur are allowed to take a break of one year at any time after II year to pursue full-time entrepreneurship programme/to establish startups. This period may be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation. The principal of the respective college shall forward such proposals submitted by the students to the Institution . An evaluation committee constituted by the

University shall evaluate the proposal submitted by the student and the committee shall decide whether to permit the student(s) to avail the Gap Year or not

24. *Transitory Regulations*

Discontinued, detained, or failed candidates are eligible for readmission as and when the semester is offered after fulfilment of academic regulations. Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to Section 2 and they will follow the academic regulations into which they are readmitted.

Candidates who are permitted to avail Gap Year shall be eligible for re-joining into the succeeding year of their B. Tech from the date of commencement of class work, subject to Section **2** and they will follow the academic regulations into which they are readmitted.

25. *Minimum Instruction Days for a Semester:*

The minimum instruction days including exams for each semester shall be 90 days.

26. *Medium of Instruction:*

The medium of instruction of the entire B. Tech undergraduate programme in Engineering &Technology (including examinations and project reports) will be in English only.

27. *Student Transfers:*

Student transfers shall be as per the guidelines issued by the Government of Andhra Pradesh and the University/Institution from time to time.

28. *General Instructions:*

i) The academic regulations should be read as a whole for purpose of any interpretation.
ii) Malpractices rules-nature and punishments are appended.
iii) Where the words “he”, “him”, “his”, occur in the regulations, they also include “she”, “her”, “hers”, respectively.
iv) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.
v) The Institute may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the institute.
vi) In the case of any doubt or ambiguity in the interpretation of the guidelines given, the decision of the Head of the institution is final.

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ACADEMIC REGULATIONS (DR24) FOR B.TECH. (LATERAL ENTRY SCHEME)

*(Effective for the students admitted into II year through Lateral Entry Scheme from the Academic Year **2025-26** onwards)*

1. *Award of the Degree*

a. Award of the B.Tech. Degree / B.Tech. Degree with a Minor if he/she fulfils the following:

i. Pursues a programme of study for not less than three academic years and not more than six academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Six years).
ii. Registers for 120 credits and secures all 120 credits.

b. Award of B.Tech. degree with Honors if he/she fulfils the following:

i. Student secures additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 120 credits.
ii. Registering for Honors is optional.
iii. Honors is to be completed simultaneously with B.Tech. programme.

1. *Students, who fail to fulfil the requirement for the award of the degree within six consecutive academic years from the year of admission, shall forfeit their seat.*
2. *Minimum Academic Requirements*

The following academic requirements have to be satisfied in addition to the requirements mentioned in item no.**2**

i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together.
ii. A student shall be promoted from III year to IV year if he/she fulfils the academic requirements of securing 40% of the credits (any decimal fraction should be rounded off to lower digit) in the subjects that have been studied up to V semester.
iii. And in case if student is already detained for want of credits for particular academic year, the student may make up the credits through supplementary exams of the above exams before the commencement of IV year I semester class work of next year.

3. *Course Pattern*

i. The entire course of study is three academic years on semester pattern.
ii. A student eligible to appear for the end examination in a subject but absent at it or has failed in the end examination may appear for that subject at the next supplementary examination offered.
iii. When a student is detained due to lack of credits/shortage of attendance the student may be re-admitted when the semester is offered after fulfilment of academic regulations, the student shall be in the academic regulations into which he/she is readmitted.

4. *All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).*

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