Course Regulation

&

Curriculum Book

of

B.Tech. Undergraduate Degree Programme

Department of Electrical Engineering

JIS College of Engineering, Kalyani, Nadia

1. **Name of the Programme:** B.Tech. in Electrical Engineering

   Affiliation: Maulana Abul Kalam Azad University of Technology (MAKAUT), West Bengal

   Accreditation: National Board of Accreditation (NBA)

   Approved by: All India Council for Technical Education (AICTE)

2. **Duration:** 4 Years (8 Semester)

The programme for the B.Tech degree shall extend over a period of four academic years comprising of eight semesters. The first and second semesters shall be combined; the scheme and syllabi for combined first and second semesters (S1 & S2) will be common for all branches of study. The maximum duration permissible for taking the B.Tech. Degree is fixed as 8 years. For lateral entry students maximum duration permissible for taking the B.Tech. Degree is fixed as 7 years. The minimum number of working days in combined first and second semesters shall be 150 days. In 3rd to 8th semesters, there shall be minimum 90 working days.

3. Departmental Vision:

To impart technical knowledge, develop skills for research and prepare graduates to meet the industry and societal needs with a great human value.

4. Departmental Mission :

DM 1 - To impart quality engineering education with holistic development and to produce engineers, technologists, scientists and citizens who will contribute meaningfully to the growth and development of the country

DM 2 - To promote interdisciplinary research work and opportunity to work in a team through collaborative research and project work to meet the industrial and societal challenges

DM 3 - To inculcate professional ethics, focusing on excellence in curricular, co-curricular, extracurricular activities and moral responsibility for a better society

5. Programme Educational Objectives (PEOs)

PEO 1. Graduates will have initiate their careers in industry, government and private sector, research organizations or become an entrepreneur

PEO 2. Graduates will pursue higher education in electrical engineering or other fields of their comfort

PEO 3. Graduates will work in a team with leadership quality, show ethical values, express with effective communication, concern to environment and commitment to safety and development of society in the field they choose to pursue

6. Program Specific Outcomes (PSOs):

At the end of the program, the graduates will able to

PSO 1. Analyze, design and solve societal problems to cater the needs of industry related to the electrical engineering field.

PSO 2. Conduct investigations and experiments using modern techniques and tools as an individual or in a multidisciplinary team to cater the needs of societal and industry related problems.

PSO 3. Be motivated for continuous self learning and pursue academics and research in advanced areas of electrical engineering and be a professional and responsible citizen of India for sustainable energy development.

7. Program Outcomes (POs)

Engineering Graduates will be able to:

PO 1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 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.

PO 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.

PO 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.

PO 5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 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.

PO 7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 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.

PO 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.

PO 12. **Life-long 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.

Regulations for B.Tech. in Electrical Engineering Programme

The B.Tech. in Electrical Engineering programme of JIS College of Engineering, Kalyani is governed by the undergraduate regulations approved by the Academic Council and the Board of Governors. Here, some important sections of this document are reproduced for ready reference by the students and the faculty. Students are advised to consult the original book of regulations and amendments issued from time to time for complete guidance. This section has subsection numbers given in this chapter refer to the corresponding section numbers in the original document.

R1. Academic Calendar

R1.1. Each year shall be divided into two semesters ODD Semester (July to December) and EVEN Semester (January to June). The ODD semester shall ordinarily begin in July for students already on rolls and the EVEN semester shall ordinarily begin in January. However, the first semester (ODD, for newly admitted students including later entry) may begin a little later depending on completion of admission formalities. The number of teaching weeks in each semester shall be 15 to 17 with a maximum of 90 teaching days excluding the period of examination.

R1.2. Each year the institute shall draw out an academic calendar approve by Academic Council inclusive of dates for registration, Mid-semester and End-semester examinations; inter-semester breaks etc, well in advance of start of a semester. The academic calendar shall usually provide for at least 100 working days (including examination dates) in each semester, excluding holidays and days when classes are suspended.

R2. Admission

R2.1. The minimum qualification for admission to B. Tech degree programme (Regular) shall be: A pass in the 10+2 (Higher Secondary) examination or any other equivalent examination of any authority, recognized by this University, with a minimum aggregate of marks in Mathematics / Biology, Physics and Chemistry to be specified by the Admission Committee.

R2.2. A student who has acquired a diploma in Engineering through a minimum of three years of Institutional study, can be considered to be academically equivalent to a student who has passed the first year of the four year Engineering degree programme.

R2.3. Students pursuing first degree Engineering /Technology programme may be allowed change of branch after completion of course requirements for first (autumn) and second (spring) semester of first year programme. The selection shall be on the basis of merit assessed through the combined result of the first and second semester examinations declared the in the form of Yearly Grade Point Average (YGPA) at the end of the first year. This is an incentive to meritorious students securing YGPA of 8.5 or more. The change of branch shall be accorded to only such students who have cleared all examinations items of both semester in first attempt, in examinations held during academic session of his first admission to the course, change of branch may be accorded subject to the condition that the consequent total student strength in the 'gainer programme' shall not exceed by 10% of the approved seats and net student strength in the 'loser programme' shall not deplete by more than 10% of the actual student strength existing on the rolls prior the change during the process.

R2.4. Course Structure:

R2.4.1. Details of curriculum and syllabi as proposed by departmental committee recommended by Under-graduate Board of Studies shall be approved by the Academic Council with provision for modification form time to time as per needs of the specializations concerned. The departments will also prepare the syllabus of each subject containing the scope of studies and instructions to be imparted which must have the approval of Academic Council.

R2.4.2. The duration of the course leading to B.Tech. Degree will ordinarily be four academic years consisting of 8 semesters (2 semesters in each year).

R2.5. Course Curriculum Structure

R2.5.1. B. Tech Electrical Engineering programme will have a curriculum and course contents (syllabi) proposed by the respective Boards of Studies and approved by the Academic Council.

R2.5.2. The curriculum is designed to have minimum 180 credits for the award of the B. Tech degree. For lateral entry students the number of credits to be earned for the award of the B.Tech. Degree will be in accordance with the curriculum of program concerned.

R2.5.3. The medium of instruction, examination and project reports will be in English.

R2.5.4. All subjects will have Lecture – Tutorial – Laboratory/Sessional components (L–T–P) to indicate the contact hours. Credits are assigned to the courses based on the following general pattern:

One credit for each one hour per week lecture (L) period;
One credit for two or less hour per week tutorial (T) periods;
Two credit for three hour per week practical/project/seminar (P) periods
One credit for two or less hour per week practical/project/seminar (P) periods

Theory based courses are that with 'L' & 'T' or 'L' alone or 'T' alone.
Courses with theory and practical components are that with 'L', 'T' & 'P' or 'L' & 'P'.
Courses with only practical component are that with 'P' alone.
Teaching of subjects will be calculated in terms of credits.

R2.5.5. The complete programme of study will consist of 8 categories of courses distributed over eight semesters (6 semesters for lateral entry students) with two semesters per year as listed below:

Sl.	Course Work - Subject Area	Range of Total Credits (%)
1	Humanities and Social Sciences (HS), including Management	5 - 10
2	Basic Sciences(BS) including Mathematics, Physics, Chemistry, Biology	15 - 20
3	Engineering Sciences (ES), including Materials, Workshop, Drawing, Basics of Electrical / Electronics / Mechanical / Computer Engineering, Instrumentation	15 - 20
4	Professional Subjects-Core (PC), relevant to the chosen specialization/branch	30 - 40
5	Professional Subjects – Electives (PE), relevant to the chosen specialization/ branch	10 - 15
6	Open Subjects- Electives (OE), from other technical and/or emerging subject areas	5 - 10
7	Project Work (PW), Seminar and/or Internship in Industry or elsewhere	10 - 15
8	Mandatory Courses (MC)	No credit

R2.5.6. Every course shall be taught by a single course instructor, who may be assisted by adjunct faculty, teaching assistants, postgraduate and research students, and by other faculty members. The academic council will recognize one or two teacher per course, who will be a regular member of the Institute faculty unless otherwise arranged with approval of Principal.

R2.6. Attendance:

R2.6.1. Attendance is the physical presence of the student in the class. It is a well-observed fact that the students who score good grades are those who attend classes regularly. Therefore, the students must strive to attend all the classes without fail.

R2.6.2. A student shall be eligible to appear in end semester examination provided he/she pursues a regular course of study and attends at least 75% of theoretical, practical and sessional classes on an average, held during the semester to balance 25% to account for illnesses, permitted assignments such as job interviews, accidents, unforeseen emergencies etc. The attendance shall be considered from the date of admission of the candidate in the College to last instruction date of the course.

R2.6.3. Concessions: A student who has been absent for short periods due to participation cultural, sports, other academic/official assignments in the interest of the College with prior written permission of the head of the Institution shall be permitted a maximum of additional concessions of 10% in attendance and would be eligible for appearing in examination with a minimum of 65% of attendance in a semester.

R2.6.4. The course instructor handling a course shall announce the attendance and communicate clearly to the students by displaying prominently in the department and also report in writing to Heads of Department. Copies of the same should also be sent to the Principal also. The students who have less than 75% attendance will not be permitted to appear in end semester examination.

R2.6.5. The attendance records are to be maintained by course instructor and he shall show it to the student, if and when required.

R2.6.6. A student shall be admitted to any examination of the College only if he has paid the prescribed fee by the date specified by the Controller of Examinations. A student may, however, deposit the examination fee with prescribed additional fee for late submission of application after the expiry of the specified day, provided that no such period grace shall apply to a candidate for an examination for clearing his backlog or special examination if any.

R2.6.7. A candidate shall be allowed in an examination only after he is issued an Admit card for the relevant examination by the College, after obtaining the appropriate eligibility certificate.

R2.6.8. A student who is promoted to the next higher year with backlogs in the previous year shall be permitted to appear as an ex-student/casual as per provisions.

R2.7. Assessment Process:

R2.7.1. The complete academic performance of a student for each course is evaluated by Continuous assessment (internal) and End Semester examinations.

R2.7.2. Internal assessment shall be conducted throughout the semester by the concerned course instructor/departments except (in the case of project work where an external examiner shall be nominated for the viva voce).

R2.7.3. Continuous assessment shall be based on two internal examinations, assignments (such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.) as decided by the faculty handling the programme, and attendance throughout the semester.

R2.7.4. End Semester examinations of theory and practical subjects will be conducted by the institute. The failed candidates will have to appear for the End Semester examinations as backlog student. However, Semester-End examinations of 7th and 8th semesters will be conducted once in every semester.

R2.7.5. The assessment method for Theory subject is further detailed below:

Assessment Tool	Weightage	Remarks
CA2 - Class Test I	15%	Each class test is 30 marks
CA4 - Class Test II		
CA1 & CA3 - Assignment/Quizzes etc.	15%	Conducted on class
Total Mid Semester Assessment	30%	
End Semester Examination	70%	Duration - 3 hours

R2.7.6. The assessment method for Practical subject is further detailed below:

Assessment Tool	Weightage	Remarks
Continuous Evaluation	40%	Evaluated throughout semester
Total Internal Assessment	40%	
Problem Formation & Organization	20%	Duration - 3 hours
Performance of Experiments	20%	
Viva-voce	20%	
Total External Examination	60%	

R2.7.7. An external examiner and an internal examiner, appointed by the head of the department, shall conduct the end semester examinations of practical subjects. These examiners should necessarily have minimum two years teaching experience at engineering degree level.

R2.7.8. No candidate will be permitted to attend the end semester practical examinations unless he/she produces certified record of the laboratory.

R2.7.9. The assessment method for Sessional/Project subject is further detailed below:

Process	**Review #**	Assessment Tool	**Review Assessment Weightage**	**Over all Weightage**
Internal Evaluation	Review 1	Project Synopsis/ Proposal Evaluation	(6)	(40)
	Review 2	Mid-Term Project Evaluation	(10)	
	Review 3	End Semester Project Evaluation	(10)	
	Review 4	Project Report Evaluation	(8)	
	Review 5	Evaluation by Guide	(6)	
External Evaluation	Review 6	Basic Understanding	(20)	(60)
	Review 7	Report and presentation	(20)	
	Review 8	Viva-voce		

R2.7.10. For sessional subjects internal examiner (course instructor), appointed by the head of the department, shall conduct the end semester examinations and evaluate on the basis of student performance throughout the semester. An external examiner and an internal examiner, appointed by the head of the department, shall conduct the end semester examinations of projects.

R2.8. Pattern of Questions for End Semester Examinations of Theory Subjects

R2.8.1. The question papers of end semester examinations of theory subjects shall be able to perform achievement testing of the students in an effective manner. The question paper shall be prepared

a. covering all sections of the programme syllabus
b. unambiguous and free from any defects/errors
c. emphasizing knowledge testing, problem solving & quantitative methods
d. containing adequate data/other information on the problems assigned
e. having clear and complete instructions to the candidates.

R2.8.2. The question shall be prepared by an internal examiner an external examiner, appointed by the head of the department. Internal examiner an external examiner prepares ONE sets of question each. The moderator, appointed by the head of the department, selects the question from the two sets for end semester examinations. The pattern of questions for theory subjects for each PART shall be as follows:

i. GROUP A - Multiple Choice type questions 10 x 1 marks = 10 marks

(Students will ask to attempt *ten* questions out of *twelve* questions)

ii. GROUP B - Short Answer type questions 3 x 5 marks = 15 marks

(Students will ask to attempt *three* questions out of *six* questions)

iii. GROUP C - Long Answer type questions 3 x 15 marks = 45 marks

(Students will ask to attempt *three* questions out of *six* questions)

Each question paper has Total Marks: 70 marks

R2.8.3. Model question paper shall be prepared for each subject at the time of framing the syllabus. This same model question paper along with the syllabus must be sent to the question-paper setter every time for framing the questions. The model question paper shall be made available to students. All question paper setters should appointed for the evaluation of this paper.

R2.9. Minimum for Pass

R2.9.1. A candidate shall be declared to have passed in an individual subject of a semester examination if he/she secures not less than 40% marks for the subject in end semester examination both in theory and practical subjects.

R2.9.2. Candidates will be assigned grades according to the marks scored.

R2.6.9. **Credit System:** Each subject shall have a certain number of credits assigned to it depending upon the academic load and the nature and importance of the subject. The credit associated with each subject will be shown in the prescribed scheme and syllabi. Each programme shall have an integer number of credits, which reflects its weightage.

R2.10. Course Wise Grading of Students

R2.10.1. A letter grading system shall be followed in the College. Details of the same shall be specified in the rules formulated by the Academic Council.

R2.10.2. A student's level of competence shall be categorized by a GRADE POINT AVERAGE to be specified as:

SGPA - Semester grade point average
YGPA - Yearly grade point average

DGPA - Degree grade point average

R2.10.3. **Method of Awarding Letter Grades:** A letter grading system shall be followed in the College. Details of the same shall be specified in the rules formulated by the Academic Council. Based on the semester performance, each student is awarded a final letter grade at the end of the semester in each Course. The letter grades and the corresponding grade points are as follows:

Letter Grade	Normalized Marks Scored	Grade Point
O	100 - 90	10
E	89 - 80	9
A	79 - 70	8
B	69 - 60	7
C	59 - 50	6
D	49 - 40	5
F	Below 40	2
I	Incomplete	2

R2.10.4. A transitory letter Grade I (carrying points 2) shall be introduced for cases where the candidate fails to appear in End Semester Examination(s) and where the results are incomplete. This grade shall automatically be converted in to appropriate grade(s) as and when the results are complete.

R2.10.5. No student shall be allowed to received/complete the final degree with any I or F grade.

R2.10.6. There shall be no class/division awarded to a student either at semester or degree level.

R2.10.7. The College shall declare the CGPA of a student on the final semester grade sheet/card. The CGPA has been defined by Academic Regulation and indicates his/her overall performance in the course keeping relative importance of all courses identical.

R2.10.8. Definition in Grade System

Grade Point — Integer qualifying each letter grade

Credit — Integer signifying the relative emphasis on individual course item(s) in a semester as indicated by the Course structure and syllabus

Credit Point — Product of Point and Credit

SGPA — Sum of Credit Points of all courses taken in that semester.

$$SGPA = \frac{\sum_{i=1}^{n} C_i GP_i}{\sum_{i=1}^{n} C_i}$$

Where C_i = credit for the i^{th} course, $(GP)_i$ = the grade point obtained for the i^{th} course, n = total number of courses and the sum is over all the courses taken in that semester, including those in which the student has secured F and I grades.

R2.10.9. CGPA as specified for each course separately under respective rules shall be the basis of judging his/her overall competence in the course. The modality of arriving at the CGPA is indicated for individual groups of courses under rules governing their execution.

$$CGPA = \frac{\sum_{i=1}^{n} C_i GP_i}{\sum_{i=1}^{n} C_i}$$

R2.11. Eligibility for Award of the B. Tech Degree

R2.11.1. A student shall be declared to be eligible for the award of B. Tech degree if he/she has

a) Registered and successfully completed all the courses and projects as per the curriculum.

b) Successfully acquired the required credits as specified in the curriculum corresponding to the branch of his/her study within the stipulated time duration.

c) No disciplinary action pending against him/her

R2.12. Change of Regulations: Any regulation can be modified by the Academic Council of JIS College of Engineering.