ACADEMIC REQUIREMENT FOR B TECH (EVD) PROGRAM

(Effective from Autumn 2023-24)

This document contains Rules governing the B Tech (Bachelor of Technology) in Electronics and VLSI Design (EVD) program, which is a four-year undergraduate program. These rules are applicable to students admitted to the program in the academic year 2023-24 and onwards.

These Rules deal only with the post-admission academic activities of the program. Eligibility criteria for admission, admission procedures, etc. are outside the purview of this document. The Rules are subject to amendments from time to time as per the needs and requirements.

Dean (Academic Programs)/Registrar may, from time to time, issue such instructions or directions as may be necessary to give effect to and carry out the provisions of these Rules. Director, as Chairman of the Academic Council, may relax/exempt provision(s) of the Rules in exceptional situations and all such cases shall be reported to the Academic Council in the immediate next meeting.

Important terms/expressions used in the document have been defined in the GLOSSARY at the end of this document.

1. REGISTRATION

At the beginning of each semester, until the completion of the program, every student must register for the semester and for the courses that she/he will study during the semester.

1.1 Procedure for Registration:

The registration schedule is announced in advance, and registration is normally carried out within the first two days of each semester through the prescribed procedure (Student Registration System or SRS). Late registration may be permitted for valid reasons on submission of an application to the Deputy Registrar and only on payment of the prescribed late registration fee. In any case, registration must be completed before the prescribed last date for late registration in the Academic Calendar. Students having any outstanding dues to the Institute or hostel will not be permitted to register.

1.2 Eligibility for Course Registration:

A student with no backlog courses (i.e., who has passed all the previous courses) will be eligible to register for all courses prescribed in the curriculum for that semester, inclusive of the specified number of electives. A student who has backlog course(s) or is on academic probation may be recommended a different set of courses, by the Convenor of the UG Committee.

1.3 Withdrawal from Semester and Discontinued for Failing to Register:

a) A student who wishes to withdraw prior to registration for a semester must obtain a formal approval from the Dean (Academic Programs) before the prescribed last date for late registration for the concerned semester. Withdrawal after registration for a semester is permitted only on medical grounds or for other exceptional reasons and formal approval for such withdrawal must be obtained from the Dean (Academic Programs) before the date of commencement of the end semester examination for the concerned semester. Withdrawal from a semester, either prior to registration or after registration is permitted for only one semester at a time. If a student does not register for a regular semester or does not withdraw with permission from the Dean (Academic Programs) as indicated above, she/he will be discontinued from the Institute.

b) A student who registers for a semester after having withdrawn in the previous semester(s) may register for the available courses as prescribed in the curriculum for that particular semester as suggested by the UG Committee.

c) The transcript of a student who has “withdrawn” a semester would show the appropriate status for the corresponding semester(s). The transcript of a student who is suspended from a semester for an academic or disciplinary reason would also show “withdrawn” status in the corresponding semester.

2. AUDITING OF COURSES AND REGISTRATION FOR PG COURSES

2.1 Registration of Courses for AUDIT:

Auditing of courses allows students to gain exposure to additional subjects without increasing unduly their overall course load. Registration of courses for AUDIT is permitted from fifth semester onwards under the following conditions:

a) A student can take maximum two courses under audit during the entire program.

b) A student has to enter the courses to be audited in the Course Registration Form while registering for the semester. The word “Audit” would be specially mentioned in the remarks column of the student’s course registration form.

c) A student can register a course for audit provided the following two conditions are satisfied:
   (i) The course Instructor permits and approves the registration.
   (ii) The lecture, lab and tutorial time-tables strictly permit.

d) An audit course will not be considered as an overload.

e) If the student’s performance is satisfactory, a grade of P (Pass) would be awarded. If the performance is not satisfactory, a grade of F (Fail) would be awarded by the Instructor.

f) An audit course will not be considered for the purpose of calculation of Semester Performance Index (SPI)/Cumulative Performance Index (CPI). However, the course will be reflected in the Semester Grade Report and Transcript as an Audit Course provided a grade of P is obtained, otherwise the course will not appear in the Semester Grade Report and Transcript.

g) In a semester only one course can be registered as an audit course.

2.2 Registration for Post Graduate Level Courses for Credit:

Students with a CPI of 7.4 or above may be permitted to register for available MTech level courses as credit courses from fifth semester onwards. Such courses would be regarded as a part of the prescribed course load for the regular semester. A student can register a Post Graduate level course provided the following two conditions are satisfied:

(i) The program convenor approves the registration, and
(ii) The lecture, lab and tutorial time-tables strictly permit.

3. COURSE LOAD

3.1 Regular Semesters:

A student is permitted to register for additional courses over the prescribed courses in the curriculum for a regular semester provided the total number of courses does not exceed 7 (excluding Co-Curricular Activities) and the total credits do not exceed 28. A student is permitted to underload her/his prescribed academic load in a regular semester by dropping one or more courses provided the number of courses is at least 4 and the registered credits are not less than 12. However, after completion of her/his seventh regular semester, a student will be permitted to register for less than four courses.

3.2 Summer Semester:

The summer semester is a special semester of approximately eight weeks between May and July. In a Summer Semester, a student can register for a maximum of three (3) backlog courses. For the purpose of this rule, internship would be regarded as two (2) courses and BTech Project Part II would be regarded as three (3) courses. BTech Project Part I would be regarded as a single course. However, no other course can be taken along with industrial/rural internship. For Summer Semester only, the term “backlog courses” indicates a course which a student has registered earlier and failed. However, for a student who has completed eight regular semesters, the term “backlog course” would have the standard interpretation as given in the Glossary. Furthermore, students who have completed eight regular semesters are also permitted to register for grade improvement in Summer Semester (see, section 5.2).

4. COURSE ASSESSMENT AND MODES OF ASSESSMENT

4.1 Course Assessment:

The various modes of assessment used for rating students’ performance in a course include home assignments, tutorial assignments, laboratory work, group assignments, quizzes, tests (open or closed book), viva-voce, mini projects, etc. and the end-semester examination. Attendance in lectures/labs/tutorials may also be given due weightage in course assessment. The Instructor may make attendance in lectures/tutorials/labs compulsory (80% or less) and award “F” grade to students who do not achieve the prescribed level of attendance in that course. The distribution of weightage for the assessment (continuous evaluation) through the various modes listed above will be as indicated by the course instructor at the beginning of the semester.

Note: Academic requirements such as projects and summer assignments, which are prescribed in the curriculum, are regarded as courses for the purpose of assessment.

4.2 Grading:

a) For every course taken by a student, she/he is awarded a letter grade based on her/his overall performance in all the assessments. These letter grades are assigned on a 10-point scale as described in the Table below:

Letter Grade	Corresponding Points	Explanation
AA	10	
AB	9	
BB	8	
BC	7	
CC	6	
CD	5	
DD	4	
DE	3	Pass
F	0	Fail
I	-	Incomplete
P	-	Passed

b) A student passes the course if she/he gets any grade in the range of AA to DE, but fails if she/he gets the grade F. Certain courses are indicated as Pass/Fail courses in the curriculum, and in these courses a grade of P or F is awarded. F grade may also be awarded in case of reported malpractice in examination(s)/continuous evaluation process.

c) Pass/Fail courses are not considered for calculation of SPI/CPI.

d) "I" grade will be awarded in a course if the overall performance of the student is satisfactory in the course, but the student either misses the end-semester examination due to illness, accident/death in the family and obtains an approval from the Dean (Academic Programs) under exceptional circumstances. A student who misses the end-semester examination must apply to the Convener of Undergraduate Committee and her/his application must be supported by (i) proper medical certificate duly approved by the Medical Authority of the Institute in the case of illness, or (ii) adequate evidence in the event of accident/death in the family. An application not so supported will not be considered. Grade "I" awarded for missing the end-semester examination will be converted into a performance grade (depending on the overall performance of the student in the course) after taking an examination equivalent to the end-semester examination of that particular course. An "I" grade must be converted into a performance grade by the specified date in the Academic Calendar for the next semester, otherwise it will be converted into "F" grade.

5. REPEATING A COURSE

5.1 A student must repeat a course in which she/he has obtained an F grade in a course taken for credit. Such a course is regarded as a backlog course and is subject to the regulations for registration as indicated in Section 3. A backlog elective course can be replaced by another elective of the same category (Specialization/ICT/Technical/MnC/HASS/Science).

5.2 Grade Improvement

A student whose CPI is less than 5.0 is allowed to repeat a course in which a DD or DE grade was obtained for the purpose of grade improvement in a regular semester only. The grade obtained in the repeated attempt will be considered for the purpose of calculating the CPI. The grade obtained in the first attempt will be shown in the Transcript, but will not be considered for calculating the CPI.

5.3 Backlog/Grade Improvement

A student will be allowed to register for one Backlog/Grade Improvement course during regular semesters subject to conditions stated in 5.1 & 5.2, and subject to conditions on maximum course load stated in section 3.1. The student should ensure while registering that there is no clash in the evaluation of the Backlog/Grade Improvement course and other regular course.

6. B TECH PROJECT / INTERNSHIP

All students are required to complete either the B Tech Project (BTP) / Internship. The total number of credits will be as normally prescribed in the curriculum from time to time.

7. PERFORMANCE INDICES

7.1 Semester Performance Index (SPI):

The performance of a student in a semester is indicated by the Semester Performance Index (SPI). The SPI is the weighted average of the grade points obtained in all the courses registered by the student during the semester, calculated to two decimal places.

7.2 Cumulative Performance Index (CPI):

An up-to-date assessment of the overall performance of a student from the time of entering the Institute is obtained by calculating the student's Cumulative Performance Index (CPI). The CPI is weighted average of the grade points obtained in all the courses registered for credit by the student after entering the Institute. The CPI is also calculated to two decimal places.

8. MINIMUM REQUIREMENTS OF ACADEMIC PERFORMANCE

8.1 Academic Probation:

A student will be placed on Academic Probation with written intimation for his/her second semester if her/his SPI at the end of first semester is less than 4.5. In subsequent semesters, a student will be placed on Academic Probation with written intimation if his/her CPI in the previous semester is less than 5.0 or if his/her SPI is less than 4.5 in the previous semester.

For every student placed on Academic Probation, the Dean (Academic Programs) may prescribe a minimum SPI the student must attain in the semester. The minimum SPI so stipulated will be arrived at on the basis of the performance of the student in terms of her/his SPI/CPI as compared to the minimum requirements for graduation.

8.2 Discontinuation from the Institute on Account of Poor Academic Performance:

If the performance of a student is poor so that she/he is not likely to benefit from continuing in the program any further, she/he would be required to leave the Institute. For this purpose, an assessment of the student's academic performance will initially be made at the end of the second semester of her/his stay at the Institute and thereafter, at the end of every subsequent semester. This assessment will be based on the CPI and SPI obtained by the student.

8.3 Repeat a year OR Discontinuation from the Institute on account of Poor Academic Performance at the end of the Second and Fourth Semester:

A student whose CPI is less than 4.0 at the end of second or fourth semester shall be asked to repeat a year as appropriate with course improvement options in order to improve his/her academic performance. A student, who is placed on academic probation, may be allowed to register for the available backlog courses offered in the summer semester, following his/her second/fourth semester. Such a student is permitted to register for a maximum of three (3) of the available summer courses in which he/she is having F or DE grade. In case the student achieves the minimum CPI of 4.0 based on his results including the said summer semester, he/she would be allowed to continue the program; otherwise, the student will be asked to repeat a year OR discontinue from the program.

8.4 Minimum and Maximum Period for Completion of B Tech Program:

The minimum period to complete the program is four academic years. In any case, a student should fulfill the requirements for her/his Degree within a maximum period of six academic years, failing which she/he will be required to leave the Institute. The period of six years includes any semester for which the student has "withdrawn" status.

9. AWARD OF DEGREE

9.1 The B Tech (EVD) Degree will be conferred on a student after she/he has fulfilled the following requirements:

a. The student should have taken for credit and passed all the foundation and elective courses including internships, BTP/Internship, co-curricular activity and exploratory projects courses prescribed in the curriculum for the program.

b. The minimum total number of credits to be cleared is 163: 138 through core and elective courses, 19 through internships and BTP/Internship, 6 through co-curricular activities and exploratory project courses. Total course credits is 138, of which 93 correspond to foundation courses; 17 credits to Individual and Group projects; the remaining 28 credits must be obtained through elective courses in form of (i) Specialization electives 19 credits (minimum five courses), and (ii) open electives 9 credits (minimum three courses) which includes any of the following from other programs qualify as an Open elective:

ICT Electives	Technical Electives	MnC Electives	Humanities and Social Sciences Electives	Science Electives

c. The minimum Final CPI (as described in Section 9.2) should be 5.0.

d. The minimum number of grade points required from course work for graduation is 690 (138 x 5.0). For this requirement, internships and BTP/Internship credits 19 are not considered. In case the student has earned the minimum number of credits, but does not have the minimum number of grade points, then she/he must take additional elective courses (up to the maximum specified for each category) in order to fulfill the requirement.

e. The student should have registered for at least eight regular semesters (i.e., excluding summer semester and the withdrawn semester) as a regular student and should have paid all the institute dues.

f. The student should have no case of indiscipline pending against her/him.

9.2 Final CPI and Class:

a) For the purposes of computing the CPI at the end of the program, the student's CPI will be computed on the basis of the best CPI obtainable from the courses taken subject to:
   i) The total credits from course work will be taken from the least number of courses which are required to obtain 690 grade points; provided that these total credits must be at least 138, and must include 93 credits from foundation courses and must satisfy the minimum requirements for different categories of electives, as indicated in paragraph 9.1 (b) above.
   ii) All other courses taken by the student will be categorized as extra credits and not considered for calculating the final CPI.
   iii) The CPI would be computed inclusive of the grade points earned from course work, as described in 9.2 (a) and from the BTP. ITP has not impact on CPI since it is a Pass/Fail course.
   iv) The requirement of earned course credits and grade points is subject to change, with the Director's approval, in case credit structure of a course is modified.

b) The Transcript will indicate Distinction if the student obtains a CPI of 9.0 or above and First Class if the student obtains a CPI of 6.5 or above but less than 9.0.

9.3 Certificate of Academic Accomplishment:

A student who is unable to complete the degree requirements within the stipulated maximum period (see Clause 8.4 above) would be eligible to receive a "Certificate of Academic Accomplishment" by applying for it. The eligibility criteria and procedure for issue of the Certificate would be as laid down by the Institute from time to time.

10. GLOSSARY

Backlog Course: A course prescribed in the curriculum which has either not been registered or failed by a student.

Course Credit: Weighted sum of number of Lecture hours (L), Tutorial hours (T) and Practical hours (P) associated with the course. The weight for L and T is 1.0, and the weight for P is 0.5.

Grade Points: Product of the credits and points of a letter grade awarded to the course.

Semester: An academic year consists of two regular semesters of approximately 16 weeks duration each, the first (Autumn Semester) extending from July to December and the second (Winter Semester) from January to May. The summer semester is not a regular but a special semester of approximately eight weeks usually between May and July.

Semester Grade Report: Official record of the grades obtained in all the courses registered by a student in a semester.

Transcript: Official record of the grades obtained in all the courses registered by a student and is issued after the completion of the degree requirements.

Under-Graduate Committee (UG Committee): Committee of the Institute responsible for Policy Guidelines & Implementation Strategies covering the Undergraduate Program.

DA-IICT, Gandhinagar
May, 2023

BTech (EVD) Curriculum

(Effective from BTech 2023-24 batch)

1. Introduction: The Academic Council has approved the BTech (EVD) Curriculum Review Committee's Final Report, and directed that the curriculum contained therein should be followed with effect from the 2023 batch and onwards. The document contains the official description of the course structure for the BTech (EVD) 2023 batch onwards.

2. Course Structure for B Tech (EVD) Program with effect from 2023 Batch is indicated in Table 1:

Table 1

Semester-1	L-T-P-C	Semester-2	L-T-P-C
Engineering Mathematics I	3-1-0-4	Engineering Mathematics II	3-1-0-4
Introduction to Programming	3-0-0-3	Digital Logic and Computer Organization	3-0-2-4
Programming Lab	0-0-2-1	Data Structures	3-0-0-3
Basic Electronic Circuits	3-0-2-4	Data Structure Lab using OOP	1-0-2-2
Engineering Physics	3-0-2-4	Electromagnetic Theory	3-1-0-4
Language and Literature	3-0-0-3	Approaches to Indian Society	3-0-0-3
		Exploration Project I	0-1-0-1
Co-Curricular Activities I	0-0-2-1	Co-Curricular Activities II	0-0-2-1
TOTAL	**15-1-8-20**	**TOTAL**	**16-3-6-22**

Semester-3	L-T-P-C	Semester-4	L-T-P-C
Engineering Mathematics III	3-1-0-4	Embedded Hardware Design	3-0-2-4
Solid State Devices	3-0-2-4	Digital IC Design and Tape out	3-0-0-3
Signal Processing and Control Systems	3-0-2-4	Digital IC Design and Tape out LAB	0-0-4-2
Electronic Design Lab	1-1-4-4	Analog Electronics	3-0-2-4
Science, Technology and Society	3-0-0-3	Entrepreneurship and Product Design	1-0-4-3
Exploration Project II	0-0-2-1	Specialization Elective-1	3-0-0-3
Co-Curricular Activities III	0-0-2-1	Co-Curricular Activities IV	0-0-2-1
TOTAL	**13-2-12-21**	**TOTAL**	**13-0-14-20**

Semester-5	L-T-P-C	Semester-6	L-T-P-C
Digital Signal Processing Hardware	3-0-2-4	Environmental Science	3-0-0-3
VLSI Design	3-0-0-3	Open Elective – 2	3-0-0/2-3/4
VLSI Design LAB	0-0-4-2	VLSI Testing and Validation	3-0-2-4
Open Elective – 1	3-0-0/2-3/4	Specialization Elective – 3	2-0-4-4
Specialization Elective - 2	3-0-2-4	Individual Project – 2 and 3	0-0-12-6
Principles of Economics	3-0-0-3		
Individual Project 1	0-0-6-3		
TOTAL	**15-0-14/16 - 22/23**	**TOTAL**	**11-0-18/20 - 20/21**

Semester-7	L-T-P-C	Semester-8	L-T-P-C
Specialization Elective – 4	3-0-2-4	BTP / Internship	0-3-18-12
Specialization Elective - 5	3-0-2-4		
Open Elective – 3	3-0-0/2-3/4		
Group Project	0-0-16-8		
TOTAL	**9-0-20/22 - 19/20**	**TOTAL**	**0-3-18-12**

Course/Credits Distribution

	# of Course	# of Credits	%
Core Engineering	13	45	27.5
Mathematics	3	12	7
Physics	3	12	7
HASS	5	15	9
Programming & Algorithms	4	9	5.5
Specialization Electives	5	19	12
Open Electives	3	9	5.5
Individual Project	3	9	5.5
Group Project	1	8	5
Rural Internship	1	3	12
Summer Internship	1	4	
BTP/Internship	1	12	
Exploration Project	2	2	4
Co-Curricular Activities	4	4	

4. Elements of the Curriculum:

4.1 Foundation or Core Courses: Set of compulsory courses taken by every student for first six semesters. These courses are from the technical areas of Electronics, VLSI Systems and Design, as well as courses in Humanities, Mathematics and Basic Sciences.

4.2 Specialization Elective Courses: These courses provide technical depth in Electronics Systems Design and VLSI Design pathways. Students will have options to specialize in the areas based on their interest.

4.3 Open Elective Courses : Electives from any of the following from other programs qualify as an Open elective.

- ICT Electives
- Technical Electives
- MnC Electives
- Humanities and Social Sciences Electives
- Science Electives

4.4 Provision of MOOC courses as electives: A student may be allowed to take relevant MOOC courses that can qualify as electives, subject to prior consent of a faculty mentor assigned by Dean-Academics. Maximum two such courses may be allowed to a student throughout the program and only one such course in a semester will be allowed.

4.5 Rural Internship: A unique feature of the program is the mandatory rural internship, which is expected to give the student a feel of his/her social milieu and is typically carried out with an NGO and Govt. organizations. The duration of the rural internship is 4 weeks and is carried out in the Winter break after the third semester. This course is graded as Pass/Fail.

4.6 Research/Industrial Internship: The student is required to do a 6-8 weeks industrial/research internship, which is offered in the summer break after the 6th semester. The student has a choice of taking an industrial internship or a research internship depending on his/her career goals.

Research internship is designed to train the students to carry out research and to expose them to research environment. The student learns how to carry out independent research and how to write a research report. This internship can be done on-campus or externally at other R&D organizations and universities.

Industrial internship is designed to train the students to the working environment in industry. Through this training the student learns about corporate culture. The internship enables the students to learn about the team work, to build inter-personal dynamics and behaviour, and to gain experience in real life problems. This course is graded as Pass/Fail.

4.7 Internships: All students must undertake and pass Rural Internship of 3 credits (normally offered in the Semester Break between Semesters III and IV) and Industrtial/Research Internship of 4 credits (normally offered in Summer Semester after Semester VI).

4.8 B Tech/Internship: The students must undertake and pass B Tech Project or Internship (12 credits). The BTP work can be a continuation of the work done during previous internships. In the BTech project (BTP) the student undertakes a problem of interest, identifies the issues involved, and develops techniques to address the issues. The student can undertake a theoretical study and/or experimental or developmental work. The work can be carried out individually or in groups under the supervision of faculty.

A student has option to do an Industrial Internship in the 8th semester in the off-campus mode. Industrial internship is to be done at an approved industry site with a designated industry mentor and a well specified project. This option is suitable for those students who want to gain an early industry experience to better prepare them as an industry professional.

4.9 Co-curricular Activities and Exploration Project: Co-curricular activities are non-class activities like sports, cultural and technical club activities. These courses run over the first four semesters and are graded Pass/Fail.

Exploration projects allow students to explore their surroundings to identify interesting problems that admit a design based and/or hardware based solution. Students are expected to work in groups of 8 to 10 under a faculty mentor over two semesters - second and third semester.

Graduation Requirement — B Tech (EVD)

1. Total credits – 163 (included 4 Co-Curricular and 2 Exploratory Project credits)
2. Course credits – 138
3. Internships and BTP/Internship credits – 19
4. Minimum Final CPI – 5.0

NB: The course outlines will be notified separately.