

# Department of Electronics & Communication Engineering

## Minor Programme in Electronics and Communication Engineering

Minors are coherent sequences of courses taken in addition to the courses required for the Bachelor of Engineering students chosen from a considerable variety of complementary courses under the categories of technical and complementary studies.

Department of Electronics and Communication Engineering, JUIT, Wagnaghat proudly offers minor in Electronics and Communication Engineering for all concerned students. This minor program covers the most current theories and practices used in Electronics and Communication Engineering. The program provides a valuable adjunct credential to engineering students pursuing their major degree in various fields. Engineering students from any branch may choose from a considerable variety of complementary courses under the categories of technical and complementary studies offered by Electronics and Communication Engineering Department JUIT, Wagnaghat. This minor program is rigorous enough to serve as a introductory credential for students subsequently electing to pursue advanced studies in Electronics and Communication Engineering.

*Conditions for Award of Additional Certificate of Minor in Electronics and Communication Engineering*

1. Earning of minimum credits, as required for award of Major degree.
2. Earns 20 credits in addition to the credits as specified for the programme in the minor area.
3. Additional 20 credits in a minor discipline could be earned through MOOCs also and may include supporting courses from allied discipline limited to a maximum of 6 credits.
4. Successfully completing the Industrial Internship within the minimum period of 4 years.
5. Completing all the requirements of a degree in the minimum period of years.

Following is the course curriculum outline for proposed Minor programme in Electronics and Communication Engineering, from which subjects worth 20 credits may be chosen by the student:

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, SOLAN							
COURSE CURRICULUM FOR MINOR PROGRAMME(160 +20 CREDITS)							
MINOR IN ELECTRONICS AND COMMUNICATION ENGINEERING							
S. No.	Semester	Name of the Subjects	Course Hours			Credits	Total Hours
			L	T	P		
1	3	Digital Electronics & Logic Design	3	1	0	4	4
2	3	Digital Electronics & Logic Design Lab	0	0	2	1	2
3	4	Modern Analog and Digital Communication	3	1	0	4	4
4	5	Microprocessor and Interfacing	3	0	0	3	3
5	5	Microprocessor and Interfacing Lab	0	0	2	1	2
6	6	Advance Communication Lab	0	0	2	1	2
7	6	Wireless and Data communication	3	0	0	3	3
8	7	Internet of Things	3	0	0	3	3
					Total	20	23

\* Elective courses from MOOC or NPTEL may be chosen by student (maximum 6 credits) in case course content matches with subjects mentioned above.

# Proficiency Programme in Electronics and Communication Engineering

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Electronics and Communication Engineering students can choose to either broaden their background or attain in-depth coverage of a particular subject by enrolling in a Proficiency Programme. Proficiency courses are coherent sequences of courses that may be taken in place of regular elective slots required for the B. Tech degree, in the chosen field of proficiency.

*Conditions for award of additional certificate of proficiency in Electronics and Communication Engineering*

1. Qualify for the award of B. Tech. degree in the minimum period.
2. Have passed in minimum of >50% of B. Tech elective subjects taken from Electronics and Communication Engineering Department.
3. Grade Point Average in the elective subjects of (2) is >7.0.
4. Major project has been done in Electronics and Communication Engineering Department with at least 'A' grade
5. CGPA for 195 credits (pre 2018 batch) /160 credits (post 2018 batch) of B. Tech. level is >6.5.

At present Department of Electronics and Communication Engineering JUIT, Wagnaghat offers following proficiency programmes:

1. Proficiency in Embedded System
2. Proficiency in Communication Technology
3. Proficiency in Machine Learning
4. Proficiency in Signal Processing
5. Proficiency in Digital Image Processing
6. Proficiency in Microwave and RF Design

The Proficiency programmes offered in aforementioned areas are designed primarily for students of Electronics and Communication Engineering Department, JUIT to experience the engineering approach to the solution of design problems. Students pursuing any of the proficiency courses will be better prepared for careers in Electronics and Communication Engineering. These proficiency courses will provide students with a technical and competitive edge over most traditional Electronics and Communication Engineering undergraduates in the Electronics and Communication Engineering job marketplace. As per 160 credit course curricula, a student must opt minimum 3 courses from chosen field of proficiency in place of regular elective courses to get additional certificate of proficiency in chosen field.

Following are the course curriculum outline for proposed 6 proficiency courses:

### 1. Proficiency in Embedded Systems:

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, SOLAN							
COURSE CURRICULUM FOR PROFICIENCY PROGRAMME (160 CREDITS)							
PROFICIENCY IN EMBEDDED SYSTEM							
S. No.	Semester	Name of the Subjects	Course Hours			Credits	Total Hours
			L	T	P		
1	5	Switching Theory and Logic Design	3	0	0	3	3
2	6	Embedded system design	3	0	0	3	3
3	7	FPGA based Instrumentation System Design	3	0	0	3	3
4	7	Real Time Operating System	3	0	0	3	3
5	8	Digital CMOS ICs	3	0	0	3	3
6	8	CAD Algorithms for Synthesis of Digital Systems	3	0	0	3	3

\* Elective courses from MOOC or NPTEL may be chosen by student (maximum 6 credits) in case course content matches with subjects mentioned above.

### 2. Proficiency in Communication Technology:

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, SOLAN							
COURSE CURRICULUM FOR PROFICIENCY PROGRAMME (160 CREDITS)							
PROFICIENCY IN COMMUNICATION TECHNOLOGY							
S. No.	Semester	Name of the Subjects	Course Hours			Credits	Total Hours
			L	T	P		
1	5	Communication Engineering	3	0	0	3	3
2	6	Optical Communication Systems	3	0	0	3	3
3	7	Next Generation Communication Systems	3	0	0	3	3
4	7	OFDM and Applications	3	0	0	3	3
5	8	Cognitive Radio Networks	3	0	0	3	3
6	8	Wireless Communication and Mobile Networks	3	0	0	3	3

\* Elective courses from MOOC or NPTEL may be chosen by student (maximum 6 credits) in case course content matches with subjects mentioned above.

### 3. Proficiency in Machine Learning:

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, SOLAN							
COURSE CURRICULUM FOR PROFICIENCY PROGRAMME (160 CREDITS)							
PROFICIENCY IN MACHINE LEARNING							
S. No.	Semester	Name of the Subjects	Course Hours			Credits	Total Hours
			L	T	P		
1	5	Introduction to Machine Learning	3	0	0	3	3
2	6	Machine Learning for Data Analysis	3	0	0	3	3
3	7	Pattern Analysis in Machine Intelligence	3	0	0	3	3
4	7	Optimisation Techniques	3	0	0	3	3
5	8	Artificial Intelligence Techniques	3	0	0	3	3
6	8	Soft Computing Techniques	3	0	0	3	3

\* Elective courses from MOOC or NPTEL may be chosen by student (maximum 6 credits) in case course content matches with subjects mentioned above.

### 4. Proficiency in Signal Processing:

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, SOLAN							
COURSE CURRICULUM FOR PROFICIENCY PROGRAMME (160 CREDITS)							
PROFICIENCY IN SIGNAL PROCESSING							
S. No.	Semester	Name of the Subjects	Course Hours			Credits	Total Hours
			L	T	P		
1	5	Statistical Signal Processing	3	0	0	3	3
2	6	Digital Filter Design and Applications	3	0	0	3	3
3	7	Time Frequency Analysis and Applications	3	0	0	3	3
4	7	Wavelets and Applications	3	0	0	3	3
5	8	Adaptive Signal Processing and Machine Intelligence	3	0	0	3	3
6	8	Bioelectronic Sensors	3	0	0	3	3

\* Elective courses from MOOC or NPTEL may be chosen by student (maximum 6 credits) in case course content matches with subjects mentioned above.

## 5. Proficiency in Digital Image Processing:

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, SOLAN							
COURSE CURRICULUM FOR PROFICIENCY PROGRAMME (160 CREDITS)							
PROFICIENCY IN DIGITAL IMAGE PROCESSING							
S. No.	Semester	Name of the Subjects	Course Hours			Credits	Total Hours
			L	T	P		
1	5	Fundamentals of Digital Image Processing and Applications	3	0	0	3	3
2	6	Computer Vision	3	0	0	3	3
3	7	Forensic Image Processing	3	0	0	3	3
4	7	Medical Image processing	3	0	0	3	3
5	8	Applied Medical Signal Processing	3	0	0	3	3
6	8	Remote Sensing and Satellite Image Processing	3	0	0	3	3

\* Elective courses from MOOC or NPTEL may be chosen by student (maximum 6 credits) in case course content matches with subjects mentioned above.

## 6. Proficiency in Microwave and RF Design:

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, SOLAN							
COURSE CURRICULUM FOR PROFICIENCY PROGRAMME (160 CREDITS)							
PROFICIENCY IN MICROWAVE AND RF DESIGN							
S. No.	Semester	Name of the Subjects	Course Hours			Credits	Total Hours
			L	T	P		
1	5	RF Integrated Circuits	3	0	0	3	3
2	6	Fundamentals of Computational Electromagnetics	3	0	0	3	3
3	7	Microwave Theory and Techniques	3	0	0	3	3
4	7	Antenna and Wave Propagation	3	0	0	3	3
5	8	Design of Modern Antennas	3	0	0	3	3
6	8	RF Engineering	3	0	0	3	3

\* Elective courses from MOOC or NPTEL may be chosen by student (maximum 6 credits) in case course content matches with subjects mentioned above.