

<p>Education</p>	<p>NATIONAL INSTITUTE OF TECHNOLOGY, ARUNACHAL PRADESH (ESTABLISHED BY MINISTRY OF HUMAN RESOURCE DEVELOPMENT, GOVT. OF INDIA)</p>	<p>Ethics</p>
<p>In GOD's own land, a fusion of scholastic students, innovative & motivate researchers & teachers and fast moving visionary leaders.</p>	<div data-bbox="592 604 982 1012" data-label="Image"> </div> <p>COURSE STRUCTURE & SYLLABUS FOR ELECTRONICS & COMMUNICATION ENGINEERING</p>	<p>Steeping Stone and Sky reaching ladder to success</p>
<p>Research</p>	<p>PO- Yupia, Dist.- Papum Pare, Arunachal Pradesh, Pin-791112 PhNo: 0360-2284801/2001582 FaxNo: 0360-2284972 Email- nitarunachal@gmail.com</p>	<p>Service to Society</p>



NATIONAL INSTITUTE OF TECHNOLOGY, ARUNACHAL PRADESH

(Established by Ministry of Human Resources Development, Govt. Of India) Yupia, District Papum Pare, Arunachal Pradesh - 791112

Fax: 0360 - 2284927, E-mail: directornitap@gmail.com

SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Professor Chandan Tilak Bhunia, Ph.D [Engg.], FIETE, FIE (I), SMIEEE

DIRECTOR



FORWARD

To achieve the target of being a global leader in the field of Technical Education, there is some sort of time bound urgency to work quickly, massively and strongly, in respect of National Institute of Technology, Arunachal Pradesh being an “ Institute of National Importance” (by an Act of Parliament) and being established only in threeyears back in 2010. I have therefore adopted a ‘B’ formula as stated below to achieve the primary goal of producing world class visionary Engineers and Exceptionally brilliant Researchers and Innovators:

B- FORMULA

- Best for Teaching
- Best for Research
- Best for Entrepreneurship & Innovation
- Best for Services to Society

In implementing the ‘B’ formula in letter and spirit, the framing of syllabi has been taken as important legitimate parameter. Therefore, extraordinary efforts and dedications were directed for the last one year to frame a syllabi in a framework perhaps not available in the country as of today.

Besides attention on ‘B’ formula institute has given considerable importance to the major faults of current Technical Education while framing the syllabus. The major stumbling blocks in Technical Education today are:

- I. The present system is producing “Academic Engineers” rather than “Practical Engineers”.
- II. The present system of education makes the students to run after jobs rather than making them competent to create jobs.
- III. There is lack of initiative to implement the reality of “Imagination is more important than knowledge”.

Taking due consideration of the findings made above, to my mind a credible syllabi has been framed in the institute in which the major innovations are introduction of:

- I. I-Course (Industrial Course) one in each semester at least one, which is targeted to be taught by the Industrial Expert at least up to 50% of its component.
- II. Man making and service to society oriented compulsory credit courses of NCC/NSS, values & ethics.



III. Compulsory audit course on Entrepreneurship for all branches.

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- I. Many add-on courses, those are (non-credit courses), to be offered in vacation to enhance the employability of the students.
- II. Many audit courses like French, German, and Chinese to enhance the communication skill in global scale for the students.
- III. Research and imagination building courses such as Research Paper Communication.
- IV. Design Course as "Creative Design".

Further, the syllabi have been framed **not to fit in a given structure as we believe, structure is for syllabus and syllabus is not for structure. Therefore, as per requirement of the courses, the structure, the credit and the contact hours has been made available** in case to case.

The syllabus is also innovative as it includes:

- I. **In addition to the list of text and reference books, a list of journals and magazines for giving students a flexibility of open learning.**
- II. **System of examination in each course is conventional examination, open book examination and online examination.**

Each course has been framed with definite objectives and learning outcomes. Syllabus has also identified the courses to be taught either of two models of teaching:

- I. **J.C.Bose model of teaching where practice is the first theory.**
- II. **S.N.Bose model of teaching where theory is the first practice.**

Besides the National Institute of Technology, Arunachal Pradesh has initiated a scheme of **simple and best teaching** in which for example:

- I. **Instead of teaching RL, RC and RLC circuit separately, only RLC circuit will be taught and with given conditions on RLC circuits, RL and RC circuits will be derived and left to the students as interest building exercise.**
- II. **Instead of teaching separately High Pass Filter, Band Pass Filter and Low Pass Filter etc.; one circuit will be taught to derive out other circuits, on conditions by the students.**

I am firmly confident that the framed syllabus will result in **incredible achievements, accelerated growth and pretty emphatic win over any other systems** and therefore, **my students will not run after jobs rather jobs will run after them.**

For the framing of this excellent piece of syllabus, **I like to congratulate all members of faculty, Deans and HODs in no other terms but "Sabash!"**.

Prof. Dr. C.T. Bhunia
Director, NIT, (A.P.)



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TEACHING GUIDELINES

In order to achieve the desired goal of excellence and innovations in each and every function of National Institute of Technology, Arunachal Pradesh and to implement 'B' Plan in totality, I call upon my distinguished members of

Faculty to invest some of their valuable business time in doing Research on Teaching. In this context, I put forward the following general guidelines for teaching practices in the institute:

- 1) **J.C. Bose Model of Teaching:** As an example, In the Basic Electronics course instead of first teaching the color codes of the resistors in a theoretical class, teacher may carry few resistors to class and note down on the blackboard the colors of resistors and their values. Thereafter, the teacher may ask the students to device the color code creating enthusiasm among students. Similarly, instead of teaching the characteristics of PN junction diode, teacher may guide the students in a laboratory to draw the characteristics curve, then may advise the students to analyze the behavior of characteristics. Thereafter, the teacher may teach the theory of PN junction diode.
- 2) **S.N. Bose Model of Teaching:** This is the conventional model of teaching where theory is first practice but even then I suggest some unique ideas to improve imaginative power and creativity of students in the subject. For example, instead of teaching two algorithms for conversion of decimal to binary, one for integral part and another for fractional part, I call upon the teachers to design a single algorithm for both the purposes for inspiring teaching.
- 3) I also believe that noble teaching **will be simple and in simpler way**. Therefore, I call upon the teachers not to teach band-pass filter, low pass filter, high pass filter separately. Teachers may design a single circuit for all filters and put on condition thereon to derive separate circuits for different filters. Similarly, instead of teaching RL, RC and RLC circuits separately, I call upon the teachers to teach only RLC circuit and then putting suitable condition on RLC circuit; RL and RC circuits may be derived and taught.
- 4) **Last but not the least**, I call upon the teachers to **solve all the problems of all chapters of the main text book prescribed for a subject** in a teaching-learning process—50% to be solved by teachers (maybe of even ones) and 50% may be solved by students (may be odd ones).

I solicit and anticipate full cooperation from all my brilliant pool of young and energetic faculty members to practice the noble and novel teaching procedures explained above without fail. Once procedures implemented by teachers are documented, we may proceed to file a patent on Research in Teaching on behalf of NIT, Arunachal Pradesh.

*Prof. Dr. C.T. Bhunia
Director, NIT, (A.P.)*



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In recent years, Electronics & Communication Engineering has made unprecedented growth in terms of new technologies, new ideas and principles resulting in extremely high rate of obsolescence of technologies. Researchers, academicians, industries and the society at large have to work in unison to meet the challenges of the rapidly growing discipline. The research organizations and industries that work in this frontier area are in need of highly skilled and scientifically oriented manpower. This manpower can be available only with flexible, adaptive and progressive training programs and a cohesive interaction among the research organizations, academicians and industries. The teaching program contains a proper blend of basic concepts and advances in technology. The faculty has succeeded in keeping a lively atmosphere among the students with innovative teaching techniques. The teaching is closely coupled with the research activities of the department. The ECE Department of NIT Arunachal Pradesh has been consistently working towards this goal. The Department of Electronics & Communication Engineering was established right from inception of the institute in 2010. The department offers a four year degree program in Electronics & Communication Engineering with an annual intake of 30 students, PG programme & Research leading to Ph.D started from 2014 and 2013 July session respectively. During these years, this department has diversified its activities in teaching and research. A continuous effort has been put forward towards setting up new laboratories and improves the facilities in the existing laboratories. Following are the laboratories developed with modern infrastructural facilities.

1. Advance Electronic Device & Circuit Laboratory
2. Electronics Measurement Laboratory
3. Modern Communication Engineering Laboratory
4. Embedded System Design Laboratory
5. Antenna & Propagations Laboratory
6. Microwave Engineering Laboratory
7. Digital Signal Processing Laboratory
8. Simulation Lab
9. VLSI Laboratory

At present research and development activities of department are in the following area:

1. Digital Signal and Image Processing
2. Microwave Patch Antenna
3. VLSI (Very Large Scale Integrated Circuit)
4. Mobile Communication
5. Microcontrollers based systems design.
6. Semiconductor Physics.

It is our objective to prepare our students to be successful in integrating all the field of engineering and science and to be able to pursue advanced studies in electronics engineering on a competitive global basis. The mission is a culmination of our effort to meet the mission of NIT Arunachal Pradesh, North East region and the nation at large.

1st year the student of ECE department learn about Basic Engineering subject with NCC and one Audit course of French / Korean and German / Chinese which meet Global Standard. 2nd and 3rd year student also have Audit course which help to prepare them to face the challenges in Industry. Syllabus also include Industrial Trainings and Project work which help student to fit into industry and research areas.



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

SEMESTER – I

Subject Code	Subject	P	T	L	Credit
MAS 101	Engineering Mathematics - I	0	1	3	4
CHY 101	Engineering Chemistry	2	0	3	4
PHY 101	Engineering Physics - I	2	0	3	4
BIO 101	Life Science	0	0	3	3
ME 101	Engineering Mechanics	0	0	3	3
CE 101	Engineering Drawing	3	0	0	2
ME 102	Workshop Practice – I	3	0	0	2
EE 101	Basic Electrical & Electronics Engineering	2	0	3	4
HSS 101	Communication Skill	2	0	0	1
HSS 102	NSS / NCC	2	0	0	1
HSS 103	Foreign Language (French / Korean) (Audit)	2	0	0	1
	Total	18	1	18	29

SEMESTER – II

Subject Code	Subject	P	T	L	Credit
MAS201	Engineering Mathematics – II	0	1	3	4
ME201	Basic Elements of Mechanical Engineering	0	0	3	3
CSE 201	Programming in C	8	0	0	4
CHY201	Environmental Science	0	0	3	3
PHY 201	Engineering Physics – II	2	0	3	4
ECE 201	Digital Electronics & Logic Design	2	0	3	4
HSS 201	Historiography of Science & Technology	0	0	3	3
CE 201	Basic Civil Engineering	3	0	0	2
ME 202	Workshop Practice – II	3	0	0	2
HSS 202	Foreign Language (German / Chinese) (Audit)	2	0	0	0
	Total	20	1	18	29

SEMESTER – III

Subject Code	Subject	P	T	L	Credit
MAS 301	Discrete Mathematics	0	1	3	4
EE 301	Circuit Theory & Network	2	0	3	4
CSE 301	Computer Organization & Architecture	2	0	3	4
CSE 302	Data Structure & Algorithm	2	0	3	4
ECE 301	Electronics Circuit & Devices – I	2	0	3	4
ECE 302	Electronics Instrument & Measurement	2	0	3	4
HSS 301	Behavioral Science	0	0	2	2
	Total	10	1	20	26

SEMESTER – IV

Subject Code	Subject	P	T	L	Credit
MAS 401	Stochastic Processes	0	1	3	4
MAS 402	Computational Numerical Method	2	0	3	4
ECE 401	Principal of Communication Engineering	2	0	3	4
ECE 402	Signal & System	0	1	2	3
ECE 403	Electronics Circuit & Devices – II	2	0	3	4
EE 405	Control Engineering	2	0	3	4
HSS 401	Entrepreneurship & Innovation for Practices	0	0	3	3
	Total	8	1	21	26



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SEMESTER – V

Subject Code	Subject	P	T	L	Credit
ECE 501	Microprocessor, Microcontroller & Embedded System	2	0	3	4
ECE 502	RF & Microwave Engineering	2	0	3	4
ECE 503	Digital Communication Engineering	2	0	3	4
CSE 503	Database Management System	2	0	3	4
ECE 504	Digital Signal Processing	2	0	3	4
HSS 501	Industrial Management	0	0	3	3
ECE 505	Telecommunication Engineering	0	0	3	3
	Total	10	0	21	26

SEMESTER – VI

Subject Code	Subject	P	T	L	Credit
CSE 601	Computer Networking	2	0	3	4
ECE 601	Fiber Optics Communication	0	0	3	3
HSS 601	Engineering Ethics & IPR	0	0	3	3
HSS 602	Disaster Management	0	0	2	2
ECE 602	Creative Design	2	0	0	1
ECE 603	Power Electronics Devices & Circuit	2	0	3	4
CSE 606	Soft Computing	2	0	3	4
	Total	8	0	17	21

SEMESTER – VII

Subject Code	Subject	P	T	L	Credit
ECE 701	Mobile Communication	2	0	3	4
HSS 701	Mass Communication for Technology	0	0	3	3
XXX 701	Research Paper Communication	2	0	0	1
ECE 7XX	Elective – I	0	0	3	3
ECE 7XX	Elective – II	0	0	3	3
ECE 702	Propagation & Antenna	2	0	3	4
ECE 703	VLSI Design	2	0	3	4
	Total	8	0	18	22

SEMESTER – VIII

Subject Code	Subject	P	T	L	Credit
ECE 801	Industrial Training	2	0	0	1
ECE 802	Project Works	16	0	0	8
ECE 803	Seminar	2	0	0	1
ECE 804	Grand Viva	12	0	0	6
	Total	32	0	0	16



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SEMESTER – I

Subject Code	Subject	P	T	L	Credit
MAS 101	Engineering Mathematics - I	0	1	3	4
CHY 101	Engineering Chemistry	2	0	3	4
PHY 101	Engineering Physics - I	2	0	3	4
BIO 101	Life Science	0	0	3	3
CE 101	Engineering Drawing	4	0	0	2
ME 101	Engineering Mechanics	0	0	3	3
ME 102	Workshop Practice – I	4	0	0	2
EE 101	Basic Electrical & Electronics Engineering	2	0	3	4
HSS 101	Communication Skill	2	0	0	1
HSS 102	NSS / NCC	2	0	0	1
HSS 103	Foreign Language (French / Korean) (Audit)	2	0	0	1
	Total	20	1	18	29

SEMESTER – II

Subject Code	Subject	P	T	L	Credit
CE 201	Basic Civil Engineering	0	0	3	3
MAS201	Engineering Mathematics – II	0	1	3	4
CHY201	Environmental Science	0	0	3	3
PHY 201	Engineering Physics – II	2	0	3	4
CSE 201	Programming in C	8	0	0	4
ECE 201	Digital Electronics & Logic Design	2	0	3	4
ME201	Basic Elements of Mechanical Engineering	0	0	3	3
ME 202	Workshop Practice – II	3	0	0	2
HSS 201	Historiography of Science & Technology	0	0	3	3
HSS 202	Foreign Language (German / Chinese) (Audit)	2	0	0	0
	Total	17	1	21	30



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Teaching Methodology

1 st Year 1 st Semester				
SL.No	J.C. Bose Model		S.N. Bose Model	
	Subject Code	Name of The Subject	Subject Code	Name of The Subject
1			MAS101	Engineering Mathematics - I
2			CHY101	Engineering Chemistry
3	PHY 101	Engineering Physics – I		
4			BIO 101	Life Science
5	CE101	Engineering Drawing		
6	ME 101	Engineering Mechanics		
7	ME102	Workshop Practice – I		
8	EE 101	Basic Electrical & Electronics Engineering		
9	HSS101	Communication Skill		
10	HSS102	NSS / NCC		
11	HSS103	Foreign Language (French / Korean) (Audit)		

1 st Year 2 nd Semester				
SL.No	J.C. Bose Model		S.N. Bose Model	
	Subject Code	Name of The Subject	Subject Code	Name of The Subject
1			MAS 201	Engineering Mathematics – II
2			CHY 201	Environmental Science
3	PHY 201	Engineering Physics – II		
4	CSE 201	Programming in C		
5	ECE 201	Digital Electronics & Logic Design		
			CE 201	Basic Civil Engineering
6			ME 201	Basic Elements of Mechanical Engineering
7			HSS201	Historiography of Science & Technology
8	HSS 202	Foreign Language (German / Chinese) (Audit)		



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Teaching Methodology

2 nd Year 1 st Semester				
SL.No	J.C. Bose Model		S.N. Bose Model	
	Subject Code	Name of The Subject	Subject Code	Name of The Subject
1			MAS 301	Discrete Mathematics
2	EE 301	Circuit Theory & Network		
3	CSE 301	Computer Organization & Architecture		
4	CSE 302	Data Structure & Algorithm		
5	ECE 301	Electronics Circuit & Devices – I		
6	ECE 302	Electronics Instrument & Measurement		
7			HSS 301	Behavioral Science

2 nd Year 2 nd Semester				
SL.No	J.C. Bose Model		S.N. Bose Model	
	Subject Code	Name of The Subject	Subject Code	Name of The Subject
1			MAS 401	Stochastic Processes
2			MAS 402	Computational Numerical Method
3			ECE 401	Principal of Communication Engineering
4	ECE 402	Signal & System		
5	ECE 403	Electronics Circuit & Devices – II		
6	EE 405	Control Engineering		
7			HSS 401	Entrepreneurship & Innovation for Practices



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Teaching Methodology

3 rd Year 1 st Semester				
SL.No	J.C. Bose Model		S.N. Bose Model	
	Subject Code	Name of The Subject	Subject Code	Name of The Subject
1	ECE 501	Microprocessor, Microcontroller & Embedded System		
2			ECE 502	RF & Microwave Engineering
3			ECE 503	Digital Communication Engineering
4	CSE 503	Database Management System		
5			ECE 504	Digital Signal Processing
6			HSS 501	Industrial Management
7			ECE 505	Telecommunication Engineering

3 rd Year 2 nd Semester				
SL. No	J.C. Bose Model		S.N. Bose Model	
	Subject Code	Name of The Subject	Subject Code	Name of The Subject
1			CSE 601	Computer Networking
2			ECE 601	Fiber Optics Communication
3			HSS 601	Engineering Ethics & IPR
4			HSS 602	Disaster Management
5	ECE 602	Creative Design		
6	ECE 603	Power Electronics Devices & Circuit		
7	CSE 606	Soft Computing		



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Teaching Methodology

4th Year 1st Semester

SL. No	J.C. Bose Model		S.N. Bose Model	
	Subject Code	Name of The Subject	Subject Code	Name of The Subject
1	ECE 701	Mobile Communication		
2	HSS 701	Mass Communication for Technology		
3	XXX 701	Research Paper Communication		
4			ECE 7XX	Elective – I
5			ECE 7XX	Elective – II
6	ECE 702	Propagation & Antenna		
7	ECE 703	VLSI Design		



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First Semester (Common to all)

Subject Code	Subject	P	T	L	Credit
MAS -101	Engineering Mathematics - I	0	1	3	4
CHY - 101	Engineering Chemistry	2	0	3	4
PHY - 101	Engineering Physics - I	2	0	3	4
BIO - 101	Life Science	0	0	3	3
ME-101	Engineering Mechanics	0	0	3	3
CE - 101	Engineering Drawing	3	0	0	2
ME - 102	Workshop Practice-I	3	0	0	2
EE - 101	Basic Electrical & Electronics Engineering	2	0	3	4
HSS - 101	Communication Skill	2	0	0	1
HSS - 102	NSS / NCC	2	0	0	1
HSS - 103	Foreign Language (French / Korean) (Audit)	2	0	0	1
		18	1	18	29

Name of the Module: Engineering Mathematics-I

Module Code: MAS 101

Semester: 1st

Credit Value: 4 [P=0, T=1, L=3]

A. Objectives:

The course is designed to meet with the objectives of:

1. providing high quality education in pure and applied mathematics in order to prepare students for graduate studies or professional careers in mathematical sciences and related fields,
2. imparting theoretical knowledge and to develop computing skill to the students in the area of Science and Technology,
3. providing teaching and learning to make the students competent to their calculating ability, logical ability and decision making ability,
4. giving students theoretical knowledge of Calculus, Algebra and their practical applications in the various fields of Science and Engineering,
5. apply their knowledge in modern industry or teaching, or secure acceptance in high-quality graduate programs in Mathematics and other fields such as the field of quantitative/Mathematical finance, Mathematical computing, statistics and actuarial science.

B. Learning Outcomes:

Students successfully completing this module will be able to:

1. students will become more confident about their computing skill, logical skill and decision making skill,
2. students will find various applications of calculus and algebra in the practical fields science and engineering,
3. students will become more competent to analyze mathematical and statistical problems, precisely define the key terms, and draw clear and reasonable conclusions,



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4. student will be able to use mathematical and statistical techniques to solve well defined problems and present their mathematical work, both in oral and written format, to various audiences (students, mathematicians, and non-mathematicians),
5. student will be able to understand, and construct correct mathematical and statistical proofs and use the library and electronic data-bases to locate information on mathematical problems,
6. student will be able to explain the importance of mathematics and its techniques to solve real life problems and provide the limitations of such techniques and the validity of the results,
7. student will be able to propose new mathematical and statistical questions and suggest possible software packages and/or computer programming to find solutions to these questions.

C. Subject Matter:

Unit I:

Matrices: Introduction to Matrices and their basic properties, Transpose of a matrix, verification of the properties of transposes, Symmetric and Skew symmetric matrices and their properties. Determinant of a square matrix, Minors and Cofactors, Laplace's method of expansion of a determinant, Product of determinants, Adjoint of a determinant, Jacobi's theorem on adjoint determinant. Singular and non-Singular matrices, Adjoint of a matrix, Inverse of a non-singular matrix and its properties, Orthogonal matrix and its properties, Trace of a matrix, Rank of a matrix and its determination using elementary row and column operations, Solution of simultaneous linear equations by matrix inversion method, Consistency and inconsistency of a system of homogeneous and non homogeneous linear simultaneous equations, Eigen values and Eigen vectors of a square matrix (of order 2 or 3), Eigen values, Cayley-Hamilton theorem and its applications, Diagonalisation of a square matrix with real and distinct eigen values (up to 3rd order).

Unit II:

Successive Differentiation: Higher order derivatives of a function of single variable, Leibnitz's theorem (statement only) and its application, problems of the type of recurrence relations in derivatives of different orders.

Mean Value Theorems & Expansion of Functions: Rolle's theorem (statement only) and its application, Mean Value theorems – Lagrange & Cauchy (statement only) and their application, Taylor's theorem with Lagrange's and Cauchy's form of remainders (statement only) and its application, Expansions of functions by Taylor's and Maclaurin's theorem, Maclaurin's infinite series expansion of the functions.

Unit III:

Integrals: Double and triple integrals and evaluation of area and volume. Change of order of integration.

Reduction formula: Reduction formulae both for indefinite and definite integrals.

Unit IV

Complex variables: complex numbers, De-Moivre's Theorem and its applications, Inverse circular and Hyperbolic functions, functions, continuity, Differentiability, analyticity -Cauchy Riemann equations and properties of analytic functions, Cauchy's integral and Cauchy's integral formula, derivatives of analytic functions.

D. Teaching/ Learning/ Practice Pattern:

Teaching: 70%



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Learning: 30%

Practice: 0%

E. Examination Pattern:

Theoretical Examination: Written

F. Books:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley Eastern.
2. Babu Ram, "Engineering Mathematics", Pearson Education.
3. H. K. Dass "Higher Engineering Mathematics", S. Chand & Co.
4. B.S. Grewal, "Engineering Mathematics", S. Chand & Co.
5. PulakKundu, "A Text book on Engineering Mathematics" Vol. I, ChhayaPrakashani.
6. Pal & Das, "Engineering Mathematics" Vol. I, U.N. Dhar.
7. John Bird, "Higher Engineering Mathematics", 4th Edition, 1st Indian Reprint 2006, Elsevier.
8. L. Rade and B. Westergren, "Mathematics Handbook: for Science and Engineering", (5th edition, Indian Edition 2009, Springer).
9. M. J. Strauss, G. L. Bradley and K. L. Smith, "Calculus", 3rd Edition, 1st Indian Edition 2007, Pearson Education.
10. S. K. Adhikari, "A text Book of Engineering Mathematics-I", DhanpatRai and Co. (P) Ltd.
11. S. S. Sastry, "Engineering Mathematics", PHI, 4th Edition, 2008.
12. Ravish R Singh, "Engineering Mathematics", McGraw Hill.
13. Das & Mukherjee, "Differential Calculus", U.N. Dhar & Sons Private Ltd.
14. Das & Mukherjee, "Integral Calculus", U.N. Dhar & Sons Private Ltd.

G. Magazines:

1. Current Science (Indian Academy of Science).
2. The Mathematics Student (Math Student) (Indian Mathematical Society).
3. Mathematical Spectrum (The University of Sheffield).
4. Mathematics Magazine (Mathematical Association of America).
5. +Plus magazine (University of Cambridge).
6. Mathematics Today, London Metropolitan University.

H. Journals:

1. Journal of Engineering Mathematics, Springer.
2. Journal of Computational and Applied Mathematics, London Metropolitan University.
3. The Journal of Indian academy of Sciences.
4. Bulletin of Pure and Applied Sciences.

Name of the Module: Engineering Chemistry

Module Code: CHY 101

Semester: 1st

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the following objectives:



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1. imparting theoretical and practical knowledge to the students in the area of Chemistry.
2. providing teaching and learning to make students acquainting with advanced science and technology in Chemistry.
3. injecting the future scope and the research direction in the discipline of Chemistry.
4. making students competent to the research and development in advanced science and technology in Chemistry.

B. Learning outcomes:

Students successfully completing this module will be able to:

1. adequately trained to become Chemists, Scientist and Chemical Engineers.
2. skilled both theoretically and practically to do operation, control and maintenance works in Chemistry and Chemical Engineering.
3. substantially prepared to take up prospective research assignments.

C. Subject matter:

Unit I:

Chemical Thermodynamics: Concept of Thermodynamic System: diathermal wall, adiabatic wall, isolated system, closed system, open system, extensive property, intensive property. Introduction to first law of thermodynamics: different statements, mathematical form; internal energy: physical significance, mathematical expression (ideal and real gas), Enthalpy: physical significance, mathematical expression. C_p and C_v definition and relation; adiabatic changes; reversible and irreversible processes; application of first law of thermodynamics to chemical processes: exothermic, endothermic processes, law of Lavoisier and Laplace, Hess's law of constant heat summation, Kirchoff's law. Second law thermodynamics; Joule Thomson and throttling processes; inversion temperature; evaluation of entropy: characteristics and expression, entropy change in irreversible process, entropy change for irreversible isothermal expansion of an ideal gas, entropy change of a mixture of gases.

Work function and free energy: physical significance, mathematical expression for ideal and real gases obeying Vander Waals' equation, Gibbs Helmholtz equation.

Condition of spontaneity and equilibrium

Unit II:

Electrochemistry Conductance: Conductance of electrolytic solutions, specific conductance, equivalent conductance, molar conductance and ion conductance, effect of temperature and concentration. Kohlrausch's law of independent migration of ions, transport numbers and hydration of ions. Conductometric titrations: SA vs SB & SA vs WB; precipitation titration KCl vs AgNO₃.

Electrochemical cell: Cell EMF and its Thermodynamic significance, single electrode potentials and its applications; hydrogen half cell, quinhydrone half cell and calomel half cell. Storage cell, fuel cell. Application of EMF measurement. Reaction Dynamics: Reaction laws: rate and order; molecularity; zero, first and second order kinetics. Arrhenius equation. Mechanism and theories of reaction rates (Transition state theory, Collision theory). Catalysis: Homogeneous catalysis and heterogeneous catalysis.

Unit III:

Structure and reactivity of Organic molecule: Electronegativity, electron affinity, hybridization, Inductive effect, resonance, hyperconjugation, electromeric effect, carbocation, carbanion and free radicals. Brief study of substitution, eliminations and addition reactions. **Instrumental Methods of Analysis:** Introduction to instrumental methods such as IR, UV, VIS, NMR and Mass spectrometry.

Unit IV:



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Polymerization: Concepts, classifications and industrial applications. Polymerization processes (addition and condensation polymerization), degree of polymerization, Copolymerization, stereo-regularity of polymer, crystallinity and amorphicity of polymer. Preparation, structure and use of some common polymers: plastic (PE, PP, PVC, bakelite), rubber (natural rubber, SBR, NBR), fibre (nylon 6.6, polyester). Conducting and semi-conducting polymers.

Industrial Chemistry: Solid, liquid and gases fuels; constituents of coal, carbonization of coal. Coal analysis: Proximate and ultimate analysis. Classification of coal, petroleum (LPG, CNG), gasoline, octane number, aviation fuel, diesel, cetane number. Natural gas, water gas, Coal gas, bio gas. Bio-diesel.

D. List of practical's: (Minimum eight experiments should be conducted by students)

1. Acid-base titration : (Estimation of commercial caustic soda)
2. Red-ox titration: (Estimation of iron using permanganometry)
3. Complexometric titration: (Estimation of hardness of water using EDTA titration)
4. Chemical Kinetics : (Determination of relative rates of reaction of iodide with hydrogen peroxide at room temperature (clock reaction).
5. Heterogeneous equilibrium (Determination of partition coefficient of acetic acid between n-butanol and water)
6. Viscosity of solutions (determination of percentage composition of sugar solution from viscosity)
7. Conductometric titration for
 - (a) Determination of the strength of a given HCl solution by titration against a standard NaOH solution.
 - (b) Analysis of a mixture of strong and weak acid by strong base.
8. Preparation of a homo-polymer by free radical initiated chain polymerization and determination of its molecular weight by viscosity average molecular weight method.
9. pH- metric titration for determination of strength of a given HCl solution against a standard NaOH.

E. Teaching/ Learning/ Practice pattern:

Teaching: 40%

Learning: 10%

Practice: 50%

F. Examination pattern:

1. Theoretical Examination: Written.
2. Practical Examination: Conduct Practical Examination and viva-voce.

G. Reading lists:

Books:

1. Rakshit P. C., "Physical Chemistry" Sarat Book Distributor.
2. Dutta R. L. , "Inorganic Chemistry" The New Book Stall.
3. Levine " Physical Chemistry" McGraw-Hill Education.
4. Finar I. L., "Organic Chemistry (vol. 1 & 2)." Pearson.
5. Iastton Samuel, " Text Book of Physical Chemistry" New York, D. Van Nostrand company.
6. Lee J. D., "Concise Inorganic Chemistry", Wiley India.
7. Sykes, P., "Guidebook to Mechanism in Org.Chems", Orient Longman.
8. Chakraborty D.K. , "Solid State Chemistry", New Age International.
9. Gupta M.C. , "Atomic & Molecular Spectroscopy", New Age.
10. Gowarikar V.R. , "Polymer Science", New Age.
11. Mishra G.S. , "Introductory Polymer Chemistry", New Age.
12. Nasipuri D. , "Stereochemistry of Organic Compounds", New Age.
13. Kalsi P.S, "Spectroscopy of Organic Compounds", New Age.
14. Kalsi P.S. , "Organic Reactions & their Mechanism", New Age.



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15. Maity and Maity, "Engineering Chemistry", U & N Dhar Publisher.

16. Ray, Das, Biswas, "Engineering Chemistry", New Central Book Agency.

Magazines:

1. Chemical science
2. chemistry Today
3. chemistry For You

Journals:

1. Journal of Organic Chemistry, ACS
2. Journal of Physical Chemistry, ACS
3. Material Science & Engineering B, Elsevier

Name of the Module: Engineering Physics - I

Module Code: PHY 101

Semester: 1st

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the following objectives:

1. imparting theoretical & practical knowledge to the students in the area of Engineering Physics.
2. providing teaching and learning to make students acquainting with modern state-of-art of Engineering.
3. injecting the future scope and the research direction in the field of Physics with specific specialization.
4. making students competent to design & development of Engineering Physics.

B. Learning outcomes:

Students successfully completing this module will be able to:

1. adequately trained to become Engineers.
2. substantially prepared to take up prospective research assignments.

C. Subject matter:

Unit I:

Scalar and vector: Scalar and vector, dot and cross product, Scalar and vector fields, concept of Gradient, Divergence and Curl.

General Properties of Matter: Elasticity, Viscosity, Surface tension.

Unit II:

Acoustics: Simple Harmonic Motion, Damped Vibration, Forced Vibration

Thermal Physics: Kinetic Theory of Gas, conductivity & Radiation

Unit III:

Physical Optics: Introduction to Interference, Diffraction, Polarization

Elementary Solid State Physics: Elementary ideas of crystal structure : lattice, basis, UNIT cell,



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fundamental types of lattices-Bravais lattice, simple cubic, f.c.c and b.c.c lattices, Miller indices and miller planes, Co-ordination number and atomic packing factor, X-rays: Origin of characteristics and continuous X-ray, Bragg's law (no derivation), determination of lattice constant

Unit IV:

Fundamental of Quantum Physics: Wave particle duality, Compton effect, Photo electric effect, Heisenberg's uncertainty relation, concept of wave packet.

D. List of practical's: (Minimum five experiments should be conducted by students)

1. Determination of thermal conductivity of a good conductor by Searle's method
2. Determination of thermal conductivity of a bad conductor by Lees and Charlton's method
3. Determination the dispersive power of the material of a given prism
4. Use of carry Foster's bridge to determine unknown resistance
5. Determination of Young Modulus by flexure method and calculation of bending moment and shear force at a point on the beam
6. Determination of coefficient of Viscosity by Poiseuille's capillary flow method
7. Determination of wavelength of light by Newton's ring method.
8. Determination of Surface tension of a liquid.

E. Teaching/ Learning/ Practice pattern:

Teaching: 40%

Learning: 10%

Practice: 50%

F. Examination pattern:

1. Theoretical Examination: Written.
2. Practical Examination: Conduct Practical Examination and viva-voce.

G. Reading lists:

Books:

1. Murrat R. Spiegel, Seymour Lipschutz & Dennis Spellman, "Vector Analysis" Second Edition, Tata McGraw Hill Education Private Limited, New Delhi, 2009.
2. Takwale and Puranic, "Classical Mechanics" Tata McGraw-Hill Publishing
3. Sengupta & Chatterjee, "A Treatise on General Properties of Matter" New Central Book Agency (P) Limited
4. D. Chattopadhyay and P. C. Rakshit, "Vibrations, Waves and Acoustics" BOOKS and Allied (P) Ltd.
5. N. K. Bajaj, "The physics of Waves and Oscillations" Tata McGraw Hill Education Private Limited, New Delhi.
6. A. Ghatak, "Optics" 4th Edition, Tata McGraw Hill Education Private Limited, New Delhi.
7. S. O. Pillai, "Solid State Physics", Wiley Eastern Ltd.
8. Kittel, "Solid State Physics" 7th edition, Wiley India.
9. Richard P. Feynman, Robert B. Leighton and Matthew Sands, "The FEYNMAN Lectures on Physics" Vol. I to Vol. IV, Pearson
10. D. Chattopadhyay and P. C. Rakshit, "An Advanced Course in Practical Physics" New Central Book Agency (P) Ltd.

Magazines:

1. Physics Reports



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2. *Resonance*
3. *Scientific American*
4. *Physics Today*
5. *Physics For You*
6. *Physics Teacher (IPS)*
7. *Physics World (IoP-UK)*
8. *Physics News (IPA)*

Journals:

1. *Nature*
2. *Proceedings of the National Academy of Sciences*
3. *IEEE Spectrum*
4. *Journal of Physics: (Including A, B, C, D, E, F & G)*
5. *Indian Journal of Engineering & Material Sciences*
6. *Indian Journal of Radio and Space Physics*
8. *Journal of Scientific & Industrial Research*

Name of the Module: Life Science

Module Code: BIO 101

Semester: 1st

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is designed to meet the following objectives:

1. imparting knowledge on the origin of Earth and life forms on Earth, appreciating importance of biological diversity and understanding biomolecules being the main component of life.
2. understanding "Cell" – the basic UNIT in different life forms, and structure and function of different tissue systems in plants and animals.
3. imparting knowledge on water relations, nutrient uptake and assimilation, and metabolism in plants.
4. providing knowledge on Bioenergetics of plant and animal cells, different organelles involved in electron transport systems, nervous, digestive and immune systems in animals.

B. Learning Outcomes:

Upon completion of the subjects:

1. students will understand the characteristics of living organisms; appreciate the importance of diversity of life and their interaction with the environment.
2. students will be able to explain the interrelationship between biomolecules and the living system, and influences of biomolecules upon the structure and function of intracellular components.
3. students will have a broad knowledge on Bioenergetics of plant and animal cells; and a brief on important biological systems of animal.

C. Subject matter:

Unit I:

Origin of Life: History of earth, theories of origin of life and nature of the earliest organisms.

Varieties of life: Classification, Five kingdoms, viruses (TMV, HIV, Bacteriophage), Prokaryote (Bacteria-cellstructure, nutrition, reproduction), Protista, Fungi, Plantae and Animalia.



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Chemicals of life: (Biomolecules)- Carbohydrates lipids, amino acids, proteins, nucleic acids and identification of biomolecules in tissues.

Unit II:

Cell: Cell concept, structure of prokaryotic and eukaryotic cells, plant cells and animal cells, cell membranes, cell organelles and their function, Structure and use of compound microscope.

Histology: Meristemes (apical, intercalary, lateral) and their function; simple tissue (parenchyma, collenchyma, sclerenchyma); Complex tissue (xylem and phloem); Tissue systems (epidermal, ground, vascular); primary body and growth (root, stem, leaf); Secondary growth (root, stem). Animal tissues (Epithelial, connective, muscle and nervous tissues) and their functions in the body.

Unit III:

Transport: Plant water relationships, properties of water, diffusion, osmosis, imbibition, uptake of water by roots and theories of transport of water through xylem (ascent of water in xylem, cohesion-tension theory), apoplast and symplast theory; Transpiration-structure of leaf, opening and closing mechanisms of stomata, factors affecting transpiration and significance of transpiration.

Nutrition: Mineral Nutrition in plants, Heterotrophic nutrition in plants; Photosynthesis (Autotrophic forms of nutrition), Chloroplast structure, two pigment systems, photosynthetic UNIT, light absorption by chlorophyll and transfer of energy, phosphorylation and electron transport system, Calvin-Benson Cycle (C₃), Hatch Slack Pathway (C₄), Crassulacian Acid Metabolism (CAM), factors affecting photosynthesis.

Unit IV:

Energy Utilization: (Respiration) - Structure of mitochondria, cellular respiration, relationship of carbohydrate metabolism to other compounds, Glycolysis, fermentation, formation of acetyl co-A, Krebs cycle, Electron Transport System and Oxidative Phosphorylation, ATP, factors affecting respiration; Elementary canal in humans, nervous and hormonal control of digestive systems, fate of absorbed food materials; Nutrition in humans, Reference values; General characteristics of blood vascular system, development of blood systems in animals, Composition of blood, circulation in blood vessels, formation of tissue fluids, the heart, functions of mammalian blood, the immune system.

D. Teaching/ Learning/ Practice pattern:

Teaching: 70%

Learning: 30%

Practice: 0%

E. Examination pattern:

Theoretical Examination: Written

F. Reading Lists:

Books:

1. J.N. Mitra, D. Mitra and S.K. Chowdhuri, "Studies in Botany" Volume I & II, Moulik Library Publisher, Kolkata,
2. M.J. Pelczar, E.C.S. Chan and N.R. Krieg, "Microbiology", Tata McGraw Hill Education, New Delhi, 1993.
3. B.P. Pandey, "Plant Anatomy", S. Chand & Company Ltd., New Delhi, 1997.
4. H.S. Srivastava, "Plant Physiology", Rastogi Publishers, Meerut, 1998.
5. B.P. Pandey, "College Botany" Volume I & II, S. Chand Publisher, New Delhi, 2012.
6. N.A. Campbell, J.B. Reece, "Biology" Person Education, Inc & Dorling Kinderley Publishing, Inc.

Magazines:

1. National Geographic Channel, <http://science.nationalgeographic.co.in/science/earth>



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2. Wikipedia, The Free Encyclopedia, <http://www.bbc.co.uk/science/earth>
3. Wikipedia, The Free Encyclopedia, <http://en.wikipedia.org/wiki/HIV>

Journals:

1. Journal of Biology, BioMed Central Ltd, London, England.
2. Annals of Botany, Oxford Journals, USA.
3. Plant and Cell Physiology, Oxford journals, USA.

Name of the Module: Engineering Mechanics

Module Code: ME 101

Semester: 1st

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is designed to meet with the following objectives:

1. Ability to utilise scalar and vector analytical techniques for analysing forces in statically determinate structures.
2. Ability to apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems.
3. Student gets a basic idea of Centre of gravity, moment of inertia, mass moment of inertia, friction.

B. Learning Outcome:

Upon completion of the subject, students should have the knowledge of:

1. Different type of forces and how to resolve forces.
2. Centre of gravity of different size, shape, and solid.
3. Centre of gravity, moment of inertia, mass moment of inertia, friction.

C. Subject Matter:

Unit I:

Forces and Moments: Force, Moment and Couple, Resultant of forces, Forces in space Equilibrium, FBD, General equations of equilibrium, Analysis of forces in perfect frames, Brief introduction to vector approach.

Unit II:

Friction: Introduction to dry friction, laws of friction, friction of simple machines, inclined planes, Screw jacks.

Unit III:

Centre of gravity and moment of inertia: Centre of gravity of axes, volume and composite bodies, Area moment of inertia and mass moment of inertia for plane figures and bodies.

Unit IV:

Dynamics: Kinematics and Kinetics, Rectilinear motion of particles, determination of position velocity and acceleration under uniform rectilinear motion (uniform and non-uniform accelerated rectilinear motion), Relative motion, construction of x-t, v-t and a-t graphs (simple problems),



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Projectile motion, Normal and Tangential components, Radial and Transverse components, simple problems, Equation of motion, D. Alembert's principle.

D. List of Practical's: No Practical's

E. Teaching/ Learning/ Practice pattern:

Teaching: 60%

Learning: 40%

Practice: 0%

F. Examination pattern:

1. Theoretical Examination.

G. Reading lists:

Books:

1. Mariam & Kraige, "Engineering Mechanics (Vol-II) Dynamics", Wiley.

2. Mariam & Kraige, "Engineering Mechanics, Vol-I (Statics)", Wiley.

3. Timoshenko, "Engineering Mechanics", MGH.

4. Nelson, "Engineering Mechanics", TMGH.

5. Shames and Rao, "Engineering Mechanics", Pearson.

6. S. Chakraborty, "Engineering Mechanics", Everest Publishing House.

7. Beer and Johnson, "Vector Mechanics for Engineers", TMGH.

Magazines:

1. Popular Mechanics Everyday.

2. Engineering Magazine.

Journals:

1. International Journal of Applied Mechanics and Engineering.

2. Journal of Applied Mechanics, ASME.

3. Journal of Engineering Mechanics, ASCE.

Name of the Module: Engineering Drawing

Module Code: CE 101

Semester: 1st

Credit Value: 2 [P=3, T=0, L=0]

A. Objectives:

The course is designed to meet the following objectives:

1. increase the ability to understand Engineering Drawing.
2. learn to sketch and take field dimensions.
3. learn to take data and transform it into graphic drawings.
4. learn basic Auto Cad skills.
5. learn basic engineering drawing formats.
6. prepare the student for future Engineering positions.



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B. Learning Outcome:

Upon completion of the subject student's ability to:

1. hand letter will improve.
2. perform basic sketching techniques will improve.
3. draw orthographic projections and sections will improve.
4. use architectural and engineering scales will increase.
5. produce engineered drawings will improve
6. convert sketches to engineered drawings will increase.
7. cope up and become familiar with office practice and standards will increase.
8. handle and become familiar with Auto Cad two dimensional drawings will improve.
9. develop good communication skills and team work will improve.

C. Subject Matter:

Unit I:

Indian Standards: Line symbols and line groups, sheet layout of rules of printing, preferred scales.

Unit II:

Orthographic Projection: Theory of Orthographic Projection.

Unit III:

First and third angle system of projection: Technical sketching, Multi-planar representation.

Unit IV:

Glass box concept: Sketching of orthographic views and line.

D. List of Practical's:

1. Technical writing of various type of letters.
2. Technical sketching of Scales- Plain, Diagonal, Vanier, Comparative and chord.
3. Technical sketching of Projection of points.
4. Technical sketching of Projection of lines.
5. Technical sketching of Projection of plains.
6. Technical sketching of Projection of solids.
7. Technical sketching of orthographic Projection

D. Teaching/ Learning/ Practice Pattern:

Teaching: 70%

Learning: 30%

Practice: 0%

E. Examination pattern:

1. Practical Drawing.
2. Assignment.

F. Reading lists:

Books:

1. N. D. Bhatt, "Machine Drawing". Charotar Publishing House Pvt. Ltd.
2. V. Laxmi Narayanan & M. L. Mathur, "A Text Book of Machine Drawing", Jain Brothers, New Delhi.
3. Jolhe "Machine Drawing", Charotar Publishing House Pvt. Ltd.
4. K. Venugopal and V. R. Prabhu "Engineering Graphics", New Age International Pvt. Ltd.
5. K. C. John, "Engineering Graphics", PHI Learning Pvt. Ltd.
6. D. M. Kulkarni, A. P. Rastogi, A. K. Sarkar, "Engineering Graphics with Auto CAD", PHI Learning



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7. K. V. Natarajan, "Engineering Graphics", Dhanalakshmi Publisher.

8. French and Vierk "Fundamentals of Engineering Drawing", MGH.

Magazines:

1. *Machine Design.*
2. *Design to Part Magazine.*

Journals:

1. *International Journal of Design Engineering*

Name of the Module: Workshop Practice-I

Module Code: ME 102

Semester: 1st

Credit Value: 2 [P=3, T=0, L=0]

A. Objectives:

The course is designed to meet the following objectives:

1. acquire skills in basic engineering practice.
2. identify the hand tools and instruments.
3. acquire measuring skills.
4. acquire practical skills in the trades.
5. acquire practical skills in welding, carpentry, fitting.

B. Learning outcomes:

Upon completion of the subject, students should have the knowledge of:

1. workshop safety.
2. handling workshop tools, machines.
3. different welding types.
4. different carpentry joints.
5. working principle of different tools.

C. Subject matter:

Unit I:

Carpentry (Wood Working): Timber, Seasoning and Preservation, Plywood and Plyboards, Carpentry Tools, Engineering applications, Different Joints.

Unit II:

Metal Joining: Definitions of welding, brazing and soldering processes and their applications, Oxy acetylene gas welding process, equipment and techniques, types of flames and their applications, Manual metal arc welding technique and equipment, AC and DC welding, electrodes, constituents and functions of electrodes, welding positions, types of weld joint, common welding defects such as cracks, slag inclusion and porosity.

Unit III:

Bench work and Fitting: Tools for laying out, chisels, files, hammers, hand hacksaw, their specifications and uses.



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Unit IV:

Laying out (bench work): Sawing and finishing by filing.

D. List of Practicals:

1. T-Lap joints and Bridle joint (Carpentry Shop).
2. Gas Welding practice on mild steel flat/sheet upto 3 mm thick.
3. Lap joint by Gas Welding (upto 3mm thick).
4. Manual Metal Arc Welding practice (upto 5mm thick).
5. Pattern Making. (Carpentry Shop)
6. Laying out (bench work); Sawing and Finishing by Filing.

E. Teaching/Learning/Practice pattern:

Teaching: 20%

Learning: 20 %

Practice: 60%

F. Examination pattern:

1. Job making.
2. Viva-voce.

G. Reading lists:

Books:

1. *M.L. Begeman and B.H. Amstead, "Manufacturing Process" John Wiley, 1968.*
2. *W.A.J. Chapman and E.Arnold, "Workshop Technology" Vol. 1, 2 & 3, CRC press Prentice Hall*
3. *B.S. Rghuwanshi, "Workshop Technology" Vol. 1 & 2 – Dhanpat Rai and Sons.*
4. *Hazra and choudhary "Workshop Technology" Vol. 1, 2, Media Promoters*
5. *VirenderNarula "Workshop Technology",S.K.Kataria& Sons*

Magazines:

1. *International Metal Working News.*
2. *Industrial Distribution*

Journals:

1. *International Journal of Machine Tools and Manufacture*
2. *Journal of Manufacturing Science and Engineering, Transactions of the ASME*
3. *Journal of Manufacturing Technology and Research*

Name of the Module: Basic Electrical & Electronics Engineering

Module Code: EE 101

Semester: 1st

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. To make the students familiar with the course and its importance.



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

2. Introduction to Basic Electrical & Electronics Engineering.
3. Basic knowledge of DC circuits, Electromagnetism, AC fundamental.
4. Introduction to DC, AC single and three phase machine, their construction and working principles.
5. Introduction to measurement of electrical quantities.
6. Making familiar with P-N Junction.
7. Briefing to Semiconductor devices and their applications

B. Learning outcomes:

Students successfully completing this module will be able to:

1. Students will develop interest in learning the subject and be adequately trained to solve network problems.
2. Students will be skilled both theoretically and practically to utilize conventional circuit solving procedures.
3. Students will be substantially prepared to take up prospective design assignments.

C. Subject matter:

Unit I:

DC circuits: Definition of electric circuit, network, linear circuit, non-linear circuit, bilateral circuit, unilateral circuit, Dependent source, Kirchoff's law, Principle of superposition. Source equivalence and conversion, Thevenin's theorem, Norton Theorem, nodal analysis, mesh analysis, star-delta conversion. Maximum power transfer theorem with proof.

Electromagnetism: Biot-savart law, Ampere's circuital law, field calculation using Biot-savart & ampere's circuital law. Magnetic circuits, Analogous quantities in magnetic and electric circuits, Faraday's law, self and mutual inductance. Energy stored in a magnetic field, B-H curve, Hysteretic and Eddy current losses, lifting power of Electromagnet.

Unit II:

Decision making: Simple If statement, if-else statement, nested if else statement, Switch statement, nested switch, the operator, goto statement.

Decision making & branching: while statement, do-while statement, for statement. Array

Unit III:

Transformers: Construction, Types, emf equation, voltage, current, impedance and turns ratio; auto-transformer. DC machines (motor and generator)—Construction, types, emf equation, equivalent circuit, starting, speed control, braking, applications. Single phase motors, types; need of rotating field, starting, running, speed control and applications.

Unit IV:

Introduction to Semiconductors: Band gap, Conductivity, intrinsic and extrinsic types, Doping: donors and acceptors, n-type and p-type.

P-N Junction: Energy band diagram, Formation of P-N junction, built-in-potential, forward and reverse biased P-N junction, formation of depletion zone, V-I characteristics, Zener breakdown, Avalanche breakdown and its reverse characteristics, junction capacitance and varactor diode. Simple diode circuits, load line, linear piecewise model; rectifiers: half wave, full wave, its PIV, DC voltage and current, ripple factor, efficiency, Clipper & Clamper Circuits.



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Introduction to Transistors: Formation of PNP/ NPN junctions, energy band diagram; transistor mechanism and principle of transistors, Biasing: CE, CB, CC configuration, transistor characteristics: cut-off, active and saturation mode, Early effect. Introduction to Field Effect Transistor: Structure and characteristics of JFET and MOSFET, depletion and enhancement types, CS, CG, CD configurations.

D. List of practicals: (Minimum eight experiments should be conducted by students)

1. To construct a series-parallel circuits and verify:
Ohms law, Kirchhoff's laws
Verify Thevenin's theorem.
Verify Norton's theorem.
Verify Maximum Power Transfer theorem.
2. Construct an R-L-C circuit and verify
Voltage across R, L and C
Verify the phasor sum of the voltages across the combination of R-L-C.
3. Measurement of power in the circuit made in 2 above and verify:
The power consumed by Resistance, Inductance and Capacitance and the total power consumed by the circuit.
4. How does the power factor varies in the circuit of 2 above if Resistance, Inductance and Capacitance are varied.
5. Study of VI Characteristics of Silicon Diode.
6. Study of VI Characteristics of Zener Diode.
7. Design and Analysis of a Half wave Rectifier using Diode.
8. Design and Analysis of a center-tap Full wave Rectifier using Diodes
9. Design and Analysis of a Bridge Rectifier Circuit.
10. Design and Analysis of a Clipping Circuit with one voltage source. (Different possible configurations)
11. Design and Analysis of a Clipping Circuit with two voltage source. (Different possible configurations)
12. Design and Analysis of a Clamper Circuit.
13. Analysis of the characteristics of BJT (CE and CB mode)
14. Design and Analysis of fixed bias circuit using NPN transistor (DC)
15. Design and Analysis of emitter bias circuit using NPN transistor (DC)
16. Determination of the characteristics of JFET.
17. Determination of the characteristics of MOSFET.
18. Verification of truth tables of logic gates.

E. Teaching/ Learning/ Practice pattern:

Teaching: 40%
Learning: 10%
Practice: 50%

F. Examination pattern:

1. Theoretical Examination: Written.
2. Practical Examination: Conduct Practical Examination and viva-voce.

G. Reading lists:

Books:

1. Theraja, "Electrical technology, Vol 1 & 2", Nirja Construction & Development Co. (P) Ltd.



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2. Sen, P.C. "Principles of Electrical Machines and Power Electronics" John Wiley and Sons.
3. V.K.Mehta, "Basic Electrical Engineering" S.Chand and Co. Publication.
4. Guru and Hiziroglu "Electric Machinery and Transformers", Saunders College Pub. NY, 1990
5. Malvino: "Electronic Principle" Tata McGraw-Hill Publishing Co.Ltd.
6. Millman & Halkias: "Integrated Electronics" Tata McGraw-Hill Publishing Co.Ltd.
7. Boylestead and Nashelsky, *Electronic Devices and Circuits Theory*, 9/e, PHI, 2006.
8. R.P.Jain, *Modern Digital Electronics*, 3/e, TMH, 2000.

Magazines:

1. IEEE Industrial Electronics
2. Electrical Line, Canada.

Journals:

1. Electrical Engineering, Springer.

Name of the Module: Communication Skill

Module Code: HSS 101

Semester: 1st

Credit Value: 1 [P=2, T=0, L=0]

A. Objectives:

The course is designed to meet the following objectives:

1. to increase the Students ability to improve and utilize the skills necessary to be competent interpersonal communicator.
2. to Increase the students' understanding of his or her own communication behaviour.
3. to Increase the students' understanding of others communication behaviours.
4. to improve the students' communication skills in both social and professional contexts.
5. to improve the students ability to demonstrate effective complete resolution skills.

B. Learning outcomes:

Students successfully completing this module will be able to :

1. develop their communication skills on the specific subject.
2. direct effectively in their work place.

C. Subject matter:

Unit I:

General Principles of Communication and Oral Communication: The Process of Communication, Principles of Communication (communication barriers, levels of Communication, Communication network, verbal, non-verbal) and Professional Communication. The Speech Mechanism, IPA symbols (vowel and consonant sounds), minimal pairs, word transcription, stress and intonation , active listening, types of listening, traits of a good listener, active versus passive listening,

Unit II:

Constituents of Effective Writing and Vocabulary: The sentence and its parts, articles, the verb phrase, tense and aspect, the active and passive, the adjective, interrogative and negative sentences, concord,



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preposition. Paragraph development, summary writing and reading comprehension. Word formation processes: affixation, compounding, converting, use of words in different parts of speech, idioms and phrases.

Unit III:

Business Correspondence and Communication Strategies: Characteristics of Business Letters, Drafting: Bio-data/Resume/Curriculum vitae (theory). Report Writing: Structure, Types of Reports (theory). Presentation Skills, public speaking and group discussion (theory) and Soft Skills (theory).

D. List of practicals:

1. Issue Writing
2. Writing Resumes and Applications
3. Writing Memos
4. Reading Comprehension
5. Vocabulary
6. Presentation Skills
7. Group Discussion
8. Extempore
9. Debates

E. Teaching/ Learning/ Practice pattern:

Teaching: 40%

Learning: 10%

Practice: 50%

F. Examination pattern:

1. Theoretical Examination

G. Reading lists:

Books:

1. *NiraKonar, "English Language Laboratory", Prentice Hall India*
2. *Jones, Daniel, Cambridge English Pronouncing Dictionary with CD, New Delhi, 2009.*
3. *Roach, Peter, English Phonetics and Phonology with CD, CUP, India, 1983.*
4. *Cambridge Learners Dictionary with CD, CUP, New Delhi, 2009.*
5. *Rajeevan, Dutt, Sasikumar, A course in Listening and Speaking I & II with CD, CUP, New Delhi, 2007.*
6. *Rajeevan and Dutt, Basic Communication Skills, CUP, New Delhi, 2007.*
7. *Software: Orell Digital Language Lab Software.*
8. *R.C. Sharma and Krishna Mohan Business Correspondence and Report Writing 10.Meenakshi*
9. *Raman and Sangeeta Sharma Technical Communication, Oxford.*
10. *Krishna Mohan and MeeraBannerji ,Development Communication Skills*

Magazines:

1. *Communication Skill Magazine*
2. *Magazine for Communication*
3. *Communication Studies*

Journals:

1. *Developing Effective Communication Skills.*



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2. *Cooperative Communication Skills.*
3. *Improving Communication Skills.*
4. *Key Communication Skills.*
5. *Journal on Communication.*

Name of the Module: Foreign Language (French) (Audit)

Module Code: HSS 103

Semester: 1st

Credit Value: 0[P=2, T=0, L=0]

A. Objectives:

The course is designed to meet the objectives of:

1. the French Language course accords to a method created for Indian students who are complete beginners in French and who wish to acquire verbal communication skills in current scenario.

B. Learning outcomes:

Students successfully completing this module will be able to:

1. develop four skills in French i.e. Reading, Writing, Speaking, Comprehension.

C. Subject matter:

Unit-I:

Preliminaries of Grammar: Articles, Gender and Number of Nouns and Adjectives. Personal and Tonique Pronouns, Demonstrative and Possessive Adjectives, Preposition and Adverbs.

Unit-II:

Conjugation : Present, Past and Future Tense: Types of Sentences.

Pronominal Verbs Conjugation of Verbs of all the Groups in present Tense and Introduction to past and Future tense, Interrogation, Negation and Imperatives.

Unit-III

Names of days, seasons. Months, colours, garments body parts and numbers. Computer, Commerce & Marketing related Vocabulary & Terminology.

D. List of practicals:

1. Issue Writing
2. Writing Resumes and Applications
3. Writing Memos
4. Reading Comprehension
5. Vocabulary
6. Presentation Skills
7. Group Discussion
8. Extempore

E. Teaching/ Learning/ Practice pattern:

Teaching: 40%

Learning: 10%

Practice: 50%



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F. Examination pattern:

1. Theoretical Examination

G. Reading lists:

Books:

1. *Suggested book-Ailes Volume-I*
2. *G. Mauger: I (La Langue et de Civilisation francaise) Alliance française Paris Ile-de-France.*

Name of the Module: NSS/ NCC

Module Code: HSS 102

Semester: 1st

Credit Value: 1 [P=2, T=0, L=0]



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Second Semester

Subject Code	Subject	P	T	L	Credit
MAS -201	Engineering Mathematics - II	0	1	3	4
ME – 201	Basic Mechanical Engineering	0	0	3	3
CSE - 201	Programming in C	8	0	0	4
CHY – 201	Environmental Science	0	0	3	3
PHY - 201	Engineering Physics - II	2	0	3	4
ECE – 201	Digital Electronics & Logic Design	2	0	3	4
HSS – 201	Historiography of Science & Technology	0	0	3	3
CE- 201	Basic Civil Engineering	3	0	0	2
ME-202	Workshop Practice-II	3	0	0	2
HSS – 202	Foreign Language (German / Chinese) (Audit)	2	0	0	0
		20	1	18	29

Name of the Module: Engineering Mathematics-II

Module Code: MAS 201

Semester: 2nd

Credit Value: 4 [P=0, T=1, L=3]

A. Objectives:

The course is designed to meet the following objectives:

1. imparting theoretical knowledge to the students about three and more dimensional objects in space and to improve their capability of visualising of objects in space.
2. making student competent enough to construct a differential equation/ mathematical modelling for every real life situation with its solution.
3. giving students theoretical knowledge of vectors with the flavour of Calculus.
4. introduce the concepts of Laplace and Fourier transforms and its application to the solution of differential equations (ODE & PDE) to the students.

B. Learning Outcomes:

Upon completion of the subject:

1. students will have strong visualising capability in their mind about any object.
2. students are so trained that they will recognize various real life situation/ problem and able to solve them by constructing a differential equation/ mathematical model.
3. students will be able to find the Laplace and Fourier representation as well as transforms of functions of one variable.

C. Subject matter:

Unit I:

Coordinate Geometry Of Three Dimensions: Equation of a sphere, plane section of a sphere, tangent plane, orthogonality of spheres, definition and equation of right circular cone and right circular cylinder.



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Unit II:

Vector Calculus: Differentiation and integration of vector functions, scalar and vector fields, Gradient, Directional derivative, Divergence, Curl. Line integral, Surface integral and Volume integral, Green's, Gauss' and Stokes' theorems (without proofs) and their simple applications.

Unit III:

Ordinary Differential Equations: Formulation of Differential equations, Linear Differential Equations and reducible to linear form, Exact Equations, Reducible to exact form, Linear differential equations with constant coefficients, Second order ordinary differential equations with variable coefficients, Homogeneous form, Change of dependent variable, Change of independent variable, Normal form, Variation of Parameters, Solution in series of second order LDE with variable co-efficient (C.F. only), Bessel's and Legendre differential equations with their series solutions, Orthogonal properties, recurrence relations and generating function of Bessel functions and Legendre polynomials.

Partial Differential Equation: Linear and non-linear Partial Differential Equation of order one, Linear Partial Differential Equation with constant coefficient, Partial Differential Equation of order two with variable coefficients.

Unit IV:

Basic Transform: Laplace & Fourier.

D. Teaching/ Learning/ Practice Pattern:

Teaching: 70%

Learning: 30%

Practice: 0%

E. Examination Pattern:

Theoretical Examination and open book examination.

F. Reading Lists:

Books:

1. Shanti Narayan, "Analytic Solid Geometry", S. Chand.
2. M. D. Raisinghania, "Vector Analysis", S. Chand.
3. R. K. Jain & S R. K Iyengar, "Advanced Engineering Mathematics", Narosa.
4. M. D. Raisinghania, "Ordinary & Partial Differential equations", S. Chand.
5. M. D. Raisinghania, "Advanced Differential equations", S. Chand.
6. H. K. Dass, "Higher Engineering Mathematics", S. Chand & Co.
7. B. S. Grewal, "Engineering Mathematics", S. Chand & Co.
8. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley Eastern.
9. S. L. Ross, "Differential equations", Willey.
10. Pal & Das, "Engineering Mathematics", Vol. I, U. N. Dhar.
11. J. N. Sharma, A. R. Vasishtha, "Vector Calculus", Krinhna Prakashan Mandir, Meerut.
12. P. P. Gupta, G. S. Malik, "Vector Calculus", Kedarnath Ramnath, Meerut.
13. Brahma Nand, B. S. Tyagi, B. D. Sharma, "Co-ordinate Solid Geometry", Kedarnath Ramnath, Meerut, Delhi.
14. A. R. Vasishtha, D. C. Agarwal, "Analytical Geometry of Three Dimensions", KrinhnaPrakashan Media (P) Ltd, Meerut.

Magazines:

1. Current Science (Indian Academy of Science).



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2. *The Mathematics Student (Math Student) (Indian Mathematical Society).*
3. *Mathematical Spectrum (The University of Sheffield).*
4. *Mathematics Magazine (Mathematical Association of America).*
5. *+Plus magazine (University of Cambridge).*
6. *Ganithavahini (Ramanujan Mathematical Society).*
7. *Mathematics Today, London Metropolitan University.*

Journals:

1. *Journal of Engineering Mathematics, Springer.*
2. *Journal of Computational and Applied Mathematics, London Metropolitan University.*
3. *The Journal of Indian academy of Sciences.*
4. *Bulletin of Pure and Applied Sciences.*

Name of the Module: Basic Mechanical Engineering

Module Code: ME 201

Semester: 2nd

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is design to meet with the following objectives:

1. Ability to utilise scalar and vector analytical techniques for analysing forces in statically determinate structures.
2. Ability to apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems.
3. Student gets a basic idea of Engineering Mechanics, Fluid Mechanics, Strength of Material and Thermodynamics.

B. Learning Outcome:

Upon completion of the subject, students will have the:

1. Knowledge of different type of force resolving.
2. Knowledge of centre of gravity of different size, shape, and solid.
3. Knowledge of basic idea of Engineering Mechanics, Fluid Mechanics, Strength of Material and Thermodynamics.

C. Subject Matter:

Unit I:

Thermodynamics: Introduction to Thermodynamics, Concepts of system control volume, state, properties, equilibrium, quasi- static process, reversible & irreversible process, cycle. Zeroth Law and Temperature, Heat and Work transfer Definition, Sign convention, various P-dV work done (Isobaric, Isochoric, Polytrophic, adiabatic and isothermal processes) and related problems.

Unit II:

1st Laws of Thermodynamics for closed & open systems (ii) Non Flow Energy Equation (iii) Steady State, Steady Flow Energy Equation and related problems. , Equivalence of two statements, Definition of Heat Engines, Heat pumps, Refrigerators Carnot and related problems. Air Standard



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cycles – Otto and Diesel cycle and their efficiencies and related Problems.

Unit III:

. **Fluid Mechanics:** Properties & Classification of Fluids – ideal & real fluids, Newton's law of viscosity, Newtonian & Non Newtonian Fluids, Compressible & Incompressible fluids Pressure at a point, Pascal's law, Measurement of Pressure, Continuity equation, Bernoulli's equation and its application

Unit IV:

Strength Of Materials: Concept of simple stresses and strains. Yield strength, Normal stress Shear stress, Bearing stress, Normal strain, Shearing strain, Hooke's law, poisson's ratio, Examples.

D. List of Practical: No practicals.

E. Teaching/Learning/Practice Pattern:

Teaching: 60 %

Learning: 40 %

Practice: 0%

F. Examination Pattern:

1. Theoretical Examination.

G. Reading List:

Books:

1. P. K. Nag , "Engineering Thermodynamics" 2nd Edition, Tata McGraw Hill Publisher
2. S. K. Som & G. Biswas, "Introduction to Fluid Mechanics & Fluid Mechines" Tata McGraw Hill
- 3 Timoshanko & Young, "Elements of Strength of Materials" D Van Nostrand Company
4. Mariam & Kraige, "Engineering Mechanics (Vol-II) Dynamics" Wiley Publisher
- 5 Meriam & Kraige, "Engineering Mechanics, Vol-I (Statics)" Wiley India

Magazine:

1. PopularMechanics Everyday
2. Engineering Magazine

Journals:

1. International Journal of Applied Mechanics and Engineering
2. Journal of Applied Mechanics, ASME
3. Journal of Engineering Mechanics, ASCE.

Name of the Module: Programming in C

Module Code: CSE 201

Semester: 2nd

Credit Value: 4 [P=8, T=0, L=0]

A. Objectives:

The course is designed to meet the objectives of:

1. introducing art, science and engineering of C programming language to the students of all UG programs,
2. teaching and training of different problems in data structures,



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3. guiding and training students to write efficient coding,
4. guiding & training students to fragment problems into different functions or units.

B. Learning outcomes:

Students successfully completing this module will be able to:

1. understand the basic terminology used in computer programming
2. write, compile and debug programs in C language in different operating systems.
3. design programs involving decision structures, loops and functions.
4. use and apply the dynamics of memory by the use of pointers in engineering applications.
5. use and apply the differences between structure oriented and function oriented programming in programming applications.

C. Subject matter:

Unit I:

Basic Idea: Algorithm, Flowchart, Program, Top down approach, Procedure oriented etc..

Keyword & Identifiers: History & Importance of C, Basic structure of C programs, C fundamentals: The C character set identifier, Constants and keywords, data types & size, variable names, declaration, statement, C token, symbolic constant.

Operators and Expression: Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment & Decrement operators, Condition Operators, Bitwise Operators, Special operators, precedence of arithmetic operators.

Managing Input & output operations: using of printf() & scanf().

Unit II:

Decision making: Simple If statement, if-else statement, nested if else statement, Switch statement, nested switch, the operator, goto statement.

Decision making & branching: while statement, do-while statement, for statement. Array

Unit III:

Array: Declaration, Initialization and processing One-dimension array, Two-dimension array and multi dimension array and their operations.

String & pointer: String: Operation on String without using library function and using library function. Pointer: Declaration of pointer variables, accessing the variable by using pointer, pointer increment and decrement operator, pointer and array.

Functions: Basic functions, function type, function with no argument & no return value, function with no argument but return value, function with argument & return value, Storage class identifier, Call by reference, Recursive function. Pointer to function.

Unit IV:

Structure & Union: Defining a structure, accessing of structure variable, structure and array, array within structure. Nested structure, structure & functions, Pointer & structure, Unions, Enum.

File management system: Advantage of using file, Open, close, read, write in the files, Operation on files.

Dynamic memory Allocation: use of Malloc, calloc, realloc, free. Library functions, Implementation of Linked list and their various operations.

The pre-processor: macro statements.

D. List of practicals: (Minimum eight experiments should be conducted by students)



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1. Write a program to find the two's complement of a given binary sequence.
2. Write a program to find the addition of two integer numbers by using 2's complement arithmetic.
3. Write a program to perform subtraction using 2's complement method.
4. Write a program to find the n-bits even/odd parity hamming code for the given binary sequences of r-bits.
5. Write a program to design the full adder logic and display the sum and carry of the provided binary inputs.
6. Write a program to design the truth table for any given function.
7. Write a program to find the shortest paths between each nodes of the given graph.
8. Write a program to design the traffic rules of a Junction Railway station consist with finite number of platforms.
9. Write a program to find the optimal weighted spanning tree from a graph.
10. Write a program to create a circular linked list and traverse the all the nodes.
11. Calculate the value of power factor, using two wattmeter methods, the first reading of wattmeter is $X W$ and that of second wattmeter is $Z W$, when the both the reading is positive.
12. From the experimental data of OCC (Open Circuit Characteristics) and SCC (Short Circuit Characteristics) of a $1-\Phi$ transformer, write a program for determining the parameters for the equivalent circuit.
13. Write a program to implement the Bernoulli's Equation.
14. Write a program to determination of Cantilever Beam – Concentrated load P at any point.
15. Write a program to determine the shear strength of soil by Triaxial and direct shear method.
16. Write a mini project to store all records of students and search by their name, roll number or registration number.
17. Write a program to create, edit, open, delete a file and perform different operations accordingly.
18. Write a program to backup one file to another file.
19. Write a program to merge two files.
20. Write a mini project to control mouse cursor and display whether left, right or scroll happens.

E. Teaching/ Learning/ Practice pattern:

Teaching: 40%

Learning: 10%

Practice: 50%

F. Examination pattern:

1. Theoretical Examination: Open book and on line.
2. Practical Examination: Conduct Programming test and viva voice.

G. Reading lists:

Books

1. Kernighan and Ritchie , “The 'C' programming language”, Prentice Hall.
2. Yashavant P. Kanetkar, “Let Us C”, Infinity Science Press, 2008.
3. Herbert Schildt, “C: The Complete Reference”, McGraw-Hill Education, 2000.
4. Balaguruswamy, “Programming In Ansi C, 5E”, Tata McGraw-Hill Education, 2011.



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5. Govil, Agrawal, Mathur & Pathak, "Computer Fundamentals and Programming in C", Jaipur Publication House(JPH)
6. M.T. Somashekara, "Programming in C", PHI Learning Pvt. Ltd., 2005.
7. Sinha&Sinha, "Foundations of Computing", BPB Publications, 2002.
8. J. B. Dixit, "Computer Fundamentals and Programming in C", Firewall Media, 2009.
9. Stephen G. Kochan, "Programming in C", Addison-Wesley Professional, 2014.
10. K. N. King, "C Programming: A Modern Approach", W.W. Norton, 2010.
11. Zed Shaw, "Learn C The Hard Way", Addison Wesley Professional, 2015.
12. Steve Oualline, "Practical C Programming, 3rd Edition", O'Reilly Media, Inc., 2003.
13. Ajay Mittal, "Programming In C: A Practical Approach", Pearson Education India, 2010.
14. A.P.Godse, D.A.Godse, "Computer Concepts and Programming in C", Technical Publications, 2008.

Magazines:

1. C/C++ Users, CMP Media LLC publication, United States.
2. EPS Software Corp/CODE Magazine, 6605 Cypresswood Drive, Suite 300 Spring, TX 77379.

Journals:

1. Science of Computer Programming:Methods of Software Design: Techniques and Applications, Elsevier, ISSN:0167-6423
2. Programming and Computer Software, Springer, ISSN: 0361-7688.
3. Dr. Dobb's Journal, United Business Media publication, United State,ISSN: 1044-789X
4. Journal of C Language, CMP Media LLC publication, United States
5. C vu Journal, ACCU, UK.

Name of the Module: Environmental Science

Module Code: CHY 201

Semester: 2nd

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is designed to meet the following objectives:

1. imparting the knowledge to the students in the area of Environmental Engineering.
2. providing teaching and learning to make students acquainting with advanced science and technology in Environmental Science.
3. injecting the future scope and the research direction in the discipline of Environmental Engineering.
4. making students competent to the research and development in Environmental Engineering.

B. Learning outcomes:

Students successfully completing this module will be able to:

1. adequately trained to become Scientist, trainers and Chemical Engineers.
2. skilled both to control and maintenance in Environmental pollution, waste water treatment and other related activities in Environmental Engineering.
3. be substantially prepared to take up prospective research assignments.

C. Subjects matter:

Unit-1



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Environment: Concepts of Environment, Environmental gradients, Tolerance levels of environment factor, EU, US and Indian Environmental Law. Chemistry in Environmental Engineering: Chemistry of the atmosphere, combustion related air pollution, global environmental problems - ozone depletion, greenhouse effect, acid rain etc.

Ecological Concepts: Biotic and Abiotic components, Ecosystem Process: Energy transfer, Food Chain and Food Web, Water cycle, Oxygen cycle, Carbon cycle, Nitrogen cycle etc., Soil chemistry. Soil composition, properties, identification and classification. Noise pollution Effect of noise on people, rating systems, community noise sources and criteria, traffic noise prediction, noise control. Noise standards, measurement and control.

Unit – II

Waste Water Treatment: Water Treatment: water quality standards and parameters, Ground water. Water treatment processes, Pre-treatment of water, Conventional process, advanced water treatment process. DO and BOD of Waste water treatment process, primary and secondary treatment of waste water, Activated sludge treatment: Anaerobic digestion, Reactor configurations and methane production.

Water resources, characteristics of water, water pollutants, oxygen demanding wastes, surface water quality, groundwater quality, water treatment systems, biomedical wastes treatment technologies and disposal options.

Unit – III

Solid waste, Definition and characteristics of industrial and hazardous wastes. Hazardous waste management, Solid Waste Management, Source classification and composition of MSW: Separation, storage and transportation, Reuse and recycling, Waste Minimization Techniques. Hazardous Waste Management, Hazardous waste and their generation, Transportation and treatment: Incinerators, Inorganic waste treatment. E.I.A., Environmental auditing, Hazardous substances and risk analysis: Hazardous substance legislation, risk assessment, hazard identification, potential carcinogens, toxicity testing in animals, human exposure assessment.

Unit-IV

Air quality standards, emission standards, criteria pollutants, air pollution and meteorology, atmospheric dispersion, emission controls. Air pollution and pollutants, criteria pollutants, Acid deposition, Global climate change –greenhouse gases, non-criteria pollutants, air pollution meteorology, Atmospheric dispersion. Industrial Air Emission Control. Flue gas desulphurization, NOx removal, Fugitive emissions.

D. Teaching/ Learning/ Practice pattern:

Teaching : 50%

Learning : 50%

(Teacher is to divide components for T/R/P)

E. Examination pattern:

1. Theoretical Examination: Open book and on line.

F. Reading lists:

Books:

1. G. Kiely, "Environmental Engineering Irwin", McGraw Hill International Edition, 1997.
2. Arcadio P. Sincero & Gergoria A. Sincero, "Environmental Engineering", PHI
3. M. L. Davis and S. J. Masen, "Principles of Environmental Engineering and Science", McGraw Hill International Edition, 2004
4. Curringham & Saigo, "Environmental Science", TMH.



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

5. *Gilbert M. Masters & Wendell P. Ela, "An Introduction to Environmental Engineering and Science", PHI Publication.*
6. *Gilbert M Masters, "Introduction to Environmental Engineering and Science".*
7. *J. G. Henry and G. W Heinke, "Environmental Science and Engineering".*
8. *M.L. Davis and D.A. cornwell, "Introduction to Environmental Engineering".*

Magazines:

1. *Applied Environmental Research Foundation*
2. *Environmental Science and Engineering*
3. *Climate Wire*
4. *Down to Earth*
5. *The Green Economist*
6. *Green Wire*

Journals:

1. *Journal of Environmental Science, Elsevier Publication*
2. *Environmental Science and Technology, ACS Publication*
3. *Energy and Environmental Science, RSC Publication*
4. *Environmental International, Elsevier Publication*

Name of the Module: Engineering Physics - II

Module Code: PHY 201

Semester: 2nd

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. imparting theoretical & practical knowledge to the students in the area of Engineering Physics.
2. providing teaching and learning to make students acquainting with modern state-of-art of Engineering
3. injecting the future scope and the research direction in the field of Physics with specific specialization.
4. making students competent to design & development of Engineering Physics.

B. Learning outcomes:

Students successfully completing this module will be able to:

1. adequately trained to become Engineers.
2. substantially prepared to take up prospective research assignments and will be substantially prepared to take up prospective research assignments.

C. Subject matter:

Unit I:

Electricity: Coulombs law in vector form, Electrostatic field and its curl, Gauss's law in integral form and conversion to differential form, Electrostatic potential and field, Poisson's Eqn. Laplace's Eqn.



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(Application to Cartesian, Spherically and Cylindrically symmetric systems-effective 1D problems)
Electric current, drift velocity, current density, continuity equation, steady state current Dielectrics-
concept of polarization.

Unit II:

Magnetostatics & time varying Field: Lorentz force, force on a small current element placed in a magnetic field, Biot-Savart law and its applications, divergence of a magnetic field, vector potential, ampere's law in integral form and conversion to differential form, Faraday's law of electromagnetic induction in integral form and conversion to differential form.

Electromagnetic theory: conception of displacement current, Maxwell's field equations, Maxwell's wave equation and its solution for free space, E.M wave in a charge free conducting media, skin depth, physical significance of skin depth, E.M. energy flow & Poynting vector.

Unit III:

Quantum Mechanics: Wave particle duality, Compton effect, Photo electric effect, Black body radiation, Heisenberg's uncertainty relation, concept of wave packet. Conception of probability and probability density, operators, commutator, Formulation of quantum mechanics and basic postulates, Time dependent Schrodinger's equation, Formulation of Time independent Schrodinger's equation, physical interpretation of wave function, Free particle and particle in a box.

Unit IV:

Statistical Mechanics: Concept of energy levels and energy states. Microstates, macrostates and thermodynamic probability, equilibrium macrostate. MB, FD, BE statistics (No deduction necessary), fermions, bosons (definitions in terms of spin, examples), physical significance and application, classical limits of quantum statistics Fermi distribution at zero & non-zero temperature, Bose-Einstein statistics - Planck's law of blackbody radiation.

D. List of practicals: (Minimum six experiments are required to be performed)

1. Determination of dielectric constant of a given dielectric material.
2. Determination of resistance of ballistic galvanometer by half deflection method and study of variation of logarithmic decrement with series resistance.
3. Determination of specific charge (e/m) of electron by J.J. Thomson's method.
4. Determination of Planck's constant using photocell.
5. Determination of Rydberg constant by studying Hydrogen/ Helium spectrum.
6. Determination of Stefan's radiation constant.
7. Verification of Bohr's atomic orbital theory through Frank-Hertz experiment.
8. Determination of Hall co-efficient of semiconductors.
9. Determination of band gap of semiconductors
10. Use of carry Foster's bridge to determine unknown resistance

E. Teaching/ Learning/ Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F .Examination Pattern:



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1. Theoretical Examination: Open book and on line.
2. Practical Examination: Conducting Experiment and Viva-Voce.

G. Reading lists:

Books:

1. Herbert Goldstein, Charles P. Poole and John Safko, "Classical Mechanics" 3rd edition, Pearson.
2. N. C. Rana and P. S. Joag, "Classical Mechanics", Tata McGraw Hill Education Private Limited, New Delhi.
3. D. Chattopadhyay and P. C. Rakshit, "Electricity and Magnetism", New Central Book Agency (P) Ltd.
4. David J. Griffiths, "Introduction to Electrodynamics," 3rd edition, PHI Learning Private Limited.
5. W. H Hayt and J A Buck, "Engineering Electromagnetics" 7th edition, Tata McGraw Hill Education Private Limited, New Delhi.
6. Eisenberg and Resnick, "Quantum Physics", 2nd edition, Wiley India.
7. F. Reif, "Statistical Physics" Tata McGraw Hill Education Private Limited, New Delhi.
8. S. N. Ghoshal, "Atomic Physics" S. Chand
9. Beiser, Mahajan and Choudhury, "Concepts of Modern Physics" Tata McGraw Hill Education Private Limited, New Delhi.
10. A. B. Gupta, "Modern Atomic and Nuclear Physics" BOOKS and Allied (P) Ltd.
11. Jeremy Bernstein, Paul M. Fishbane and Stephen G. Gasiorowicz "Modern Physics" Pearson.
12. Richard P. Feynman, Robert B. Leighton and Matthew Sands, "The FEYNMAN Lectures on Physics" Vol. I to Vol. IV, Pearson
13. D. Chattopadhyay and P. C. Rakshit, "An Advanced Course in Practical Physics" New Central Book Agency (P) Ltd.

Magazines:

1. Resonance
2. American Teacher
3. Scientific Physics
4. Physics Today
5. Physics For You
6. Physics Teacher (IPS)
7. Physics World (IoP-UK)
8. Physics News (IPA)

Journals:

1. Nature
2. Physical Review Letter
3. Physical Review A & B
4. Applied Physics Letters (APL)
5. Journal of Applied Physics (JAP)
6. American Journal of Physics
7. Proceedings of the National Academy of Sciences



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8. *Chemical Physics Letters*
9. *Journal of Physics: (Including A, B, C, D, E, F & G)*

Name of the Module: Digital Electronics & Logic Design

Module Code: ECE 201

Semester: 2nd

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. to make the students to build a solid foundation about Boolean algebra
2. to make the students to study Digital Logic Gates and Circuits
3. to provide a clear foundation of Modern Digital System

B. Learning outcomes:

At the end of this module, students are expected to be able to

1. clear understanding & utilization of logic gates
2. design and develop of advanced TTL logic circuits
3. utilization of Combinational and Sequential circuits, Counters, ADC and DAC

C. Subject matter:

Unit I:

Number Systems: Decimal, Binary, Octal and Hexadecimal systems, conversion of a number from one base to another.

Codes: BCD, Excess- 3, Gray, Reflected, ASCII, EBCDIC.

Algebra for logic circuits: Logic variables; Logic constants; Logic functions- NOT, AND, OR, NAND, NOR, Ex-OR;

Combinational circuits: Full Adder / Subtractor, BCD Adder, LAC Adder, Comparator, Decoder, Encoder, Priority Encoder, MUX/DEMUX & there structures, Combinational logic design using ROM array, Applications of MSI designs.

Unit II:

Minimization Techniques & System Design: Basic models of sequential M/C, Analysis of Asynchronous and Synchronous circuits, Synthesis of completely and incompletely specified synchronous sequential M/Cs, Combination & Sequential Circuits. Boolean Algebra (including Shanon's expansion theorem and consensus theorem); Ven diagram representation, Canonical representations-min-term, max-term; Karnaugh map simplification, Quine Mc-clusky minimization. Minimization of Multiple Input and multiple Output system. Introduction to state machines. Classification of State Machines. State Machine Applications. Analysis of State Machine, State table, State Diagram, State Equation, State reduction and State assignment.

Unit III:

Other Gates & Circuits: Difference between combinational and sequential circuits,

Sequential Gates: Triggering of sequential logic circuits. Difference between flip flop and latch – Construction of RS, D, JK, JK master slave, T flip flops using basic gates, preset and clear signal,

Shift Registers: Serial in serial out – Serial in parallel out, Parallel in serial out, Parallel in parallel out, Universal Shift Registers & their Applications.



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Counters: Asynchronous and synchronous counter, Ripple counter, Mod-N counter, Up-down counter, Ring counter, Johnson counter, Programmable counter – Applications. Design of Synchronous State Machine (including Counter) and Asynchronous state machine.

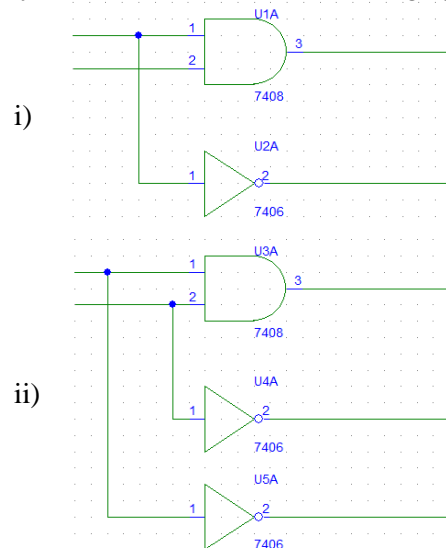
Unit IV:

Logic Families: Comparative studies of different type of logic families like RTL, Diode logic, DTL, TTL, IIL, HTL, ECL, MOS & CMOS etc. with the following characteristics: (a) logic levels, (b) power dissipation, (c) fan in and fan out, (d) propagation delay, and, (e) noise immunity.

Data Converters: Digital to Analog Converters: Binary weighted resistor type, R-2R ladder type, Specifications and applications of DA converter. Analog to Digital Converter: Comparator type, Successive approximation type, Dual slope AD converter, Specifications and applications of AD converter.

D. List of Experiments: (Minimum eight experiments should be conducted by students)

1. Study Data Hand Book and list atleast 5 chips for each of primary, secondary gates & flip-flops and draw their diagram with pin configuration.
2. Verify Truth Table of NOT, 2-input AND and 2-input OR gate thereby inference.
 - i) Single line definition of multiple input AND & OR gate.
 - ii) What is the primary difference between NOT gate from AND & OR gate.
3. Study the Truth Table of the following by circuits.



- iii) Compare the Truth Table of i) & ii) and that of AND gate and state inference.
4. Design Gray to Binary and Binary to Gray Converter & test
 5. Design and test byte operated even parity generator & then convert it to odd parity generator.
 6. Design and test (7,4) Hamming Code Generator and Error Correction decoder.
 7. Design a Majority Gate and use it & a XOR gate to realize Adder Circuit & Verify.
 8. With Serial Data input design a single circuit for test of >, < and = for two data.
 9. Minimize the following logic system with SOP by tabular technique & implement the circuit.
 - i) $f_1(A,B,C,D) = m_0 + m_1 + m_2 + m_3 + m_5 + m_6 + m_{10} + m_{13} + m_{15}$
 - ii) $f_2(A,B,C,D) = m_0 + m_1 + m_2 + m_3 + m_5 + m_7 + m_{10} + m_{13}$
 - iii) $f_3(A,B,C,D) = m_1 + m_2 + m_4 + m_5 + m_6 + m_7$
 10. Minimize the following logic circuit defined in POS by tabular minimization technique:
 - i) $f_1(X,Y,Z) = M_0.M_1.M_3.M_7$
 - ii) $f_2(X,Y,Z) = M_0.M_1.M_2.M_6.M_7$



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11. Write a C program to implement Tabular Technique for minimization of system as in problem (8) & (9)
12. Test Truth Table of
 - i) S – R flip flop
 - ii) J – K flip flop
 - iii) D – flip flop
 - iv) T – flip flop
13. Design 1 bit Read/Write memory with flip-flop and other logic gate & test.
14. Design Serial input & parallel output Shift register & test.
15. Design a binary counter & test.
16. Design one ADC & one DAC circuit & test.

E. Teaching/Learning/Practice pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.
2. Practical Examination: Conducting Experiment and Viva-Voice.

G. Reading lists:

Books:

1. J Crowe & B. Hayes-Gill, "Introduction to Digital Electronics", Newnes.
2. T. L. Floyd, "Digital Fundamentals" (9th Edition), Prentice Hall.
3. Taylor L. Both, "Introduction to Computer Engineering", 3rd Ed., John Wiley & Sons
4. R. P. Jain, "Modern Digital Electronics", Tata McGraw Hill.
5. R L Morris & J R Miller, "Designing with TTL integrated circuits", McGraw Hill
6. C. H. Roth (Jr.), "Fundamentals of Logic design", Cengage Engineering.
7. M. Morris Mano, "Digital Logic Design" (3rd Edition), Prentice Hall.
8. Malvino & Leach, "Digital Principles and Applications", Tata McGraw Hill.
9. Anand Kumar, "Fundamentals of Digital Circuits", Prentice Hall.

Magazines:

1. Planet Analog, <http://www.planetanalog.com/>
2. IEEE Spectrum, <http://spectrum.ieee.org/>
3. Electronics for you, EFY Enterprises Pvt. Ltd, New Delhi., <http://www.electronicsonline.com/>
4. Electropages, <http://www.electropages.com/>

Journals:

1. International Journal of Electronics Devices and Circuits.
2. IEEE Transaction on Computer-Aided Design of Integrated Circuits and System.
3. IEEE Transaction on Computer.

Name of the Module: Historiography of Science & Technology

Module Code: HSS 201



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Semester: 2nd

Credit Value: 3[P=0, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. providing teaching with inclusive learning.
2. imparting theoretical lectures with case discussion.
3. making students aware of the importance of this subject in their future career.

B. Learning outcomes:

Students successfully completing this module will be able to :

1. work with efficiency as they are equipped with background knowledge on the subject.
2. perform much better in their workplace.

C. Subject matter:

Unit I

Introduction: An overview: definitions, Different approaches to the scientific explorations, to introduce humanity's endeavour behind science and its application over the centuries, characteristics of historiography of science and technology.

Unit II

Motivation: Nature of drives, needs and motives, work motives, need of hierarchy theory and two factor theory of motivation, How to motivate the workers at work, factors effecting the morale of workers.

Lives of Eminent Scientists: To understand the Background, Opportunities, Achievements and Qualities in their efforts to become Scientist of first order.

Scientific Eras: Course of Civilization and Scientific Endeavour.

Contribution of science: Contribution to the present day World.

Unit III

Answers to the Criticism that Science has created a World full of Pollutions

A. Teaching/Learning/Practice pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

B. Examination pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.

F. Reading lists:

Books:

1. Agassi, Joseph. *Towards an Historiography of Science*, Wesleyan University Press. 1963.
2. Kragh, Helge *An Introduction to the Historiography of Science*, Cambridge University Press. 1990.
3. Kuhn, Thomas. *The Structure of Scientific Revolutions*, Chicago: University of Chicago, 1962 (third edn, 1996)
4. Gopalakrishnan, K.V. *Inventors Who Revolutionised Our Lives*, National Book Trust, India. 1999.

Magazines:

1. *Science and Technology Magazine*
2. *Historigraphy of contemporary Science and Technology*



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3. *Science News Letter*

Journals:

1. *Historiography in Graduate Technology*
2. *Innovation, Technology or History*
3. *Historiography of the Sciences*

Name of the Module: Basic Civil Engineering

Module Code: CE 202

Semester: 2nd

Credit Value: 2 [P=3, T=0, L=0]

A. Objectives:

The course is designed to meet the following objectives:

- a. increase the ability to understand Engineering Drawing.
- b. learn to sketch and take field dimensions.
- c. learn to take data and transform it into graphic drawings.
- d. learn basic engineering drawing formats.
- e. prepare the student for future Engineering positions.

B. Learning outcomes:

Upon completion of the subject:

- a. student's ability to perform basic sketching techniques will improve.
- b. students will be able to draw orthographic projections and sections.
- c. student's ability to use architectural and engineering scales will increase.
- d. students ability to produce engineered drawings will improve
- e. student's ability to convert sketches to engineered drawings will increase.
- f. students will become familiar with office practice and standards.

C. Subject matter:

Unit I:

Traditional Materials: stones, bricks, lime, cement, timber. Mortar: sand, cement mortar, mud mortar, special mortar, test on mortar
Concrete: plain concrete, reinforced cement concrete, reinforced brick concrete

Unit II:

Metals as Building materials: Ferrous metals, aluminum, copper. Miscellaneous Building materials: Glass, plastics, bitumen, asbestos, paints, distempers, varnishes, solid and hollow concrete Blocks, Roofing and flooring tile

Unit III:

Superstructures: Types of superstructure based on the method of load transfer, walls, stone masonry, brick masonry, plastering, pointing, flooring, roof, doors and lintels, stairs.

Unit IV:

Surveying: Introduction to surveying-Object and uses of surveying, primary divisions of surveying, fundamental principles of surveying, classification of surveying, plans and maps, scales.

D. Teaching/Learning/Practice pattern:



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Teaching : 40%

Learning : 10%

Practice : 50%

E. Examination pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.

F. Reading lists:

Books:

1. Rakesh Roshan Beohar, "Basic Civil Engineering", Laxmi Publications.
2. Ramamurtham, "Basic Civil Engineering", Dhanpat Rai and sons
3. S SBhavikatti "Basic Civil Engineering" New Age international Publishers,

Magazines:

1. *Civil Engineering and construction Review.*

Journals:

1. ASCE.
2. Springer.

Name of the Module: Workshop Practice-II

Module Code: ME 202

Semester: 2nd

Credit Value: 2 [P=3, T=0, L=0]

A. Objectives:

The course is design to meet the following objectives:

1. acquire skills in basic engineering practice.
2. identify the hand tools and instruments.
3. acquire measuring skills.
4. acquire practical skills in the trades.
5. acquire practical skills in welding, carpentry, fitting.

B. Learning outcomes:

Upon completion of the subject, students should have the knowledge of:

1. workshop safety.
2. handling workshop tools, machines.
3. different welding types.
4. different carpentry joints.
5. different tools and their working principle.

C. Subject matter:

Unit I:

Bench work and Fitting: Tools for laying out, chisels, files, hammers, hand hacksaw, their specifications and uses, plumbing, Sheet metal Work.



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Unit II:

Metal Joining: Definitions of welding, brazing and soldering processes, and their applications. Oxy acetylene gas welding process, equipment and techniques. Types of flames and their applications. Manual metal arc welding technique and equipment. AC and DC welding, electrodes, constituents and functions of electrodes. Welding positions. Types of weld joint. Common welding defects such as cracks, slag inclusion and porosity.

Unit III:

Machine Shop: Introduction, Basic Principles of Lathe, Shaper, Milling, Drilling, Grinding, Power Hacksaw, etc.

D. List of practicals:

1. To practice Gas welding using a 3mm thick mild steel plate. (Welding Shop)
2. To prepare a Lap joint and Butt joint by Gas Welding from 3mm thick mild steel plate (Welding Shop).
3. To practice Manual metal arc welding using a 5mm thick mild steel plate (Welding Shop).
4. To prepare various patterns using wood as a pattern material with the help of specific tools. (Carpentry Shop)
5. To perform various bench working operations like sawing, filing and finishing on a 5mm thick mild steel plate using specific tools (Fitting Shop).
6. To prepare jobs (Square, Angular and Semi Circular grooves) using 5mm mild steel plate using specific tools (Fitting Shop)
7. T-Lap joint and Bridle joint (Carpentry Shop).
8. Gas Welding practice on mild steel flat/sheet upto 3 mm thick.
9. Lap joint by Gas Welding (upto 3mm thick).
10. Manual Metal Arc Welding practice (upto 5mm thick).
11. Pattern Making. (Carpentry Shop)
12. Laying out (bench work); Sawing and Finishing by Filing.

E. Teaching/Learning/Practice pattern:

Teaching: 20%
Learning: 20 %
Practice: 60%

F. Examination pattern:

1. Job making.
2. Viva-voce.

G. Reading lists:

Books:

1. *M.L. Begeman and B.H. Amstead, "Manufacturing Process" John Wiley, 1968.*
2. *W.A.J. Chapman and E. Arnold, "Workshop Technology" Vol. 1, 2 & 3, CRC press Prentice Hall*
3. *B.S. Rghuwanshi, "Workshop Technology" Vol. 1 & 2 – Dhanpat Rai and Sons.*
4. *Hazra and choudhary "Workshop Technology" Vol. 1, 2, Media Promoters*
5. *Virender Narula "Workshop Technology", S.K. Kataria & Sons*
6. *Anderson "Shop Theory" Mc Graw Hill.*
7. *H.S. Bawa, "Carpentry: A complete guide", Tata McGraw Hill.*
8. *R. Little, "Welding & Welding Technology", Tata McGraw Hill.*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

9. L.M.Gourd, "Principles of welding technology", Edward Arnold Publishers.
10. R.S.Parmar, "Welding processes and technology" Khanna publication.

Magazines:

1. International Metal Working News.
2. Industrial Distribution

Journals:

1. International Journal of Machine Tools and Manufacture
2. Journal of Manufacturing Science and Engineering, Transactions of the ASME
3. Journal of Manufacturing Technology and Research

Name of the Module: Foreign Language (German/Chinese) (Audit)

Module Code: HSS202

Semester: 2nd

Credit Value: 2 [P=2, T=0, L=0]

A. Objectives:

The course is designed to meet the objectives of:

1. the French Language course accords to a method created for Indian students who are complete beginners in French and who wish to acquire verbal communication skills in current scenario.

B. Learning outcomes:

Students successfully completing this module will be able to :

1. develop four skills in French i.e. Reading, Writing, Speaking, Comprehension

C. Subject matter:

Unit-I:

Social Interaction: Self Introduction, Introducing Friends, Family & persons Topical writing, Essays
Description of persons Place, Things, Class, City, Country, House, Plan a Week-End, Excursion,

Unit-II:

Developing Writing Skills: Making Resume, Interviews Letter Writing, Rejecting or accepting proposals.
Invitation, Dialogues, Tastes & Preferences

Unit-III:

Professional Dialogue: Conversational French between Known & Unknown people, Telephonic
Conversation with Friends & Client

D. List of practicals:

1. Writing Resumes and Applications
2. Writing Memos
3. Reading Comprehension
4. Vocabulary
5. Presentation Skills
6. Group Discussion
7. Extempore

E. Teaching/ Learning/ Practice pattern:

Teaching: 40%



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Learning: 10%

Practice: 50%

F. Examination pattern:

1. Theoretical Examination

G. Reading lists:

Books:

1. *Suggested book-Ailes Volume-II*
2. *G. Mauger: II (La Langue et de Civilisation francaise) Alliance française Paris Ile-de-France.*

SEMESTER – III

Subject Code	Subject	P	T	L	Credit
MAS 301	Discrete Mathematics	0	1	3	4
EE 301	Circuit Theory & Network	2	0	3	4
CSE 301	Computer Organization & Architecture	2	0	3	4



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CSE 302	Data Structure & Algorithm	2	0	3	4
ECE 301	Electronics Circuit & Devices – I	2	0	3	4
ECE 302	Electronics Instrument & Measurement	2	0	3	4
HSS 301	Behavioral Science	0	0	2	2
	Total	10	1	20	26

Name of the Module: Discrete Mathematics

Module Code: MAS 301

Semester: 3rd

Credit Value: 4 [P=0, T=1, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. To extend student's Logical and Mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.
2. Apply logical reasoning to solve a variety of problems.

B. Learning outcomes:

Upon completion of the subject:

1. Students will have acquired greater precision in logical argument and have gained a core mathematical understanding of discrete mathematics.
2. Students will have learned and practised basic concepts of mathematical proof (direct proof, proof by contradiction, mathematical induction).
3. Students will be able to handle the standard logical symbols with some confidence.
4. Students will have learned elementary combinatorial and counting techniques and how to apply them to simple problems.
5. Students will be able to simplify complex mathematical expressions and apply general formulae to specific contexts.
6. Students will have learned how to state precisely and prove elementary mathematical statements and solve problems.
7. Students will have a basic understanding of information technology and its use in mathematical contexts.

C. Subject matter:

UNIT I:

Sets and Properties: Finite and Infinite Sets, Combinations of Sets, Unaccountably Infinite Sets, Mathematical Induction, Principle of Inclusion and Exclusion, Multisets, Propositions.

Permutations, Combinations, and Discrete Probability: The Rules of Sum and Product, Permutations, Combinations, Generation of Permutations and Combinations, Discrete Probability, Conditional Probability, Information and Mutual Information.

Relations and Functions: A Relational Model for Data Bases, Properties of Binary Relations, Equivalence Relations and Partitions, Partial Ordering, Relations and Lattices, Chains and Antichains, A Job-Scheduling Problem, Functions and the Pigeonhole Principle.

UNIT II:



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Graphs and Planar Graph: Basis Terminology, Multigraphs and Weighted Graphs, Paths and Circuits, Shortest Paths in Weighted Graphs, Eulerian Paths and Circuits, Hamiltonian Paths and Circuits, The Traveling Salesperson Problem.

Trees and Cut-Sets: Trees, Rooted Trees, Path Lengths in Rooted Trees, Prefix Codes, Binary Search Trees, Spanning Trees and Cut-Sets, Minimum Spanning Trees.

UNIT III:

Discrete Numeric Functions and Generating Functions: Manipulation of Numeric Functions, Asymptotic Behavior of Numeric Functions, Generating Functions, Combinatorial Problem.

Recurrence Relations and Recursive Algorithms: Recurrence Relations, Linear Recurrence Relations with Constant Coefficients, Homogenous Solutions, Particular Solution.

UNIT IV:

Group and Rings: Groups, Subgroups, Generators and Evaluation of Powers, Cosets and Lagrange's Theorem, Permutation Groups and Burnside's Theorem, Codes and Group Codes, Isomorphisms and Automorphisms, Homomorphisms and Normal Subgroups, Rings, Integral Domains, and Fields.

Boolean Algebra: Lattices and Algebraic Systems, Principle of Duality, Basic Properties of Algebraic System, Defined by Lattices, Distributive and Complemented Lattices, Boolean Lattices and Boolean Algebras, Uniqueness of Finite Boolean Algebras, Boolean Functions and Boolean Expressions, Propositional Calculus.

D. List of Experiments: NIL

E. Teaching/ Learning/ Practice pattern:

Teaching: 70%

Learning : 30%

Practice : 0%

F. Examination pattern:

1. Theoretical Examination:

G. Reading lists:

BOOKS:

1. C.L. Liu, "Elements of Discrete Mathematics", Tata Mc Graw Hill, 2011.
2. Kolman B, Busby R. C, Ross S.C, "Discrete Mathematical Structures", PHI Learning, 2011.
3. D.S Malik & M.K.Sen, "Discrete Mathematical Structures: Theory & Applications", Thomson India Edition, 2004.
4. T. Veerarajan, "Discrete Mathematics", Mc Graw Hill, 2012.
5. N. Chandrasekaran, M. Umaparvathi, "Discrete Mathematics", PHI Learning Private Limited, 2010.
6. Babu Ram, "Discrete Mathematics", Pearson, 2011.
7. S. Lipschutz, Marc L. Lipson, "Discrete Mathematics", Schaum's outlines, Tata Mc Graw Hill, 2010.
8. Norman L. Biggs, "Discrete Mathematics", Oxford, 2nd Edition, 2009.
9. S. K. Chakraborty, B. K. Sarkar, "Discrete Mathematics", Oxford University Press, 2011.
10. K. D. Joshi, "Applied Discrete Structures", New Age International Publishers, 2003.
11. Rowan Garnier & John Taylor, "Discrete Mathematics", CRC Press, 2011.
12. Johnsonbaugh, "Discrete Mathematics", Pearson, 2011.



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MAGAZINES:

1. *Current Science (Indian Academy of Science)*
2. *The Mathematics Student (Math Student) (Indian Mathematical Society)*
3. *Mathematical Spectrum (The University of Sheffield)*
4. *Mathematics Magazine (Mathematical Association of America)*
5. *+Plus magazine (University of Cambridge)*
6. *Ganithavahini (Ramanujan Mathematical Society)*
7. *Mathematics Today, London Metropolitan University.*

JOURNALS:

1. *SIAM Journal on Discrete Mathematics.*
2. *Open Journal of Discrete Mathematics. Website: [http:// www. scirp. org/journal/ojdm/](http://www.scirp.org/journal/ojdm/)*
3. *Discrete Mathematics, Elsevier.*
4. *Journal of Discrete Mathematics, Hindawi Publishing Corporation.*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Circuit Theory & Networks

Module Code: EE301

Semester: 3rd

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. Imparting knowledge to the students for classification of networks and systems based on different criteria and their analysis using network theorems,
2. Applicability of Fourier and Laplace transforms in circuit analysis,
3. Making familiar with SPICE modeling,
4. Use of MATLAB for circuit solving procedures.

B. Learning outcomes:

Upon completion of the subjects:

1. Students will be made aware of the basic Network Theorems and their applicability in DC Bilateral Linear Circuits.
2. Students will be skilled both theoretically and practically for circuit modeling and study of various parameters related to circuit theory.
3. Students will be trained for use of simulation software like PSPICE and MULTISIM.

C. Subject matter:

UNIT I:

Different types of systems & networks: continuous & Discrete, Fixed and Time varying, linear and Non-linear, Lumped and distributed, Passive & Active Networks & Systems and Laplace transform of impulse and sinusoidal steps waveforms for RL, RC, LC and RLC Circuits. Transient analysis of different electrical circuits with and without initial conditions, Fourier series and Fourier Transform.

UNIT II:

Network theorems and their applications in circuit analysis, Formulation of network equations, Source transformations, Loop variable analysis and node variable analysis. Graph of network, concept of tree branch, tree link. Incidence matrix, Tie-set matrix and loop currents, Cut set matrix and node pair potentials.

UNIT III:

Two port networks, Open circuit Impedance and Short circuit Admittance parameters, Transmission parameters, hybrid parameters, and their inter-relations. Indefinite admittance matrix-their applications to the analysis of active network. Active filter analysis and synthesis using operational amplifier.

UNIT IV:

SPICE: How SPICE works. Model statement, models for passive and active device, D.C. circuits analysis, small signal analysis, capacitors and inductors in D.C. Circuits, steady state and transient, plotting and printing, input and output Impedance, D.C. sensitivity analysis, harmonic decomposition (Fourier Series), Harmonic re-composition, voltage controlled components

D. List of Experiments: (Minimum eight experiments should be conducted by students)

1. Transient response in R-L and R-C Network: Spice, Simulation/hardware



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2. Transient response in R-L-C Series & Parallel circuits Network: Simulation/hardware
3. Determination of Impedance (Z) and Admittance(Y) parameters of two port network
4. Frequency response of LP and HP filters
5. Frequency response of BP and BR filters
6. Generation of Periodic, Exponential, Sinusoidal, Damped sinusoidal, Step, Impulse, Ramp signals using MATLAB in both discrete and analog form
7. Evaluation of convolution integral, Discrete Fourier transform for periodic & non-periodic signals and simulation of difference equations using MATLAB.
8. Representation of poles and zeros in z-plane, determination of partial fraction expansion in z-domain and cascade connection of second order system using MATLAB
9. Determination of Laplace transform and inverse Laplace transformation using MATLAB
10. Spectrum analysis of different signals

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.
2. Practical Examination: Conducting Experiment and Viva-Voice.

G. Reading List:

BOOKS:

1. *Sudhakar, "Circuits & Networks", Analysis & Synthesis 2/e TMH New Delhi*
2. *Valkenburg M.E.Van, "Network Analysis", Prentice Hall.*
3. *Engineering circuit analysis with PSPICE and probe-Roger*
4. *Engg Circuit Analysis: Hayt 6/e Tata Mcgraw-Hill*
5. *A.Chakravarty: Networks, Filters & Transmission Lines*
6. *D. Chattopadhyay and P.C. Rakshit: ElectricalCircuits*
7. *A.V. Oppenheimer and A.S.Wilsky: Signals & Systems, PHI*
8. *R.V.Jalgaonkar.: Network Analysis & Synthesis. EPH.*
9. *Sivandam-Electric Circuits Analysis. Vikas*
10. *Reza F.M. and Seely S., "Modern Network Analysis", Mc.Graw Hill Book Company*
11. *Roy Choudhury D., "Networks and Systems", New Age International Publishers.*
12. *KuoF.F., "Network Analysis & Synthesis", John Wiley & Sons.*

MAGAZINES:

1. *EDN*
2. *Electrical India Magazine*

JOURNALS:

1. *Circuits and Systems, IEEE Transactions*
2. *Circuits, devices and Systems, IET.*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Computer Organization & Architecture

Module Code: CSE 301

Semester: 3rd

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet with the objectives of:

1. Helping the students to develop an understand the nature and characteristics of the organisation and design of the modern computer systems,
2. Focusing on the organisation & operation of the CPU. The Intel Pentium CPU will be used as the main case study.

B. Learning outcomes:

Students successfully completing this module will be able to:

1. Understand the key concepts that are likely to be included in the design of any modern computer system,
2. Understand and to apply the basic metrics by which new and existing computer systems may be evaluated,
3. Understand and to evaluate the impact that languages, their compilers and underlying operating systems have on the design of computer systems,
4. Understand and to evaluate the impact that peripherals, their interconnection and underlying data operations have on the design of computer systems,
5. Demonstrate the techniques needed to conduct the design of a computer ,
6. Examine different computer implementations and assess their strengths and weaknesses.

C. Subject matter:

UNIT I:

Concepts and Terminology: Digital computer components Hardware & Software and their dual nature, Role of Operating Systems (OS).

UNIT II:

The ALU: ALU organization, Integer representation, Serial and Parallel Adders, 1s and 2s complement arithmetic, Multiplication of signed binary numbers, floating point number arithmetic, Overflow detection, Status flags. Instruction formats, Addressing modes, Instruction execution with timing diagram.

UNIT III:

The CPU: Instruction sequencing, hardwired control unit, microprogrammed control unit, interfacing of memory and I/O.

UNIT IV:

Memory Unit: Memory classification, Bipolar and MOS storage cells. Organization of RAM, address decoding, Registers and stack, ROM and PROM-basic cell. Organization and erasing schemes, Magnetic memories-recording formats and methods. Disk and tape Units. Concept of memory map. Timing diagrams, T-States, Timing diagram Controlling arithmetic and logic instructions. Instruction sequencing with examples. Introduction to Micro- programming, Variations in Micro-programming configuration.



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

D. List of Experiments: (Minimum eight experiments should be conducted by students)

1. Design Ripple Carry Adder
2. Design Carry-look-ahead adder
3. Design Registers and Counters
4. Design Wallace Tree Adder
5. Design Combinational Multipliers
6. Design Booth's Multiplier
7. Design Arithmetic Logic Unit
8. Memory Design
9. Associative cache Design
10. Direct Mapped cache Design
11. CPU Design

E. Teaching/ Learning/ Practice pattern:

Teaching: 40%

Learning: 10%

Practice: 50%

F. Examination pattern:

1. Theoretical Examination: Regular Examination.
2. Practical Examination: Conducting experiment and viva voice

G. Reading lists:

BOOKS

1. J. P. Hayes, "Computer Architecture & Organisation", McGraw Hill, 1998
2. C. Hamacher, Z. Vranesic, "Computer Organisation", Tata Mcgraw Hill, 2011.
3. M. Jain, S. Jain, V. Pillai, "Computer Organization and System Software", BPB Publications, 2003.
4. P. Pal Chaudhuri, "Computer Organisation & Design", PHI Learning Private Ltd., 2009.
5. M.M. Mano, "Computer System Architecture", Pearson Education.
6. T. K. Ghosh & A. J. Pal, "Computer Organization & Architecture", Tata McGraw-Hill,
7. A. S. Tanenbaum, T. Austin, "Structured Computer Organisation", Pearson, 2013.
8. M. Rafiqzaman, "Computer Architecture", Prentice Hall of India.

MAGAZINES:

1. IEEE Micro Magazine, IEEE Computer Society, United State.

JOURNALS:

1. IEEE Transactions on Computers, IEEE, Computer Society, United State.
2. ACM Transactions on Computing Systems (TECS), ACM New York, United State.
3. Journal of Systems Architecture, Elsevier, Netherlands



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Data Structure & Algorithm

Module Code: CSE 302

Semester: 3rd

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet with the objectives of:

1. Designing principles of algorithms and data structures,
2. Learning efficiency and scaling of algorithms,
3. Learning essential algorithms in computing,
4. Understanding generic data structures for common problems.

B. Learning outcomes:

Students successfully completing this module will be able to:

1. assess performance efficiency of sequential algorithms,
2. design data structures to enable algorithms and design sequential algorithms for performance,
3. implement designing algorithms and corresponding data structures using object oriented programming languages,
4. demonstrate deployment of essential data structures such as lists, stacks, queues, and trees,
5. demonstrate the use of algorithm design methods such as divide and conquer.

C. Subject matter:

UNIT I:

Introduction: Basic concept of data, structures and pointers.

Arrays: Representation, implementation, polynomial representation, limitations.

Strings: Representation, String operations, implementing string.h library functions.

UNIT II:

Recursion - Design of recursive algorithms, Tail Recursion, When not to use recursion, Removal of recursion.

Linked List: Static and dynamic implementation. Single, double, circular, multiple linked lists.

Stacks: Recursion and Stacks. Static and dynamic implementation. Expression evaluation. Infix, postfix expressions, multiple stacks. Queues: Static and dynamic implementation, circular queues, and implementation.

UNIT III:

Hash Tables: Hash tables implementation. Hashing techniques, single, double.

Storage Management: Memory Management techniques, garbage collection.

Trees: Binary trees, binary search trees, static and dynamic implementation. AVL tree, B+ tree, B tree, tree operations, insert, delete, and search.

Heaps: Implementation, sorting etc.

Sorting and Searching: Different sorting techniques. Insertion sort, selection sort, bubble sort, radix sort, quick sort, merge sort, heap sort.

UNIT IV:

File Structures: Sequential and Direct Access. Relative Files, Indexed Files - B+ tree as index, Multi-indexed Files, Inverted Files, Hashed Files.

Graphs: Representation of graphs, BFS, DFS sort.



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D. List of Experiments: (Minimum eight experiments should be conducted by students)

1. Experiments should include but not limited to: Implementation of array operations.
2. Implementation of Stacks and Queues: adding, deleting elements Circular Queue: Adding & deleting elements Merging Problem: Evaluation of expressions operations on Multiple stacks & queues:
3. Implementation of linked lists: inserting, deleting, and inverting a linked list. Implementation of stacks & queues using linked lists. Eg, Railway ticketing system, CD's in the case wearing bangles.
4. Implementation of polynomial addition, polynomial multiplication, sparse Matrices: multiplication, addition. Recursive and Non recursive traversal of Trees
5. Implementation of threaded binary tree traversal.
6. Application of Trees. Application of sorting .
7. Implementation of different types of searching techniques like linear search, binary search with real life analysis.
8. Hash tables implementation: searching, inserting and deleting, searching & sorting techniques.
9. Implementation of recursive function using Tower of Hanoi.
10. Implementation of External memory data structure using B tree.
11. Implementation of AVL tree.

E. Teaching/ Learning/ Practice pattern:

Teaching: 40%

Learning: 10%

Practice: 50%

F. Examination pattern:

1. Theoretical Examination: Open book and on line.
2. Practical Examination: Conducting experiment and viva voice

G. Reading lists:

BOOKS:

1. Seymour Lipschutz, "Data Structure", Schaum's Outlines, Tata McGraw-Hill.
2. P. S. Deshpande, O. G. Kakde, "C & Data Structures", Charles River Media, 2004.
3. Aho Alfred V, Hopperoft John E., Ullman Jeffrey D, "Data Structures and Algorithms", Addison Wesley, 1998.
4. Adam Drozdek, "Data Structures and Algorithms in C++", Cengage Learning.
5. Heileman, "Data Structures, Algorithms & Object Oriented Programming", Tata Mcgraw-Hill Publishing Company Limited.
6. Mariappa Radhakrishnan, "Data Structures Using C", BPB Publications, 2001.
7. Mark Allen Weiss, "Algorithms, Data Structures, and Problem Solving with C++", Addison-Wesley Publishing Company, 1996.
8. Horowitz Ellis & Sartaj Sahni, "Fundamentals of Data Structures", Galgotria Publications
9. Aaron M. Tanenbaum, "Data Structures using C", Pearson Education.
10. Ajay Agarwal, "Data structure Through C", Cyber Tech Publications, 2005.

MAGAZINES:

1. MSDN Magazine, Microsoft and 1105 Media, USA
2. IBM system Magazine, IBM, USA

JOURNALS:



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1. *IEEE Transactions on Computers, IEEE, Computer Society, United State*
2. *ACM Transactions on Embedded Computing Systems (TECS), ACM, United State*
3. *Journal of Systems Architecture, Elsevier, Netherlands*
4. *Journal of Discrete Algorithms (JDA), Elsevier, Netherlands*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Electronics Circuit & Devices – I

Module Code: ECE301

Semester: 3rd

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. Making the students to build a solid foundation about science & technology of the basic electronic elements, circuits and devices, namely, junction theory, electrons, holes, diodes and transistors
2. Making the students to study the characteristics and hence functions & performance parameters of basic electronics devices
3. Providing a clear foundation of making different circuits using different combinations of different diodes and transistors
4. Making student to understand the measurement parameters and criteria of circuits likes rectifiers, bias circuits, amplifiers

B. Learning outcomes:

Students successfully completing this module will be able to:

1. Clear understanding & utilization of semiconductor devices & fabrication.
2. Design and develop different electronic circuits made by diodes and bipolar junction transistors.
3. Measure their performances to apply in particular systems.

C. Subject matter:

UNIT I:

Junction Theory: Conduction in solids. Pure and doped semiconductor, Metal Semiconductor Junction, Concept of holes, Electron and hole mobility, Band Diagram, Ohmic & rectifying effects, Depletion & capacitance effects, Semiconductor-semiconductor junction, p-n junction, homo & hetero junction, Equilibrium band diagram, Potential diagrams of p-n junction.

UNIT II:

p-n diodes: Metal-insulator-semiconductor junctions, Band diagram, p-n junction diodes, diode mechanism & I-V characteristics, Equivalent circuits of diodes, biased p-n diode, Schottky diode, Avalanche and Zener effect, Zener diode and its I-V characteristics, Degeneration, Large doping, Tunnel diode & its I-V characteristics, Backward diode, Half wave and Full wave rectifier circuits, clipping and clamping circuits.

UNIT III:

Bipolar Junction Transistors Theory: n-p-n and p-n-p junctions (BJT), transistors characteristics: Emitter, Collector and Base terminals, I-V characteristics, transfer characteristics, input-output characteristics, Biasing and Stability of transistors' bias circuits in different modes: Self Bias-CE, CB, CC, Small signal model of transistor.

UNIT IV:

Power Amplifiers and OPAMP: Introduction to Power amplifiers – Class A, B, AB, C, Push pull & Tuned amplifier. Introduction, characteristics of OPAMP, open-loop OPAMP configurations: differential amplifier, inverting and non-inverting amplifier.

UNIT V:



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FET, MOSFET, Constant Current Source, FET as VCR, High Input Impedance Source Follower, High Input Impedance Emitter Follower.

D. List of Experiments: (Minimum eight experiments should be conducted by students)

1. Design, implement and measure with graphical analysis of input and output of clipping and clampers circuits with p-n junction diode. Differentiate clipping from clampers in terms of engineering applications based on experimental results and diagrams.
2. Design and study of the input / output of self - bias transistor circuits of different modes: CE, CB, CC Measurement of the gain and the transconductance, and a comparison of the different modes.
3. Design, implement and measure gain, input and output resistance of CE mode voltage amplifier.
4. Design, implement and measure input and output resistance of a RF amplifier with CE mode.
5. Design, implement and measure with graphical analysis of heat dissipation of a Class C amplifier
6. Design, implement and measure of gain of any push pull amplifier
7. Design, implement and measure of differential & common mode gain of a differential amplifier
8. Design a circuit to study OPAMP Inverting and Non- inverting amplifier / Calculate gain, input impedance & propose some industrial application of the circuits so designed.
9. Design & analysis a High Input Impedance Source Follow.
10. Design FET as a VCR by PSpice simulator package.

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.
2. Practical Examination: Conducting Experiment and Viva-Voice.

G. Reading List:

BOOKS:

1. Millman&Halkias, "Integrated Electronics"(3rd Edition), Tata McGraw Hill.
2. Chattopadhyaya, Rakhist, Saha and Porkait, "Foundation of Electronics"(3rd Edition), New Age International Publisher (2014)
3. S M Sze and Kwok K. Ng, "Physics of Semiconductor Devices", (3rd Edition), Wiley- Interscience.
4. Donald A. Neaman, "Semiconductor Physics & Devices: Basic Principle", (3rd Edition), Tata McGraw Hill, New Delhi.
5. Horowitz & Hill, "The Art of Electronics"(3rd Edition), Cambridge University Press.
6. R L Smith, "Electronics: Circuits & Devices"(3rd Edition), John Wiley & Sons Ltd
7. Streetmann and Banerjee, "Solid State Electronic devices"(7th Edition), Prentice Hall, 2014.
8. D. RoyChowdhury and S. B. Jain, "Linear Integrated Circuits"(2nd Edition), New Age International Publishers, 2004.

MAGAZINES:

1. Planet Analog, <http://www.planetanalog.com/>
2. IEEE Spectrum, <http://spectrum.ieee.org/magazine>
3. Electronics for you, <http://www.electronicshobby.com>
4. Electropages, <http://www.electropages.com/>



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

JOURNALS:

1. *International Journal of Electronics(Taylor Francis) .*
2. *IEEE Transaction on Circuits and System I – Regular Papers.*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Electronic Measurement and Instrumentation

Module Code: ECE 302

Semester: 3rd

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. To build a solid foundation about basics measurement techniques.
2. To understand the measurement parameters and criteria of measurement.
3. To build a solid foundation of the Moving coil, Moving Iron, dynamometer, Wattmeter.
4. Measurement technique of various parameters by CRO.

B. Learning Outcomes:

Students successfully completing this module will be able to:

1. clear understanding & utilization of different instruments.
2. design and develop different instruments.
3. measure their performances to apply in particular systems.
4. know about different Transducers and actuators.

C. Subject Matter:

UNIT I:

Basic Measurement Techniques: Moving coil, Moving Iron, dynamometer, Wattmeter, Electrostatic Instruments,

Errors in Measurement: Definition of accuracy, precision speed of response, non-linearity, techniques of linearization, classification of errors, Statistical analysis, Introduction to reliability.

UNIT II:

AC/DC Bridges: Wheatstone Bridge Principle, Kelvin, Wein, Anderson Bridge and Scherring Bridges, measurement of inductance, capacitance, resistance and frequency.

UNIT III:

Cathode-Ray Oscilloscope: Construction and principle of operation, Sweep and sweep synchronization, Measurement of various parameters by CRO, High frequency and low frequency limitations – sampling and storage oscilloscopes. Frequency domain instruments, Wave analyzer, spectrum analyzer. Digital Instrumentation – DVM, DMM, frequency counter.

UNIT IV:

Transducers and actuators: piezoelectric sensors, LVDT, Measurement of pressure, Temperature and flow. Special Purpose Instruments: Signal generators, Q-meter.

D. List of Experiments: (Minimum eight experiments should be conducted by students)

1. Instrument workshop – observe the construction of PMMC, Dynamometer, Electro thermal and Rectifier type instrument, Oscilloscope and digital multimeter.
2. To Calibrate moving iron and electro-dynamometer type ammeter/voltmeter by potentiometer
3. To Calibrate dynamometer type Wattmeter by potentiometer
4. Study of voltage shunt and series ammeter behaviour.



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

5. To Calibrate A. C. energy meter
6. Measure the resistivity of material using Kelvin Double Bridge
7. Measurement technique of power using Instrument transformer
8. Measurement technique of in Polyphase circuits
9. Measurement technique of Frequency by Wien Bridge using Oscilloscope
10. Measurement technique of by Anderson Bridge
11. Measurement technique of Capacitance by De Sauty Bridge
12. To Study of static characteristic (accuracy, precision, hysteresis, repeatability, linearity) of a measuring instrument.
13. To Study of dynamic characteristic (fidelity, speed of response)
14. To Acquaintance with basic structure of DMM and measurement of different electrical parameters.
15. To Statistical analysis of errors in measurement using computer simulation
16. To Study of advanced A/D converter along with its associate circuitry
17. To Study of advanced D/A converter
18. Realization of Data Acquisition System
19. Wave and spectrum analysis using digital storage oscilloscope & spectrum analyzer.

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.
2. Practical Examination: Conducting Experiment and Viva-Voce.

G. Reading list:

BOOKS:

1. H. S. Kalsi, "Electronic Instrumentation", Tata McGraw-Hill Education
2. Helpic & Cooper, "Modern Electronic Instrumentation and Measuring Instruments", PHI/Pearson Education
3. Nakra & Chowdhury, "Instrumentation, Measurement and Analysis", Tata McGraw-Hill Education
4. Golding & Widdis, "Electrical Measuring Instruments & Measurements" Pitman
5. A.K. Sawhany, "A course in Electrical & Electronic Measurement & Instruments", Dhanpat Rai.
6. J. J. Carr, "Elements & Electronic Instrumentation and Measurement", Prentice Hall
7. A. J. Bowens, "Digital Instrumentation", Tata McGraw-Hill Education

MAGAZINE:

1. Electronics For You
2. Electronics Business Magazine. <http://www.ebmag.com/>
3. Chip, <http://www.chip.in/>

JOURNALS:

1. Journal of Electronic Measurement and Instrument
2. Instruments and Experimental Techniques (Springer)
3. IEEE Spectrum
4. Bell Systems Technical Journal



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Behavioral Science

Module Code: HSS301

Semester: 3rd

Credit Value: 2 [P=0, T=0, L=2]

A. Objectives:

The course is designed to meet the objectives of:

1. Imparting theoretical lectures with case discussion.
2. Providing teaching with inclusive learning.
3. Making students aware about the importance of this subject in their future career.

B. Learning outcomes:

At the end of this module, students are expected to be able to

1. Work with efficiency as they had knowledge of the subject.
2. With the backup knowledge their performance will definitely be much better in their workplace.

C. Subject matter:

UNIT I:

Behavioral Science: An overview: definitions, Man the critical factor, Behavioral science and its historical development.

Motivation: Nature of drives, needs and motives, work motives, need hierarchy theory and two factor theory of motivation, how to motivate the workers at work, factors effecting the morale of workers.

UNIT II:

Industrial Sociology: Concept and Definitions; Importance for Engineers; Growth; Criticism of the Hawthorne Studies; Nature and scope of Industrial sociology, Industry and Community, Industry and Tradition in India.

Society and Technical Change: Concept of social change, meaning and definitions of social change, nature of Social change. Factors such as Natural, Cultural, Economic, Planning, Technological, Indian Information Technology Scenario, Effect of Technology on Social Institutions.

Society and Environment: Meaning and Definitions, Characteristics, Classification of Environment, Physical Environment and its Influence, Social Environment and its some basic elements, Environment in Industry, Illumination, Noise, Atmospheric Conditions, Music and Colour.

UNIT III:

Groups: Meaning and Definitions, types of Groups, characteristics, functions of formal and informal groups, merits and demerits of informal groups.

UNIT IV:

Human relations: Historical overview, definitions, early and later approaches to human relations, strategies for establishing healthy human relations.

Labour management relations: Industrial relations; meaning, objectives and definitions, Dunlop's theory of industrial relations, Psychological and Gandhian approach to industrial relations, industrial relations in Japan and India, industrial relation in coming years, challenges of coming years, new dimensions of industrial relations, the ways of industrial peace. Trade unions; meaning and definitions, functions of Indian trade Unions, recent emerging trends in Indian trade unions.



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D. Teaching/Learning/Practice Pattern:

Teaching	: 50%
Learning/ case presentation	: 30%
Assignment	: 10%
Attendance	: 10%

E. Examination Pattern:

1. Theoretical Examination	: 50
2. Class test	: 30
3. Assignment	: 20

F. Reading List:

BOOKS:

1. *Wendell L. French, Human Resource Management (4th Ed.)* Proston: Honshto Mittin, 1998.
2. *H.Fayol, Industrial and General Administration, Paris: Dunod, 1916.*
3. *Mintzberg, the Nature of Managerial Works: Upper Saddle River, N.J Printice Hall, 1973.*
4. *Fred N.Ker Linger, Behavioral Research: A conceptual Approach, New York:Holt Rinehart and Winston,1979*
5. *Milter William R. And Stephen Rollnick, Motivational Interviews, (3rd ed.), Sept 7, 2012.*
6. *Daniel Kahnmen, Thinking Fast and Slow, April 2, 2013.*
7. *Elizabeth, D. Hutchison. Essentials of Human Behaviour, September 3, 2013.*
8. *Susan P.Robbins, Pranal Chatterjee, Edward R.Canda, Contemporary Human Behaviour Theory, 2013.*

MAGAZINES:

1. *Leadership Quarterly*
2. *HBR Magazine*

JOURNALS:

1. *Journal of Behavioural Sciences*
2. *Behavioural and Brain Sciences*
3. *Journal of Contextual Behavioural Sciences*
4. *Harvard Business Review*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

SEMESTER - IV

Subject Code	Subject	P	T	L	Credit
MAS 401	Stochastic Processes	0	1	3	4
MAS 402	Computational Numerical Method	2	0	3	4
ECE 401	Principal of Communication Engineering	2	0	3	4
ECE 402	Signal & System	0	0	3	3
ECE 403	Electronics Circuit & Devices - II	2	0	3	4
EE 405	Control Engineering	2	0	3	4
HSS 401	Entrepreneurship & Innovation for Practices	0	0	3	3
	Total	8	1	21	26



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Stochastic Process

Module Code: MAS 401

Semester: 4th

Credit Value: 4 [P=0, T=1, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. Imparting theoretical knowledge and practical application to the students in the area of Stochastic Process,
2. Introducing the basic notions of probability theory and develops them to the stage where one can begin to use probabilistic ideas in statistical inference and modeling, and the study of stochastic processes,
3. Providing confidence to students in manipulating and drawing conclusions from data and provide them with a critical framework for evaluating study designs and results,
4. Injecting future scope and the research directions in the field of stochastic process.

B. Learning outcomes:

Upon Completion of the subjects:

1. Students will add new interactive activities to fill gaps that we have identified by analyzing student log data and by gathering input from other college professors on where students typically have difficulties,
2. Students will add new simulation-style activities to the course in Inference and Probability,
3. Students will be substantially prepared to take up prospective research assignments.

C. Subject matter:

UNIT I:

Probability:

Theory of Probability: Random Experiment, Sample space; Random Events; Probability of events. Axiomatic definition of probability; Frequency Definition of probability; Finite sample spaces and equiprobable measure as special cases; Probability of Non-disjoint events (Theorems). Counting techniques applied to probability problems; Conditional probability; General Multiplication Theorem; Independent events; Bayes' theorem and related problems.

Random variables (discrete and continuous); Probability mass function; Probability density function and distribution function. Distributions: Binomial, Poisson, Uniform, Exponential, Normal, t and χ^2 . Expectation and Variance (t and χ^2 excluded); Moment generating function; Reproductive Property of Binomial; Poisson and Normal Distribution (proof not required). Transformation of random variables (One variable); Chebychev inequality (statement) and problems.

UNIT II:

Approximation Theory: Binomial approximation to Poisson distribution and Binomial approximation to Normal distribution (statement only); Central Limit Theorem (statement); Law of large numbers (Weak law); Simple applications.

UNIT III:

Statistics:

Sampling Theory: Population; Sample; Statistic; Estimation of parameters (consistent and unbiased); Sampling distribution of sample mean and sample variance (proof not required).



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Estimation Theory: Point estimate, Maximum likelihood estimate of statistical parameters (Binomial, Poisson and Normal distribution). Interval estimation.

Testing of Hypothesis: Simple and Composite hypothesis; Critical Region; Level of Significance; Type I and Type II Errors; Best Critical Region; Neyman-Pearson Theorem (proof not required); Application to Normal Population; Likelihood Ratio Test (proof not required); Comparison of Binomial Populations; Normal Populations; Testing of Equality of Means; χ^2 —Test of Goodness of Fit (application only).

UNIT IV:

Correlation and Regression: Simple idea of Bivariate distribution; Correlation and Regression; and simple problems

D. List of Experiments: NIL

E. Teaching/Learning/Practice pattern:

Teaching: 70%

Learning: 30%

Practice: 0%

F. Examination pattern:

1. Theoretical Examination & Open book examination.

G. Reading lists:

BOOKS:

1. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", Universal Book Stall, 2000.
2. Khazanie, Ramakant, "Basic Probability Theory and Applications Santa Monica", CA: Goodyear, 1976.
3. Ross, Sheldon M, "Introduction to Probability Models", New York, NY: Academic Press, 1972, 1985. Third Edition.
4. S. Ross, "A First Course in Probability", 6th Ed., Pearson Education India, 2002.
5. Cramer, Harald. "Random Variables and Probability Distributions", New York, NY: Cambridge University Press, 1970. Third Edition.
6. Parzen, Emanuel. "Modern Probability Theory and Its Applications" New York, NY: John Wiley, 1960.
7. Rothschild, V. and Logothetis, N. "Probability Distributions", New York, NY: John Wiley, 1986.
8. Bailey, Norman T.J. "The Elements of Stochastic Processes with Applications to the Natural Sciences" New York, NY: John Wiley, 1990.
9. Bhat, U. Narayan. "Elements of Applied Stochastic Processes", New York, NY: John Wiley, 1984. Second Edition.
10. Karlin, Samuel and Taylor, Howard M. "A First Course in Stochastic Processes", New York, NY: Academic Press, 1975. Second Edition.
11. Karlin, Samuel and Taylor, Howard M. "A Second Course in Stochastic Processes" New York, NY: Academic Press, 1981.
12. J. Medhi, "Stochastic Processes", 3rd Ed., New Age International, 2009.
13. Ross, Sheldon M. "Stochastic Processes", New York, NY: John Wiley, 1983.
14. N.G. Das, "Statistical Methods", Vol-I & Vol-II, Mc Graw Hill.
15. Murray R. Spiegel, "Probability and Statistics", McGrawHill, Schaum's Outline Series.



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

MAGAZINES:

1. *Current Science (Indian Academy of Science)*
2. *The Mathematics Student (Math Student) (Indian Mathematical Society)*
3. *Mathematical Spectrum (The University of Sheffield)*
4. *Mathematics Magazine (Mathematical Association of America)*
5. *+Plus magazine (University of Cambridge)*
6. *Ganithavahini (Ramanujan Mathematical Society)*

JOURNALS:

1. *Advances in Probability and Related Topics (Marcel Dekker)*
2. *Annals of Applied Probability (Institute of Mathematical Statistics)*
3. *Annals of Probability (Institute of Mathematical Statistics)*
4. *Communications on Stochastic Analysis*
5. *Electronic Journal of Probability*
6. *Séminaire de Probabilités (Lecture Notes in Mathematics, Springer-Verlag)*
7. *Stochastic Modelling and Applied Probability (Springer-Verlag)*
8. *Stochastic Processes and their Applications*
9. *Stochastics: An International Journal of Probability and Stochastic Processes (Taylor & Francis)*
10. *Theory of Probability and its Applications (SIAM)*
11. *Stochastic Processes and their Applications, Elsevier.*
12. *Stochastics: An International Journal of Probability and Stochastic Processes, Taylor Francis Online.*
13. *International Journal of Stochastic Analysis, Hindwai Publishing Corporation.*
14. *Journal of the American Statistical Association.*
15. *Journal of the Royal Statistical Society, Series A, Statistics in Society.*
16. *Journal of the Royal Statistical Society, Series B, Statistical Methodology.*
17. *Journal of the Royal Statistical Society, Series C, Applied Statistics.*
18. *SANKHA, ISI, Kolkata.*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Computational Numerical Methods

Module Code: MAS 402

Semester: 4th

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. Introducing the basic concepts of round off error, truncation error, numerical stability and condition, Taylor polynomial approximations; to derive and apply some fundamental algorithms for solving scientific and engineering problems: roots of nonlinear equations, systems of linear equations, polynomial and spline interpolation, numerical differentiation and integration, numerical solution of ordinary differential equations.
2. Application of computer oriented numerical methods which has become an integral part of the life of all the modern engineers and scientists. The advent of powerful small computers and workstation tremendously increased the speed, power and flexibility of numerical computing.
3. Injecting future scope and the research directions in the field of numerical methods.

B. Learning outcomes:

Upon Completion of the subject:

1. Students will be skilled to do Numerical Analysis, which is the study of algorithms for solving problems of continuous mathematics.
2. Students will know numerical methods, algorithms and their implementation in 'C' for solving scientific problems.
3. Students will be substantially prepared to take up prospective research assignments.

C. Subject matter:

UNIT I:

Errors in computation: Overflow and underflow; Approximation in numerical computation; Truncation and round off errors; Propagation and control of round off errors; Chopping and rounding off errors; Pitfalls (hazards) in numerical computations (ill conditioned and well conditioned problems).

UNIT II:

Interpolation: Lagrange's Interpolation, Newton's forward & backward Interpolation Formula. Extrapolation; Newton's Divided Difference Formula; Error; Problems.

UNIT III:

Numerical Differentiation: Use of Newton's forward and backward interpolation formula only.

Numerical Integration: Trapezoidal formula (composite); Simson's 1/3rd formula (composite); Romberg Integration (statement only); Problems.

UNIT IV:

Numerical Solution of System of Linear Equations: Gauss elimination method; Matrix Inversion; Operations Count; LU Factorization Method (Crout's Method); Gauss-Jordan Method; Gauss-Seidel Method; Sufficient Condition of Convergence.

Numerical Solution of Algebraic and Transcendental Equations: Iteration Method: Bisection Method; Secant Method; Regula-Falsi Method; Newton-Raphson Method.



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Numerical solution of Initial Value Problems of First Order Ordinary Differential Equations:
Taylor's Series Method; Euler's Method; Runge-Kutta Method (4th order); Modified Euler's Method and Adams-Moulton Method.

D. List of Experiments; (Minimum six experiments are required to be performed)

1. Assignments on Interpolation: Newton forward & backward, Lagrange.
2. Assignments on Numerical Integration: Trapezoidal Rule, Simson's 1/3rd Rule.
3. Assignments on Numerical solution of a system of Linear Equations: Gauss elimination, Gauss Jordan, Matrix Inversion, Gauss Seidel.
4. Assignments on Solution of Algebraic Equations: Bisection, Secant, Regula-Falsi, Newton- Raphson Methods.
5. Assignments on Ordinary Differential Equations: Taylor Series, Euler's Method, Runge-Kutta (4th Order).

E. Teaching/Learning/Practice pattern:

Teaching: 40%
Learning : 10%
Practice: 50%

F. Examination pattern:

1. Theoretical Examination: Open book and on line.
2. Practical Examination: Conducting Experiments and Viva-Voce.

G. Reading lists:

BOOKS:

1. Kincaid and W. Cheney, "Numerical Analysis: Mathematics of Scientific Computing", 3rd Ed., AMS, 2002.
2. K. E. Atkinson, "An Introduction to Numerical Analysis", Wiley, 1989.
3. S. D. Conte and C. de Boor, "Elementary Numerical Analysis - An Algorithmic Approach", McGraw-Hill, 1981.
4. C.M. Bender and S.A. Orszag, "Advanced Mathematical Methods for Scientists and Engineers", McGraw-Hill Book Co., 1978.
5. John H. Mathews, "Numerical Methods for Mathematics Sciences and Engineering", 2nd ed. Prentice Hall of India, New Delhi 2003.
6. M.K.Jain, S.R.K. Iyengar and R.K. Jain, "Numerical method for Scientific and Engineering Computation", New Age International Pvt. Ltd. 3rd edition, 1993,
7. V Rajaraman, "Computer Oriented Numerical Methods", Pearson Education 3rd edition , 2013
8. Steven C. Chapra, "Numerical Methods for Engineers", 4th Ed., McGraw Hill, 2002.
9. Brian Bradie, "A Friendly Introduction to Numerical Analysis", Pearson Prentice Hall, 2006.
10. Günther Hämmerlin and Karl-Heinz Hoffmann, "Numerical Mathematics", Springer-Verlag, 1991.

MAGAZINES:

1. Current Science (Indian Academy of Sciences).
2. The Mathematics Student (Math Student) (Indian Mathematical Society).
3. Mathematical Spectrum(The University of Sheffield).
4. Mathematics Magazine (Mathematical Association of America).
5. +Plus magazine (University of Cambridge).
6. Ganithavahini (Ramanujan Mathematical Society).



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

JOURNALS:

1. *Numerische Mathematik, Springer Link.*
2. *Acta Numerica, Cambridge University Press.*
3. *SIAM Review, University of Bristol, UK.*
4. *Journal of Computational Physics, Elsevier.*
5. *SIAM Journal on Numerical Analysis, University of Bristol, UK.*
6. *SIAM Journal on Scientific Computing, University of Bristol, UK.*
7. *IMA Journal of Numerical Analysis, Oxford Journals.*
8. *Mathematics of Computation, American Mathematical Society.*
9. *Foundations of Computational Mathematics, Springer Link.*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Principle of Communication Engineering

Module Code: ECE401

Semester: 4th

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. To make the students to understand different types of modulation and demodulation techniques.
2. Communication signals to be encountered in communication engineering and to study their behaviour in time and frequency domain.
3. To make students familiarization about radio signals transport by multiplexing and de multiplexing.
4. To make students to know about noise problem in communication, and to solve the problem.

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Utilize the appropriate modulation techniques & multiplexing in transporting signals over a channel.
2. Reject noise from the communication signals.

C. Subject matter:

UNIT I:

Review: Classification of signals, Basic blocks of communication system, Introduction to various terminologies: Transmitter, Receiver, Modulation, Carrier, Channel etc, Review of Frequency Bands, Fourier Transform and Fourier series.

Amplitude Modulation Systems: Need for modulation, normal AM, generation and demodulation (envelope & synchronous detection), modulation index, DSB-SC: generation and demodulation, Effect of phase and frequency offset on demodulation, SSB: Generation using filter and phasing method, detection. Frequency division multiplexed systems using SSB.

UNIT II:

Angle Modulation/Transmitter: Concept of frequency and phase modulation, frequency deviation and modulation index, FM spectra, Carson's rule, narrowband FM, generation of Wideband FM Armstrong method, direct FM generation. Demodulation of FM-discriminatory, Effect of non-linear distortion and interferences, Superheterodyne analog AM/FM receivers, FM Broadcasting system, Pre-emphasis and de-emphasis.

Receiver Signal Theory/Demodulation: TRF and superheterodyne receiver, AGC, FM receiver, sensitivity, selectivity, image frequency rejection measurements, communication receiver and its special features, PLL, Power Line Carrier: Interfacing with power line, description of a typical system.

UNIT III:

Sampling and Discrete time Modulations: Sampling Theorem – low pass and band pass, Pulse Amplitude Modulation (PAM), Pulse Width Modulation (PWM), Pulse Position Modulation (PPM) their generation and detection-phase time division multiplying. Review of random signals and noise, signal to noise ratio in amplitude and angle modulated systems. Thermal and shot noise, White noise and filtered noise, AWGN Properties, Noise equivalent bandwidth concept.

Random signal theory: Discrete probability theory, Continuous random variables, Statistically independent random variables, Probability density functions of sums, Transformation of density functions, Ergodic functions, Correlation process, Spectral density.



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UNIT IV:

Digital Communication: PCM, quantization noise, bandwidth, advantages over analog communication, PCM system, Differential PCM, Delta Modulation, Digital Modulation – ASK, FSK, PSK, DPSK, Digital Multiplexing.

D. List of Experiments: (Minimum eight experiments should be conducted by students)

1. Design an AM transmitter (or Use AM Trainer kit) to study Amplitude Modulation with given input wave and carrier wave, and hence the power efficiency of AM.
2. Use the AM transmitter designed in experiment number 1 to generate SSB and DSB transmitter with necessary other circuits. Study the output and power efficiency of the circuit.
3. Design a FM transmitter (or Use FM Trainer kit) to study Frequency Modulation with given input wave and carrier wave, and hence the power efficiency of FM.
4. Use the FM transmitter designed in experiment number 3 to generate PM with necessary other circuits. Study the output and power efficiency of the circuit of PM transmitter.
5. Design an SSB-SC receiver and use it with the circuit of experiment number 2 (SSB-SC transmitter) to design a complete SSB-SC radio.
6. Design PLL demodulator of PM and test the same with PM transmitter designed in experiment number 4.
7. Design any practical noise filtering circuit, and study its input and output in term of signal to noise ratio.
8. Design mixer circuit for any given FR amplifier, and study its performance.
9. Design a 4 to 1 FDM and study its operation.
10. Design a 1 to 4 demultiplexer and use it with the circuit of experiment number 9 and justify the communication by multiplexing.

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.
2. Practical Examination: Conducting Experiment and Viva-Voce.

G. Reading List:

BOOK:

1. H Taub and D. L. Schilling, "Principles of Communication System", (2nd Edition), McGraw Hill, New Delhi.
2. Carlson, "Communication System", (4th Edition) Tata McGrawHill, New Delhi,
3. B P Lathi and Zhi Ding, "Modern Digital and Analog Communication Systems", Oxford University Press, India
4. L. W. Couch Li, "Digital and Analog Communication System", (6th Edition), Pearson Education, Pvt. Ltd
5. J A Betts, "Signal Processing, Modulation and Noise", (Unibooks), Hodder & Stoughton Ltd (January 1, 1974)
6. Siman Haykin, "Communication Systems", (4th Edition), John Wiley and Sons Inc.
7. Kennedy and Davis, "Electronic Communication Systems" (4th Edition), Tata McGraw Hill.
8. John G. Proakis and M Salehi, "Fundamental of Communication Systems", Pearson Education



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

MAGAZINE:

1. *Electronics For You*
2. *Electronics Business Magazine.*
3. *Chip*

JOURNALS:

1. *Journal of Electronic Measurement and Instrument*
2. *IEEE Spectrum*
3. *Bell Systems Technical Journal*
4. *Electronics Letter*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Signals & Systems

Module Code: ECE 402

SEMESTER: 4th

Credit: 3[P=0, T=1, L=2]

A. Objectives:

The course is design to meet with the objectives

1. To make the students to understand different types of signals to be encountered in communication engineering and to study their behavior in time and frequency domain
2. To make the students familiarization about Fourier transform for the purpose of signal analysis
3. To make the students using MATLAB for signal and system analysis
4. To make the students understand about noise and their rejection by electronic filters required in communication engineering.

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Understand different types of signals and to utilize Fourier Transform & MATLAB to analyze signals and
2. Know about types & sources of noise.
3. Develop different filtering technique to reject noise.

C. Subject Matter:

UNIT I:

Signal: Continuous Time and Discrete Time signals, Exponential and Sinusoidal Signals, Unit Impulse, Unit Step Functions and Ramp Function. Power and Energy signal, Periodic and aperiodic signals, Orthogonal signal. Time domain and frequency domain representation of a signal.

System: Basic System Properties, Characterization of systems: memory, linearity, causality, time-invariance, stability.

UNIT II

Fourier Series: Analysis and synthesis of Fourier series, convergence issues and conditions for existence of the Fourier Series. Fourier Series of some useful functions.

Properties of Fourier Series: Linearity, Multiplication, Time Shifting, Time Scaling, Conjugation, Parseval's Relation.

Fourier Transform: Fourier Transform definition, Fourier Transform of some useful functions. Convolution and correlation in time domain and frequency domain.

Properties of Fourier transform: Linearity, Time Shifting, Time Scaling, Differentiation, Integration, Convolution, Modulation.

UNIT III

Laplace Transform: Definitions of Laplace Transform, Laplace Transform as a generalization of the Fourier Transform. The region of convergence and its properties. Pole-zero plots. Inverse transformation: role of the ROC in ensuring uniqueness. Properties of the Laplace Transform: Linearity, Time Shifting, Time Scaling, Differentiation, Integration, Convolution. Pole-Zero plot, System characterization from the pole-zero plot. One-sided Laplace Transform.

UNIT IV

Random Signals: Poission distribution, Probability, events, mutually exclusive events, joint



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probability. Random variables and processes, Cumulative distribution functions, Probability density functions, mean, variance, standard deviation probability density functions.

Auto correlations, Stationary and ergodic processes, Poisson, Gaussian, Rayleigh and other distribution functions,

Noise:Types of noise: White Gaussian Noise, Rayleigh Noise, Burst Noise, Thermal Noise, Noise band width. Effect of filtering of noise: Linear filtering, integration, differentiation and its effect on PSD and PDF.

D. List of Experiments: NIL

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Written examination and on line test.

G. Reading list:

BOOKS:

1. Alan V. Oppenheim, Alan S. Willsky and Ian T. Young "Signals and Systems" Prentice Hall, 1983.
2. B P Lathi "Signal Processing and Linear System", Cambridge Press, Berkely 1998.
3. John R. Pierce and Edward C. Posner, "Introduction to Communication Science and Systems" Plenum Publishing Corporation.
4. J A Betts, "Signal Processing, Modulation and Noise", American Elsevier Publishing Company, 1971.

MAGAZINES:

1. IEEE Signal Processing Magazine.
2. Circuits, Systems and Signal Processing - Springer

JOURNALS:

1. International Journal of Electronics Signals and Systems
2. International Journal of Electronics Devices and Circuits.



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Electronics Circuit & Devices – II

Module Code: ECE403

Semester: 4th

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. To teach & train students the characteristics and hence functions & performance parameters of different unipolar, junction and other field effect transistors FET
2. To teach & train students the design and implementing different bias circuit and amplifiers made of FET
3. To teach & train students the advanced circuits, namely different oscillators made of transistors
4. To teach & train students the advanced circuits, namely different arithmetic operations & active filters, made of operational amplifiers
5. To teach & train students about circuits, namely astable, monostable and bistable oscillators made of UJT and 555 timer

B. Learning outcomes:

Upon completion of the subjects, students are expected to be able to:

1. Clear understanding & utilization of FET, UJT and Linear ICs namely, Operational Amplifier & 555 timer
2. Design and develop different advanced electronic circuits made of these devices and ICs
3. Utilize the semiconductor sensors and detectors

C. Subject matter:

UNIT I:

Feedback Circuits: Concept of feedback, Classification of feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on Amplifier characteristics- Voltage series-Voltage shunt, Current series and Current shunt Feedback configurations-Simple problems.

Oscillators: Conditions for oscillations. RC and LC type Oscillators, Crystal oscillators, Frequency and amplitude stability of oscillators, Generalized analysis of LC oscillators, Quartz, Hartley, and Colpitts Oscillators, RC-phase shift and Wien-bridge oscillators, Crystal OSC.

UNIT II:

Operational Amplifiers: Operational Amplifiers & its biasing block, Study of characteristics, Differentiator, Integrators, Active filters, Summation and subtraction circuits made of OPAMP, Familiarizations with OPAMP ICs: 709 and 741, Diff. Comparator circuits, Log amplifier, Instrumentation Amp; PLL, DLL, Diff. Waveform generation, A/D & D/A converter.

Unipolar Transistors and application: Field effect transistors: Principle of operation and Fabrication of JFET (Junction Field effect Transistor), CMOS (Complementary MOS): Characteristics and parameters, Equivalent Circuits, Bias Circuits of JFET (CD, CS, CG), FET Amplifiers and Oscillators, FET Voltage Follower, FET Voltage Control Resistors. MOSFET (Metal Oxide Semiconductor FET).

UNIT III:

Uni Junction transistors: Principle and fabrication of UJT and its complement Pinch off / standoff ratio, Bias circuits, Generation of Sawtooth waveform, study of PUT.



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UNIT IV:

Other Semiconductor devices and 555 timer: Principle and application of thyristors, p-n-p-n/ n-p-n-p devices, Semiconductor sensors and detectors: LED, LCD, Photodiode, Photo transistor, Timer. Monostable and astable operation using 555 timers, linear voltage regulator: series and shunt, Switched mode power supply.

D. List of Experiments: (Minimum eight experiments should be conducted by students)

1. Design, implement and analysis output wave form of a Wien Bridge oscillator.
2. Design, implement and analysis output wave form of a Heartly oscillator.
3. Design, implement and measure input and output of a voltage amplifier made of JFET.
4. Design, implement and measure input and output of Emitter Follower made of JFET.
5. Design a voltage amplifier with minimum dissipation (1/2 voltage biasing) and test it.
6. Study of I- V characteristics of UJT with variable bias resistors.
7. Using a 15-volt supply and a 2N2646 UJT, design a pulse generator for a pulse rate of frequency of 10 KHz. Assume $\eta = 0.56$ to 0.75 and $R_{bb} = 4.7$ to 9.1 K Ω .
8. Design & test UJT leakage isolation circuit
9. Design & test UJT made pulse divider circuit.
10. Study IC 556 timer & design a pulse generator & analyse.
11. Design, implement and analysis of output wave form of astable oscillator made of UJT.
12. Design, implement and study active filters made of IC741 Op-amp.
13. Design, implement and study integrator and differentiator circuit made of IC709 Op-amp.
14. Design, implement and study astable oscillator with different frequencies made of IC555.

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.
2. Practical Examination: Conducting Experiment and Viva-Voice.

G. Reading List:

BOOKS:

1. R. L. Boylested and Nashelsky, "Electronics Devices & Circuit Theory"(9th Edition) Prentice Hall of India, New Delhi.
2. S M Sze, "Physics of Semiconductor Devices", Wiley Interscience
3. H Ahmed and P J Spreadbury, "Electronics for Engineers: An Introduction" University Press.
4. Millman ,Taub and Mothiki, "Pulse, digital & switching waveforms", (3rd Edition) Tata McGraw hill, New Delhi.
5. Millman and Gabel, "Microelectronics", (2nd Edition), Tata McGraw-Hill, New Delhi.
6. J Watson, "Semiconductor Circuit Design", Adam Hilger Ltd, Bristol (1970).
7. Donald L. Schilling and C. Belove, "Electronic Circuit : Discrete & Integrated"(3rd Edition) Tata McGrawhill, New Delhi.
8. Hayes & Horowitz, "Student Manual for the Analog Electronics" Cambridge University Press.
9. Millman & Halkias, "Integrated Electronics"(3rd Edition), Tata McGraw Hill, New Delhi.



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10. Ben G. Streetman, Sanjay Banerjee "Solid State Electronic Devices" (6th Edition) Pearson Prentice Hall, 2006.

11. David Neaman "Microelectronics Circuit Analysis And Design" (3rd Edition) McGraw-Hill Science Engineering, 2007.

MAGAZINES:

1. *IEEE Circuits and Devices Magazine*
2. *IET Digital Library: IET Circuits, Devices & Systems*
3. *Circuit Cellar*

JOURNALS:

1. *International Journal of Electronics Devices and Circuits*
2. *Journal of Active and Passive Electronic Devices*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Control System Engineering

Module Code: EE405

Semester: 4th

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. Show the classical design methods which have been greatly enhanced by the availability of low cost computers for system analysis and simulation.
2. View, how the graphical tools of classical design like root locus plots, NY Quist plots, Bode plots and Nichols chart can now be more easily used with computer graphics.

B. Learning outcomes:

Upon completion of the subjects:

1. Familiarize the basic of dynamical system theory while, at the same time, equipping them with the tools necessary for control system design.
2. The emphasis is based on the design in order to show how dynamical system theory fits into practical applications. In this module various methods of control system design are discussed.

C. Subject matter:

UNIT I:

Introduction: Concept of feedback and Automatic Control, Electrical analogy of physical system. Transfer Function, Design and Compensation of control systems, Block diagram representation of Control Systems, Block Diagram Algebra, Signal Flow Graph, and Mason's gain formula, Modelling in state space.

UNIT II:

Control system components: Error sensing devices, potentiometer, Synchros, D.C. and A.C. tachometers, servomotors, modulators and demodulators.

Mathematical modelling of physical systems: State space representation of differential equations, Liquid level systems, Pneumatic systems, Hydraulic systems, Thermal systems, Transformation of mathematical models in MATLAB.

UNIT III:

Steady State and Transient Analysis: Introduction to first order, second order and higher order control systems, Transient analysis of closed loop systems, Transient errors and their minimisation, steady state error and their minimisation, error coefficients, P, PI and P-I-D type controllers, Effects of integral and derivative control on system performance, Tuning methods: Ziegler-Nichol's Tuning, Zero placement approach, degrees of freedom.

UNIT IV:

Stability of Control Systems: R-H criteria, Nyquist criteria, Bode Plots. Polar Plots, Nichols chart, measures of relative stability. Construction of Root Loci for simple system, effects of the movement of poles and zeros, Lead compensation, Lag compensation, Lead-Lag compensation, Improvement of system performance through compensation. Case studies on control voltage, current, frequency, position and speed. Control of liquid level, density, flow, temperature etc, Relative stability analysis, State space analysis, controllability, observability.



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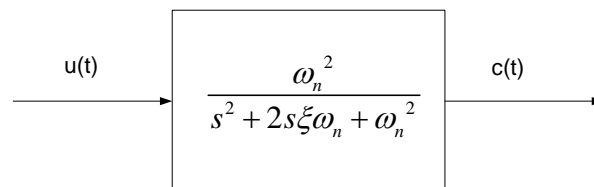
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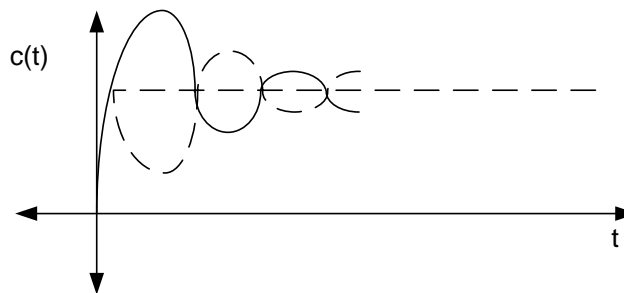
SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

D. List of Experiments: (Minimum eight experiments should be conducted by students)

1. Familiarization with MATLAB control system toolbox, MATLAB Simulink toolbox & PSPICE.
2. Determination of step response for first order & second order system with unity feedback on CRO & calculations of control system specification.
3. Calculation and verification of time constant, peak overshoot, setting time etc. from the response.
4. Simulation of step response & impulse response for type -0, type-1 & type-2 system with unity feedback using MATLAB & PSPICE.
5. Determination of Root Locus, Bode-Plot, Nyquist Plot using MATLAB- Control system toolbox for 2nd order system determination of different control system specifications from the plot.
6. Determination of PI, PD, PID controller action of first order simulated process.
7. Determination of approximate transfer function experimentally from Bode plot.
8. Evaluation of steady state error, setting time, percentage peak overshoot, gain margin, phase margin, with addition of lead compensator & by compensator in forward path transfer function for unity feedback control system using PSPICE.
9. Determination of control system specifications for variations of system parameters in practical position control system.
10. a. Design of a second order linear time invariant control system and study of system response with unit step input.



- b. Design a scheme for minimization of possible oscillation with generation of the dotted signal as shown below.



- c. Generalization of the technique for oscillation free response based on above idea (b).

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.
2. Practical Examination: Conducting Experiment and Viva-Voice.

G. Reading List:



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

BOOKS:

1. Kuo B.C. *Automatic Control System*, PHI
2. Das Gupta S : *Control System Theory* ; Khanna Pub.
3. Nagrath I J & Gopal M : *Control Systems Engineering*, New Age International Pub.
4. Ogata K : *Modern Control Engg.* PHI
5. Dorf R C & Bishop R.H.: *Modern Control System* ; Addison – Wisley
6. Bolton: *Industrial Control & Instrumentation*, Orient Longman
7. Nakra: *Theory & Applications of Automatic Control*, New Age International
8. Gopal: *Modern Control System Theory*, New Age International
9. Gopal: *Digital Control Engineering*, New Age International
10. Sinha: *Control Systems*, New Age International

MAGAZINES:

1. *Industrial Electronics Magazine*, IEEE.
2. *Control and Automation Magazine*, IEEE.
3. *Process control and engineering*, Elsevier.
4. *Control and Automation Magazine*, IET.

JOURNALS:

1. *Intelligent Systems*, IEEE Transactions.
2. *Journal of Control Theory and Applications*, Springer Publications.



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Entrepreneurship and innovation for Practices

Module Code: HSS 401

Semester: 4th

Credit Value: 3[P=0, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. To involve themselves in the business activities
2. Starting innovative practices in their entrepreneurial activities.
3. Developing their skills on the traits that they want to carry forward.
4. Starting activities on Forest based Technology.

B. Learning outcomes:

At the end of this module, students are expected to be able to

4. Start their venture more scientifically.
5. Start their venture by linking with the financial institutions.

C. Subject matter:

UNIT I:

Introduction to Entrepreneurship: Meaning, Role of Entrepreneur, Entrepreneur Process: different approaches, Motivation for becoming an Entrepreneur.

SME: Concept, its role, status, prospects and policies for promotion of SMEs.

Importance of Entrepreneurship: innovations, Qualities of successful Entrepreneur, Functions of an Entrepreneur, Types of Entrepreneur, Issues & Problems Entrepreneurial Practices.

UNIT II:

Importance of Entrepreneurship: Innovations, Converting Innovation to Economic Value which includes, Growth Strategies, value position, Market Segments, Value Chain Structure, Revenue Model etc., Qualities of successful Entrepreneur, Functions of an Entrepreneur, Types of Entrepreneur, Issues & Problems Entrepreneurial Practices.

Contribution of Entrepreneurs: Towards R&D, creates Wealth of Nation & Self prospect with Challenge.

Entrepreneur Carrier: Different Stages, Entrepreneur Development Programmers (EDPs).

UNIT III:

Characteristics of Entrepreneurship: Risk taker, Perceptive, Curious, Imaginative, Persistent, Goal setting, and Hardworking, Research & Management Skill, Organizing & Controlling, Soft skills and Feasibility.

Women Entrepreneurship: Opportune, promotion Hurdles and Prospects of women Entrepreneurs. Factors & Models of Entrepreneurial Development.

Social Entrepreneurial Initiative: Solving social Problems, Business plan, Strategic Plan vs Business Plan

UNIT IV:

Forest based Industries: Mobilization of resources from NTFP products, Processing UNITS, Technical and Financial Feasibility study and analysis of projects under self-employment scheme including small entrepreneur.

Farm based enterprises for production and post production of Agri-produce



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Crops: Cereals, Legumes, Oilseeds; Horticulture crops: Fruits and vegetables; Livestock production: Poultry, Fishery, Medicinal and Aromatic plants.

Handlooms & Sericulture; Handicraft, coir, jute & leather.

Micro entrepreneurial skills development and good production practices

D. Teaching/Learning/Practice Pattern:

Teaching :70%

Learning :30%

Practice :0%

E. Examination Pattern:

3. Theoretical Examination

F. Reading List:

BOOKS:

1. *Desai, Vasant, Small-Scale Industries and Entrepreneurship. Himalaya Publishing House, Delhi.*
2. *Kaulgud, Aruna, "Entrepreneurship Management". Vikas Publishing House, Delhi.*
3. *Cynthia, L. Greene, "Entrepreneurship Ideas in Action". Thomson Asia Pvt. Ltd., Singapore.*
4. *Timmons, Jerry A., and Spinelli, Stephen, "New Venture Creation: Entrepreneurship for the 21st Century", 8th Edition, Boston, MA: Irwin McGraw-Hill*
5. *Entrepreneurship: Successfully Launching New Ventures by Barringer, Pearson Education Publishing*
6. *Hisrich, Entrepreneurship, Tata McGraw Hill, New Delhi, 2001*
7. *Donald F. Kuratko, Entrepreneurship: Theory, Process, Practice Cengage Learning*

MAGAZINES:

1. *Longe Magazine*
2. *Home Business Magazine*
3. *Entrepreneur*

JOURNALS:

1. *International Journal of Entrepreneurship*
2. *International Journal of Innovation Management*
3. *Journal of Small business and Entrepreneurship*
4. *Journal of Human Values.*
5. *Journal of Management Research*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

SEMESTER – V

Subject Code	Subject	P	T	L	Credit
ECE 501	Microprocessor, Microcontroller & Embedded System	2	0	3	4
ECE 502	RF & Microwave Engineering	2	0	3	4
ECE 503	Digital Communication Engineering	2	0	3	4
CSE 503	Database Management System	2	0	3	4
ECE 504	Digital Signal Processing	2	0	3	4
HSS 501	Industrial Management	0	0	3	3
ECE 505	Telecommunication Engineering	0	0	3	3
	Total	10	0	21	26



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Microprocessor, Microcontroller & Embedded System

Module Code: ECE 501

Semester: 5th

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is design to meet with the objectives of:

1. To study the Architecture of microprocessor and microcontroller
2. To study the Interrupts and DMA
3. To study the synchronous, asynchronous, interrupt driven using 8255

B. Learning Outcomes:

Upon completion of the subjects, the student would be able to:

1. Understanding basic principle of microprocessor.
2. Microprocessor programming and interfacing.
3. Understand efficiency in microprocessor-based system.
4. Write code or a compiler for a microprocessor which takes advantage of the advanced architectural techniques.

C. Subject Matter:

UNIT I:

Microprocessor:Architecture of microprocessor; case study with intel series of microprocessors. Assembly language programming using intel 8085 microprocessor.16bitprocessors:8086and architecture,segmented memoryhascycles,read/writecycleinmin/maxmode.Reset operation,waitstate,Haltstate,Holdstate, Lockoperation,interruptprocessing.Addressingmodesandtheirfeatures.

UNIT II:

Interfacing of memory to a microprocessor; system bus, timing diagram,peripheralchips(IOMappedIO&MemorymappedIO). InterruptsandDMA. Interfacing of I/O devices; modes of data transfer, synchronous, asynchronous, interrupt driven using 8255 PPI, interfacing of DAC and ADC. Serial mode of data transfer using 8251.

UNIT III:

Interfacing of key board and display devices using 8279, Peripherals:8279,8255,8251,8253,8237,8259, A/DandD/Aconvertersandinterfacingofthesame.Typicalapplicationsofamicroprocessor.

UNIT IV:

Microcontroller:Overview of 8031 and 8051 microcontroller. Architecture.I/O Ports.Memory organization, addressing modes and instruction set of 8051, simple program,Memory and I/O interfacing to 8051 microcontroller.programming 8051 timers and counters.

D. List of Experiments: (Minimum eight experiments should be conducted by students)

1. Start two set of integer into two arrays. Add even number into two arrays. Add even number of one array with odd number of another & vice –versa.
2. To develop a subroutine to add two floating point quantities.



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- To develop program to multiply two single byte unsigned numbers, giving a 16 bit product.
- To develop subroutine which will multiply two positive floating point numbers.
- Design a delay loop using i) NOP instruction and ii) Loop Instructions. ADD X, Y for a fixed period. Compare the two.
- To write program to evaluate $P*Q+R*S$ are 8 bit binary numbers.
- To write a program to divide a 4 byte number by another 4 byte number.
- Write a program for adding first N natural numbers and store the results in memory location X.
- Write a program which decrements a hex number stored in register C.
- To design and interface a circuit to read data from an A/D converter, using the 8255 A
- To design and interface a circuit to convert digital data into analog signal using the 8255 A in the memory mapped I/O.
- To interface a keyboard with the microprocessor using 8279 chip and transfer the output to the printer.
- To design a circuit to interface a memory chip with microprocessor with given memory map.

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

- Theoretical Examination: Open book/ Regular examination and on line test.
- Practical Examination: Conducting Experiment and Viva-Voce.

G. Reading List:

BOOKS:

- Ramesh S. Gaonkar "Microprocessor architecture, programming and applications with 8085/8085A", Wiley eastern Ltd, 1989.
- Intel Corp: The 8085/8085A. Microprocessor Book-Intel marketing communication, Wiley interscience publications, 1980.
- Muhammad Ali Mazidi, Janice Gillispie Mazidi and Rolin McKinlay "The 8051 Microcontroller And Embedded Systems Using Assembly And C" (2nd Edition), Pearson India
- Adam Osborne and J. Kane "An introduction to microcomputers Vol.2- some real Microprocessor" Galgotia Book Source, New Delhi
- Ray and Bhurchandi "Advanced Microprocessors" TMH
- Intel Corp. Micro Controller Handbook-Intel Publications, 1994.
- Douglas V. Hall "Microprocessors and Interfacing" McGraw Hill International Ed. 1992
- Alan R. Miller "Assembly Language Programming the IBMPC", Subex Inc, 1987
- Bary B. Brey "The Intel Microprocessors: 8086/8088, 80186, 80286, 80386 & 80486" Prentice Hall, India
- Kenneth. J. Ayala. "The 8051 microcontroller" (3rd Edition), Cengage learning, 2010

MAGAZINES:

- IEEE Spectrum
- Electronics for you
- Electropages
- The Future of Microprocessors

JOURNALS:

- Microprocessors and Microsystems- Embedded hardware design (Elsevier)



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

2. *International Journal of Embedded Systems*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: RF & Microwave Engineering

Module Code: ECE502

Semester: 5th

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. To make the students to study the microwave spectrum, tubes, components, diodes and device
2. To study the operation, functions of microwave sources, diodes and devices and to know about the application of these devices for microwave circuits & systems, radar and satellite communication
3. To expose students to the measurement of microwave & RF circuits
4. To make the students to learn about EMI and EMC
5. To understand and study in depth of the theory and the technology of microwave components, devices, diodes, tubes and sources
6. To know about the microwave circuit measurement & communication system design; and to understand EMI & EMC

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Clear understanding & utilization of microwave spectrum, components, diodes, devices & sources.
2. Design and develop different microwave circuit & their utility in satellite application.
3. Applications of EMI & EMC.

C. Subject matter:

UNIT I:

Spectrum: Classification and band concepts of electromagnetic spectrum, RF and Microwave spectrum, historical background of RF and Microwave, Maxwell's wave equations, Faraday's laws, displacement current, skin depth, Poynting theorem, Poynting Vector, RF lines, Smith Chart.

Transmission Line Theory: Telegraphic Equation, Ch. Impedance, Transmission losses, VSWR, Unknown impedance measurement using shift in minima technique and impedance matching using signal and double stub matching

UNIT II:

Microwave waveguides and components: Rectangular waveguide and circular waveguide – mode structure, cut-off frequency, wall current, attenuation; microwave cavities – rectangular cavity resonator, Q factor, scattering matrix and transmission matrix, return loss, gain considerations noise figure, attenuator, phase shifter, directional coupler, Bethe hole coupler, magic tee, hybrid ring, circulator, isolator, Antennas.

Microwave Tubes: Limitations of conventional tubes, Multicavity Klystron, Reflex Klystron, Magnetron, Travelling Wave Tube, Backward Wave Oscillator

UNIT III:

Applications of Microwave: Radar system, Satellite Communication System, Industrial Applications of Microwave.

Microwave Measurement: VSWR measurement, power measurement, impedance measurement, frequency measurement.

UNIT IV:



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

RF Circuit: Low pass filter, high pass filter, band pass filter, RF amplifier-low noise consideration.

EMI / EMC: EMI standard, radiated and conducted EMI and susceptibility, wire antenna, EMI sensor, antenna factor, cable to cable coupling, electrostatic discharge

D. List of Experiments: (Minimum eight experiments should be conducted by students)

1. To investigate the properties of a system comprising a dipole and a parasitic element. Understand the terms 'driven element', 'reflector', 'director'. To know the form of a Yagi antenna and examine multi element Yagi. To see how gain and directivity increase as element numbers increase.
2. To investigate the Radiation Pattern of Printed antennas
3. Be familiar with the Parabolic/Dish form of antenna. To investigate the gain and directivity of the dish antenna. Appreciate the advantages and disadvantages of a dish antenna as compared with a Yagi.
4. Study of Smith Chart
5. Be familiar with the Log Periodic form of antenna. To investigate the gain, and directivity of the log Periodic antenna over a wide frequency range. Appreciate the advantages and disadvantages of a log periodic Antenna as compared with a Yagi.
6. Understand the terms 'baying' and 'stacking' as applied to antennas. To investigate stacked and bayed Yagi antennas. To compare their performance with a single Yagi.
7. A matching stub is a piece of transmission line which is normally short circuited at the far end. Stub has an input admittance which a pure susceptance and it is used to tune the susceptance component of the line admittance. Stubs are particularly used at higher frequencies for variety of loads. How a matching stub used to matching the frequency.
8. Study and show variation in the radiation strength at a given distance from the antenna and detector will show a higher strength when it is nearer to the transmitting antenna and shall reduce gradually with increasing distance.
9. Study of Spectrum Analyser
10. Measurement of EMI Field using EMC Sensors

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.
2. Practical Examination: Conducting Experiment and Viva-Voice.

G. Reading List:

BOOKS:

1. S Y Liao, "Microwave Devices and Circuits", Prentice Hall of India, 2006.
2. Reinhold Ludwig and Pavel Bretshko "RF Circuit Design", Pearson Education, Inc., 2006
3. Matthew M Radmanesh, "Radio Frequency and Microwave" Electronics Illustrated, Pearson Education Asia.
4. David M Pozar, "Microwave Engineering", John Willy & Sons. Inc, 2006.
5. Peter A Rizzi, "Microwave Engineering – Passive Circuits", Prentice Hall of India.
6. M L Sisodia, "Microwave Active Devices – Vacuum and Solid State", New Age Int. Publication.
7. M N O Sadiqu, "Elements of Electromagnetism", Oxford University Press.
8. K C Gupta, "Microwave Engineering" New Age Int. Publication, New Delhi.
9. M I Skolnik, "Introduction to Radar Systems", Tata McGraw Hill.



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

10. S. K. Ray et al, "Microwave Semiconductor Devices", Prentice Hall of India, New Delhi

MAGAZINES:

1. *Microwaves & RF*
2. *IEEE Spectrum*
3. *Electronics for you*
4. *Electropages*
5. *IEEE Microwave Theory and Techniques Society*

JOURNALS:

1. *IEEE Microwave Theory and Techniques*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Digital Communication Engineering

Module Code: ECE503

Semester: 5th

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. To make the students to understand different types of digital coding, decoding, modulation and demodulation techniques for both base band & broadband communication.
2. To make students familiarization about standard hierarchy framing, staffing, multiplexing, de multiplexing and important keying techniques.
3. To make students to know about information theory & coding.
4. To understand and study about different types of digital modulation, demodulation, broadband communication

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Utilize the appropriate digital modulation techniques & multiplexing in transporting digital signals over a channel and
2. To utilize appropriate line coding, compression coding to transport signals.

C. Subject matter:

UNIT I:

Introduction: Perspective of digital communication, Digital Representation of Analog Signal, Certain issues in Digital Transmission, Advantages of Digital Communication Systems, Bandwidth-S/N tradeoff, Hartley Shannon Law, Nyquist Sampling Theorem, Unipolar and bipolar sampling, Elements of digital communication system.

Multiplexing: Frequency Division & Time Division Multiplexing, multiplexing hierarchy, synchronous and asynchronous multiplexing, pulse staffing and word staffing.

Digital modulation technique: ASK, FSK, PSK, BPSK, DPSK, BFSK, MARY-, QPSK, MSK principles, QASK, Error calculation.

UNIT II:

Source encoding: Pulse code modulation, quantization noise, linear and non-linear quantization, companding. Differential pulse code modulation, delta modulation, adaptive delta modulation, μ -law and A-law, Delta sigma modulation, linear predictive coders, PCM, DPCM, DM, ADM, Analysis, Signal to Quantization Noise Ratio, Slope Overload Condition, Start Up Noise, System Design

Line coding: UPNRZ, UPRZ, PNRZ, PNZ, Manchester, differential Manchester and their spectral characteristic, self synchronization properties of some of the encoded signal, B3ZS, HDB3.

Information Theory and coding: Concept and measure of information, Entropy, Discrete and continuous message, Message source, zero memory source, extension of zero memory source, Markov source and their entropy, Channel with and without memory, Channel capacity, Hartley and Shannon's law, Uniquely decodable codes, Instantaneous codes, Kraft inequality and Macmillan inequality, Construction of instantaneous codes, Huffman and Shannon – Fano coding.

UNIT III:

Baseband Transmission: Base band signal receiver: Integrate and dump type filter, probability of error calculations, optimum filters, coherent reception, matched filter and its transfer function.



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Probability of error of matched filter. Regenerative repeater, Bit synchronization, Inphase and midphase synchronizer. Early late gate synchronizer. Frame synchronization.

Equalization: Inter symbol interference (ISI), Purpose of equalization, Eye pattern, Nyquist criterion for zero ISI, fixed equalizer, Design of equalizer, Adaptive decision directed equalizer, Partial response signaling.

UNIT IV:

Spread-spectrum modulation: Pseudo-Noise Sequence, A motion of Spread Spectrum, Direct-Sequence Spread Spectrum with Coherent Binary Phase-Shift Keying, Processing Gain, Probability of Error, Frequency-hop Spread Spectrum, Code-Division Multiplexing.

D. List of Experiments: (Minimum eight experiments should be conducted by students)

1. To verify Nyquist theorem.
2. To design 8-bit PCM coder-decoder to perform PCM coding & decoding of a given test signal.
3. Verify μ -law and A-law companding in hardware.
4. To design an ADPCM coder-decoder to perform ADPCM coding & decoding.
5. To generate p-n sequence with shift Register
6. To perform delta modulation/demodulation of a test signal and findout overload noise and co-ordination noise/estimate slope overload condition. Find the start-up noise if presence.
7. To perform ASK modulation and demodulation using given test signal.
8. Design a line coding(NRZ coding, Bipolar coding, manchester coding).
9. To implement PSK Design FSK system (or use a trainer kit) to perform & test the FSK with given signal.
10. Design a TDM system (or use a trainer kit) to perform & test the TDM with a few given signals
11. Write program to implement Huffman and Shannon-Fano coding.
12. To design single channel direct space spectrum modulator and demodulator with code binary phase shift scheme.

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.
2. Practical Examination: Conducting Experiment and Viva-Voice.

G. Reading List:

BOOKS:

1. Carlson, "Communication System"(4th Edition)TataMcgrawHill, New Delhi.
2. L. W. Couch Li, "Digital and Analog Communication System",(2nd Edition),Macmillan Publishing Co, New York.
3. J A Betts, "Signal Processing, Modulation and Noise", English Universities Press Ltd, London, Latest Edition
4. Taub & Schilling, Principle of Communication System, Tata McGraw Hill
5. B P Lathi, "Modern Digital and Analog Communication System", Oxford University Press, Latest Edition.
6. Simon Haykin, "Communication System", Jhon Wiley & Sons, Latest Edition
7. L W Couch II, "Modern Communication System", Prentice Hall India, Latest Edition



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8. *J G Proakis, "Digital Communications", McGraw Hill, New Delhi, Latest Edition*
9. *J Das, S K Mullick, P K Chatterjee, Principle of Digital Communication, Wiley Eastern Limited, Latest edition*

MAGAZINES:

1. *IEEE Communication Magazine.*
2. *IEEE Signal Processing Magazine.*
3. *Electronics Business Magazine.*
4. *Telecommunication Magazine.*
5. *IEE ASSP Magazine*
6. *IEEE wireless communication magazine*
7. *IEEE Personal communication magazine*

JOURNALS:

1. *IEEE journal on selected Areas in communication.*
2. *IEEE Spectrum*
3. *Bell Systems Technical Journal*
4. *AT & T Bell Laboratory Technical Journal*
5. *Electronics Letter*
6. *International Journal of wireless Information Networks.*
7. *British Telecom Technological Journal*
8. *International journal of satellite communication*
9. *Journal of Application of signal Processing*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Database Management System

Module Code: CSE 503

Semester: 5th

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. Explain the purpose of a database management system (DBMS),
2. Explain the role of the database administrator,
3. Explain what is meant by data consistency, data integrity, data redundancy and data independence,
4. Explain the concept of entity relationships and data normalisation,
5. Explain the concept of a client/server database,
6. Recall the relevant advantages of a client/server database over a non-client/server database,

B. Learning outcomes:

Students successfully completing this module will be able to :

1. Define a Database Management System, database and basic foundational terms of Database ,
2. Description of the Database Management structure,
3. Understand the applications of Databases,
4. Know the advantages and disadvantages of the different models,
5. Compare relational model with the Structured Query Language (SQL),
6. Know the constraints and controversies associated with relational database model.
7. Know the rules guiding transaction ACID,
8. Identify the major types of relational management systems,
9. Compare and contrast the types of RDBMS based on several criteria,
10. Understand the concept of data planning and Database design,
11. Know the steps in the development of Databases,
12. Trace the history and development process of SQL,
13. Know the scope and extension of SQL.

C. Subject matter:

UNIT I:

Introduction: Concept & Overview of DBMS, Data Models, Database Languages, Database Administrator, Database Users, Three Schema architecture of DBMS.

Entity-Relationship Model : Basic concepts, Design Issues, Mapping Constraints, Keys, Entity-Relationship Diagram, Weak Entity Sets, Extended E-R features.

UNIT II:

Relational Model: Structure of relational Databases, Relational Algebra, Relational Calculus, Extended Relational Algebra Operations, Views, Modifications of the Database.

SQL and Integrity Constraints: Concept of DDL, DML, DCL. Basic Structure, Set operations, Aggregate Functions, Null Values, Domain Constraints, Referential Integrity Constraints, assertions, views, Nested Sub queries, Database security application development using SQL, Stored procedures and triggers.

Unit III:



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Relational Database Design :Functional Dependency, Different anomalies in designing a Database., Normalization using functional dependencies, Decomposition, Boyce-Code Normal Form, 3NF, Normalization using multi-valued dependencies, 4NF, 5NF

Internals of RDBMS: Physical data structures, Query optimization : join algorithm, statistics and cost bas optimization. Transaction processing, Concurrency control and Recovery Management: transaction model properties, state serializability, lock base protocols, two phase locking.

Unit IV:

File Organization & Index Structures :File & Record Concept, Placing file records on Disk, Fixed and Variable sized Records, Types of Single-Level Index (primary, secondary, clustering), Multilevel Indexes, Dynamic Multilevel Indexes using B tree and B+ tree .

D. List of Experiments: (Minimum three experiments should be conducted by students)

Write the following in Oracle PL / SQL Stored Procedure

1. Creating Database
 - a. Creating a Database
 - b. Creating a Table
 - c. Specifying Relational Data Types
 - d. Specifying Constraints
 - e. Creating Indexes
2. Table and Record Handling
 - a. INSERT statement
 - b. Using SELECT and INSERT together
 - c. DELETE, UPDATE, TRUNCATE statements
 - d. DROP, ALTER statements
3. Retrieving Data from a Database
 - a. The SELECT statement
 - b. Using the WHERE clause
 - c. Using Logical Operators in the WHERE clause
 - d. Using IN, BETWEEN, LIKE , ORDER BY, GROUP BY and HAVING Clause
 - e. Using Aggregate Functions
 - f. Combining Tables Using JOINS
4. Database Management
 - a. Creating Views
 - b. Creating Column Aliases
 - c. Creating Database Users
 - d. Using GRANT and REVOKE Cursors in Oracle PL / SQL

E. Teaching/ Learning/ Practice pattern:

Teaching: 40%

Learning: 10%

Practice: 50%

F. Examination pattern:

1. Theoretical Examination: Open Book and online Examination.
2. Practical Examination: Conducting experiment and viva voice

G. Reading Lists:



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

BOOKS:

1. Henry F. Korth and Silberschatz Abraham, "Database System Concepts", Mc.Graw Hill.
2. Elmasri Ramez and NavatheShamkant, "Fundamentals of Database Systems", Benjamin Cummings Publishing. Company.
3. Ramakrishnan, "Database Management System", McGraw-Hill
4. Gray Jim and Reuter Address, "Transaction Processing : Concepts and Techniques", Moragan Kauffman Publishers.
5. Jain, "Advanced Database Management System", CyberTech
6. Date C. J., "Introduction to Database Management", Vol. I, II, III, Addison Wesley.
7. Ullman JD., "Principles of Database Systems", Galgottia Publication.
8. James Martin, "Principles of Database Management Systems", 1985, Prentice Hall of India, New Delhi
9. Ramez Elmasri, Shamkant B .Navathe, "Fundamentals of Database Systems", Addison Wesley Publishing Edition
10. Arun K .Majumdar, Pritimay Bhattacharya, "Database Management Systems", Tata McGraw Hill

MAGAZINES:

1. IBM Systems Magazine, IBM, New York, U.S.
2. IT - Data Management Magazines, IBM, New York, U.S.
3. Relational Database Management Systems (RDBMS and DBMS), IBM, New York, U.S.

JOURNALS:

1. Journals in Database Management & Info Retrieval - Springer, United States
2. International Journal of Database Management Systems (IJDMS), Academy & Industry Research Collaboration Center (AIRCC)
3. Journal of Database Management (JDM), IGI, Hershey-New York, USA



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Digital Signal Processing

Module Code: ECE504

Semester: 5th

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. To make the students to understand different types of digital signal processing techniques and tools
2. To make students familiarization about advanced transform namely discrete Z transform, Fast Fourier transform and Filters using MATLAB
3. To make students to apply transform and DSP techniques to design systems of coding & decoding

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Utilize the DSP tools and Techniques, Discrete Z transform, Fast Fourier Transform to design system & analysis and
2. Design important filters FIR, IIR for systems and analysis

C. Subject matter:

UNIT I:

Introduction: Overview of digital signal processing, Multichannel and multidimensional signals, Sequences: classification based on length, symmetry, periodicity, energy, power, Discrete signal, Time linear system, Sequences, arbitrary sequences, linear time invariant system, causality, stability, Difference equation, relation between continuous and discrete system, Classifications of sequence, recursive and non-recursive system

Mathematical operations on sequences: Convolution, graphical and analytical techniques, overlap and add methods, sliding tap methods, matrix methods, some examples and solutions of LTI systems, MATLAB examples

UNIT II:

Z-transform: Definition, relation between Z transform and Fourier transform of a sequence, properties of Z transform, mapping between S-plane and Z-plane, UNIT circle, convergence and ROC, Inverse z-transform, solution of difference equation using the one sided Z-transform with MATLAB examples

UNIT III:

Discrete Fourier Transform: Definition, inverse discrete Fourier transform (IDFT) Twiddle factor, linear transformation, basic properties, circular convolution, multiplication of DFT, linear filtering using DFT

Fast Fourier Transform (FFT): FFT algorithm, Radix 2 algorithm. Decimation-in-time and decimation-in-frequency algorithm, signal flow graph, butterflies, Chirp z-transform algorithm, MATLAB examples

UNIT IV:

Digital filter realization: Principle of digital filter realization, structures of All-zero filters, Design of Finite Impulse Response(FIR) filters, linear phase, windows-rectangular, Bartlett, Hamming and Blackman. Design of infinite impulse response(IIR) filters from analog filters, Bilinear transformation,



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Butterworth, Chebyshev, Elliptic filters. Optimization method of IIR filters. Some example of practical filters design. Computer aided filter design, MATLAB examples.

D. List of Experiments: (Minimum eight experiments should be conducted by students)

1. Generate Sine wave and hence Tan wave in writing program in C/C++
2. Perform solution of given difference equation using the one sided Z-transform with MATLAB
3. Demonstrate Chirp z-transform algorithm with MATLAB examples
4. Design and test of a FIR filter using MATLAB and DSP Trainer kit
5. Design and test of an IIR filter using MATLAB and DSP Trainer kit
6. Demonstrate time and frequency domain properties using MATLAB
7. Realize DTMF tone generator using DSP kits and code composer
8. Implement μ -law and A-law companding with TMS320C54x DSP
9. Perform Fourier analysis of a given periodic signal
10. Implement Double Precision Complex FFT with TMS320c54x DSP

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.
2. Practical Examination: Conducting Experiment and Viva-Voice.

G. Reading List:

BOOKS:

1. L R Rabiner & B Gold, "Theory and Application of Digital Signal Processing" Prentice Hall
2. J G Proakis & D G Manolakis, "Digital Signal Processing, Principles, Algorithms and Applications", 4th Edition, Pearson Edu,
3. Chen, "Digital Processing", Oxford University Press,
4. Meyar-Basse U, "Digital Signal Processing with FPGA", 2nd Edition, Springer India,
5. S K Mitra, "Digital Signal Processing – A Computer based approach" 4th Edition, Tata McGraw-Hill,
6. Emmanuel C. Ifeachor et al, "Digital Signal Processing: A Practical approach", Pearson Education, 2nd edition.
7. Alan V. Oppenheim, Ronald W. Schaffer and John R. Buck, Discrete-Time Signal Processing, Pearson Education India, 2nd Edition

MAGAZINES:

1. IEEE Signal Processing Magazine.
2. Electronics Business Magazine.
3. IEE ASSP Magazine

JOURNALS:

1. IEEE journal on selected Areas in communication.
2. IEEE Spectrum
3. Bell Systems Technical Journal
4. AT & T Bell Laboratory Technical Journal
5. Electronics Letter



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Industrial Management

Module Code: HSS 501

Semester: 5th

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is designed to meet with the objectives of:

1. Imparting theoretical lectures with case discussion.
2. Providing teaching with inclusive learning.
3. Making students aware about the importance of this subject in their future career.

B. Learning Outcomes:

Students successfully completing this module will be able to :

1. Students will be work with efficiency as they had knowledge of the subject.
2. With the backup knowledge their performance will definitely much better in their workplace.

C. Subject Matter:

UNIT I:

Concept of Management: Various Approaches to Management, Management as an art, a Science, and a Profession, Managerial skills, Process of management, Planning-Mission, Goals, Strategy, Program and Procedure; Decision making-process, decision making under risk and uncertainty, Models of decision making.

UNIT II:

Principles of Organization: Organizational Structure, span of control, Staffing function with emphasis on, Performance Appraisal, Training and Development.

UNIT III:

Direction and coordination: Motivation and Leadership, control function-Process and Techniques.

UNIT IV:

Production Management: Types of Production, Locational Decisions, Plant layout and design, Production

Planning scheduling and control: work study, method Study, and Wage Payment Schemes and Bonus, Productivity – concept and measurement.

Material Management: Inventory Planning, Procurement-functions, procedures and control, storing-planning procedure and control, issue and pricing, Inventory control Techniques, Value analysis and Engineering.

D. Teaching/ Learning Pattern:

Teaching	: 50%
Learning/ case presentation	: 30%
Assignment	: 10%
Attendance	: 10%

E. Examination pattern:

1. Theoretical Examination : 50
2. Class test : 30



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

3. Assignment : 20

F. Reading Lists:

BOOKS:

1. *Badiru ,A (ed),2005, Hand Book of Industrial and System Engineers, CRC press.*
2. *Blanchand, B& Fabrycky, W.2005. System Engineering Analysis (4th Ed.). Prentice Hall.*
3. *Salvendy,G.(Ed.)2001.Hand Book Of Industrial Engineering: Technology &Operations Management, Wiley-Inter service.*
4. *Turner, W.et.al.1992 Introduction to Industrial and System Engineering(3rd ed.) Prentice Hall.*

MAGAZINES:

1. *Industrial Management and Entrepreneurship*
2. *Industrial Management Magazine*

JOURNALS:

1. *Group and Organization Management*
2. *Journal of Organizational Behaviour*
3. *Journal of Management*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Telecommunication Engineering

Module Code: ECE505

Semester: 5th

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. Design, assembly and testing of linear electrical networks and systems. Use of computers to control electrical equipment and acquire data.
2. Understanding the importance of lifelong learning, ethics, and a knowledge of contemporary issues

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Provide a strong background in the basics of wireless mobile communication
2. Impart knowledge about the existing GSM and CDMA mobile communication technology

C. Subject matter:

UNIT I:

Introduction: Evolution of Telecommunication; Components and Examples of Telecommunication systems. Telephone Systems; Pulse dialing & Tone dialing; Telephone Instruments -rotary dial and push button types.

UNIT II:

Telecommunication Transmission Lines:G.I, Copper, Co-axial, and Fiber optic cables; Transmission Bridge -Hybrid circuit for 2-wire to 4-wire conversion and vice versa. PCM Carriers; American and European standards of carrier channels; Subscriber loop systems, BORSCHT Functions; Switching hierarchy & routing, signalling techniques-in channel & common channel signaling, SS7.

UNIT III:

Basics of Switching System: Classification of Switching System, Automatic Switching System, Principle of Operation of Strowger& Crossbar Electro-mechanical Systems;Step by step Circuit Switching, Director and Non-Director systems. TDM, FDM and SDM; Time/Digital Switching systems - Time division Timeswitch, Time multiplexed Space switch, Time multiplexed Time switch, Hybrid switching; TS, ST, STS, TST systems; Architecture of 5ESSsystems; Generation of Electronic Exchanges. Stored Program Control, Software architecture, Application software; Traffic Engineering: Blocking network, blocking probability, grade of service,traffic load, Erlang-B and C-congestion formulas-case studies.

UNIT IV:

Modems and their standards:RS 232C; DTE and DCE, Facsimile Transmission Introduction to ISDN channels & access arrangements, formats, servicecapabilities and user-network interfaces; Limitations of ISDN, Introduction toB-ISDN.Introduction to cordless telephones, Digital PABX and WLL 2

D. List of Experiments: NIL

E. Teaching/Learning/Practice Pattern:



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.

G. Reading List:

BOOKS:

1. T. Viswanathan, "Telecommunications Switching Systems & Networks", PHI
2. P. Gnansivam, "Telecommunication Switching Systems & Networks", New Age
3. Syed RiffatAli, "Digital Switching System", Illustrated, TMH
4. J. Martin "Telecommunication and Computer", 3rd Edition, PHI
5. A. Z. Dodd, "The Essential Guide to Telecommunication", Illustrated, Pearson
6. B. A. Farouzan, "Data Communication and Networking" 4th Edition, TMH
7. S. Ramchandran, "Telecommunication Principles, Circuits & Systems", 5th Edition, Khanna Publishers
8. N. N. Deb, "Telecommunication Engineering" Vol-I & II, New Age
9. J. E. Flood, "Tele Communication Switching-Traffic & Networks", Pearson

MAGAZINES:

1. Communications Magazine - IEEE Xplore
2. IEEE Spectrum
3. Electronics for you
4. Electropages

JOURNALS:

1. Wireless Communications - IEEE Xplore
2. International Journal of wireless Information Networks.
3. AT&T Technical JOURNALS
4. British Telecom Technological Journal



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

SEMESTER - VI

Subject Code	Subject	P	T	L	Credit
CSE 601	Computer Networking	2	0	3	4
ECE 601	Fiber Optics Communication	0	0	3	3
HSS 601	Engineering Ethics & IPR	0	0	3	3
HSS 602	Disaster Management	0	0	2	2
ECE 602	CreativeDesign	2	0	0	1
ECE 603	Power Electronics Devices & Circuit	2	0	3	4
CSE 606	Soft Computing	2	0	3	4
	Total	8	0	17	21



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Computer Networking

Module Code: CSE 601

Semester: 6th

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet with the objectives of:

1. To know Communication between applications on different computers,
2. To understand state-of-the-art in network protocols, architectures, and applications,
3. Examine and comprehend the following networking concepts -basic computer networking concepts including Circuit-switching and Packet-switching, Residential access networks (point-to-point, dialup modem, ADSL, cable modem), Protocol layer stack, Client-Server paradigm, and Packet-switched network delay calculation application-layer applications including Telnet, FTP, DNS, HTTP, SMTP - Other state of arts topics including Wireless and Mobile Networks, and Security in Computer Network.
4. Examine and analyze the following transport-layer concepts: -Transport-Layer services Reliable vs. un-reliable data transfer -TCP protocol -UDP protocol
5. Examine and synthesize the following network-layer concepts: -Network-Layer services -Routing -IP protocol -IP addressing
6. Examine and evaluate the following link-layer and local area network concepts: -Link-Layer services -Ethernet -Token Ring -Error detection and correction -ARP protocol.

B. Learning outcomes:

Students successfully completing this module will be able to:

1. Explain the roles of key elements in data communication,
2. Explain the difference between local area and wide area networks,
3. Explain the uses of WANs with respect of current practice,
4. Design Explain the uses, hardware requirements and advantages of WANs,
5. Describe the application and operation of protocols,
6. Distinguish types of networks,
7. Compare network topologies,
8. Describe and distinguish features of node addressing methods,
9. Describe the standards for industry network architectures.

C. Subject matter:

UNIT I:

Introduction: Introduction to Computer Network and Physical Layer

Types of Networks: Broadcast and Point-to-point- LAN-MAN-WAN- Wireless networks.

Layered Architecture and Reference Models: Layered architecture- OSI reference model, TCP/IP reference model – Internet Protocol Stack – Network Entities in Layers- Connection oriented and Connection less services,

ATM:Protocol Architecture, ATM Logical Connections, ATM Cells, Transmission of ATM Cells, ATM Adaptation Layer, Traffic and Congestion Control, ATM LAN Emulation

Internetworking:Principles of Internetworking, Connectionless Internetworking, TheInternet Protocol, Routing Protocol, IPv6 (IPng), ICMPv6

UNIT II:



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Data Transmission/The Physical Layer: Concepts and Terminology, Analog and Digital Data Transmission, Transmission Impairments, Guided Transmission Media, Wireless Transmission, Communication Satellites, The Public Switched Telephone Network, The Mobile Telephone System, Cable Television

Data Encoding: Digital Data: Digital and Analog Signals, Analog Data: Digital and Analog Signals, Spread Spectrum.

Data Communication Interface: Asynchronous and Synchronous Transmission, Line Configurations, Interfacing.

Multiplexing: Frequency-Division Multiplexing, Synchronous Time-Division Multiplexing, Statistical Time-Division Multiplexing.

Circuit Packet and Switching: Switched Networks, Circuit-Switching Networks, Switching Concepts, Routing in Circuit-Switched Networks, Control Signalling, Packet-Switching Principles, Routing, Congestion Control, X.25 282.

Frame Relay: Frame Relay Protocol Architecture, Frame Relay Call Control, User Data Transfer, Network Function, Congestion Control.

UNIT III:

LAN Technology and Systems: LAN Architecture, Bus, Tree LANs, Ring LANs, Star LANs, Wireless LANs, Ethernet and Fast Ethernet (CSMA/CD), Token Ring and FDDI, 100VG-AnyLAN, ATM LANs, Fibre Channel, Wireless LANs, Bridge Operation, Routing with Bridges.

Protocols and Architecture: Protocols, OSI, TCP/IP Protocol Suite.

Examples of networks: Novell Netware, Arpanet, and Internet. Examples of Data Communication Services: X.25 Networks, Frame relay, Broad band ISDN and ATM. Physical Layer: Transmission media- Narrow band ISDN: Services-Architecture- Interface, Broad band ISDN and ATM- Virtual Circuits versus Circuit Switching – Transmission in ATM networks. FDDI.

Link Layer and Local Area Networks Data link layer: Service provided by data link layer-Error detection and correction Techniques-Elementary data link layer protocols -Sliding Window protocols - Data link layer in HDLC, Internet and ATM . Multiple Access protocols: Channel partitioning protocols: TDM-FDM-Code Division Multiple Access(CDMA) .Random Access protocols: ALOHACDMA and CSMA/CD. Local area Network: LAN addresses- Address Resolution Protocol-Reverse Address Resolution Protocol. Ethernet: Ethernet Technologies-IEEE standards- Hubs-Bridges and Switches.

Distributed Applications: Abstract Syntax Notation One (ASN1), Network Management-SNMPV2, Electronic Mail-SMTP and MIME, Uniform Resource Locators (URL) and Universal Resource Identifiers a. (URI), Hypertext Transfer Protocol (HTTP)

UNIT IV:

Network Layer and Routing: Network Service model – Datagram and Virtual circuit service-Routing principles- Link state routing-distant vector routing-hierarchical routing-multicast routing-IGMP Internet Protocol (IP): IPv4 addressing-routing and forwarding datagram-datagram format-datagram fragmentation- ICMP- DHCP- Network Address Translators (NATs)-IPv6 packet format-transition from IPv4 to IPv6-Mobile IP. Routing in the Internet: Intra Autonomous System Routing: RIP and OSPF-Inter Autonomous System Routing: BGP – Network layer in ATM.

Transport Layer: Transport Layer Services-Relationship between Transport Layer and Network Layer-Transport Layer in Internet-Multiplexing and De multiplexing. Connectionless Transport: UDP-Segment structure-Checksum Connection Oriented Transport: TCP-TCP connection-TCP Segment Structure-Round trip Time estimation and Time out-Reliable Data transfer-Flow control-TCP connection Management. Congestion Control: Causes and costs of congestion- Approaches to congestion control- TCP congestion control: Fairness-TCP delay modelling. ATM ABR congestion control. ATM AAL Layer protocols.



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Application Layer and Network Security: Application Layer Protocols - WWW and HTTP-File transfer Protocol: FTPCommands and Replies – Domain Name System (DNS) - SMTP - SNMP-multimedia. Remote Procedure Call. Security in Computer Networks: Principles of Cryptography-Symmetric key-Public key-authentication protocols -Digital Signatures – Firewalls. Security in different Layers: Secure E-mail- SSL – IP security.

D. List of Experiments: (Minimum eight experiments should be conducted by students)

1. Study of different types of Network cables and practically implements the cross-wired cable and straight through cable using climpling tools.
2. Study of different networking devices
3. Study of Basic network command and network configuration commands.
4. Socket programming using Java or C programming language.
5. Fundamental Network Configuration and Troubleshooting
6. Firewall Configuration using iptables and ipchains and solve different general problems in Linux OS.
7. Network topology configuration using Cisco packet tracer software
8. Network topology configuration of static routing using Cisco packet tracer software
9. Routing Protocol Configuration In A Network Using Packet Tracing Software
10. Practical on Server Configuration Example, Web Server, Mail Server, FTP Server etc.
11. Introduction to ns2 (network simulator) - small simulation exercises to study TCP behaviour under different scenarios and study link layer protocols such as Ethernet and 802.11 wireless LAN.
12. Experimental study of application protocols such as HTTP, FTP, SMTP, using network packet sniffers and analyzers such as Ethereal. Small exercises in socket programming in C/C++/Java.
13. Experiments with packet sniffers to study the TCP protocol. Using OS (netstat, etc) tools to understand TCP protocol FSM, retransmission timer behaviour, congestion control behaviour.

E. Teaching/ Learning/ Practice pattern:

Teaching: 40%

Learning: 10%

Practice: 50%

F. Examination pattern:

1. Theoretical Examination: Regular Examination.
2. Practical Examination: Conducting experiment and viva voice

G. Reading lists:

BOOKS:

1. C T Bhunia, "Information Technology Network & Internet", New Age International Publications, New Delhi.
2. James F. Kurose and Keith W. Ross, Computer Networking – A Top-Down Approach Featuring the Internet, 2/e Pearson Education, 2003
3. S. Keshav, An Engineering Approach to Computer Networking, Pearson education, 2002
4. F. Halsall, Data Communication, Computer Networks and Open Systems, Addison Wesley, 1996
5. Andrew S. Tanenbaum, Computer Networks, 4/e, Pearson education, 2003
6. Behrouz A. Fourouzan, Data Communications and Networking, 2/e TataMcGrawhill, 2000
7. TCP/IP Illustrated, by W.R.Stevens,Addison-Wesley
8. Internetworking with TCP/IP, by Douglas Comer,Prentice Hall
9. Internet Routing Architectures, Second Edition, by Sam Halabi and Danny McPherson, Cisco Press



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

10. *Emerging Communication Technologies*, by Uyles Black, Prentice Hall

11. *Computer Networks: A System Approach*, by Larry L. Peterson and Bruce S. Davie, Morgan Kaufmann Publishers

MAGAZINES:

1. *Network World, IT, United states, Massachusetts*
2. *Network Magazine, Indian Express, India*

JOURNALS:

1. *Computer Networks - Journal - Elsevier, Netherland*
2. *Journal of Network and Computer Applications - Elsevier, Netherland*
3. *Journal of Computer Networks and Communications, Elsevier, Netherland*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Fiber Optics Communication

Module Code: ECE601

Semester: 6th

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. To make students to learn about art and technology of fiber optical communication, mainly Transmitter, Receiver and Links.
2. To make the students knowledgeable of different types of techniques for measuring fiber optics communication parameters.
3. To know about techniques of optical coupling, amplification and oscillation.
4. To study techniques, devices, measurement and coupling of optical fiber communication.

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Design optical transmitters, receivers and couple them through links for installing fiber communication.
2. Know about different techniques of measurement of parameters of optical communication.

C. Subject matter:

UNIT I:

Introduction to optical fiber: Ray diagram, different types of optical fiber, step index, graded index.
Optical Fiber Communication: Principles and systems, Single-mode Fiber: Mode Cut-Off wavelength, Mode-field Diameter, Equivalent Step-Index (ESI) Profile, Measurement, Dispersion Measurements: Time-Domain method & Frequency-Domain Method, Geometrical Measurements: diameter, deformation, eccentricity, elasticity, Mechanical Strength of Optical Fiber

UNIT II:

Transmitters and Receivers: Physics of semiconductor, LED, Laser Diodes, Tunable Laser diode, Lasers, Bias & stabilization, Driver circuits for analog & digital modulation, Modulation bandwidth, PIN, APD photodiodes, photo diode amplifiers, Signal to noise ratio in PIN and APD receivers, Receiver sensitivity, Eye diagram, Coupling mechanism, Transmission Characteristics of fibers, short haul, long haul and high speed links, optical power budget calculations

UNIT III:

Optical Interconnecting Devices: Optical isolators, polarizer, circulators, attenuators, amplifiers, oscillators, filters, add/drop multiplexers, optical modulators

Other optical device used in fiber optics communication: Wave division multiplexing and demultiplexing, optical switching, optical amplifier (Raman, EDFA)

UNIT IV:

Measurement: Lock-in-Amplifier, Monochromator, Optical chopper, Infrared Detector, Optical spectrum Analyzer, Multi-mode-fiber: Parameters for characterization, Steady-State Power distribution, mode stripper, Measurement of Attenuation: Loss Mechanisms in Fiber, Calorimetric Method, Absorption & Scattering I/O attenuation, Cut-Back method, OTDR techniques; Numerical Aperture-trigonometric & Scanning method, International Standards for Measurements



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

D. List of Experiments: NIL

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.

G. Reading List:

BOOKS:

1. Ghatak, "An introduction to Fiber Optics", Cambridge University Press
2. J M Senior, "Optical Fiber Communication", 3rd Edition, Pearson
3. G Keiser, "Optical Fiber Communication", 5th Edition, McGraw Hill
4. D K Myabaev & L LScheiner, "Fiber Optic Communication Technology", 1st Pearson Ltd
5. Dietrich Marcuse, "Principles of Optical Fiber Measurements", Academic Press Inc NY
6. Giovanni Cancellieri & Umberto Ravaoli, "Measurements of Optical Fibers & Devices – Theory & Experiments", Artech House Inc. Dedham, USA
7. Bishnu Pal, "Fundamentals of Fiber Optics in Telecommunication & Sensor Systems", Wiley Eastern Limited
8. Giovanni Cancellieri (1st Editor), "Single-Mode Optical Fiber Measurements, Characterization & Sensing", Artech House Inc. Boston

MAGAZINES:

1. IEEE Spectrum
2. Electronics for you
3. Electropages

JOURNALS:

1. IEEE Xplore
2. Journal of Optical and Fiber Communications Research - Springer
3. Journal of Optical Communications - Walter de Gruyter
4. Fiber optics and optical communications - Optics InfoBase



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Engineering Ethics & IPR

Module Code: HSS 601

Semester: 6th

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is designed to meet with the objectives of:

1. Imparting theoretical lectures with case discussion.
2. Providing teaching with inclusive learning.
3. Making students aware about the importance of this subject in their future

B. Learning outcomes:

Students successfully completing this module will be able to:

1. Work with efficiency as they had knowledge of the subject.
2. With the backup knowledge their performance will definitely be much better in their workplace.

C. Subject Matter:

UNIT I:

Engineering as a profession, historical and social context, Ethics in Engineering, Codes of Engineering Ethics, history and purpose, consequentialism and utilitarianism, Deontological approaches, duties, rights and respect for a person, responsibility, virtue Ethics, honesty, moral autonomy, obligations of Engineering profession and moral propriety.

UNIT II:

Engineer's moral responsibility for safety and human right, risk assessment and communication, product liability, development ethics, engineers and employer relationship, whistle blowing and its moral justifications.

UNIT III:

Computer Ethics: Social impact of computers, Computer and gender issues, n privacy, cyber crime, ethical use of software's, intrinsic value of nature.

UNIT IV:

IPR I: Intellectual property, definition, types, rights and functions, patents, trademark, software design, industrial designs, semi-conductor and integrated circuits layout design, grant of patent in India, authority and procedure, patent forms, surrender and revocation of patents and compulsory licensing, acquisition of inventions by the Government.

IPR II: Contents of draft application for patents, Drafting patent specification and claims, WTO and drafting patent specification and claims, IPR in infringement and piracy under Indian Laws.

D. Teaching/ Learning:

Teaching	: 50%
Learning/ case presentation	: 30%
Assignment	: 10%
Attendance	: 10%

E. Examination pattern:

1. Theoretical Examination : 50



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- | | |
|---------------|------|
| 2. Class test | : 30 |
| 3. Assignment | : 20 |

F. Reading list:

BOOKS:

1. Chowdhury, Subir, *Blending the best of the East & West*, , EXCEL
2. Ghosh, Vikas, *Ethics and Mgmt. & Indian Ethos*,
3. Pherwani, *Business Ethics*, EPH
4. Balachandran Raja,Nair, *Ethics, Indian Ethos and Mgmt.*, Shroff Publishers
5. Velasquez, *Business Ethics: concept and cases*, Pearson
6. William Cornish, *Intellectual Property Rights*, Sweet & Maxwell, 7th Revised Edition

MAGAZINE:

1. *Industry Week*
2. *Business Ethics magazine*
3. *The Weekly Standard*
4. *Harpers*
5. *The Week*

JOURNALS:

1. *Journal of Business Ethics*
2. *The Journal of Ethics*
3. *Ethics, University of Chicago Press*
4. *Kennedy Institute of Ethics Journal*
5. *Journal of Global Ethics*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Disaster Management

Module Code: HSS 602

Semester: 6th

Credit Value: 2 [P=0, T=0, L=2]

A. Objectives:

The course is design to meet with the objectives of:

1. Imparting theoretical lectures with case discussion.
2. Providing teaching with inclusive learning.
3. Making students aware about the importance of this subject in the future prospect

B. Learning outcomes:

Students successfully completing this module will be able to :

1. Students will be able to work with efficiency as they had knowledge of the subject.
2. With the backup knowledge their performance will definitely be much better in their workplace.

C. Subject Matters:

UNIT I:

Introduction: Disaster preparedness, Goals and objectives of ISDR Programme, Risk identification, Risk sharing.

Disaster and development: Development plans and disaster management. Alternative to dominant approach, disaster-development linkages, Principle of risk partnership

UNIT II:

Disaster management and risk reduction in garment industry: Types of disasters and disaster plans: Processing machines and utilities. Sustainable livelihoods and their Protection – Recovery from disaster –fire, boiler mishap. Garment Industry health monitoring and Disaster aids.

UNIT III:

Awareness of risk reduction: Trigger mechanism, constitution of trigger mechanism, risk reduction by education, disaster information network, risk reduction by public awareness.

UNIT IV:

Development planning on disaster: Implication of development planning, financial arrangements, areas of improvement, disaster preparedness, community based disaster management, emergency response.

Seismicity: Seismic waves, Earthquakes and faults, measures of an earthquake, magnitude and intensity ground damage, Tsunamis and earthquakes

D. Teaching/ Learning/Practice Pattern:

Teaching	: 50%
Learning/ case presentation	: 30%
Assignment	: 10%
Attendance	: 10%

E. Examination pattern:

1. Theoretical Examination : 50
2. Class test : 30



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

3. Assignment : 20

F. Reading List:

BOOKS:

1. White, Gilbert F. and J. Eugene Hass, 1975, *Assessment of Research on Natural Hazards*, Cambridge, the MIT Press, MA.
2. White, G.F, 1974, *Natural Hazards: Local, National, Global*, Oxford University Press, New York.
2. Taori, K (2005) *Disaster Management through Panchayati Raj*, Concept Publishing Company, New Delhi.
3. Bryant Edwards (2005): *Natural Hazards*, Cambridge University Press, U.K.
4. Kasperson, J.X., R.E. Kasperson, and B.L. Turner III (Eds.), 1995, *Regions at Risk: Comparisons of Threatened Environments*, United Nations University Press, Tokyo
5. Singh Satendra (2003): *Disaster Management in the Hills*, Concept Publishing Company, New Delhi.
6. Pardeep Sahni, Madhavi Malalgoda and Aariyabandu, *Disaster risk reduction in south Asia*, PHI, 2009
7. Amita Sinvhal, *Understanding Earthquake Disasters*, TMH, 2010.
8. MHA, GOI-UNDP, *Disaster Management in India*, 2009
9. NDMA, 'Incident Response Guidelines', 2009
10. *Disaster Management Act*, 2005.

MAGAZINES:

1. *Crises and Disaster Management Magazine*
2. *Emergency Management*

JOURNALS:

1. *Asian Journal of Environment and Disaster Management*
2. *International Journal of Disaster management*
3. *IDRIM Journal*
4. *Journal of Disaster Risk Studies*
5. *Emergency Management Review*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Creative Design

Module Code: ECE602

Semester: 6th

Credit Value: 1 [P=2, T=0, L=0]

A. Objectives:

The course is designed to meet the objectives of:

1. To give students broad but comprehensive theoretical analysis, ideas and practical design & implementation of useful electronics systems
2. To impart the essential knowledge of electronic circuit design and fault analysis, to enhance hands on experience and to encourage innovativeness

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Take up innovative project for designing electronic systems of varied nature

C. Subject matter: NIL

D. List of Experiments: (Minimum eight experiments should be conducted by students)

1. Design of MOSFET, CMOS for different application by using TCAD
2. Design of a BJT based voltage Amplifier: Theory, Design & Practice
3. Design of a Wien Bridge Oscillator with Op-amp: Theory, Design & Practice
4. Design of Differential Amplifier using MOSFET: Theory, Design & Practice
5. Design of a heterodyne Radio Receiver-Theory, Design & Practice
6. Design of a TV Audio System: Theory, Design & Practice
7. Design of a TV Video System: Theory, Design & Practice
8. Design of VSB transceiver: Theory, Design & Practice
9. Design of PCM based Baseband transceiver: Theory, Design & Practice
10. Design of a RF Amplifier: Theory, Design & Practice
11. Design of Up and Down Converter: Theory, Design & Practice
12. Design of ADC/DAC
13. Design of an ADM Coder and Decoder: Theory, Design & Practice
14. Design of Analog Computer using Op-amp: Theory, Design & Practice
15. Design of active filters using Op-amp: Theory, Design & Practice
16. Design of a Temperature Controller using 8085 microprocessor and AD590H transducer: Theory, Design & Practice

Software:

ORCAD, MULTISIM, TCAD SILVACO, TANNAR

E. Teaching/Learning/Practice Pattern:

Teaching : 40%
Learning : 10%
Practice : 50%

F. Examination Pattern:

1. Practical Examination: Conducting Experiment and Viva-Voce.



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

G. Reading List:

BOOKS:

1. *As in all subjects*

MAGAZINES:

1. *IEEE Spectrum*
2. *Electronics for you*
3. *Electropages*

JOURNALS:

1. *Journal of Electronic Systems - dline*
2. *Journal of Systems Engineering and Electronics Elsevier*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Power Electronics Device and Circuits

Module Code: ECE603

Semester: 6th

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. To teach students about energy conversions and processing using various power electronic converters.
2. To develop knowledge and understanding of power devices, converters and apply their mathematical skills for solving practical problems.
3. To develop & design methodologies for power equipments and their modeling.

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Knowledge of power electronics circuits used for AC-DC Conversions, signal conditioning.
2. Students will be able to design converters for specific purpose and select semiconductor devices relevant to the working requirements.
3. Students will be substantially prepared to take up research assignment in relevant topics.

C. Subject matter:

UNIT I:

Power Semiconductor Devices: History of development of Power Electronic devices, Constructional features, Characteristics, rating and specification, gate/base drive circuits, protection including cooling and application consideration of diodes, SCRS, GTO, BJTS, MCT, MOSFET and IGBT. Electromagnetic interference.

UNIT II:

AC to DC Converters: Operation and analysis of Single phase and multi-phase uncontrolled and controlled rectifiers with R, RL and back EMF load, effect of source inductance, free-wheeling effect, power factor improvement methods for phase controlled rectifiers, filters.

UNIT III:

AC to AC Voltage Converter: Operation and analysis of single phase integral cycle and phase controlled converters, Configuration of three phase controllers.

UNIT IV:

DC to DC Converters: Single phase and three phase bridge inverters, VSI and CSI, voltage control – PWM & Square wave operation, Harmonics and their reduction techniques.

DC to AC Converters: Single phase and three phase bridge inverters, VSI and CSI, voltage control- PWM and square wave operation, Harmonics and their reduction techniques

Cycloconverters: Single phase and three phase configurations and operating Principle of cycloconverters.

D. List of Experiments: (Minimum eight experiments should be conducted by students)

1. Study of I-V characteristic of SCRS triac & diac.
2. Study of BJT, IGBT, GTO & MOSFET
3. To Study a UJT firing circuit for the control of SCRS.



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4. To generate and study the PWM control signal for Single Phase dc to ac inverter.
5. To Study and use of the single phase half controlled & fully controlled AC to DC Converter and effect of firing angle control on load voltage & wave Forms.
6. To study and use of back to back connected SCR/triac Controlled AC Voltage controller and its wave forms with Variation of firing angle.
7. To study & use chopper circuit for the control of DC Voltage using (1) Pulse width control (2) Frequency Control & (3) Current limit Control.
8. Study of Single Phase inverter and its wave form.
9. Study of Three phase firing circuit with synchronization, and testing with three phase AC to DC bridge converter.
10. Testing of wave forms of digital firing modules.
11. Study and Testing of a Three Phase bridge inverter with different types of loads.
12. To Study the harmonics & reactive power measurement in AC mains with rectifier and AC Voltage Controller loads.

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.
2. Practical Examination: Conducting Experiment and Viva-Voice.

G. Reading List:

BOOKS:

1. Rashid Muhammad., "Power Electronics: Circuits, Devices and Applications", 2nd Ed. Prentice - Hall
2. Mohan Ned, Undeland Tore, M. and Robbins William, P., "Power Electronics: Converter, Applications and Design", 3rd Edition, John Wiley & Sons.
3. Landev Cyrill, W., "Power Electronics", 3rd Edition, McGrawHills, London
4. Dewan, S. B. and Satrughan A., "Power Semiconductor Circuits", John Wiley & Sons

MAGAZINES:

1. Power Electronics Letters, IEEE.
2. Power Electronics Magazine, IET

JOURNALS:

1. Power Electronics, IEEE Transactions.
2. Electrical and Electronics Engineering, Elsevier.
3. The Journal of Institute of Electrical and Electronics Engineer, Japan.



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Soft Computing

Module Code: CSE 606

Semester: 6th

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. Introducing the fundamental concepts of Soft Computing;
2. Equip with the knowledge and skills in logic programming;
3. Exploring the different paradigms in knowledge representation and reasoning;
4. Understanding the contemporary techniques in machine learning;
5. Evaluating the effectiveness of hybridization of different artificial intelligence techniques.

B. Learning outcomes:

Students successfully completing this module will be able to:

1. Understand the history, development and various applications of Soft Computing.
2. Familiarize with propositional and predicate logic and their roles in logic programming;
3. Learn the knowledge representation and reasoning techniques in rule-based systems, case-based systems, and model-based systems;
4. Appreciate how uncertainty is being tackled in the knowledge representation and reasoning process, in particular, techniques based on probability theory and possibility theory (fuzzy logic);
5. Master the skills and techniques in machine learning, such as decision tree induction, artificial neural networks, and genetic algorithm;

C. Subject matter:

UNIT I:

Machine Learning & AI: Introduction, hierarchical perspective and foundations. Rote Learning, Learning by advice, learning in problem solving inductive learning, explanation based learning, learning from observation and discovery, learning by analogy, introduction to formal learning theory. Biological neurons and brain, models of biological neurons, artificial neurons and neural networks, Early adaptive nets Hopfield nets, back error propagation competitive learning lateral inhibition and feature maps, Stability - Plasticity and noise saturation dilemma, ART nets, cognition and recognition.

UNIT II:

Neural nets as massively parallel, connectionist architecture, Application in solving problems from various are as AI, Computer Hardware, networks, pattern recognition sensing and control etc.

UNIT III:

Basics of Fuzzy Sets: Fuzzy Relations – Fuzzy logic and approximate reasoning – Design Methodology of Fuzzy Control Systems – Basic structure and operation of fuzzy logic control systems.

UNIT IV:

Concepts of Artificial Neural Networks: Basic Models and Learning rules of ANN's. Single layer perception networks – Feedback networks – Supervised and unsupervised learning approaches – Neural Networks in Control Systems. Basics of Genetic Algorithms: Evolution of Genetic Algorithm Applications.

D. List of Experiments: (Minimum eight experiments should be conducted by students)



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1. Simulate DFS
2. Simulate BFS
3. Simulate A*
4. Simulate 8- Puzzle Problem
5. WAP to implement and function using ADALINE with BIPOLAR inputs and outputs
6. WAP to implement and function using MADALINE with BIPOLAR inputs and outputs
7. WAP to implement discrete Hopfield network and test for input patterns
8. Write a programme to implement fuzzy set operation and properties
9. Write a programme to implement composition of fuzzy and crisp relations.
10. WAP to perform MAX-MIN composition of two matrices obtained from Cartesian product.
11. Write a programme for maximizing $f(x) = x^2$ using GA where x is ranges from 0 to 31 perform only 5 iteration.

E. Teaching/ Learning/ Practice pattern:

Teaching: 40%

Learning: 10%

Practice: 50%

F. Examination pattern:

1. Theoretical Examination: Regular Examination.
2. Practical Examination: Conducting experiment and viva voice

G. Reading lists:

BOOKS:

1. P H Winston, "Artificial Intelligence", Pearson Education
2. Bishop, "Neural Networks for Pattern Recognition", OUP
3. Cohen, "Empirical Methods for AI", PHI
4. Haykin, "Neural Network", Pearson Education/PHI
5. E Charniak and W. Midermott, "Introduction to Artificial Intelligence", Pearson Education.
6. Hagan, "Neural Network Design", Vikas
7. Shivanandan Vikas Bose "Artificial Neural Network", Neural Network TMH
1. 8.Elaine Rich and Kevin Knight, "Artificial Intelligence", McGraw Hill Companies Inc.
8. Stuart Russell and Peter Norving, "Artificial Intelligence: A Modern Approach", Prentice Hall.
9. Davin Poole, Mackworth, and Goebel, "Computational Intelligence: A logical Approach", Oxford University Press.

MAGAZINE:

1. AI Magazine - Association for the Advancement of Artificial Intelligence, AAAI Press, USA
2. IEEE Intelligent Systems Magazine, Computer Society, United State

JOURNAL:

1. Artificial Intelligence ,Elsevier, Netherland, ISSN: 0004-3702
2. Artificial Intelligence in medicine, Elsevier, Netherland,ISSN: 0933-3657
3. Journal of Artificial Intelligent Research(JAIR) , AAAI Press, USA, ISSN 1076-9757
4. Applied Soft Computing - Journal - Elsevier, Netherland,ISSN: 1568-4946



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

SEMESTER - VII

Subject Code	Subject	P	T	L	Credit
ECE 701	Mobile Communication	2	0	3	4
HSS 701	Mass Communication for Technology	0	0	3	3
XXX 701	Research Paper Communication	2	0	0	1
ECE 7XX	Elective - I	0	0	3	3
ECE 7XX	Elective - II	0	0	3	3
ECE 702	Propagation & Antenna	2	0	3	4
ECE 703	VLSI Design	2	0	3	4
	Total	8	0	18	22



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Elective –I(Open to all branches/all students)

Department of CSE

CSE701A: Bio-informatics
CSE702A: Quantum Computing
CSE703A: Robotics
CSE704A: Data Mining & Warehousing
CSE705A: Data Compression
CSE706A: Real Time Systems
CSE707A: Software Project Management
CSE708A: Software Quality Engineering
CSE709A: Neural Networks
CSE710A: Fuzzy Systems
CSE711A: Parallel Algorithms
CSE712A: Real Time Operating Systems

Department of ECE

ECE 701A: Mobile Communication
ECE 702A: Nanotechnology
ECE 703A: Personal Communication Networks
ECE 704A: Fault tolerant System
ECE 705A: CAD of VLSI Circuits
ECE 706A: EMI/EMC Techniques
ECE 707A: Television Engineering
ECE 708A: Multimedia Signal Processing
ECE 709A: Atmospheric Engineering
ECE 710A: Computational Electromagnetics

Department of EE

EE701A: Energy Audit
EE702A: High Voltage Engineering
EE703A: Special Electrical Machines
EE704A: Computer Aided Power System
EE705A: Safety and Reliability Engineering
EE706A: Power System Planning & Management
EE707A: Biomedical Instrumentation
EE708A: Computer Aided Electrical Machine Design
EE709A: Nuclear Power Plant
EE710A: Flexible AC Transmission System (FACTS)
EE711A: Electrophysiology
EE712A: Photovoltaic Device and System



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Elective –II (Open to all branches/all students)

Department of CSE

CSE705B: Information & Coding Theory
CSE706B: Pattern Recognition & Image Processing
CSE707B: Embedded System Design
CSE708B: Digital audio & speech Process
CSE709B: Computational Geometry
CSE710B: Computational Complexity
CSE711B: Parallel Algorithms
CSE712B: Natural Language Processing

Department of ECE

ECE 705B: Bio-Medical Electronics
ECE 706B: Opto-Electronics
ECE 707B: Microwave Circuit & Devices
ECE 708B: Molecular Electronics
ECE 709B: Optical Systems Design
ECE 710B: Quantum Phenomenon in Electrical Engineering
ECE 711B: Radar and Sonar Engineering

Department of EE

EE705B: Electrical Energy Management
EE706B: Microprocessor based Instrumentation
EE707B: Power Quality Issue & Remedial Measures
EE708B: Restructuring in Power System
EE709B: Non-Linear & Optimal Control
EE710B: Computational Methods in Power system Analysis
EE711B: Power Semiconductor Devices & ICs
EE712B: Sustainable Energy Systems



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Audit Electives (Optional)

- XXX809: Green Technology
- XXX810: Theory of Forecasting
- XXX811: Safety & Reliability Engineering
- XXX812: Bio-medical Instrumentation
- XXX813: Waste Management
- XXX814: Knowledge Management
- XXX815: Project Management
- XXX815: Cost Estimation Techniques
- XXX816: Re-engineering
- XXX817: Research Techniques & Methodology
- XXX818: Human Computer Interface
- XXX819: Quality Engineering
- XXX820: Technology Management Strategy
- XXX821: Engineering Product Development



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Mobile Communication

Module Code: ECE701

Semester: 7th

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. To make the students to understand modern mobile communication systems such as 2G, 2.5G, 3G and Bluetooth.
2. To make students familiarization about Co-channel and Adjacent channel interferences, Improving Coverage and System capacity Techniques,
3. To make the students to Propagation Models for Wireless Networks, Multipath Effects in Mobile Communication, Models for Multipath Reception, Mobile antenna system, Multiple Access Techniques.

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Know the different strategies that can be utilized for frequency re-use.
2. Know the different problems affecting the signal propagation
3. Know the appropriate digital technique that can be utilized in mobile communication.
4. Differentiate the wireless access protocols and have a sound knowledge about mobile IP based operations.

C. Subject matter:

UNIT I:

Introduction: Evolution of Mobile Radio Communications, Fundamental Radio Transmission Techniques, Mobile call Procedure, Cellular Concept, Operational Channels.

The Cellular Engineering Fundamentals: Introduction, Cell, Frequency Re-use, Channel Assignment Strategies, Fixed and Dynamic Channel Assignment Strategies, Handoff Process, Factors affecting Handoff Process, Handoff Strategies, Few practical cases of Handoff Scenario, Interference and System Capacity, Co-channel Interference (CCI), Adjacent Channel Interference (ACI), Cell Splitting, Sectoring, Microcell Zone concept, Repeaters, Trunked Radio System.

UNIT II:

Free Space Radio Wave propagation: Free Space Propagation Model, Basic methods of Propagation, Outdoor Propagation Models, Indoor Propagation Models.

Multipath Wave Propagation and Fading: Multipath Propagation, Multipath & Small-Scale Fading, Statistical models for multipath propagation.

UNIT III:

Modulation Techniques for mobile communication: Choice of modulation scheme, Linear and Non-Linear modulation scheme, Amplitude and Angle modulation (FM & PM), Analog and Digital modulation Techniques, BPSK, QPSK, Line coding, GMSK scheme, Receiver performance in multipath channels, Example of a Multicarrier Modulation: OFDM.

Multiple Access Techniques for wireless communication: Narrowband Systems, Wideband Systems, Frequency Division Multiple Access, Time Division Multiple Access, Spread Spectrum Multiple Access, Space Division Multiple Access.



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Modern Wireless Communication Systems: 1G: First Generation Networks. 2G: Second Generation Networks Global System for Mobile Communication (GSM, CDMA 1x network). 2.5G General Packet Radio Services, 3G: Third Generation Networks, 3G Standards and Access Technologies, 3G W-CDMA (UMTS), 3G CDMA2000. Beyond 3G Networks: LTE (4G network).

UNIT IV:

Wireless access protocols: IEEE 802.11 standard, WLAN Family, WLAN transmission technology, WLAN system architecture, Collision Sense Multiple Access with Collision Detection (CSMA/CD) and CSMA Collision avoidance (CSMA/CA), 802.11 PHY and MAC layers, IEEE 802.11 Distributed Co-ordinate System (DCF) and Point Co-ordination Function (PCF), WLAN family, HyperLAN, Bluetooth, Brief overview of WiMAX for wireless broadband communication.

Basic Mobile IP operations: types, concepts, Four basic entities for MIPv4, Mobile IPv4 Registration, Tunneling, MIPv4 Reverse Tunneling, MIPv4 Triangular Routing. Mobile Network Layer Considerations: Limitations of MIPv4, MIPv6 and HMIPv6, Dynamic Host Configuration protocol, Micromobility solutions to the host mobility problem, Routing in Mobile ad-hoc network, DSDV, DSR, AODV, Alternative metrics. Transport Layer Considerations: Traditional TCP, Classical TCP improvements- WAP, WAP 2.0.

Mobile Operating Systems: PalmOS, Pocket PC and Windows CE, Embedded Linux and other Mobile Operating Systems.

Application Layer Considerations: Adaptation, Disconnected operations, Mobile Agents, Business implications and mobile commerce. Emerging Technologies such as Wearable Computing- challenges and concerns.

D. List of Experiments: (Minimum eight experiments should be conducted by students)

1. Study of wireless Communications using Trainer Kit
2. Study of wireless Communications using VisSim
3. Study of Amplitude Modulation and Demodulation using VisSim
4. Study of Frequency Modulation and Demodulation using VisSim
5. Study of ASK, FSK, PSK, QPSK digital modulators
6. Study of Code Division Multiple Access (CDMA)
7. Study of Global System for Mobile Communication (GSM)
8. Study of Spread Spectrum – DSSS Modulation & Demodulation
9. Study of Wireless Path loss Computations - Study of Propagation Path loss Models : Indoor & Outdoor (Using MATLAB Programming)
10. Study of Free Space Propagation – Path Loss Model
11. Study of Link Budget Equation for Satellite Communication
12. Study of Carrier to Noise Ratio in Satellite Communication
13. Study of Outdoor Propagation – Okumura Model
14. Study of Outdoor Propagation – Hata Model

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.
2. Practical Examination: Conducting Experiment and Viva-Voice.



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G. Reading List:

BOOKS:

1. T. S. Rappaport, "Wireless Communications: Principles and Practice", Pearson Education, Inc.
2. K. Feher, "Wireless Digital Communications: Modulation and Spread Spectrum Applications", NJ: Prentice Hall, Delhi
3. J. G. Proakis, "Digital Communications", 4th ed. NY: McGraw Hill.
4. W. C. Lee, "Mobile Communications Engineering", 2nd ed. New Delhi Tata McGraw-Hill.
5. R. Pandya, "Mobile and Personal Communication Systems and Services", Latest ed. New Delhi PHI
6. S. Haykin and M. Moher, "Modern Wireless Communications". Singapore: Pearson Education, Inc.
7. J. W. Mark and W. Zhuang, "Wireless Communications and Networking". New Delhi PHI
8. D. P. Agarwal and Q-A. Zeng, "Introduction to Wireless and Mobile Systems". Nelson, India: Thomson Learning
9. R. Blake, "Wireless Communications Technology". Delmar, Singapore: Thomson Asia Pvt Ltd
10. B. P. Lathi and Z. Ding, "Modern Digital and Analog Communication Systems", NY: Oxford University Press
11. J. G. Proakis and M. Salehi, "Communication Systems Engineering", Latest ed. Singapore: Pearson Education, Inc.
12. Raj Kamal, "Mobile Computing", Oxford Higher Education University Press, New Delhi.
13. Pejman Roshan & Jonathan Leay, "802.11 Wireless LAN Fundamentals", Pearson Education, New Delhi.
14. Geoff Sanders, "GPRS Networks", John Wiley and sons, England

MAGAZINES:

1. IEEE Communication Magazine.
2. IEEE Signal Processing Magazine.
3. Electronics Business Magazine.
4. Telecommunication Magazine.
5. IEE ASSP Magazine

JOURNALS:

1. IEEE journal on selected Areas in communication.
2. IEEE Spectrum
3. Bell Systems Technical Journal
4. AT & T Bell Laboratory Technical Journal
5. Electronics Letter
6. International Journal of wireless Information Networks.
7. British Telecom Technological Journal
8. AT & T Technical Journals



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Mass Communication for Technology

Module Code: HSS 701

Semester: 7th

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is design to meet with the objectives of:

1. Imparting theoretical lectures with case discussion.
2. Teaching with inclusive learning.
3. Making students aware about the importance of this subject in their future career.

B. Learning Outcomes:

Students successfully completing this module will be able to :

1. Students will be able to work with efficiency as they had knowledge of the subject.
2. With the backup knowledge their performance will definitely much better in their workplace.

C. Subject Matter:

UNIT 1:

Fundamentals of Mass Communication- Definition of Mass Communication, importance, scope, importance, related fields, history of mass communication.

UNITII:

Dissemination of Scientific & Technical knowledge (DSTK): Difficulties with distribution of scientific and technical information is rapid increasing with unprecedented spade of science and technology. Further, engineers are made to meet with this challenge. The subject should cover the knowledge so as to establish adequate and effective distribution of information. Lack of information cannot make a sound engineer. Engineers should be specialists in information dissemination for which a course on DSTK is of paramount importance. Engineers should be made to write articles and research papers fluently and confidently. They should be taught to organize seminar and conferences deliver talks as well in the seminars and conferences. They should also be taught the technique of publishing magazines and journals.

D. Teaching/ Learning/ Practice Pattern:

Teaching	: 50%
Learning/ case presentation	: 30%
Assignment	: 10%
Attendance	: 10%

E. Examination pattern:

1. Theoretical Examination	: 50
2. Class test	: 30
3. Assignment	: 20

F. Reading List:

BOOKS:

1. Murthy, D.V.R. *Development of Journalism*, Dominant Publishers, 2001



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2. Naarula, Uma. *Development Communication Theory and Practice*, Har-Anand Publication Ltd New Delhi; 1990.
3. Sharma, Suresh Chandra, *Media Communication and Development*, Rawat Publication, 1987.
4. UNESCO, 'Different Theories and Practice', 1982.

MAGAZINES:

1. *Media and Communication*
2. *Communication Magazine*

JOURNALS:

1. *Mass Review*
2. *Journal of Communication Studies*
3. *Mass Communication and Society*
4. *Journal of Mass Communication*
5. *Communicator*
6. *Journal of Communication*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Propagation & Antenna

Module Code: ECE702

Semester: 7th

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. To make the students to study Antennas & their characteristics and propagation patterns
2. To expose students to application of particular antenna in particular communication system,
3. To make students aware of EM wave propagation under different modes

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. understanding & utilization of antenna as required in different communication systems
2. Know about EM wave propagation effects & pattern in different media.

C. Subject matter:

UNIT I:

Radiation Theory and Pattern: Review of Maxwell wave equation and Faraday's law, Radiation, Herzian Dipole, different field components.

UNIT II:

Antenna Fundamentals: Antenna Concept, Different types of Antenna, Directivity, Beam Width, gain, radiation resistance, Application of Network Theorems, Basic Terminology. Field radiated by dipole & loop antennas, monopole antenna, parabolic antenna, effect of ground, Travelling Wave Antennas. Antenna Impedance & Bandwidth, Array Analysis & Synthesis Special arrays like Binomical Yagi etc.

UNIT III:

Advanced Antenna: Introduction to Adaptive & Retro directive Arrays, Smart Antennas. Circularly Polarized Antennas, Helical Antennas Broadband Antennas and Arrays (Log periodic & other) Secondary Source & Aperture Antenna, Microwave Antennas, Horn, Slot, Paraboloidal Reflector, Lens & Micro strip antenna, Remote sensing application of antennas, Radar range equations. Propagation effect to Link on EM.

UNIT IV:

Wave propagation: Wave propagation in Different frequency Ranges, Interference Effects of Ground, Antennas Located over Flat & Spherical Earths' Magnetic Fields, Troposphere Scatter, Ducts & Nonstandard Refraction, EIF propagation using Earth-Ionosphere Waveguide Model, Scattering & Absorption at Microwave Frequencies Introduction to Propagation Modeling and Predictive studies on Propagation, Multipath fading, Friis transmission formula Brightness & Antenna Temperature their role in link calculation.

D. List of Experiments:

1. Study the characteristics of the Reflex Klystron Tube and to determine its electronic tuning range. What do you mean by beam voltage and rippled voltage? How rippled voltage helps to get estimated frequency. Measure frequency from microwave bench.



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2. By the use of the slotted line. To determine the unknown frequency. To determine the Voltage Standing Wave Ratio (VSWR) and Reflection Coefficient.
3. To describe the characteristics of the Horn antenna. To carry out gain measurements using method of comparison. Measurement of the gain of Horn Antenna using Method of the two antennas.
4. By use of slotted waveguide. To observe how the load impedance affects the VSWR. To determine when a waveguide is properly terminated.
5. To measure unknown load impedance attached to a waveguide using the smith chart.

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.
2. Practical Examination: Conducting Experiment and Viva-Voice.

G. Reading List:

BOOKS:

1. J D Kraus, R. J. Marhefka, A. S Khan "Antennas and Wave Propagation", Tata McGraw Hill, 4th Edition.
2. C. A. Balanis "Antenna Theory: Analysis and Design" (3rd Edition) Wiley India.
3. J D Kraus, "Electromagnetics with Applications" McGraw Hill, 5th Edition.
4. G Kenedy, "Electronic Communication Systems", MC GrawHill, Latest Edition.
5. Hayt, "Engineering Electromagnetics", Tata McGraw Hill, Latest Edition.
6. John D Ryder, "Networks Lines and Fields", Prentice Hall of India, 2nd Edition.
7. E C Jordan and K G Balmain, "Electromagnetic Waves and Radiating Systems", Prentice Hall of India
8. S Y Liao, "Microwave Devices and Circuits", Prentice Hall of India.
9. Matthew M Radmanesh, "Radio Frequency and Microwave" Electronics Illustrated, Pearson Education Asia.
10. David M Pozar, "Microwave Engineering", John Willy & Sons. Inc.
11. Peter A Rizzi, "Microwave Engineering – Passive Circuits", Prentice Hall of India.
12. M L Sisodia, "Microwave Active Devices – Vacuum and Solid State", New Age Int. Publication.
13. M N O Sadiqu, "Elements of Electromagnetism", Oxford University Press.
14. K C Gupta, "Microwave Engineering" New Age Int. Publication, New Delhi.
15. M I Skolnik, "Introduction to Radar Systems", Tata McGraw Hall.
16. S. K. Ray et al, "Microwave Semiconductor Devices", Prentice Hall of India, New Delhi

MAGAZINES:

1. *Microwaves & RF*
2. *IEEE Spectrum*
3. *Electronics for you*
4. *Electropages*
5. *IEEE Microwave Theory and Techniques Society*

JOURNALS:

1. *IEEE Microwave Theory and Techniques*
2. *IET Microwaves, Antennas and Propagation*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: VLSI Design

Module Code: ECE703

Semester: 7th

Credit Value: 4 [P=2, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. To make the students to understand different types of analog and digital CMOS circuits and gates
2. To make students familiarization about VLSI tools and techniques
3. To expose students to modern art of VLSI design

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Utilize CMOS circuits and gates for VLSI system design and IC
2. Use SPICE, LASI and VHDL/Verilog techniques for VLSI system

C. Subject matter:

UNIT I:

Digital VLSI Circuit Design: MOS inverters, CMOS inverters, state characteristics, switching characteristics, power dissipation issues, CMOS logic gates: NAND, NOR, XOR, CMOS logic design of half and full adders. CMOS transmission gates, pseudo-nMOS, domino logic gates, Sequential MOS Logic Circuit: The SR latch circuit, clocked latch and flip-flop, CMOS D-latch and edge-triggered circuits, Schmitt trigger circuit, Comparator, Dynamic Logic Circuit: Pass transistor logic, synchronous dynamic circuit techniques, Semiconductor Memories: ROM circuit, SRAM circuits, DRAM circuits, drivers and buffers, Buffer scaling and design issues

UNIT II:

Analog CMOS Circuit Design: Review of MOSFET characteristics, scaling and small-geometry effects, MOSFET capacitance, .MOS resistor, MOS current source, current mirror circuits. MOS voltage source linear voltage and current converters, MOS differential amplifier CMOS operational amplifier (OPAMP), CMOS buffer circuit, design: Differential amplifier, level shifter, source follower, output stage voltage and power amplifiers, Cascaded OPAMP, Compensation techniques.

UNIT III:

Basic Rules for VLSI design: Stick diagram, λ -rule, conversion circuit to stick diagrams and stick diagrams to layout.

Analog Filters: Switched capacitor (SC) fundamentals, first order SC circuits, second-order SC circuit and cascade design Analog to digital and digital to analog converters, speed of conversion and over sampling issues,

VLSI Interconnects: distributed RC model, transmission line model. Future inter connect technologies.

UNIT IV:

Models and Simulation of VLSI Circuit: SPICE : Element lines, Control lines, Command lines, Types of analysis, Models and model parameters, Sub circuits and Macros, Layout design rules, Layout of inverters, NAND, NOR gates using LASI, VHDL model, VHDL Syntax: Basic concepts in VHDL/Verilog and VHDL grammar, Structural specification, VHDL description of Inverter, NAND gate, Full adder.



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UNIT V:

CMOS Mixed Signal Circuit: Adapting Biasing, CMOS comparator design, Analog multipliers, Level Shifting, Dynamic mixed signal circuit, data converter circuits, bit synchronization/data recovery circuit, spread spectrum signal

D. List of Experiments: (Minimum eight experiments should be conducted by students)

1. Design CMOS Transistors: testing of switching characteristics, gain and capacitance using SPICE Simulation
2. Experiment with CMOS inverter and testing inverter behaviour. Using SPICE simulate CMOS Inverter
3. Design of CMOS differential/ Op-amp circuit using SPICE and measurement of gains
4. Implementation of active filters and testing
5. Experiment with CMOS logic gates: NAND, NOR, XOR. Design layout of a two input CMOS NAND using LASI
6. Design of Full Adder with CMOS logic gates and testing
7. Study of CMOS SR flip flop and CMOS D latch and testing
8. Study of Schmitt trigger circuit and testing
9. Use VHDL/Verilog to realize carry function of full adder
10. Application of VHDL/ Verilog to realize a counter
11. Implementation of Digital circuit in FPGA

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.
2. Practical Examination: Conducting Experiment and Viva-Voice.

G. Reading List:

BOOKS:

1. *M Ismail and T Fietz "Analog VLSI Signal and Information Processing" McGraw Hill*
2. *R L Geiger, P E Allen and N R Stader, "VLSI Design Techniques for Analog and Digital Circuit", 1st Edition, McGraw Hill*
3. *P E Allen and D R Holberg "CMOS Analog VLSI Design", 3rd Edition, Oxford University Press*
4. *Ken Martin, "Digital Integrated Circuit Design", Oxford University Press*
5. *S M Kang and Y Leblebici, "CMOS Digital Integrated Circuit" 3rd Edition, Tata McGraw Hill, New Delhi*
6. *J M Rabaey, "Digital Integrated Circuit" 2nd Edition, Prentice Hall of India*
7. *M Ercegovac, TLang and J H Moreno, "Introduction to Digital Systems" McGraw Hill.*
8. *R J Baker, H W Li and D E Boyce "CMOS Circuit Design, Layout and Simulation", Prentice Hall of India*
9. *P. P. Sahu "VLSI Design", 1st Edition, Mc-Graw Hill Education, 2013.*

MAGAZINES:

1. *IEEE Symposium on VLSI circuits*

JOURNALS:

1. *International journal of VLSI design & Communication Systems (VLSICS)*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Nanotechnology

Module Code: ECE702A

Semester: 7th

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives:

1. To introduce students with diversified backgrounds to the expanding nano-world.
2. Lecture and Web-based learning supplemented class materials to increase exposure to students and bring material forward for discussion.
3. To effectively encouraged not only students but local professionals to participate in design proposals and to pursue further nanotechnology studies.

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. To demonstrate the ease of application and progression of integrating nanotechnology into the undergraduate education curriculum for engineering students, while providing hands on learning and initial research experience.
2. This coursework demonstrates substantial opportunities for students and faculty, while bringing forth the nanotechnology paradigm shift opportunities to the masses.

C. Subject matter:

UNIT I:

Introduction: Definition of nanotechnology, History of Nanotechnology and Overview of nanomaterials, Bonding in atoms, atomic structure and giant molecular solids. Main features of nanomaterials; types of nanostructures (0D, 1D, and 2D structures) Electronic conduction, system classification confined to one, two or three dimension and their effect on properties, top-down and bottom-up processes; and main chemical/physical/electrical/optical properties of nanomaterials.

UNIT II:

Fabrication and Synthesis of Nanomaterials (Bottom up, Top Down): Fabrication of Nanomaterials by bottom-up and top-down approaches; self-assembly of nanostructures; and examples for nanotechnology application, Spin coating, lithography, deposition, PVD, etching, and material modification methods, processes and equipments.

Epitaxy-different types of Epitaxy: Lattice mismatch - Liquid Phase Epitaxy (LPE) -Molecular Beam Epitaxy (MBE)-Chemical vapour deposition (CVD) - Atomic layer deposition (ALD)

Compound semiconductor nanostructures: growth of compound semiconductors, superlattices, self-assembled quantum dots.

UNIT III:

Characterization Tools: Methods for characterizing the nanomaterials: Scanning Electron Microscopy (SEM), electro probe microanalysis (EPMA), transmission electron microscopy (TEM) including energy dispersive X-ray (EDX) analysis, electron energy loss spectroscopy (EELS), Auger electron spectroscopy (AES), low energy electron diffraction (LEED), reflection high energy electron diffraction (RHEED), Atomic force microscopy (AFM), scanning tunneling microscopy (STM) and scanning tunneling spectroscopy (STS).

Photons as probes: generally electrons/photons are emitted and are analyzed as light microscopy including confocal and two photon microscopy, X-ray diffraction (XRD), X-ray fluorescence (XRF),



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X-ray absorption spectroscopy (XAS), infrared spectroscopy (IR), Raman spectroscopy (Raman), Luminescence, Cathodeluminescence and X-ray photo electron spectroscopy (XPS).

UNIT IV:

Application: Nanotechnology for Healthcare and Medicine, Energy Harvesting, Storage and Conversion, Electro-Optic-Mechanical devices: OLEDs, OTFTs, Nanoelectronics and photonics devices.

D. List of Experiments: NIL

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.

G. Reading List:

BOOKS:

1. John H. Davies, "The Physics of Low Dimensional Semiconductors: An Introduction", Cambridge University Press, 1998.
2. Edward L. Wolf, "Nanophysics and Nanotechnology: An Introduction to Modern Concepts in Nanoscience", 2nd Ed., Wiley-VCH, 2006.
3. John Mongillo, "Nanotechnology", Greenwood Press, 2007. ISBN # ISBN-13: 978-0-313-33880-802.
4. Rainer Waser, "Nanoelectronics and Information Technology: Advanced Electronic Materials and Novel Devices", Wiley-VCH, 2003.
5. Vladimir V. Mitin, Viatcheslav A. Kochelap, Michael A. Stroscio, "Introduction to Nanoelectronics: Science, Nanotechnology, Engineering, and Applications", Cambridge University Press, 2008.
6. W. Gaddand, D. Brenner, S. Lysherski and G.J. Infrate (Eds), "Handbook of nanoscience, Engg. and Technology", CRC Press, 2002.
7. G. W. Hanson "Fundamental of Nanoelectronics" Pearson Education, 2009

MAGAZINES:

1. Photonics Spectrum, <http://www.photonics.com/>
2. Discover, <http://discovermagazine.com/tags/nanotechnology>
3. Nanomagazine, <http://www.nanomagazine.co.uk/>

JOURNALS:

1. Nanotechnology Education: Ernst. J.V. (2009). Contemporary content and approaches. *The Journal of Technology Studies* 35 (1), 3-8.
2. Nano Revolution-Big impact: How emerging nanotechnologies will change the future of education and industry in America (and more specifically in Oklahoma) an abbreviated account. *The Journal of Technology Studies* 35 (1), 9-19.
3. Allhoff, F., Lin, P. & Weckert, J. (2007). *Nanoethics: The Ethical and Social Implications of Nanotechnology*. John Wiley & Sons, Inc.: New Jersey. ISBN: 978-0-470-08416-8



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

4. Hall, S.J. (2005). *Nanofuture: What's Next For Nanotechnology*. Prometheus Books: New York, ISBN: 1-59102-287-8-1.



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Personal Communication Networks

Module Code: ECE703A

Semester: 7th

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. Introducing basic concepts of various personal communication networks that we use in our day-to-day life.
2. To have clear understanding of various 3GPP concepts and non 3GPP.

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Clear understanding of various personal communication networks around them.
2. Understand the design and develop different Cellular Mobile Wireless Networks
3. Understand various 3GPP based system and Non 3GPP systems.

C. Subject matter:

UNIT I:

Introduction: Basics of Wireless communication, Personal Communication systems, Paging systems, Cordless telephone systems, TV remote control systems, Cellular Mobile Wireless Networks: Systems and Design Fundamentals.

UNIT II:

Propagation Models: Description of cellular system, Frequency Reuse, Co-channel and Adjacent channel interferences, Propagation Models for Wireless Networks, Multipath Effects in Mobile Communication, Models for Multipath Reception, Mobile antenna system.

UNIT III:

3GPP Based systems

Global System for Mobile Communication (GSM): Architecture, Protocols, Air Interface, Frames, Multi-frames, Super-Frames and Hyper-Frames, GSM Call Set up Procedure, GSM Protocols and Signaling.

GPRS networks: The 2.5 G General Packet Radio Services, GPRS Networks Architecture, GPRS Interfaces and Reference Points, GPRS Logical Channel, GPRS Mobility Management Procedures, GPRS Attachment and Detachment Procedures, GPRS Applications.

UMTS: Architecture, Protocols, Air Interface

UNIT IV:

Non 3GPP Based system

CDMA systems: IS-95 Networks, forward link and reverse link, Universal Mobile Telecommunication System

D. List of Experiments: NIL

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.

G. Reading List:

BOOKS:

1. T. S. Rappaport, "Wireless Communications: Principles and Practice", 2nd Edition, Pearson Education
2. Jon W Mark, Weihua Zhuang, "Wireless Communications and Networking", 1st Edition, Prentice Hall
3. Raj Kamal, "Mobile Computing", 2nd Edition, Oxford University Press.
4. Pejman Roshan, Jonathan Leary, "802.11 Wireless LAN Fundamentals", 1st Edition, Cisco Press.
5. Geoff Sanders, Lionel Thorens, Manfred Reisky, Oliver Rulik, Stefan Deylitz, "GPRS Networks", 1st Edition, John Wiley & Sons

MAGAZINES:

1. IEEE Wireless Communications Magazine
2. Wireless Week

JOURNALS:

1. European Association for signal processing (EURASIP) journal on Wireless communications
2. International Journal of Wireless Communication and Networking (IJWCN).



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Fault Tolerant System

Module Code: ECE704A

Semester: 7th

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. Students will be able to know different types of faults encounter in different systems and various methods to overcome that faults.
2. Various scheduling techniques and recovery algorithms will be introduced to the students.

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Understanding of Fault Tolerant System.
2. Understand the Techniques of handling faults.
3. Fault-tolerant scheduling.

C. Subject matter:

UNIT I:

Different Faults: Permanent faults, Transient faults, intermittent faults, Specification or design faults, Component defects, Environmental effects, Permanent faults, Transient faults, Intermittent faults.

UNIT II:

Techniques of handling faults at run-time: Error detection, Error correction, Fault masking, Hardware redundancy: Voting mechanism, N-modular redundancy (NMR, Software redundancy: N-version programming, Recovery-block approach, Information redundancy: forward error recovery), Duplication, Parity encoding, Checksum codes, Cyclic codes, Time redundancy (backward error recovery): Retry, Rollback

UNIT III:

Error detection: Watchdog mechanism, Comparisons, Diagnostic tests.

UNIT IV:

Fault-tolerant scheduling: Static scheduling, Dynamic scheduling, Temporal redundancy, Spatial redundancy, Uniprocessor scheduling, Multiprocessor scheduling, Quick-recovery algorithm (Krishna & Shin, 1986), Quick-recovery algorithm, Replication-constrained allocation, Fault-tolerant First-Fit algorithm, Fault-tolerant Rate-Monotonic algorithm, Quick-recovery algorithm, Replication-constrained allocation, Replication-constrained allocation, Rate-Monotonic-First-Fit (RMFF): FT-First-Fit : (Oh & Son, 1994)

D. List of Experiments: NIL

E. Teaching/Learning/Practice Pattern:

Teaching : 40%
Learning : 10%
Practice : 50%



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F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.

G. Reading List:

BOOKS:

1. David Powell, "A Generic Fault Tolerant Architecture for Real Time Dependable Systems", 1st Edition, Kluwer Academic Publishers
2. Israel Koren, C. Mani Krishna, "Fault Tolerant Systems", 1st Edition, Elsevier
3. Rolf Isermann, "Fault-Diagnosis Systems: An Introduction from Fault Detection to Fault Tolerance", 1st Edition, Springer.

MAGAZINES:

1. IEEE Communication Magazine.
2. IEEE Signal Processing Magazine.
3. Electronics Business Magazine.
4. Telecommunication Magazine.
5. IEE ASSP Magazine

JOURNALS:

1. IEEE journal on selected Areas in communication.
2. IEEE Spectrum
3. Bell Systems Technical Journal
4. AT & T Bell Laboratory Technical Journal
5. Electronics Letter
6. International Journal of wireless Information Networks.



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: CAD for VLSI Circuits

Module Code: ECE705A

Semester: 7th

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. Students will be able to know ASIC design flow and design automation.
2. Various hardware modeling using HDL, FPGA concept and high level synthesis.

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Understanding of ASIC design.
2. Understand the Techniques of HDL coding.
3. Identify the path to do high level synthesis.

C. Subject matter:

UNIT I:

Introduction: Application specific Integrated circuits (ASICs) & design automation, CMOS Technology and design rules, PLA, PLD and CPLD.

UNIT II:

Overview of Hardware modeling with VHDL, FPGA Concept, Architecture and Programming, Simulation of Digital circuits using CAD tools.

High Level Synthesis: Data path and Control synthesis, Logic Level Synthesis, Optimization of Combinational and Sequential circuits using VHDL codes.

UNIT III:

Physical design of VLSI circuits: Physical design of graph model, Conversion of circuit model to graph model, Hypergraph, Timing Analysis, Verification and Validation, Layout methodologies, Partitioning, Floor plans, Placement, Routing. Performance of circuit layout.

UNIT IV:

Design of Testability: Analog Design automation tools, Testing (Fault modeling, Simulation, Test generation) and Design for Testability, Test generation, D-algorithm, Sequential circuit testing, Design-for- testability, Built-in self-test, Enhancing testability.

D. List of Experiments: NIL

E. Teaching/Learning/Practice Pattern:

Teaching : 40%
Learning : 10%
Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.

G. Reading List:



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BOOKS:

1. *Michael John Sebastian Smith, "Application Specific Integrated circuits", 1st Edition, Addison-Wesley Professional.*
2. *Peter J Ashenden, "The designer's guide to VHDL", 3rd Edition, Elser.*
3. *Ayan Banerjee, Neil H. E. Weste, David Harris, "CMOS VLSI Design: A Circuits and Systems Perspective", 4th Edition, Pearson Education.*
4. *Wayne Hendrix Wolf, "FPGA Based System Design", 1st Edition, Pearson India.*
5. *P. P. Sahu "VLSI Design", 1st Edition, Mc-Graw Hill Education, 2013*

MAGAZINES:

1. *IEEE Communication Magazine.*
2. *IEEE Signal Processing Magazine.*
3. *Electronics Business Magazine.*
4. *Telecommunication Magazine.*
5. *IEE ASSP Magazine*

JOURNALS:

1. *IEEE journal on selected Areas in communication.*
2. *IEEE Spectrum*
3. *Bell Systems Technical Journal*
4. *AT & T Bell Laboratory Technical Journal*
5. *Electronics Letter*
6. *International Journal of wireless Information Networks.*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: EMI/EMC

Module Code: ECE706A

Semester: 7th

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. Students will be able to know different types of biomedical equipments and applications.
2. Bioelectric signals and their recording, patient monitoring system will be introduced to the students.

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Clear understanding of Biomedical equipments and application.
2. Understand the Safety Aspect and Testing of instruments.

C. Subject matter:

UNIT I:

Introduction to EMI/EMC: Definitions, Different Sources of EMI(Electro-magnetic Interference), Electro-static discharge (ESD), Electro-magnetic pulse(EMP), Lightning, Mechanism of transferring Electro-magnetic Energy: Radiated emission, radiated susceptibility, conducted emission, conducted susceptibility, Differential & commonmode currents. Concepts of EMC, EMC UNITS.

UNIT II:

EMC requirements for electronic systems: World regulatory bodies- FCC, CISPR etc. Class-A devices, class-B devices, Regulations of the bodies on EMC issues.

UNIT III:

Different Mitigation Techniques for preventing EMIGrounding: Fundamental grounding concepts, Floating ground, Single-point & Multi-point ground, advantages & disadvantages of different grounding processes.

UNIT IV:

Shielding: Basic concepts of shielding, Different types of shielding, Shielding effectiveness(S.E), S.E of a conducting barrier to a normal incident plane wave, multiple reflection within a shield, mechanism of attenuation provided by shield, shielding against magnetic field & Electric field, S.E for Electronic metal & Magnetic metal, Skin-depth, S.E for far-field sources, shield seams, Cross-talks & Coupling, Measurement set for measuring Cross-talk, Filtering & decoupling.

D. List of Experiments: NIL

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.



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G. Reading List:

BOOKS:

1. Clayton R. Paul, "Introduction to Electromagnetic compatibility", 2nd Edition, John Wiley & Sons
2. Frederick M. Tesche, Michel Ianoz, Torbjörn Karlsson, "EMC Analysis Methods & Computational Models", John Willey & Sons, Inc
3. Bruce archambeault, Omar M. Ramahi, Colin Brench, "EMI/EMC Computational modelling Hand Book", 1st Edition, Springer Science & Business Media.

MAGAZINES:

1. IEEE Communication Magazine.
2. IEEE Signal Processing Magazine.
3. Electronics Business Magazine.
4. Telecommunication Magazine.
5. IEE ASSP Magazine

JOURNALS:

1. IEEE journal on selected Areas in communication.
2. IEEE Spectrum
3. Bell Systems Technical Journal
4. AT & T Bell Laboratory Technical Journal
5. Electronics Letter
6. International Journal of wireless Information Networks.
7. British Telecom Technological Journal
8. AT&T Technical Journals



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Television Engineering

Module Code: ECE707A

Semester: 7th

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. Students will be able to know basics of television system, composite video signal and television standards.
2. Knowledge about color television and digital television technology will be introduced to the students.

B. Learning outcomes:

At the end of this module, students are expected to be able to

1. Students will have clear understanding of television systems, components and video signals.
2. Students will be able to understand the logic behind color television.

C. Subject matter:

UNIT I:

Basic Television System (Introduction): Scanning principles: sound and picture transmission, scanning process, camera pick-up devices, video signal, transmission and reception of video signals, brightness perception and photometric quantities, aspect ratio and rectangular scanning, persistence of vision and flicker, vertical resolution, the Kell factor, horizontal resolution and video bandwidth, interlaced scanning.

UNIT II:

Composite Video Signal: Lines and scanning, video signal components, horizontal sync and blanking standards, vertical sync and blanking standards, video modulation and vestigial side band signal, sound modulation and intercarrier system.

Television Standards: Standard channel characteristics, reception of the vestigial side band signals, television broadcast channel, consolidated CCIR system-B standard, various television broadcast systems.

Television Pick-up devices and Cameras: Camera lenses, auto-focus systems, television camera pick-ups, Silicon Vidicon, CCD image sensors, video processing of camera pick-up signal.

UNIT III:

Color Television: Color fundamentals: mixing of colors and RGB color perception, chromaticity diagram, color television camera, color TV signals and transmission, NTSC, SECAM and PAL system, Trinitron picture tube, automatic degaussing, plasma, LCD displays, Requirement of TV broadcast transmission, design principle of TV transmitters, IF modulation, power output stages, block diagram of TV transmitter, co-channel interference and ghost images during propagation of television signals, antenna requirements for television system, block schematic and function requirements for television receivers, trends in circuit design, color television receiver.

UNIT IV:

Digital Television Technology: Merits of digital technology, fully digital television system, digital television signals, digitized video parameters, digital video hardware, transmission of digital TV signals, bit rate reduction, digital TV receivers, video processor UNIT, audio processor UNIT, Closed Circuit television system (CCTV), Cable television system (CATV).



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

D. List of Experiments: NIL

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.

G. Reading List:

BOOKS:

1. R. R. Gulati, "Monochrome and Color Television", 3rd Edition, New Age International (P) Ltd.
2. R. G. Gupta, "Television Engineering and Video Systems", 2nd Edition, Tata McGraw-Hill.

MAGAZINES:

1. IEEE Communication Magazine.
2. IEEE Signal Processing Magazine.
3. Electronics Business Magazine.
4. Telecommunication Magazine.
5. IEE ASSP Magazine

JOURNALS:

1. IEEE journal on selected Areas in communication.
2. IEEE Spectrum
3. Bell Systems Technical Journal
4. AT & T Bell Laboratory Technical Journal
5. Electronics Letter
6. International Journal of wireless Information Networks.
7. British Telecom Technological Journal
8. AT&T Technical Journals



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Computational Electromagnetics

Module Code: ECE710A

Semester: 7th

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. Students will be able to know basics of numerical methods, and review of basic electromagnetic.
2. Knowledge about numerical techniques will be introduced to the students.

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Clear understanding of numerical methods and their applications.
2. Understand basic electromagnetic and numerical techniques.

C. Subject matter:

UNIT I:

Numerical Methods: ODE solvers, Euler, Runge – Kutta, Boundary conditions, Propagation of errors, Survey of numerical packages, Scientific programming with MATLAB.

UNIT II:

Review of Basic Electromagnetics: Electrostatics, Magnetostatics, Wave equations, TE, TM and Hybrid modes, Guided wave structures, Metallic waveguides, Dielectric waveguides, Radiating structures.

UNIT III:

Numerical Techniques: Method of Curvilinear Squares, Method of Moments, Finite Element Method, Finite Difference Method, Monte Carlo Method, Understanding boundary conditions.

UNIT IV:

Time varying Electromagnetic Fields: FDTD simulations, Courant's stability condition, Eddy currents and skin depth, Multi-resolution Time Domain Methods, Introduction to wavelets, Families of wavelets and orthogonality conditions.

D. List of Experiments: NIL

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.

G. Reading List:

BOOKS:



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

1. Karl F. Warnick: "Numerical Methods for Engineering: An Introduction Using MATLAB and Computational Electromagnetics Examples," SciTech Publishing
2. Matthew N O Sadiku, "Numerical Techniques in Electromagnetics with MATLAB," 3rd Edition, CRC Press
3. Andrew F Peterson, Scott L Ray, Raj Mittra, "Computational Methods for Electromagnetics", Oxford University Press.
4. Roger F Harrington, "Field Computation by Moment Methods", Oxford University Press.
5. Jian-Ming Jin, "The Finite Element Method in Electromagnetics", 2nd ed., John Wiley & Sons.
6. Allen Taflove, Susan C Hagness, "Computational Electrodynamics: The Finite-Difference Time-Domain Method", 3rd ed., Artech House.
7. Warren L Stutzman, Gary A Thiele, "Antenna Theory and Design," 2nd Edition, John Wiley & Sons.

MAGAZINES:

1. IEEE Communication Magazine.
2. IEEE Signal Processing Magazine.
3. Electronics Business Magazine.
4. Telecommunication Magazine.
5. IEE ASSP Magazine

JOURNALS:

1. IEEE journal on selected Areas in communication.
2. IEEE Spectrum
3. Bell Systems Technical Journal
4. AT & T Bell Laboratory Technical Journal
5. Electronics Letter
6. International Journal of wireless Information Networks.
7. British Telecom Technological Journal
8. AT&T Technical Journals



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Bio-Medical Electronics

Module Code: ECE705B

Semester: 7th

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. Students will be able to know basics of human biology, concepts of medical instrumentation.
2. Knowledge about sensors and working principle will be introduced to the students.

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Clear understanding of different parts of human biology, medical measurements and associated constraints.
2. Understand the idea behind basic sensors and principles of operation and construction.

C. Subject matter:

UNIT I:

Human Biology: Basic concepts of Quantitative Physiology, Microbiology and Immunology, Notion of nervous system, respiratory system, circulatory system and excretory system with special emphasis on origin and alteration of physiological potentials for measurement of different pathophysiological parameters in these systems.

UNIT II:

Basic Concepts of Medical Instrumentation: Medical measurements and their associated constraints, classification of biomedical instruments, interfering and modifying inputs, compensation techniques, generalized static and dynamic characteristics commercial medical instrumentation development process, regulation of medical devices.

UNIT III:

Basic Sensors and Principles: Inertial sensors for measurement of pressure and flow, optical sensors for measurement of oxygen content, vitreo-retinal functions, thermal sensors, biosensors for bacteria detection, electrochemical sensors, Origin of biopotentials and their measurements like ENG, EMG, ECG, ERG, EEG, Principles of construction and operation of biopotential measuring equipments, Signal processing of Biopotentials, Analysis of non-stationary data with special emphasis on electroencephalographic data processing.

UNIT IV:

Measurements of physiological parameters: Description and principles of operation of analog and digital circuits for signal conditioning of biomedical sensor outputs with special emphasis to signal modulation, encoding and interfacing and electrical safety, blood pressure measurement, flow measurements and analyses by Brookfield cone-plate viscometer, Cahn surface tension balance and electronics bubble pulsating surfactometer, measurement of respiratory parameters by spirometer, blood glucose measurement by Doppler Ultrasonography; medical imaging systems like CAT Scan, MRI, USG etc.

D. List of Experiments: NIL



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.

G. Reading List:

BOOKS:

1. *Metin Akay, "Time frequency and wavelets in biomedical signal processing", 1st Edition, IEEE Press.*
2. *Leslie Cromwell, Fred J. Weibell and Erich A. Pfeiffer, "Biomedical Instrumentation and Measurements", 2nd Edition, Prentice-Hall.*
3. *John G. Webster, "Medical Instrumentation-Application and Design", 4th Edition, Wiley India Pvt Ltd.*
4. *Michael C K Khoo, "Physiological Control Systems: Analysis, Simulation and Estimation", John Wiley & Sons, Inc.*

MAGAZINES:

1. *IEEE Communication Magazine.*
2. *IEEE Signal Processing Magazine.*
3. *Electronics Business Magazine.*

JOURNALS:

1. *IEEE journal on selected Areas in communication.*
2. *IEEE Spectrum*
3. *Bell Systems Technical Journal*
4. *AT & T Bell Laboratory Technical Journal*
5. *Electronics Letter*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Optoelectronics

Module Code: ECE706B

Semester: 7th

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. Students will be able to optical processes in semiconductors, different optical sources.
2. Knowledge about photo detectors and optical fibers will be introduced to the students.

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Clear understanding of features of optical sources, photo detectors and operating principle.
2. Understand the features of photo detectors, types and fiber structures.

C. Subject matter:

UNIT I:

Introduction: Optical processes in semiconductors, Absorption, emission and radiation in semiconductors, SolarCell, OEIC.

UNIT II:

Optical Sources: Desired Features of Optical Sources for Optical Communication and Material Choices, LED Structure and Operating Principle, LED Modulation Characteristics: Output Power vs. Driving Current, Speed and Bandwidth, LED Driver Circuits for Optical Transmitters, LASER Structure and Operating Principle, Tunable Laser diode, LASER Modulation Characteristics: Output Power vs. Driving Current, Threshold Current and Its Temperature Sensitivity, Speed and Bandwidth. LASER Driver Circuits for Optical Transmitters.

UNIT III:

Photo detectors: Desired Features of Photo detectors, PIN Diode as Photo detector: Structure, Operating Principle, Shot Noise, Avalanche Photodiode (APD) as Photo detector: Structure, Operating Principle, Shot Noise, Avalanche Multiplication (Excess) Noise.

UNIT IV:

Optical Fibers: Fiber Structures and Types, Rays and Modes. Single-mode and Multimode Fibers, Refractive Index Profiles, Graded Index Fiber, Numerical Aperture, Acceptance Angle, V-Parameter. Loss mechanisms in Fibers, Loss vs. Wavelength Plot and Its Significance, Dispersion Mechanisms in Fibers: Intermodal and Intramodal (Chromatic) Dispersions, Components of Intramodal Dispersions, Dispersion vs. Wavelength Plots and their Significance.

UNIT V:

Integrated optical devices for Optical network: wavelength division multiplexing and demultiplexing, Photonic switch, wavelength router.

D. List of Experiments: NIL

E. Teaching/Learning/Practice Pattern:



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.

G. Reading List:

BOOKS:

1. Pallab Bhattacharya, "Semiconductor Optoelectronic Devices", 2nd Illustrated, Pearson.
2. John M Senior, "Optical fiber communications: principles and practice", 3rd Edition, Pearson.
3. Gerd Keiser, "Optical fiber communications", 5th Edition, McGraw-Hill.
4. Biswanath Mukherjee, "Optical WDM networks", 1st Edition, Springer, 2006

MAGAZINES:

1. IEEE Communication Magazine.
2. Telecommunication Magazine.
3. Electronics Business Magazine.

JOURNALS:

1. IEEE journal on selected Areas in communication.
2. IEEE Spectrum
3. Bell Systems Technical Journal
4. AT & T Bell Laboratory Technical Journal



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Microwave Circuit & Devices

Module Code: ECE707B

Semester: 7th

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. Students will be able to know basics of microwave transmission lines, description of multiport network.
2. Knowledge about microwave circuit analysis and impedance matching.

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Clear understanding transmission lines and multi-port junctions.
2. Understand how to do microwave circuit analysis .

C. Subject matter:

UNIT I:

Microwave transmission lines: Introduction to transmission lines - waveguides, strip-lines, micro-strip lines, fin-lines, inverted-striplines. Reflection coefficient, Transmission coefficient, VSWR, Impedance transformation in RF lossless lines. Impedance measurement, Microwave communication systems – Friis power transmission formula, Noise in microwave transmitters & receiver.

UNIT II:

Matrix description of multi-port network: Introduction to multi-port junctions: T-networks, Magic Tee, Directional couplers, Circulators. Definitions of a multi-port networks; Matrix description of N-port networks; Impedance, Admittance and Scattering matrix of N-port networks, Relations between the matrices of N-port networks. Reciprocal, Loss-less, Symmetrical multi-ports. Properties of Microwave junctions.

UNIT III:

Methods of Microwave circuit analysis: Transmission Matrix; Analysis of Cascaded networks; Reciprocity, Losslessness and Symmetrical conditions for Microwave 2-port junctions. Elementary 2-port junction, 3-port power dividers-Properties. Even- and odd-mode analysis. Directional Couplers - coupled TEM-Mode transmission lines. Different types of directional couplers. Scattering Matrix of two cascaded multi-ports. Generalized scattering matrix. Signal Flow Graph-Applications. Discontinuities. Modal analysis. Excitation of waveguides.

UNIT IV:

Impedance matching and tuning: Analytic Solutions, Smith chart solutions; Single-stub tuning – series and shunt tuning, Double-stub tuning, Quarter-wave transformer. Binomial transformer, Chebyshev transformer – Chebyshev polynomials, transformer design. Tapered lines. Microwave Filters and matching circuits-- Periodic structures, Filter design - Image Parameter Method, Insertion Method, Filter Implementation, Couple-line filters, Filters using coupled resonators. Semiconductor **Microwave Devices:** Tunnel diode; Gunn diode – design considerations for their waveguide mount. Avalanche diode – IMPATT, TRAPATT, Microwave bipolar transistor, hetero - junction bipolar transistor, Microwave field - effect transistor – JFET, MOSFET, MESFET, Parametric amplifiers; ICs.



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

D. List of Experiments: NIL

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.

G. Reading List:

BOOKS:

1. *David M Pozar, "Microwave engineering", 3rd Edition, John Wiley and Sons.*
2. *Robert E Collin, "Foundations for microwave engineering", 2nd Edition, McGraw Hill.*
3. *G P Srivastava, Vijay Laxmi Gupta, "Microwave devices and circuit design", Prentice-Hall of India.*
4. *M K Ghosh, S Sen, S Mukhopadhyay, "Measurement and instrumentation: trends and applications", Reprint, Ane Books India.*
5. *A. R. Jha, "MEMS and Nanotechnology-Based Sensors and Devices for Communications, Medical and Aerospace Applications", Illustrated, CRC Press.*

MAGAZINES:

1. *Microwaves & RF*
2. *IEEE Spectrum*
3. *Electronics for you*
4. *Electropages*
5. *IEEE Microwave Theory and Techniques Society*

JOURNALS:

1. *IEEE journal on selected Areas in communication.*
2. *IEEE Spectrum*
3. *Bell Systems Technical Journal*
4. *AT & T Bell Laboratory Technical Journal*



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Name of the Module: Robotics & Industrial Automation

Module Code: ECE712B

Semester: 7th

Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:

The course is designed to meet the objectives of:

1. To understand the basic concepts associated with the design and functioning and applications of Robots and automatic system
2. To study about the drives and sensors used in Industry.
3. To learn about analyzing robot kinematics and dynamics.

B. Learning outcomes:

At the end of this module, students are expected to be able to:

1. Clear understanding regarding Robotics & Industrial Automation.
2. Understand how to do automations where required.

C. Subject matter:

UNIT I:

Fundamentals of Robotics and Industrial Automation: Robot – Definition – Robot Anatomy – Co-ordinate Systems, Work Envelope, types and classification – Specifications – Pitch, Yaw, Roll, Joint Notations, Speed of Motion, Pay Load – Robot Parts and Functions – Need for Robots – Different Applications

Drives: Pneumatic Drives – Hydraulic Drives – Mechanical Drives – Electrical Drives – D.C. Servo Motors, Stepper Motor, A.C. Servo Motors – Salient Features, Applications and Comparison of Drives End Effectors – Grippers – Mechanical Grippers, Pneumatic and Hydraulic Grippers, Magnetic Grippers, Vacuum Grippers; Two Fingered and Three Fingered Grippers; Internal Grippers and External Grippers; Selection and Design Considerations

UNIT II:

Sensors and Actuators: Requirements of a sensor, Principles and Applications of the following types of sensors – Position of sensors (Piezo Electric Sensor, LVDT, Resolvers, Optical Encoders, Pneumatic Position Sensors), Range Sensors (Triangulation Principle, Structured, Lighting Approach, Time of Flight Range Finders, Laser Range Meters), Proximity Sensors (Inductive, Hall Effect, Capacitive, Ultrasonic and Optical Proximity Sensors), Touch Sensors, (Binary Sensors, Analog Sensors), Wrist Sensors, Compliance Sensors, Slip Sensors. Camera, Frame Grabber, Sensing and Digitizing Image Data – Signal Conversion, Image Storage, Lighting Techniques. Image Processing and Analysis – Data Reduction: Edge detection, Feature Extraction and Object Recognition - Algorithms. Applications – Inspection, Identification, Visual Serving and Navigation.

UNIT III:

Kinematics and Dynamics of Manipulator: Forward Kinematics, Inverse Kinematics and Differences; Forward Kinematics and Reverse Kinematics of Manipulators with Two, Three Degrees of Freedom (In 2 Dimensional), Four Degrees of Freedom (In 3 Dimensional) – Deviations and Problems. Economic Analysis of Robots – Pay back Method Safety Considerations for Robot Operations.

UNIT IV:



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

Embedded system for Industrial Automation: I/O interfacing to 8051 microcontroller. Robots in Industries. 8-Bit Microcontrollers. A popular 8 bit microcontroller, Architecture: CPU Block diagram, Memory organization. Program memory, Data memory, Interrupts, Peripherals. Timers, Serial port, I/O Port. Programming, Addressing Modes, Instruction Set, Programming. Interrupt programming.

D. List of Experiments: NIL

E. Teaching/Learning/Practice Pattern:

Teaching : 40%

Learning : 10%

Practice : 50%

F. Examination Pattern:

1. Theoretical Examination: Open book/ Regular examination and on line test.

G. Reading List:

BOOKS:

1. M.P. Groover, "Industrial Robotics – Technology, Programming and Applications", 1st Edition, McGraw-Hill.
2. K S Fu, Rafael C Gonzalez, C S G Lee, "Robotics Control, Sensing, Vision and Intelligence", 1st Edition, McGraw-Hill.
3. Yoram Koren, "Robotics for Engineers", 1st Edition, McGraw-Hill.
4. P. A. Janakiraman, "Robotics and Image Processing: An Introduction", 1st Edition, Tata McGraw-Hill.
5. Kenneth J Ayala, "8051 microcontroller: Architecture, Programming and Application", 2nd Edition, West Publishing Company.
6. Kenneth J Hintz, Daniel Tabak, "Microcontroller Architecture, Implementation & Programming", Illustrated, McGraw Hill.
7. Myke Predko, "Programming and Customizing the 8051 microcontroller", Illustrated, McGraw Hill.
8. James W Stewart, Kai X Miao, "8051 Microcontroller: Hardware, software and Interfacing", 2nd edition, Prentice Hall.

MAGAZINES:

1. International Metal Working News.
2. Industrial Distribution
3. EDN

JOURNALS:

1. International Journal of Machine Tools and Manufacture
2. Journal of Manufacturing Science and Engineering, Transactions of the ASME
3. Journal of Manufacturing Technology and Research
4. Robotics and Autonomous Systems, Elsevier, Netherlands
5. International Journal of Advanced Robotic Systems, Open Access.
6. International journals of robotics research publisher, Sage Publications.



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SYLLABUS FOR B. TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)

SEMESTER - VIII

Subject Code	Subject	P	T	L	Credit
ECE 801	Industrial Training	2	0	0	1
ECE 802	Project Works	16	0	0	8
ECE 803	Seminar	2	0	0	1
ECE 804	Grand Viva	12	0	0	6
	Total	32	0	0	16
