INDRAPRASTHA INSTITUTE of INFORMATION TECHNOLOGY DELHI

Okhla Industrial Estate, Phase III
New Delhi 110020
www.iiitd.ac.in

Regulations for BTech in Electronics and Communications Engineering (ECE)

1. Preamble

IIIT Delhi aims to encourage research and innovation in Information Technology (IT) and allied areas. The objective of the BTech program in Electronics and Communications Engineering (ECE) is to prepare students to undertake careers involving innovation and problem solving using suitable techniques and hardware and software technologies, or to undertake advanced studies for research careers.

In order to give due importance to apply as well as theoretical aspects of ECE, the curriculum for the BTech (ECE) program covers most of the foundational aspects and also develops in students the engineering skills for problem solving. Towards this, the BTech (ECE) program at IIIT-Delhi starts with computing and Electronics courses first, and allows the possibility of doing science courses later. Besides being better suited for developing engineering capabilities, it also enables the possibility of students seeing newer applications and possibilities of using computing and electronics in these subjects.

The first year of the ECE program is common with CSE - this allows flexibility to students in moving from one to the other. The second year program is relatively fixed, comprising mostly of core courses for the program. 3rd year onwards the program can be mostly flexible comprising of electives, which may be organized as streams, including in Computer Science as well as domain areas.

This document specifies the specific regulations for the BTech (ECE) program – the general regulations for the BTech program are given in a separate document. These regulations are in addition to the regulations of the BTech program.

2. Program Structure

- Core courses in the first four semesters are mentioned below. Courses mentioned in [ ] are electives and the name mentioned is only an example.

- The semester mentioned for the core courses is indicative and suggested, and they can be done later/earlier also. However, the pre-requisite requirements must be kept in mind by a student, if he/she wishes to do a core course in some other semester.

2.1 Common 1st year for both ECE and CSE Student

The common first year program is given below. Each of the two semesters, all students do one course each in maths, software, hardware, systems/practice, and HSS/Comm. All courses, except HSS, are core courses.

	Sem 1	Sem 2
Hardware	Digital circuits	Computer Organization
Software	Intro to Programming	Data structures and Algos
Systems/Practice	System Management	Intro to Engineering Design
Maths	Math 1 (Linear Algebra)	Math 2 (Probability and Statistics)
Communication Skills / HSS	Com 1	[HSS 1]

2.2 Core Courses for ECE in 2nd Year

2.2.1 In 3rd and 4th semesters, the course load will be same as in CSE – 5 courses, including one HSS/Communication skills. These core courses are given below: These courses will become pre-requisites for advanced courses in some of the streams.

Sem 3	Sem 4
Linear Circuits	Principles of Commn. Systems
Embedded Logic Design	Integrated Electronics
Signals & Systems	Fields and Waves
Math 3 (Complex Variables, Vector Calculus, and ODEs)	Math 4 (Numerical Methods and Optimization)
[HSS 2]	Technical Communication (2 credits) Environment studies (2 credits)

2.3 Program Structure in 3rd/4th Years

2.3.1 Most courses in Sem 5-8 are electives (an elective course is one which is not compulsory, and a student may have choices from which to select the courses he/she wants to do)

2.3.2 Some of the electives may be organized as ***streams,*** where a stream is a sequence of courses in an area providing a limited specialization in that area. Streams allow the student to focus on some area of ECE – as ECE is too diverse it is not possible for a student to gain a decent mastery in all. Streams allow the student to focus on a chosen area to gain a level of depth, and gain some understanding of other areas by doing some courses from other streams. A student will be strongly encouraged to ensure that at least one stream is completed, though is not required to do so.

2.3.3 Besides electives and streams for specialized areas, streams and electives from domain areas (e.g. health, life sciences, finance, economics, E-Governance, sciences, etc.) may also be offered. A student may also be able to take CSE courses.

2.3.4 There will also be a set of Humanities and Social Sciences (HSS) courses offered.

3 Requirements for Graduation

For a BTech(ECE) degree, a student must satisfy all the following requirements:

3.1 Earn a total of 152 credits (equivalent to 38 full courses – 20 courses in the first two years, and 18 courses in the last two years.)
3.2 Successfully complete all the core courses.
3.3 Do at least 12 credits of Humanities and Social Sciences Courses.

3.4 Do 2 credits of Community Work and Self Development each. These are pass/fail credits, which are required to be completed, but do not count for fulfilling the credit requirement (i.e. these are in addition to the requirements mentioned above)

3.5 In the last 4 semesters, do at least 32 credits (8 full courses) of ECE courses. BTP/Independent project/Independent study/Undergraduate Research cannot count for this requirement. UGC may approve some other relevant courses (e.g. from Math, CSE, Computational Biology, etc.) to be counted as ECE courses for this purpose.

3.6 A BTech Project (BTP) is optional. A student opting for BTP may take a total of 8 to 16 credits of BTP. In a semester, the student can normally register for at most 8 credits of BTP.

3.7 External BTP – A student may be permitted to do, with approval, a BTP of up to 12 credits in one semester in another organization like industry, research lab, another institution, etc. While doing External BTP, a student cannot register for any course in the Institute.

3.8 A student may take "Independent Project" or "Independent Study" or "Undergraduate Research" courses for 1, 2, or 4 credits. No more than 8 of these credits can count towards satisfying the credit requirements of the degree. Only students with satisfactory CGPA (at least 7.5) or with a strong interest in some area (the faculty advisor to determine this) can take these courses.

4 Honors Program

The BTech(ECE) program has the Honors option, requirements for which are same as specified in the regulations for the BTech program. Namely;

4.1 The student must earn an additional 12 credits (i.e. must complete at least 164 credits)

4.2 The student's program must include a BTech Project

4.3 At graduation time, the student must have a CGPA of 8.0 or more

5 Suggested "Streams" for ECE

Streams will evolve over time – based on trends as well as faculty interests. Some common streams that are possible are given below. Then nature of streams will evolve with time depending on the interests of faculty as well as relevance/importance of the areas.

1. Signal & Image Processing
2. Communications Systems/Networking
3. Circuits and Systems
4. Computer Engineering
5. RF and Applied Electromagnetics
6. Embedded Systems/Controls

The courses in the streams will be of two types to serve dual purpose. On one hand there will be courses to train students in the fundamentals of the specific streams whereas on the other hand there will be advanced courses to train the students on the latest developments in those specific streams.

The suggested courses for some of the streams are given below. These courses can be added / deleted based on their relevance after taking feedback from industry and academia.

Signal and Image Processing Courses: Digital Signal Processing, Advanced Signal Processing, Multimedia Communication, Image Processing, Media Security

Communications Systems and Networking Courses: Computer Networks, Ad-hoc Wireless Networks, Probability and Random Processes, Digital Communication, Information Theory and Coding, Wireless Communications

Circuits and Systems Courses: Introduction to VLSI Design, Introduction to Microelectronics, Analog IC Design, Digital IC Design, System on Chip Design, Design for Testability, Digital Hardware Design

Computer Engineering Courses: Computer Architecture, Operating System, Introduction to Cryptography, Applied Cryptography, Digital Hardware Design

RF and Applied electromagnetics Courses: Antenna and Wave Propagation, Topics in Mathematics, Radar Systems and Theory, RF Circuit Design, System Design for Wireless, Wireless Communication

Embedded Systems and Control Courses: Embedded Systems, Operating System, Robotics, Control Systems, Multi-agent Systems

Change History

Version July, 2013 : B.Tech.(ECE) regulation revised

Version July, 2014: Only a few minor changes done.