Jharkhand University of Technology, Ranchi

B. Tech.

(4 Years Programme)

Based on NEP 2020

Session: 2023-2024

Framework under NEP 2020 Guidelines

1. **Implementation of Four Year UG Engineering Curriculum in First Phase with effect from Academic Year 2023-24:**
   The Credit and Multidisciplinary Curricular Framework, designed on the lines of the National Credit Framework and AICTE Approval Process Handbook, is to be made applicable in first phase to the AICTE-regulated UG (B.E./B.Tech. or equivalent) Engineering/ Technology Programs conducted **in Jharkhand University of Technology and its affiliated Institutes** with effect from Academic Year 2023-24.

2. **Credit Framework under Four-Years UG Engineering Programme with Multiple Entry and Multiple Exit options:**
   The Four-year Bachelor's Multidisciplinary Engineering Degree Programme allows the students to experience the full range of holistic and multidisciplinary education in addition to a focus on the chosen major and minors as per their choices and the feasibility of exploring learning in different institutions. The minimum and maximum credit structure for different levels under the Four-year Bachelor's Multidisciplinary Engineering UG Programme with multiple entry and multiple exit options are as given below**:**

Credit Framework

Levels	Qualification Title	Credit Requirements		Semester	Year
		Minimum	**Maximum**		
1	One Year UG Certificate in Engg./ Tech.	40	44	2	1
2	Two Years UG Diploma in Engg./ Tech.	80	88	4	2
3	Three Years Bachelor's Degree in Vocation (B. Voc.) or B. Sc. (Engg./ Tech.)	120	132	6	3
	4-Years Bachelor's degree	160	160	8	4

Levels	Qualification Title	Credit Requirements		Semester	Year
		Minimum	Maximum		
5	(B.E./ B.Tech. or Equivalent) in Engg./ Tech. with Multidisciplinary Minor	160	176	8	4
6	4-Years Bachelor's degree (B.E./ B.Tech. or Equivalent) in Engg./ Tech.-Honors and Multidisciplinary Minor	180	194	8	4
7	4-Years Bachelor's degree (B.E./ B.Tech. or Equivalent) in Engg./ Tech.-Honors with Research and Multidisciplinary Minor	180	194	8	4
8	4-Years Bachelor's degree (B.E./ B.Tech. or Equivalent) in Engg./ Tech.-Major Engg. Discipline with Double Minors (Multidisciplinary and Specialization Minors)	180	194	8	4

(a) Credits offered per Semester will be a Minimum 20 and a Maximum 22. While minimum credits are mandatory as per National Credit Framework, the Jharkhand University of Technology has provided the mechanism for Semester/ Level wise credit attainment flexibility within the broad framework.

(b) With effect from Academic Year 2023-24, the first year of 4-Years Multidisciplinary Bachelor's Degree in Engg./ Tech. Program (B.E./ B.Tech. or Equivalent) will be introduced. Thus, the Fourth Year of Bachelor's Engg./ Tech. Degree (Level 4) with various options- Bachelor's Engg./ Tech. Degree in chosen Major Engg./ Tech. Discipline with Multidisciplinary Minor (160-176

credits), OR Bachelor's Engg./ Tech. Honours Degree in chosen Major Engg./ Tech. Discipline with Multidisciplinary Minor (180-194 credits) OR Bachelor's Engg./ Tech. Honours with Research Degree in chosen Major Engg./ Tech. Discipline with Multidisciplinary Minor (180-194 credits) OR Bachelor's Engg./ Tech. Degree in chosen Major Engg./ Tech. Discipline with Double Minor (Multidisciplinary and Specialisation Minor, 180-194 credits).

(c) Under Bachelor's Engg./ Tech. Honours with Research Degree in chosen Major Engg./ Tech. Discipline with Multidisciplinary Minor (180-194 credits), the students will work on a research project or dissertation for 18 credits in the fourth year in the respective Major Engg./ Tech. Discipline. The decision regarding the distribution of 18 credits for Research Project in Semesters VII and VIII of the Fourth Year will be taken by Jharkhand University of Technology. These 18 Credits will be over and above the min.160-max.176 Credits prescribed for Four Year Multidisciplinary Bachelor's Degree in Engg./ Tech. Program.

(d) The Bachelor's Engg./ Tech. Honours Degree in chosen Major Engg./ Tech. Discipline with Multidisciplinary Minor (180-194 credits) enables students to take up five-six additional courses in the same Engg./ Tech. discipline of 18 to 20 credits distributed over semesters III to VIII. The decision regarding the mechanism of distribution of these 18-20 credits over semesters III to VIII, which are over and above the min.160-max.176 Credits prescribed for Four Year Multidisciplinary.

(e) Bachelor's Degree in Engg./ Tech., Degree in chosen Major Engg./ Tech.
Under Bachelor's Engg./ Tech. Degree in chosen Major Engg./ Tech. Discipline with Double Minor (Multidisciplinary and Specialisation Minor, 180-194 credits), students would take up five-six additional courses of 18 to 20 credits in another Engg./ Tech. discipline/ Emerging Areas Specialization distributed over semesters III to VIII. The decision regarding the mechanism of distribution of these 18-20 credits over semesters III to VIII, which are over and above the min.160-max.176 Credits prescribed for Four Year Multidisciplinary Bachelor's Degree in Engg./Tech., will be taken by Jharkhand University of Technology.

(f) The NEP 2020 Four Year Multidisciplinary Engineering Curriculum Framework offers:

- The flexibility to move from one discipline of study to another.
- The opportunity for learners to choose the courses of their interest in all disciplines.
- The multiple entry and exit options with the award of UG certificate/UG diploma/ or three-year degree depending upon the number of credits secured.
- The flexibility for learners to move from one institution to another to enable them to have multi and/or interdisciplinary learning.
- Mandatory One Semester Internship/ On Job Training (OJT).
- Provision of Vocational and Skill Enhancement Courses (VSEC), Indian Knowledge System (IKS), Community Engagement Project (CEP)/Field Project (FP) in Major Discipline Degree.

- Horizontal and Vertical mobility with multiple entry and exit options at each Level.
- Provision of NSQF compliant Skill-based Courses and internships for Exits at different Levels.
- Credits for Co-curricular and Extra-Curricular Activities as Curricular activities besides provision of credits for the Ability Enhancement Courses (AEC) and Value Education Courses (VEC).
- Interdisciplinary or Multidisciplinary education through Single and Double Minors and Open Electives (OE).
- The flexibility to switch to alternative modes of learning (offline, ODL, and Online learning, and hybrid modes of learning).

3. **Distribution of Credits across Four Years Engg./Tech. Degree Programmes:**

In general, for the four years' bachelor's degree programme, the distribution of credits will be as follows:

(a) Major (Core) Subject comprising Mandatory and Elective Courses:

    i. Minimum 50% of total credits corresponding to Three/Four - year UG Degree-Mandatory Courses offered in all Four years;

    ii. Elective courses of Major will be offered in the third and/or final year.

    iii. Vocational Skill Courses, Internship/ Apprenticeship, Community Engagement Project (CEP)/ Field Projects (FP), Research Projects connected to Major

(b) Compulsory Multidisciplinary Minor Subject: 14 Credits

    i. The Minor subjects may be from the different disciplines of the Engineering faculty, or they can be from different faculty altogether.

    ii. The credits of compulsory Minor subjects shall be completed from the second year to the final year of UG Programme.

(c) Generic/ Open Elective Courses (OE): 09 credits

    i. It is to be offered in Second and/or Third year and/or Final year.

    ii. Faculty-wise baskets of OE shall be prepared by University/ Affiliated Engineering Colleges.

    iii. OE is to be chosen compulsorily from faculty other than that of the Major Discipline.

(d) Vocational and Skill Enhancement Courses (VSEC): 08 – 09 credits

- <u>Vocational Skill Courses (VSC)</u>: 04 credits, including Hands on Training corresponding to the Major and/or Minor Subject:

    i To be offered in first three years;

    ii Wherever applicable vocational courses will include skills based on advanced laboratory practical of Major.

- <u>Skill Enhancement Courses (SEC)</u> : 04 – 06 credits

    i To be offered in first three years;

ii. To be selected from the basket of Skill Courses approved by Jharkhand University of Technology.

(e) Ability Enhancement Courses (AEC), Indian Knowledge System (IKS) a n d Value Education Courses (VEC): 10 Credits

- <u>AEC: 04 credits</u>

i.   To be offered in First and Second year ii.

ii.   English: 02 Credits

iii.   Modern Indian Language: 02 credits

iv.   To be offered from the Basket approved by Jharkhand University of Technology. The focus for both languages should be on linguistic and communication skills.

- <u>IKS: 02 Credits</u>

i.   To be offered in First Year

ii.   Courses on IKS to be selected from the basket of IKS courses approved by Jharkhand University Technology or as per UGC Guidelines on IKS.

- <u>VEC: 04 Credits</u>

i.   To be offered in Second year

ii.   Value Education Courses (VEC) such as Understanding India, Environmental Science/Education, and Digital and Technological Solutions.

(f) Field Projects/ Internship/ Apprenticeship/ Community Engagement Projects corresponding to the Major (Core) Subject, Co-curricular Courses (CC).

- Internship/Apprenticeship corresponding to the Major (Core) Subject: 12 Credits. Internship of One Semester duration shall be offered either in the VII or VIII semesters. Courses offered during the Internship Semester shall be offered in online mode.

- Field Projects/Community Engagement Projects corresponding to the Major (Core) Subject: minimum 02 credits
  - ✓ To be offered in Second year of UG Degree Programmes.

- Co-curricular Courses (CC) such as Health and Wellness, Yoga education sports, and fitness, Cultural Activities, NSS/NCC and Fine/ Applied/ Visual/ Performing Arts: 04 credits
  - ✓ To be offered up to Third year.

(g) Additional Credits for Bachelor's Degree-with Double Minor OR Honours: 18-20 Credits

- These are additional credits to be offered from the second year to the final year and will be offered as an option to students.

(h) Additional Credits for Bachelor's Degree- Honours with Research: Minimum 18 Credits

- These are additional credits to be offered in the final year and will be offered as an option to students.

The UGC Regulations, 2021 permit up to 40% of the total courses being offered in a particular programme in a semester through the **Online Learning Courses** offered through the **SWAYAM** platform and/or other State Level Common Platforms which can be developed in due course with the participation of different Universities/ HTEIs.

Illustrative Semester wise Credit distribution structure for Four Year UG Engineering Program - One Major, One Minor

Semester		Total Credits
Basic Science Course	BSC/ESC	14-18
Engineering Science Course		16-12
Programme Core Course (PCC)	Program Courses	44-56
Programme Elective Course (PEC)		20
Multidisciplinary Minor (MD M)	Multidisciplinary Courses	14
Open Elective (OE) Other than a particular program		09
Vocational and Skill Enhancement Course (VSEC)	Skill Courses	08
Ability Enhancement Course (AEC -01, AEC-02)	Humanities Social Science and Management (HSSM)	04
Entrepreneurship/Economics/ Management Courses		04
Indian Knowledge System (IKS)		02
Value Education Course (VEC)		04
Research Methodology	Experiential Learning Courses	04
Comm. Engg. Project (CEP)/Field Project (FP)		02
Project		04
Internship/ OJT		12
Co-curricular Courses (CC)	Liberal Learning Courses	04
Total Credits (Major)		**160-177**

Abbreviations: Generic/ Open Electives: OE; Vocational Skill and Skill Enhancement Courses: VSEC; Vocational Skill Courses: VSC; Skill Enhancement Courses: SEC; Ability Enhancement Courses: AEC; Indian Knowledge System: IKS; Value Education Courses: VEC; OJT: On Job Training: Internship/ Apprenticeship;

Field projects: FP; Community engagement project: CEP; Co-curricular Courses: CC; RM: Research Methodology; Research Project: RP, Liberal Learning Course: Lib. Learn, Courses on Humanities, Social Science, and Management: HSSM

4. **Choice of Major and Minor Subjects/ Discipline**

    (a) Major (Core) Subject

    Major (Core) Subject is the Engineering/ Technology discipline or subject of main focus and the degree will be awarded in that discipline/ Subject. Students should secure a minimum 50% of total credits through Core Courses (mandatory courses, electives, vocational courses, Internship/ Field Projects/ Apprenticeship/ Community Engagement Projects, Seminars, and Group Discussions). In addition, for the award of Bachelor's Degree- with Double Minor OR Honours students shall have to earn additional 18-20 credits by opting for courses of Emerging Specialisations or the Same Discipline, respectively. For the award of Bachelor's Degree- Honours with Research, students shall have to earn additional 18-20 credits through Research Project or Dissertation.

    In addition, from the perspective of promoting Multidisciplinary and Interdisciplinary Thinking, the Academic of Jharkhand University of Technology can exercise the design of Major Subjects on the lines of Multidisciplinary or School, Interdisciplinary, Double Major besides Department Specific Major Subjects such as Civil Engineering, Mechanical Engineering, Electrical Engineering, Chemical Engineering etc.

    (b) Students shall select a 'Major (Core) Subject' and a 'Minor Subject' from the lists of various Subject Combinations and Options provided by the Jharkhand University of Technology.

5. **Courses on Indian Knowledge System (IKS)**

    The concerned academic authorities, while defining the curriculum for modules/ courses on IKS, may take the support of the Indian Knowledge System (IKS) Cell under the Ministry of Education (MoE) at AICTE, New Delhi which is established to promote interdisciplinary research on all aspects of IKS, preserve and disseminate IKS for further research and societal applications. The IKS Cell has established multiple IKS Centers at different Institutes in various parts of the country to act as a catalyst for initiating research, education, and outreach activities. In addition, the list of courses may be developed and offered in online or offline mode by the parent university or the specialized HEIs.

    The courses to be developed under the Indian Knowledge Systems (IKS) are as follows:

    I. Generic IKS Course: These are expected to contain basic knowledge of the IKS subject. It should contain introductory information to the IKS. The student should be able to acquire basic knowledge after completion of the course.

II. Subject-Specific IKS Courses: These courses should contain advanced information pertaining to the subject as these will be considered as a part of the major credit. The student should have completed the Generic level as a prerequisite before enrolling in the discipline-related course.

The Jharkhand University of Technology may evolve their own IKS subject-related courses by following UGC guidelines in this regard.

6. **Credit Specifications**

   i. Theory Courses: 13-15 hours of teaching per credit is required in a semester.

   ii. Laboratory Course: 26-30 hours in laboratory activities per credit is required in a semester.

   iii. Studio activities: Studio activities involve the engagement of students in creative or artistic activities. Every student is engaged in performing a creative activity to obtain a specific outcome. Studio-based activities involve visual- or aesthetic-focused experiential work. A minimum of 26-30 hours in studio activities per credit in a semester is required.

   iv. Workshop-based activities: Courses involving workshop-based activities require the engagement of students in hands-on activities related to work/vocation or professional practice. Every student is engaged in performing a skill-based activity. Related to specific learning outcome(s). 26-30 hours of workshop-based activities per credit in a semester is required.

   v. Seminar/ Group Discussion: 13-15 hours of participation in seminar/ Group Discussion activity per credit in a semester is required.

   vi. Internship: Credits for internship shall be one credit per two weeks of internship (or 36-40 hours of engagement), The internship shall be monitored jointly by the faculty and Industry/ Organisation Mentor. Internship of One Semester duration shall be offered either in the VII or VIII semesters. Courses offered during the Internship Semester shall be offered in online mode.

   vii. Field-based Learning/ Practices: These are the courses requiring students to participate in field-based learning/projects generally under the supervision of faculty. A minimum of 26-30 hours of learning activities per credit in a semester is required.

   viii. Community Engagement Projects: These are the courses requiring students to participate in field-based learning/projects generally under the supervision of faculty. The curricular component of 'community engagement and service' will involve activities that would expose students to the socio-economic issues in society so that the theoretical learnings can be supplemented by actual life experiences to generate solutions to real-life problems. 26-30 hours of contact time per credit in a semester along with 13-15 hours of activities such as preparation for community engagement and service, preparation of reports, etc., and independent reading and study with 2 credit course.

7. ABC, Admission System, Multiple Entry and Exit Path and Lateral Entry:

(a) Enrolment of Students and Registration of Colleges on ABC

Jharkhand University of Technology must promote registering on ABC. Since Credits awarded to a student for one programmes from an institution may be transferred/redeemed by another institution upon the student's consent through ABC, it is essential that all students should get enrolled on ABC, create ABC ID, and share these ABC IDs with Academic Institutions where they are enrolled. Credits Earned by the student will reflect in the student's ABC account.

Multi-institutional learning permission: The student shall be allowed to earn some credits from institutions/colleges other than the Main/ Parent College i.e. a college where students earn all their major credits (more than 50%) including credits for the core subject. Students enrolled in the degree programmes may avail of other elective credits from two different colleges affiliated with the same University and/or online courses available within the 40% cap mentioned by UGC.

(b) Multiple Exits: Students will have the flexibility to enter a programme in odd semesters and exit a programme after the successful completion of even semesters as per their future career needs.

- ✓ Students exiting the First Year programme after securing minimum 40 credits will be awarded UG Certificate in the relevant Discipline /Subject provided they secure 8 credits in work-based vocational courses or internship / Apprenticeship offered during summer vacation in addition to 4 credits from skill-based courses earned during the first and second semester.

- ✓ Students exiting the Second Year Programme after securing minimum 80 credits will be awarded UG Diploma in the relevant Discipline /Subject provided they secure additional 8 credits in skill-based vocational courses (skill-based courses, internship, mini projects etc) offered during summer vacation after the second year.

- ✓ Students exiting the 3-year UG program will be awarded B.Voc. in the relevant Discipline /Subject upon securing minimum 120 credits with additional 8 credits in skill-based vocational courses (skill-based courses, internship, mini projects etc.) offered during summer vacation after the sixth semester.

- ✓ Exit options shall be provided with Certification, Diploma and B. Vocational degrees to the students at the end of the second, fourth and sixth semester, respectively, in the four-year degree programme. Students will receive a Bachelor's degree with the single minor on successfully completing all eight semesters of the UG Programmes either at a stretch or with opted exits and re-entries. In addition to this, student will receive a Bachelor's degree with

Double Minor/Honours/ Research subject to earning additional 18 credits.

(c) Re-entry or Lateral Entry: Students, opting for exits at any level, will have the option to re-enter the programme from where they had left off, in the same or in a different higher education institution within four years of exit and complete the degree programme within the stipulated maximum period of eight years from the date of admission to first year UG. Re-entry at various levels for lateral entrants in academic programmes shall be based on the earned and valid credits as-deposited and accumulated in the Academic Bank of Credits (ABC) through proficiency test records. Lateral entry into the programme of study leading to the UG Diploma/ B. Vocational/ UG Bachelor's Degree with single minor/ UG Bachelor's Degree with Double Minor/ Honours /Research will be based on the validation of prior learning outcomes achieved and subject to availability based on intake capacity.

(d) Eligibility for admission to the UG Bachelor's Degree with Double Minor/ Honours /Research as per UGC guidelines: Minimum CGPA/CPI of 7.5 or minimum 75% after second semester for UG Bachelor's Degree with Double Minor/ Honours and Minimum CGPA/CPI of 7.5 or minimum 75% after sixth semester for UG Bachelor's Degree with Research.

All affiliated Institutes and University (JUT Ranchi) will facilitate the involvement of associations, MSME, Professional Organisations, Banks and Financial Institutions, NGOs, Sector Skill Councils and Industries in the smooth conduct of Internships/Apprenticeships programmes for all students.

(e) IDP: All affiliated Institutes will develop an Institutional Development Plan (IDP) to assess human resources requirements, in terms of faculty and administrative staff, physical infrastructural facilities, ICT-related technology requirements, Learning infrastructures such as Laboratories, Libraries, CPD requirements, Student Support related areas and Teaching infrastructure as well as the projection of growth and transformations in line with NEP. The affiliated Institutes must be committed to the holistic development of students and faculty training and should work on the establishment of a quality learner support system, infrastructure upgradation, and end-to-end digitization.

(f) Sensitization of Stakeholders: The University and Affiliated Institutes must devise, articulate and execute the rigorous plan for the sensitization of stakeholders in the immediate future on effective implementation of the new curricular framework with effect from Academic Year 2023-24.