

Master of Technology in Communication and Signal Processing



Programme Level	Post Graduate
Year of Commencement	2017
Minimum Duration	2 Years (4 Semesters)
Maximum Duration	3 Years (6 Semesters)
Senate Meeting Reference	12.3/18.5/20.5

Preamble to the program:

The program is designed giving importance to theory as well as exposure to industry needs. It consists of two parts: course work and a year-long project. The course work is structured to give solid theoretical foundations and practical, hands-on experience which would enable the student to tackle problems in the area of signal processing, communications, and machine learning in a holistic manner.

The one year long project is supposed to be in partnership with industry so that the students solve problems which are of relevance to product design and development. The project is done in-house, the problem definition and part of technical support comes from an industry or reputed government R&D laboratories.

In order to prepare the students for product development by the end of first year, courses like Advanced Programming Practicum, Embedded Systems, IoT Systems, and Systems Design are included in the curriculum. In addition to the post graduate project, these courses familiarize the students with the system design aspects relevant to signal processing, communications, and machine learning.

Objectives of the program

After the completion of the degree, students would

- be prepared with a varied range of expertise in different aspects of signal processing and communications, such as signal processing, modern communication systems, estimation and detection theories.
- acquire good understanding of both the theory and application of signal processing, communications, and machine learning approaches to wide-variety of scenarios in diversified application areas.
- be able to create models using the knowledge acquired from the program to solve future challenges and real-world problems requiring the knowledge of one or more of signal processing, communications, or machine learning.
- be better trained professionals to cater to the growing demand for signal processing, communications, machine learning professional.

Course and Credit Details

General Details

1. There are five discipline core courses. The remaining courses (excluding the open electives) are grouped into three specialization baskets.
2. It is mandatory to take one course from each basket with minimum 9 credits.
3. Students who would like to go for a specialization must take at least 9 more credits (in addition to the mandatory credits in Point 2) from whichever basket they want to specialize in.
4. Those who do not want any specialization can take courses to satisfy 9 credits from across the baskets.
5. The post graduate project is of one year duration.
6. Post graduate Projects should be industry sponsored.
7. System design (winter project) – after first year.

8. Post graduate project starts from the summer following the first year and extends to the third and fourth semesters.

Minimum credit requirements

	Credits
1. Discipline core (DC)	15
2. Specialization basket (SB)*	18
3. System design	2
4. Post graduate project	28
5. Outside discipline electives (OE)*	6
6. Technical communication	1
Total	70

SB* - Out of these 18 credits, at least 9 credits must be earned by taking one course each from the 3 baskets. At least 9 credits should be chosen from the same basket (if a specialization is desired) or from across baskets (if no specialization is desired.)

Semester wise distribution of all courses

1st Semester, 1st Year

Code	Course Title	Credit L-T-P-C	Remarks
EE 534	Probability and Random Processes	3-0-0-3	DC
EE 522	Matrix Theory	3-0-0-3	DC
CS 571	Advanced Programming Practicum	1-0-3-3	DC
	Specialization Basket	3-0-0-3	SB
	Specialization Basket	3/4	SB
	Technical Communication	1	
	Total credits	16/17	

Winter Break, 1st Year

Code	Course Title	Credit
EE 532	System design	2

2nd Semester, 1st Year

Code	Course Title	Credit L-T-P-C	Remarks
EE 530	Applied/Practical Optimization	2-0-2-3	DC
CS 541P	IoT Systems and the Cloud	1-0-3-3	DC
	Specialization basket	3	SB
	Specialization basket	3	SB
	Specialization basket	3	SB
	Outside discipline elective	3	OE
	Total credits	18	

3rd Semester, 2nd Year

Code	Course Title	Credit	Remarks
	Specialization basket	3	SB
	Outside discipline elective	3	OE
EE 626P	Post Graduate Project-1	10	
	Total credits	16	

4th Semester, 2nd Year

Code	Course Title	Credit	Remarks
EE 627P	Post Graduate Project-2	18	
	Total credits	18	

The list of courses follows

Discipline Core

S. No.	Course Code	Course Title	L-T-P-C
1	EE 534	Probability and Random Processes	3-0-0-3
2	EE 522	Matrix Theory	3-0-0-3
3	CS 571	Advanced Programming Practicum	1-0-3-3
4	EE 530	Applied/Practical Optimization	2-0-2-3
5	CS 541P	IoT Systems and the Cloud	1-0-3-3

Signal processing Basket

S. No.	Course Code	Course Title	L-T-P-C
1	EE 620	Advanced Digital Signal Processing	3-0-0-3
2	EE 62X	Modern Signal Processing	3-0-0-3
3	EE 608	Digital Image Processing	3-0-2-4
4	CS 609	Speech Processing	3-0-2-4
5	EE 529	Embedded Systems	3-0-2-4

Communication Basket

S. No.	Course Code	Course Title	L-T-P-C
1	EE 503	Advanced Communication Theory	3-0-0-3
2	EE 518	Information Theory	3-0-0-3
3	EE 517	Wireless Communication	3-0-0-3
4	CS 549	Computer Networks Analysis	3-0-0-3
5	EE 530	Estimation and Detection Theory	3-0-0-3
6	EE 507	Transmission lines and Basic Microwave engineering	3-1-0-4
7	EE 621	Radiating Systems	3-1-0-4
8	EE 529	Embedded Systems	3-0-2-4

Machine learning basket

S. No.	Course Code	Course Title	L-T-P-C
1	CS 669	Pattern Recognition	3-1-0-4
2	EE 511	Computer Vision	3-1-0-4
3	CS 671	Deep Learning and Applications	3-0-1-4
4	EE 530	Estimation and Detection Theory	3-0-0-3

OE* - Any graduate level course outside of the Communication and Signal Processing discipline from the school or from other schools are acceptable as open electives.