



**List of Courses Focus on Employability/ Entrepreneurship/
Skill Development**

Department : Electronics and Communication Engineering

Programme Name : B.Tech.

Academic Year : 2021-22

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	MA201TBS01	Mathematics-I
02.	PH201TBS02	Physics
03.	EC201TES01	Basic Electrical & Electronics Engineering
04.	IT201TES02	Introduction to Information Technologies
05.	EN201THS01	English Communication
06.	PH201PBS01	Physics Lab
07.	ME201PES01	Engineering Graphics
08.	ME201PES02	Workshop Technology & Practices
09.	EC201PES03	Basic Electrical Engineering Lab
10.	MA202TBS03	Mathematics-II
11.	CY202TBS04	Chemistry
12.	CE202TES03	Engineering Mechanics
13.	CS202TES04	Computer Programming
14.	CM202TES05	Basic Civil & Mechanical Engineering
15.	CY202PBS02	Chemistry Lab
16.	CE202PES04	Engineering Mechanics Lab
17.	CS202PES05	Computer Programming Lab
18.	EC203TPC01	Electronic Devices
19.	EC203TPC02	Digital Logic Design
20.	EC203TPC03	Network Theory
21.	EC203TPC04	Signals and Systems
22.	EC203TBS05	Mathematics-III
23.	EC203THS02	Engineering Economics
24.	EC203PPC01	Electronics Devices Lab
25.	EC203PPC02	Digital Logic Design Lab
26.	EC204TPC05	Analog Circuits



27	EC204TPC06	Analog Communication
28	EC204TPC07	Control System
29	EC204TES05	Data Structure with C++
30	EC204TBS06	Numerical Methods
31	EC204TMC02	Environmental Sciences
32	EC204PPC05	Analog Circuits Lab
33	EC204PES05	Data Structure with C++ Lab
34	EC205TPC08	LIC & its Application
35	EC205TPC09	Digital Communication
36	EC205TPC10	Digital Signal Processing
37	EC205TES06	Electromagnetic Waves
38	EC205THS03	Probability Theory & Random Process
39	EC205THS04	Effective Technical Communication
40	EC205PPC06	LIC Lab
41	EC205PPC07	Analog and Digital Communication Lab
42	EC205PPC08	Digital Signal Processing Lab
43	EC206TPC11	CMOS Digital VLSI Design
44	EC206TPC12	Data Communication & Computer Networks
45	EC206TPC13	Microprocessor & Microcontroller
46	EC206TES07	Electronic Measurements and Sensors
47	EC206TPE01	Information Theory & Coding
48	EC206TPE02	Advance Signal Processing
49	EC206TPE03	Renewable Energy Sources
50	EC206TPE04	Introduction to MEMS
51	EC206PPC09	CMOS Digital VLSI Design Lab
52	EC206PPC10	Data Communication & Computer Networks Lab
53	EC206PES06	Electronic Measurement and Sensors Lab
54	EC07TPC14	Fiber Optics Communication
55	EC07TPC15	Embedded Systems
56	EC07TPC16	Mobile Communication & Network
57	EC07TPE09	Digital Image Processing
58	EC07TPE10	Analog & Digital VLSI Design
59	EC07TPE11	Estimation and Detection Theory
60	EC07TPE12	Advanced Power Electronics
61	EC07TPE13	Microwave Theory & Techniques



62	EC07TPE14	Radar & Satellite Comm
63	EC07TPE15	Machine Learning
64	EC07PPC12	Fiber Optics Communication Lab
65	EC07PPC13	Design and Simulation Lab
66	EC07PPS01	Seminar on Industrial Training
67	EC07PPS02	Project - I
68	EC08TPC17	VLSI Fabrication Technology
69	EC08TPE16	Millimeter Wave Technology
70	EC08TPE17	Video Processing
71	EC08TPE18	Biomedical Electronics
72	EC08TPE19	Neural Network & Fuzzy logic
73	EC08TPE20	Next Gen. Comm. Technology
74	EC08TPE21	Wireless Sensor Networks
75	EC08TOE05	Intellectual Property Rights
76	EC08TOE06	Principles of Management
77	EC08TOE07	Introduction to IOT
78	EC08PPS03	Project - II
79	EC08PPS04	Comprehensive viva
80	ECPATT1	Linear Algebra
81	ECPATT2	Wireless Communication & Network
82	ECPATT3	Optoelectronic Devices
83	ECPATP1	Introduction to Signal Processing
84	ECPATP2	Introduction to Embedded & IOT System
85	ECPATP3	Microstrip Antenna
86	ECPATP4	Estimation & Detection Theory
87	ECPATP5	Digital Image Processing
88	ECPATP6	Network Security & Cryptography
89	ECPATP7	Modern Digital Communication
90	ECPATP8	Antenna for Modern wireless Communication
91	ECPBTT1	Advanced VLSI Fabrication
92	ECPBTT2	Millimeter Wave Technology
93	ECPBTP1	Machine Learning
94	ECPBTP2	Optical Communication System
95	ECPBTP3	Next Generation Communication Technologies
96	ECPBTP4	Advanced Digital Signal Processing

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97	ECPBTP5	Computer Vision
98	ECPBTP6	Digital Communication Receiver
99	ECPBTP7	Optical Instrumentation
100	ECPBTP8	Satellite Communication
101	ECPCPT1	Dissertation Stage-I
102	ECPDPT1	Dissertation Stage-II

वर्तमानाध्यक्ष (इले. एव संचार अभियंत्रिकी)
H.O.D. (Elect. & Comm. Engineering)
प्रौद्योगिकी संस्थान
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गु. घा. वि., बिलासपुर (छ.ग.)
G. G. V. Bilaspur (C.G.)



OPTIMIZATION TECHNIQUES

SUB CODE	L	T	P	DURATION	ESE	CREDITS
ECE 106	03	01	0	3 HRS	100	4

Objective: Aims to teach various optimization techniques for wireless communication and antenna design.

Outcome.. Understand the fundamental optimization techniques in wireless communication for real time application.

Unit I: Introduction Linear Programming

Linear Programming: Graphical method, simplex method, Non-Simplex Method, revised simplex method, Big-ICI method. 2- phase method, alternate optimal solutions, unbounded LPs, degeneracy and convergence, duality in linear programming. sensitivity analysis. dual simplex method,

Unit II: Non-Linear Programming

Non-Linear Programming: Nonlinear Programming - Elimination methods, Interpolation methods, unconstrained optimization techniques - Direct search methods - Indirect search methods. Constrained Optimization methods — Direct methods. Indirect methods.

Unit in: Dynamic Programming

Dynamic Programming Multistage decision process. Concept (Asa' optimization and principle of optimality, computational procedure in dynamic programming

Unit IV: Optimization Methods

Simulated annealing, Particle Swarm optimization, Ant colony optimization, Bee colony optimization. Bat Algorithms, Firefly Algorithms.

Unit V: Advanced Topics ill Optimization

Advanced Topics in Optimization for wireless communication and antenna design.

References Hooks:

- 1, Singiresu S Rao, "Engineering Optimization: Theory and Practice", 4th Edition, John Wiley and Sons.. 2009
2. K. Deb, "Optimization for Engineering Design Algorithms and Examples", Prentice-Hall of India Pvt. Ltd., New Delhi, 1995.
- 3, Edwin K P Chong and Stanislaw S Zak, "An Introduction to Optimization", Fourth Edition. John Wiley and Sons, 2013
4. S.S. Rao, "Engineering Optimization: Theory and practice", New Age International Pvt. n.Ltd., New Delhi., 2000.



ANTENNAS FOR MODERN WIRELESS COMMUNICATION

SUB CODE	L	T	P	DURATION	ESE	CREDITS
ECE 107	03	01	0	3 HRS	100	4

Unit 1: Concepts of Radiation and Antenna Fundamentals

Fundamental parameters of antennas. Near and Far Field regions, S Parameters, Antenna Measurements: Radiation pattern, gain, directivity, phase and polarization measurement

Unit 2: Printed Antenna

Microstrip Antennas & Dielectric Resonator Antenna: Radiation mechanism - parameters and applications - feeding methods.

UNIT 3: Reconfigurable Antenna

Reconfigurable methodologies, Design Considerations for Reconfigurable systems, Reconfigurable Planar/printed antenna configurations. Active reconfigurable systems. Concept of Smart Antenna,

Unit 4: Array. of Antennas

Linear and planar array fundamentals, Mutual Coupling in Arrays. Multidimensional Arrays, Phased Arrays, Array Feeding Techniques. Array optimization techniques.

Unit 5 : MIMO System

Concept of MIMO Types of MIMO Systems Design Parameters of MIMO system.

Reference Books:

1. Jordan E C and Bahl-lain K G, "Electromagnetic Waves and Radiating Systems", 2nd Edition, Pearson Education.
2. Balanis C A. "Antenna Theory: Analysis and Design". 4th Edition, John Wiley and Sons, New Jersey, 2016.
3. Kraus J D and ;Viarhefka R J, "Antennas for All Applications", 3rd Edition, Tata McGraw Hill, 2001.
4. Girish Kumar and Ray K P. "Broadband Microstrip Antennas", Artech House, 2003.



Wireless Communication & Network

SUB CODE	L	T	P	DURATION	ESE	CREDITS
ECE 108	03	01	0	3 HRS	100	4

Module 1: Overview of wireless communication, cellular communication, different generations of cellular communication system, satellite Communication including, wireless local loop, cordless phone,

Module 2: Recent wireless technologies: multicarrier modulation, OFDM, MIMO system, diversity-multiplexing trade-off, MIMO-OPOM system, smart-antenna; beamforming and MIMO, cognitive radio,

Module 3: Multiple access techniques in wireless communication: contention-free multiple access schemes (FDMA TDMA, CDMA, SDMA and Hybrid), contention-based multiple access schemes (ALOHA and CSMA).

Module 4: Wireless personal area networks (Bluetooth, UW(3 and ZigBee), wireless local area networks (IEEE 802.11, network architecture, medium access methods, WLAN standards

Module 5: Ad-hoc wireless networks: Design Challenges in Ad-hoc wireless networks, concept of cross layer design, security in wireless networks MANET and WS.N. Wireless system protocols.

Books recommended:

Textbooks: 1. Andrea Goldsmith, "Wireless Communications", Cambridge University Press, 2005.7, Sanjay Kumar, "Wireless Communication the Fundamental and Advanced Concepts" River Publishers, Denmark, 2015 (Indian reprint).

Reference books: 1. Vijay K Garg, "Wireless Communications and Networks", Morgan Kaufmann Publishers an Imprint of Elsevier, USA 2009 (Indian reprint) 2...1. Schiller, "Mobile Communication" 2/e, Pearson Education, 2012. Iti Saha rivilisra, "Wireless Communication and Networks: 3G and Beyond", 2/e, McGraw Hill (India) Private Ltd, New Delhi, 2013



FINITE ELEMENT METHOD

SUB CODE	L	T	P	DURATION	ESE	CREDITS
ECE 103	03	01	0	4 HRS	100	4

Historical background, Basic concept of the Finite Element Method. Basic equation in elasticity, Elemental shapes, nodes, nodal unknowns and coordinate systems, A general procedure for Finite Element Analysis, Application to the continuum, Discretization of the domain, Governing equations for continuum. Pre-processor, Processor and Post processor.

Basic concept of interpolation functions. Shape function in one, two and three dimension. Finding of shape function by Polynomial, Lagrange polynomial, Serendipity family and Hermite polynomial, Construction of shape function by degrading technique.

Strain displacement and elemental stiffness matrix, Assembling stiffness equation, boundary conditions and solution, Spring and bar elements. Direct approach. Strain energy, Castigliano's first theorem, Minimum potential energy, Galerkin's method. and Variational method, Isoparametric formulations.

Finite Element Analysis. Beams, Trusses and Rigid frame, Plates and shells, Heat transfer, Fluid and solid mechanics, Introduction to non-linear Finite Element methods, Adaptive finite analysis, Automatic mesh generation. Choice of new mesh. Transfer variables,

Reference Books

1. Rao S.S., "The Finite Element Method in Engineering", Elsevier Science & Technology.
2. Hutton D.V., "Fundamental of Finite Element Analysis", McGraw Hills.
3. Cook R.D., Malkus, D.S. and Plesha, M.E, "Concepts and Applications of Finite Element Analysis", 3rd Ed., John Wiley & Sons.
4. Bathe K.J., "Finite Element Procedures", Prentice Hall of India, New Delhi.
5. Huebner and Thorton, E.A., "The Finite Element Methods for Engineers" John Wiley & Sons,
6. Zienewicz O.C. and Taylor, R.I., "The Finite Element Methods", Vol. I, Vol. 2 and Vol. 1.3, McGraw Hill.
7. Belytshko, T., Liu, W.K. and Moran, B.. "Non-linear Finite Elements for Continua and Structures", McGraw Hills.