JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING (AUTONOMOUS), PULIVENDULA
YSR(KADAPA) Dist 516 390, (A.P) INDIA

Academic Regulations (R20) for B. Tech (Regular-Full time)

(Effective for the students admitted into I year from the Academic Year 2020-21 onwards)

Introduction:

The College got academic autonomous from JNTUA with effect from 2013-14 AY. After that the regulations and curriculum starts with R13 regulations. Then it again was revised the curriculum in 2015 under R15 regulations. Subsequently, as per AICTE and JNTUA directions, again revised the curriculum in 2019 under R19 regulations.

Recently, APSCHE reviewed the curriculum in B.Tech programme by expert committee and decided to adopt new curriculum with effect from 2020-21 AY with an objective to fill the gaps in the existing curriculum with reference to skill development. The revised curriculum underwent a reorganization making the engineering education enshrined with skill development ecosystem to suit the industry's needs and to ensure the graduates employability.

The curriculum mandates students to take up five skill courses which are relevant to the industry from second year onwards, two basic level skill courses, one on soft skills and other two on advanced level skill courses. The students are also given the option of choosing between skill courses offered by the respective college and a certificate course offered by industry, a professional body, APSSDC or any other accredited body. Mandatory Internship, both industry and social, is included in the revised curriculum that aims at making engineering graduates connect with the needs of the industry and society at large. It will be mandatory for the students to intern in the industry/field for 10 months during the summer vacation and also in the final semester to acquire the skills required for job.

Curricular Framework for Regular and Honors B.Tech Programmes of all Branches

1. **Award of B.Tech. Degree:** A student will be declared eligible for the award of B. Tech. degree if he/she fulfills the following:
   i. Pursues a course of study in not less than four and not more than eight academic years.
   ii. After eight academic years from the year of their admission, he/she shall forfeit their seat in B. Tech course and their admission stands cancelled.
   iii. Registers for 160 credits and must secure all the 160 credits.
   iv. A student shall be eligible for the award of B.Tech degree with Honors or Minor if he/she earns 20 credits in addition to the 160 credits. A student shall be permitted to register either for Honors or for Minor and not for both simultaneously.
2. 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.
3. Structure of the Undergraduate Engineering program:

   Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below

S.No	Category	Code	Suggested breakup of Credits
1	Humanities and social science including Management courses	HSMC	10.5
2	Basic Science courses	BSC	21
3	Engineering science courses	ESC	24
4	Professional core Courses	PCC	51
5	Open Elective Courses	OEC	12
6	Professional Elective Courses	PEC	15
7	Internship, seminar, project wok	PROJ	16.5
8	Mandatory courses	MC	Non-Credited
9	Skill Oriented Courses	SC	10
	Total Credits		**160**

Assigning of Credits:

1 Hr. Lecture (L) per week - 1 credit
1 Hr. Tutorial (T) per week - 1 credit
1 Hr. Practical (P) per week - 0.5 credits
2 Hours Practical (Lab)/week - 1 credit

4. Programs offered by the College:

The following programs are offered at present as specializations for the B. Tech. course from 2020-21 and any other course as approved by the authorities of the University from time to time.

S.No.	Name of the Program	Program Code
1.	Civil Engineering	01
2.	Electrical and Electronics Engineering	02
3.	Mechanical Engineering	03
4.	Electronics and Communication Engineering	04
5.	Computer Science and Engineering	05

5. There shall be mandatory student induction program for fresher's, 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., shall be included in the guidelines issued by AICTE.
6. All undergraduate students shall register for NCC/NSS activities. A student will be required to participate in an activity for two hours in a week during second and third semesters. Grade shall be awarded as Satisfactory or Unsatisfactory in the mark sheet on the basis of participation, attendance, performance and behavior. If a student gets an unsatisfactory Grade, he/she shall repeat the above activity in the subsequent years, inorder to complete the degree requirements.
7. Courses like Environmental Sciences, Universal Human Values, Ethics, Indian Constitution, Essence of Indian Traditional Knowledge etc., shall be included in the curriculum as non-credit mandatory courses. Environmental Sciences is to be offered compulsorily as mandatory course for all branches. A student has to secure 40% of the marks allotted in the internal evaluation for passing the course. No marks or letter grade shall be allotted for all mandatory non-credit courses.
8. There shall be 05 Professional Elective courses and 04 Open Elective courses. All the Professional & Open Elective courses shall be offered for 03 credits, wherever lab component is involved it shall be (2-0-2) and without lab component it shall be (3-0-0). If a course comes with a lab component, that component has to be cleared separately. The concerned BOS shall explore the possibility of introducing virtual labs for such courses with lab component.

9. All Open Electives are offered to students of all branches in general. However, a student shall choose an open Elective from the list in such a manner that he/she has not studied the same course in any form during the Programme.
10. A student shall be permitted to pursue up to a maximum of two elective courses under MOOCs during the Programme. Each of the courses must be of minimum 12 weeks in duration. Attendance will not be monitored for MOOC courses. Student has to pursue and acquire a certificate for a MOOC course only from the organizations/agencies approved by the BoS in order to earn the 3 credits. The Head of the department shall notify the list of such courses at the beginning of the semester.
11. The college shall invite registration forms from the students at the beginning of the semester for offering professional and open elective courses. There shall be a limit on the minimum and maximum number of registrations based on class/section strength.
12. Students shall undergo mandatory summer internships for a minimum of six weeks duration at the end of second and third year of the Programme. There shall also be mandatory full internship in the final semester of the Programme along with the project work.
13. 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 courses and the remaining one shall be a soft skills course.
14. Under graduate Degree with Honors/Minor shall be issued by the College to the students who fulfill all the academic eligibility requirements for the B. Tech program and Honors/Minor program. The objective is to provide additional learning opportunities to academically motivated students.

15. Course Evaluation:

15.1. Course pattern:

- The entire course of study is for four academic years. Semester pattern shall be followed in all the academic years
- A student eligible to appear for the end examination in a subject, but absent or has failed in the end examination may appear for that subject at the next supplementary examination when offered.
- 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 fulfillment of academic regulations. In such case, he/she shall be in that academic regulation into which he/she is readmitted.

15.2 Evaluation process:

The performance of a student in each semester shall be evaluated subject wise with a maximum of 100 marks for theory as well as for practical subject. The distribution shall be 30 marks for Internal Evaluation and 70 marks for the End Semester Examinations. A student has to secure not less than 35% of marks in the end semester examination and minimum 40% of marks in the sum total of internal and end semester examination marks to earn the credits allotted to each course.

15.3. End Examination Evaluation:

i. End examination of theory subjects shall have the following pattern:
   a. There shall be 6 questions and all questions are compulsory.
   b. Question I shall contain 10 compulsory short answer questions for a total of 20 marks such that each question carries 2 marks. There shall be 2 short answer questions from each unit.
   c. In each of the questions from 2 to 6, there shall be either/or type questions of 10 marks each Student shall answer any one of them.
   d. The questions from 2 to 6 shall be set by covering one unit of the syllabus for each question.

ii. End examination of theory subjects consisting of two parts of different subjects, for Example: Electrical & Mechanical Technology, shall have the following pattern:
   a. Question paper shall be in two parts viz., Part A and Part B with equal weightage.
   b. In each part, there shall be 3 either-or type questions for 12, 12 and 11 marks.

Note: The answers for Part A and Part B shall be written in two separate answer books.

15.4 For practical courses, there shall be a continuous evaluation during the semester for 30 sessional marks and end examination shall be for 70 marks. Day-to-day work in the laboratory shall be evaluated for 30 marks by the concerned laboratory teacher based on the regularity/record/viva/Internal test. The end examination shall be conducted by the concerned laboratory teacher and a senior expert in the subject from the same department.

In a practical subject consisting of two parts (Eg: Electrical & Mechanical Engg. Lab), the end examination shall be conducted for 35 marks in each part. Internal examination shall be evaluated as above for 30 marks in each part and final internal marks shall be arrived by considering the average of marks obtained in two parts.

15.5. There shall be mandatory courses with zero credits. There shall be no external examination. However, attendance in the audit course 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 every six months/semester at a mutually convenient date of college/student satisfying the conditions mentioned in item 1 & 2 of the regulations.

15.6. For the subject having design and/or drawing, such as Engineering Drawing, the distribution of marks shall be 30 for internal evaluation and 70 for end examination.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 midterm examinations in a semester for duration of 2 hours each for 15 marks with weightage of 80% to better mid 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 test marks will be the final sessional marks for the subject.

The end examination pattern for Engineering 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 subjects related to design/drawing is mentioned along with the syllabus.

15.7. Laboratory marks and the sessional marks awarded by the departments are not final. They are subject to scrutiny and scaling by the College wherever necessary. In such cases, the sessional and laboratory marks awarded by the department will be referred to a committee. The committee will arrive at a scaling factor and the marks will be scaled as per the scaling factor. The recommendations of the Committee are final and binding.

15.8. The laboratory records and internal test papers shall be preserved for a minimum of 2 years in the respective departments as per the College norms and shall be produced to the Committees of the College as and when the same are asked for.

16. Internal Examination Evaluation:

For theory subjects, during the semester, there shall be two midterm examinations. Each midterm 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**.

Objective paper shall be set for 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 question. Each question carries 5 marks.

17.

***Note 1:** The subjective paper shall contain 6 questions of equal weight age of 5 marks. Any fraction (0.5 & above) shall be rounded off to the next higher mark.

18.

***Note 2:** The midterm examination shall be conducted first by distribution of the Objective paper, simultaneously marking the attendance, after 20 minutes the answered objective paper shall be collected back. The student is not allowed to leave the examination hall. Then the descriptive question

paper and the answer booklet shall be distributed. After 90 minutes the answered booklets are collected back.

***Note 3:** There shall be five assignments from five units and each assignment has to evaluate for five marks and final will be the average of five assignments will be taken.

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.

First midterm examination shall be conducted for I, II units of syllabus with one either or type question from each unit and third either or type question from both the units. The second midterm examination shall be conducted for III, IV and V units with one either or type question from each unit.

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

For Example:
Marks obtained in first mid : 25
Marks obtained in second mid : 20
Final Internal Marks: (25x0.8) + (20x0.2) = 24

19. If the student is absent for any one midterm 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 mid : Absent
Marks obtained in second mid : 25
Final Internal Marks: (25x0.8)+ (0x0.2) =20.

17. **Attendance Requirements:**

i. A student shall be eligible to appear for end semester examinations if he acquires a minimum of 40% in each subject and 75% of attendance in aggregate of all the subjects.
ii. Shortage of Attendance below 65% in aggregate shall in NO case be condoned.
iii. Condonation for 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.
iv. Students whose shortage of attendance is not condoned in any semester are not eligible to take their end semester 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, as applicable. They may seek readmission for that semester when offered next.

18. Promotion Rules:

a) A student shall be promoted from first year to second year if he fulfills the minimum attendance requirements.
b) A student will be promoted from II year to III year if he fulfills the academic requirement of 40% of credits up to either II year I-Semester or II year II-Semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in II year II semester.
c) A student shall be promoted from III year to IV year if he fulfills the academic requirements of 40% of the credits up to either III year I semester or III year II semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in III year II semester.

19. Grading:

After each subject is evaluated for 100 marks, the marks obtained in each subject 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

Marks Range	Level	Letter Grade	Grade points Assigned
≥ 90	Outstanding	A^+	10
80-89	Excellent	A	9
70-79	Very Good	B	8
60-69	Good	C	7
50-59	Fair	D	6
40-49	Satisfactory	E	5
< 40	F (Fail)	F	0
Absent	Ab (Absent)	Ab	0

Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

i. 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.,

$$SGPA = \Sigma (C_i \times G_i)/\Sigma C_i$$

where, C_i is the number of credits of the i^{th} subject and G_i is the grade point scored by the student in the i^{th} course.

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

$$CGPA = \Sigma (C_i \times S_i)/ \Sigma C_i$$

where "S_i" is the SGPA of the i^{th} semester and C_i is the total number of credits upto that semester.

iii. Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

iv. 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 letters A^+, A, B, C, D, E and F.

As per AICTE regulations, conversion of CGPA into equivalent percentage as follows:

Equivalent Percentage = (CGPA – 0.50) x 10

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	≥ 4.5 < 5.5

20. Gap - Year:

Gap Year – concept of Student Entrepreneur in Residence shall be introduced and outstanding students who wish to pursue entrepreneurship are allowed to take a break of one year at any time after I year/II year/III year to pursue entrepreneurship full time. This period shall be counted for the maximum time for graduation. An evaluation committee at university level shall be constituted to evaluate the proposal

submitted by the student and the committee shall decide on permitting the student for availing the Gap Year.

22. Transitory Regulations:

Discontinued, detained, or failed candidates are eligible for readmission as and when the semester is offered after fulfillment 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 rejoining 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.

23. Minimum Instruction Days for a Semester:

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

24. Medium of Instruction:

The Medium of Instruction is **English** for all courses, laboratories, internal and external examinations, Comprehensive Viva-Voce, seminar presentations and project reports.

25. Student Transfers:

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

26. General Instructions:

a. The academic regulations should be read as a whole for purpose of any interpretation.

b. Malpractices rules-nature and punishments are appended.

c. Where the words “he”, “him”, “his”, occur in the regulations, they also include “she”, “her”, “hers”, respectively.

d. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.

e. The College 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 College.

Curricular Framework for Mandatory Internships

1. Two summer internships each with a minimum of six weeks duration, done at the end of second and third years, respectively are mandatory. The internship can be done by the students at local industries, Govt. Organizations, construction agencies, Industries, Hydel and thermal power projects and also in software MNCs.
2. 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. The report and the oral presentation shall carry 40% and 60% weightages respectively.
3. In the final semester, the student should mandatorily undergo internship and parallelly 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. Out of a total of 200 marks for the Project, 60 marks shall be for Internal Evaluation and 140 marks for the End Semester Examination (Viva-voce). The Viva-Voce shall be conducted by a committee consisting of HOD, Project Supervisor and an External Examiner nominated by the Principal. The evaluation of project work shall be conducted at the end of the VIII semester provided after successful completion of Project work. The Internal Evaluation shall be made by the departmental committee (Head of the Department, two senior faculty members of the department and Supervisor), on the basis of two seminars given by each student on the topic of his/her project.

4. The 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.

Curricular Framework for Skill oriented

1. For skill oriented/skill advanced course, one theory and 2 practical hours or two theory hours may be allotted as per the decision of concerned BOS.
2. Out of the five skill courses two shall be skill-oriented courses from the same domain and shall be completed in second year. Of the remaining 3 skill courses, one shall be necessarily be a soft skill course and the remaining 2 shall be skill-advanced courses either from the same domain or Job oriented skill courses, which can be of inter disciplinary nature. (See Annexure 1 for model skill courses)
3. A pool of interdisciplinary job-oriented skill courses shall be designed by a common Board of studies by the participating departments/disciplines and the syllabus along with the pre requisites shall be prepared for each of the laboratory infrastructure requirements. The list of such courses shall be included in the curriculum structure of each branch of Engineering, so as to enable the student to choose from the list.
4. 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/APSSDC or any other accredited bodies as approved by the concerned BoS.
5. The Board of studies of the concerned discipline of Engineering shall review the skill advanced courses being offered by eligible external agencies and prepare a fresh list every year incorporating latest courses based on industrial demand.
6. If a student chooses to take a Certificate Course offered by industries/Professional bodies/APSSDC or any other accredited bodies, in lieu of the skill advanced course offered by the Department, the credits shall be awarded to the student upon producing the Course Completion Certificate from the agency/professional bodies as approved by the Board of studies.
7. If a student prefers to take a certificate course offered by external agency, the 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 concerned Board of Studies, the student is deemed to have fulfilled the attendance requirement of the course and acquire the credits assigned to the course.
8. A committee shall be formed at the level of the college to evaluate the grades/marks given for a course by external agencies and convert to the equivalent marks/grades. The recommended conversions and appropriate grades/marks are to be approved by the University/Academic Council.

Curricular Framework for Honors Programme

1. Students of a Department/Discipline are eligible to opt for Honors Programme offered by the same Department/Discipline.
2. A student shall be permitted to register for Honors program at the beginning of 4th semester provided that the student must have acquired a minimum of 8.0 SGPA upto the end of 2nd semester without any backlogs. In case of the declaration of the 3rd semester results after the commencement of the 4th semester and if a student fails to score the required minimum of 8 SGPA, his/her registration for Honors Programme stands cancelled and he/she shall continue with the regular Programme.

3. Students can select the additional and advanced courses from their respective branch in which they are pursuing the degree and get an honors degree in the same. e.g. If a Mechanical Engineering student completes the selected advanced courses from same branch under this scheme, he/she will be awarded B.Tech. (Honors) in Mechanical Engineering.
4. In addition to fulfilling all the requisites of a Regular B.Tech Programme, a student shall earn 20 additional credits to be eligible for the award of B. Tech (Honors) degree. This is in addition to the credits essential for obtaining the Under Graduate Degree in Major Discipline (i.e. 160 credits).
5. Of the 20 additional Credits to be acquired, 16 credits shall be earned by undergoing specified courses listed as pools, with four courses, each carrying 4 credits. The remaining 4 credits must be acquired through two MOOCs, which shall be domain specific, each with 2 credits and with a minimum duration of 8/12weeks as recommended by the Board of studies.
6. It is the responsibility of the student to acquire/complete prerequisite before taking the respective course. The courses offered in each pool shall be domain specific courses and advanced courses.
7. The concerned BoS shall decide on the minimum enrolments for offering Honors program by the department. If minimum enrolments criteria are not met then the students shall be permitted to register for the equivalent MOOC courses as approved by the concerned Head of the department in consultation with BoS.
8. Each pool can have theory as well as laboratory courses. If a course comes with a lab component, that component has to be cleared separately. The concerned BoS shall explore the possibility of introducing virtual labs for such courses with lab component.(Model pool list is enclosed in the Annexure-2)
9. MOOC courses must be of minimum 8 weeks in duration. Attendance will not be monitored for MOOC courses. Students have to acquire a certificate from the agencies approved by the BOS with grading or marks or pass/fail in order to earn 4 credits. If the MOOC course is a pass/fail course without any grades, the grade to be assigned will be as decided by the university/academic council.
10. The concerned BoS shall also consider courses listed under professional electives of the respective B. Tech programs for the requirements of B. Tech (Honors). However, a student shall be permitted to choose only those courses that he/she has not studied in any form during the Programme.
11. If a student drops or is terminated from the Honors program, the additional credits so far earned cannot be converted into free or core electives; they will remain extra. These additional courses will find mention in the transcript (but not in the degree certificate). In such cases, the student may choose between the actual grade or a "pass (P)" grade and also choose to omit the mention of the course as for the following: All the courses done under the dropped Minors will be shown in the transcript. None of the courses done under the dropped Minor will be shown in the transcript.
12. In case a student fails to meet the CGPA requirement for Degree with Honors at any point after registration, he/she will be dropped from the list of students eligible for Degree with Honors and they will receive regular B.Tech degree only. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.
13. Honors must be completed simultaneously with a major degree program. A student cannot earn Honors after he/she has already earned bachelor's degree.

Curricular Framework for Minor Programme

1. a)Students who are desirous of pursuing their special interest areas other than the chosen discipline of Engineering may opt for additional courses in minor specialization groups offered by a department other than their parent department. For example, If Mechanical Engineering student selects subjects from Civil Engineering under this scheme, he/she will get Major degree of Mechanical Engineering with minor degree of Civil Engineering

   b) Student can also opt for Industry relevant tracks of any branch to obtain the Minor Degree, for example, a B.Tech Mechanical student can opt for the industry relevant tracks like Data Mining track, IOT track, Machine learning track etc.
2. The BOS concerned shall identify as many tracks as possible in the areas of emerging technologies and industrial relevance / demand. For example, the minor tracks can be the fundamental courses in CSE,

ECE, EEE,CE,ME etc or industry tracks such as Artificial Intelligence (AI), Machine Learning (ML), Data Science (DS), Robotics, Electric vehicles, Robotics, VLSI etc.

3. The list of disciplines/branches eligible to opt for a particular industry relevant minor specialization shall be clearly mentioned by the respective BoS.
4. There shall be no limit on the number of programs offered under Minor. The University/Institution can offer minor programs in emerging technologies based on expertise in the respective departments or can explore the possibility of collaborating with the relevant industries/agencies in offering the program.
5. The concerned BoS shall decide on the minimum enrolments for offering Minor program by the department. If a minimum enrolments criterion is not met, then the students may be permitted to register for the equivalent MOOC courses as approved by the concerned Head of the department in consultation with BoS.
6. A student shall be permitted to register for Minors program at the beginning of 4th semester subject to a maximum of two additional courses per semester, provided that the student must have acquired 8 SGPA (Semester Grade point average) upto the end of 2nd semester without any history of backlogs. It is expected that the 3rd semester results may be announced after the commencement of the 4th semester. If a student fails to acquire 8 SGPA upto 3rd semester or failed in any of the courses, his registration for Minors program shall stand cancelled. An SGPA of 8 has to be maintained in the subsequent semesters without any backlog in order to keep the Minors registration active.
7. A student shall earn additional 20 credits in the specified area to be eligible for the award of B. Tech degree with Minor. This is in addition to the credits essential for obtaining the Under Graduate Degree in Major Discipline (i.e. 160 credits).
8. Out of the 20 Credits, 16 credits shall be earned by undergoing specified courses listed by the concerned BoS along with prerequisites. It is the responsibility of the student to acquire/complete prerequisite before taking the respective course. If a course comes with a lab component, that component has to be cleared separately. A student shall be permitted to choose only those courses that he/she has not studied in any form during the Programme.
9. In addition to the 16 credits, students must pursue at least 2 courses through MOOCs. The courses must be of minimum 8 weeks in duration. Attendance will not be monitored for MOOC courses. Student has to acquire a certificate from the agencies approved by the BOS with grading or marks or pass/fail in order to earn 4 credits. If the MOOC course is a pass/fail course without any grades, the grade to be assigned as decided by the university/academic council.
10. Student can opt for the Industry relevant minor specialization as approved by the concerned departmental BoS. Student can opt the courses from Skill Development Corporation (APSSDC) or can opt the courses from an external agency recommended and approved by concerned BOS and should produce course completion certificate. The Board of studies of the concerned discipline of Engineering shall review such courses being offered by eligible external agencies and prepare a fresh list every year incorporating latest skills based on industrial demand.
11. A committee should be formed at the level of College/Universities/department to evaluate the grades/marks given by external agencies to a student which are approved by concerned BoS. Upon completion of courses the departmental committee should convert the obtained grades/marks to the maximum marks assigned to that course. The controller of examinations can take a decision on such conversions and may give appropriate grades.
12. If a student drops (or terminated) from the Minor program, they cannot convert the earned credits into free or core electives; they will remain extra. These additional courses will find mention in the transcript (but not in the degree certificate). In such cases, the student may choose between the actual grade or a "pass (P)" grade and also choose to omit the mention of the course as for the following:
    All the courses done under the dropped Minors will be shown in the transcript. None of the courses done under the dropped Minor will be shown in the transcript.
13. In case a student fails to meet the CGPA requirement for B.Tech degree with Minor at any point after registration, he/she will be dropped from the list of students eligible for degree with Minors and they will receive B. Tech degree only. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.

14. Minor must be completed simultaneously with a major degree program. A student cannot earn the Minor after he/she has already earned bachelor's degree.

ACADEMIC REGULATIONS FOR B. TECH.(R19)
(LATERAL ENTRY SCHEME)

(Effective for the students getting admitted into II year through Lateral Entry Scheme from the Academic Year 2019-2020 and onwards)

1. Award of B.Tech. Degree

A student admitted in Lateral Entry Scheme (LES) will be declared eligible for the award of the B.Tech degree if the student fulfills the following academic regulations:

a) Pursues a course of study for not less than three academic years and not more than six academic years.

b) Registers for *121* credits and secures all *121* credits from II to IV year of Regular B. Tech. program.

2. Students, who fail to fulfill the requirement for the award of the degree within six consecutive academic years from the year of admission, shall forfeit their seat.

3. The regulations **3** to **6** except 5.1 are to be adopted as that of B. Tech. (Regular).

4. Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.**5**

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 third year to fourth year only if the student fulfills the academic requirements of securing 40% of credits (26 credits) from the following examinations, irrespective of whether the candidate takes the end examination or not as per the normal course of study.
   a. One regular and Two supplementary examinations of III semester.
   b. One regular and one supplementary examinations of IV semester.
   c. One regular examination of V semester.

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.

5. Course Pattern

5.1. The entire course of study is three academic years on semester pattern.

5.2. 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.

5.3. 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 fulfillment of academic regulations, the student shall be in the academic regulations into which he/she is readmitted.

6. The regulations **8 to 10 and 12** to **16** are to be adopted as that of B. Tech. (Regular). 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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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING (AUTONOMOUS), PULIVENDULA
YSR(KADAPA) Dist 516 390, (A.P) INDIA

COURSE STRUCTURE: CIVIL ENGINEERING

Semester - 1 (Theory - 4, Lab - 5)					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.		Mathematics -I	BS	3-0-0	3
2.		Engineering Physics	BS	3-0-0	3
3.		Communicative English	ES	3-0-0	3
4.		**Python programming**	ES	3-0-0	3
5.		**Engineering workshop**	ES	0-0-3	1.5
6		IT workshop	ES	0-0-3	1.5
7.		Communicative English lab	BS	0-0-3	1.5
8.		Engineering Physics Laboratory	ES	0-0-3	1.5
9.		**Python programming** Laboratory	ES	0-0-3	1.5
				Total	**19.5**

Category	**CREDITS**
Basic Science course	7.5
Engineering Science Courses	7.5
Humanities and social science	4.5
TOTAL CREDITS	**19.5**

Semester – 2 (Theory – 5, Lab – 3, MC-1)					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.		Mathematics-II	BS	3-0-0	3
2.		Engineering Chemistry	BS	3-0-0	3
3.		Building materials and construction	HS	3-0-0	3
4.		Strength of materials -I	ES	3-0-0	3
5		Engineering Graphics	ES	1-0-4	3
6.		Building materials LAB	ES	0-0-3	1.5
7.		Engineering Chemistry Lab	BS	0-0-3	1.5
8.		Strength of materials LAB	ES	0-0-3	1.5
9.		Environmental science	MC	2-0-0	0
				Total	**19.5**

Universities/Institutions may swap a few courses between 1st and 2nd semesters to balance the work load of teaching and laboratory schedule.

Category	**CREDITS**
Basic Science course	7.5
Engineering Science Courses	12
TOTAL CREDITS	**19.5**

COURSE STRUCTURE : ELECTRICAL & ELECTRONICS

Semester - 1 (Theory - 5, Lab - 3)					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.		Linear Algebra and Calculus	BS	3-0-0	3
2.		Chemistry	BS	3-0-0	3
3.		Electrical Circuits-I	ES	3-0-0	3
4.		Engineering Graphics	ES	1-0-4	3
5.		Problem Solving & Programming	ES	3-0-3	3
6.		Electrical Circuits-I lab	ES	0-0-3	1.5
7.		Chemistry Lab	BS	0-0-3	1.5
8.		Problem Solving & Programming Lab	ES	0-0-3	1.5
9.					
				Total	**19.5**

Category	**CREDITS**
Basic Science course	7.5
Engineering Science Courses	12.0
TOTAL CREDITS	**19.5**

Semester – 2 (Theory – 4, Lab – 4, MC-1)					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.		Differential Equations and Vector Calculus	BS	3-0-0	3
2.		Applied Physics	BS	3-0-0	3
3.		Data Structures	ES	3-0-0	3
4.		Communicative English	HS	3-0-0	3
5		Engineering Workshop	ES	1-0-4	3
6		Data Structures Lab	ES	0-0-3	1.5
7.		Applied Physics Lab	BS	0-0-3	1.5
8.		Communicative English lab	HS	0-0-3	1.5
9.		**Universal human values**	MC	2-0-2	0
10					
				Total	**19.5**

Category	**CREDITS**
Basic Science course	7.5
Engineering Science Courses	7.5
Humanities and Social sciences	4.5
TOTAL CREDITS	**19.5**

COURSE STRUCTURE : MECHANICAL ENGINEERING

Semester - 1 (Theory - 4, Lab -5)					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.		Mathematics 1	BS	3-0-0	3
2.		Physics	BS	3-0-0	3
3.		C-Programming & Data Structures	ES	3-0-0	3
4.		Communicative English	HS	3-0-0	3
5.		Engineering Workshop	ES	0-0-3	1.5
6		IT Workshop	ES	0-0-3	1.5
7.		Physics Lab	BS	0-0-3	1.5
8.		C-Programming & Data Structures Lab	ES	0-0-3	1.5
9.		Communicative English	HS	0-0-3	1.5
				Total	**19.5**

Category	**CREDITS**
Basic Science course	7.5
Engineering Science Courses	7.5
Humanities and social science	4.5
TOTAL CREDITS	**19.5**

Semester – 2 (Theory – 5, Lab – 4, MC-1)					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.		Mathematics 2	BS	3-0-0	3
2.		Engineering Chemistry	BS	3-0-0	3
3.		Basic Electrical & Electronics Engineering	ES	3-0-0	3
4.		Material Science	ES	3-0-0	3
5		Engineering Drawing	ES	1-0-2	2
6.		Computer Aided Drafting Lab	ES	0-0-2	1
7.		Basic Electrical & Electronics Engineering Lab	ES	0-0-2	1.5
8.		Engineering Chemistry lab	BS	0-0-3	1.5
9.		Material Science Lab	ES	0-0-3	1.5
10		Environmental Science	MC	3-0-0	0.0
				Total	**19.5**

Category	**CREDITS**
Basic Science course	7.5
Engineering Science Courses	12
TOTAL CREDITS	**19.5**

COURSE STRUCTURE: ELECTRONICS & COMMUNICATION ENGINEERING

Semester - 1 (Theory - 5, Lab - 3)					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.		Linear Algebra And Calculus	BS	3-0-0	3
2.		Chemistry	BS	3-0-0	3
3.		Basic Electrical Engineering	ES	3-0-0	3
4.		Engineering Graphics	ES	1-0-4	3
5.		Problem Solving & Programming	ES	3-0-0	3
6		Basic Electrical Engineering lab	ES	0-0-3	1.5
7.		Chemistry Lab	BS	0-0-3	1.5
8.		Problem Solving & Programming Lab	ES	0-0-3	1.5
				Total	**19.5**

Category	**CREDITS**
Basic Science course	7.5
Engineering Science Courses	12.0
TOTAL CREDITS	**19.5**

Semester – 2 (Theory – 4, Lab – 4)					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.		Differential Equations & Vector Calculus	BS	3-0-0	3
2.		Applied Physics	BS	3-0-0	3
3.		Network Theory	ES	3-0-0	3
4.		Communicative English	HS	3-0-0	3
5		Electronics & Communication Engineering Workshop	EC	1-0-4	3
6.		Communicative English Lab	EC	0-0-3	1.5
7.		Applied Physics Lab	BS	0-0-3	1.5
8.		Engineering Workshop	ES	0-0-3	1.5
9.		Universal Human Values	MC	2-0-0	0
..					
				Total	**19.5**

Category	**CREDITS**
Basic Science course	7.5
Engineering Science Courses	7.5
Humanities and social science	4.5
TOTAL CREDITS	**19.5**

COURSE STRUCTURE : COMPUTER SCIENCE & ENGINEERING

Semester - 1 (Theory - 4, Lab - 5)					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1		Mathematics 1	BS	3-0-0	3
2		Chemistry	BS	3-0-0	3
3		C-Programming & Data Structures	ES	3-0-0	3
4		Basic Electrical & Electronics Engineering	ES	3-0-0	3
5		Engineering Workshop (Mechanical & Civil Fundamentals)	ES	0-0-3	1.5
6		IT Workshop	ES	0-0-3	1.5
7		Chemistry Lab	BS	0-0-3	1.5
8		C-Programming & Data Structures Lab	ES	0-0-3	1.5
9		Basic Electrical & Electronics Engineering Lab	ES	0-0-3	1.5
				Total	**19.5**

Category	**CREDITS**
Basic Science course	7.5
Engineering Science Courses	12
TOTAL CREDITS	**19.5**

Semester - 2 (Theory - 5, Lab – 3, MC-1)					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1		Mathematics 2	BS	3-0-0	3
2		Engineering Physics	BS	3-0-0	3
3		Communicative English	HS	3-0-0	3
4		Python Programming & Applications	ES	3-0-0	3
5		Engineering Graphics	ES	1-0-4	3
6		Communicative English Lab	ES	0-0-3	1.5
7		Engineering Physics Lab	BS	0-0-3	1.5
8		Python Programming & Applications Lab	ES	0-0-3	1.5
9		Universal Human Values	MC	3-0-0	0.0
				Total	**19.5**

Category	**CREDITS**
Basic Science course	7.5
Engineering Science Courses	7.5
Humanities and social science	4.5
TOTAL CREDITS	**19.5**