Shri Vile Parle Kelavani Mandal's

Dwarkadas J. Sanghvi College of Engineering

(Autonomous College Affiliated to the University of Mumbai)

Scheme and detailed syllabus (DJ19)

Second Year B.Tech

in

Biomedical Engineering

(Semester III and IV)

Revision: 1 (2019)
With effect from the Academic Year: 2020-2021

1st July, 2020

Books Recommended:

Text books:

1. R.P.Jain, "Modern Digital Electronics," Tata McGraw Hill, 1984
2. M Morris Mono, "Digital Design," Prentice Hall International-1984.
3. Malvino& Leach, "Digital Principal and Applications", Tata McGraw Hill, 1991.
4. Malvino, "Digital Electronics", Tata McGraw Hill, 1997.

Reference Books:

1. James Bignell& Robert Donovan, "Digital Electronics", Delmar, Thomas Learning,
2. Jog N.K, "Logic Circuits", 2nd edition, Nandu Publisher & Printer Pvt .Ltd. 1998.
3. Alan b. Marcovitz, "Introduction to Logic Design ", McGraw Hill International 2002.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper will be based on the entire syllabus summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Laboratory:

1. Oral and practical examination will be based on the entire syllabus including, the practical's performed during laboratory sessions.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Laboratory: (Term work)

Term work shall consist of minimum 8 experiments and minimum 2 assignments.

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the term work.

Program: Second Year B.Tech. in Biomedical Engineering	**Semester :**III
Course : Electronic Devices	**Course Code:**DJ19BMC304
Course : Electronic Devices Laboratory	**Course Code:**DJ19BML304

Teaching Scheme (Hours / week)				Evaluation Scheme					
				Semester End Examination Marks (A)			Continuous Assessment Marks (B)			Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	Avg.	
				75			25	25	25	100
				Laboratory Examination			Term Work			50
3	2	--	4	Oral	Practical	Oral & Practical				
				--	--	25	25			

Objectives:

1. To learn basic characteristics of semiconductor devices.
2. To discuss applications of BJT and MOSFET

Outcomes: On completion of the course, learner will be able to:

1. Demonstrate construction and operation of PN junction diode and bipolar junction transistor
2. Develop BJT as amplifier
3. Elaborate construction and working of MOSFET
4. Implement the applications of MOSFET
5. Illustrate the operation of differential amplifier

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1.	**Diode and Bipolar Junction Transistor (BJT)**: PN junction diode -Construction, Energy band diagram, Biasing, Characteristics; BJT -Working of NPN Transistor, Characteristics (Input, Output and Transfer), Q-point, Biasing circuits, DC load line, Negative feedback using emitter resistance	**06**
2.	**BJT as amplifier:** Small signal low frequency ac equivalent Model, Small signal analysis of common emitter amplifier, effect of capacitors in high and low frequency regions, high frequency equivalent circuit of BJT, Miller's theorem, effect of Miller's capacitance, effect of coupling, bypass and load capacitors on single stage BJT amplifier	**12**
3.	**Basics of MOSFET:** Construction and operation of Enhancement MOSFET, capacitance, characteristics and equations (input, output, transfer), second order effects, NMOS, CMOS	**08**
4.	**MOSFET applications:** Common MOSFET configurations (CS, CG, CD), biasing techniques (Fixed, Self, Voltage divider), Small-Signal low frequency model of MOSFET, Small signal analysis MOSFET Amplifiers (CS, CG, CD), high frequency model of MOSFET, low and high frequency analysis of MOSFET amplifier; MOSFET as current amplifier, transconductance amplifier, switch	**12**
5.	**Differential amplifier:** Differential and common mode signal, differential and common mode gain, CMRR, Dual input balanced output differential amplifier,Dual input unbalanced output differential amplifier	**04**

Suggested list of Experiments: (Any Eight): Implement minimum six experiments using hardware and minimum two experiments using simulation.

Laboratory Experiments/ Simulation Experiments:

1. To implement input and output characteristics of BJT in CE configuration
2. To implement biasing circuits of BJT
3. To implement BJT as amplifier
4. To implement frequency response of CE amplifier using BJT
5. To implement characteristics of MOSFET
6. To implement biasing circuits of MOSFET
7. To implement MOSFET as amplifier
8. To implement MOSFET as switch
9. To study frequency response of CS amplifier using MOSFET
10. To implement differential amplifier

Any other experiment based on syllabus may be included, which would help the learner to understand topic/concept.

Books Recommended:

Text Books:

1. Neamen Donald A., Electronics Ckt. Analyzer & Design, 2nd ed., Tata McGraw Hill.
2. Boylestad Robert L., Nashelsky Louis, Electronics Devices & Circuits, Pearson Education.
3. Sedra and Smith, Microelectronic circuit, 7th ed., Oxford University Press

Reference Books:

1. Malvino—Electronic Principles , 6/e ,TMH
2. Millman&Halkias: Basic Electronic Principles; TMH.
3. Martin Roden, Gordon carpenter, William Wieseman, Electronic design, Fourth edtion, Sroff publishers.
4. Donald Schilling & Charles Belove, Electronic Circuits Discrete and Integrated, Third edition, Mcgraw Hill.

Evaluation Scheme :

Semester End Examination (A) :

Theory:

1. Question paper will be based on the entire syllabus summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Laboratory:

1. Practical's and Oral examination will be based on the entire syllabus including, the practical performed during laboratory sessions.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Laboratory: (Term work)

1. Term work evaluation shall be based on laboratory work of minimum 8 experiments and 2 assignments.
2. Term work shall carry total of 25 marks based on the performance in the experiments and assignments.
3. The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the term work.

Program: Second Year B.Tech. in Biomedical Engineering	**Semester :** III
Course : Basic Analog and Digital Communication	**Course Code:** DJ19BMC305
Course : Basic Analog and Digital Communication Laboratory	**Course Code:** DJ19BML305

Teaching Scheme (Hours / week)				Evaluation Scheme					
				Semester End Examination Marks (A)			Continuous Assessment Marks (B)			Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	Avg.	
				75			25	25	25	100
				Laboratory Examination			Term work			
03	02	-	4	Oral	Practical	Oral & Practical	25			25
				--	--	--				

Course Objectives:

1. To Study the basic principles and techniques used in analog and digital communications.
2. To Understand the concept of noise and Fourier transform for designing and analyzing communication system.
3. To Acquire the knowledge of different modulation techniques such as AM , FM and study the block diagrams of transmitter and receiver.
4. To Study the Sampling theorem and Pulse Analog Modulation Techniques.
5. To Learn the concepts of Digital modulation techniques such as PCM, DM, ADM and multiplexing techniques.

Course Outcomes: Students will be able to -

1. Differentiate Analog and Digital communication systems
2. Identify different types of noise occurred, its minimization and able to apply Fourier analysis in frequency & time domain to quantify bandwidth requirement of variety of analog and digital communication systems.
3. Design generation & detection AM, DSB, SSB, FM transmitter and receiver.
4. Apply sampling theorem to quantify the fundamental relationship between channel bandwidth, digital symbol rate and bit rate
5. Explain different types of line coding techniques for generation and detection of signals.

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	Introduction to communications Basics of analog communication systems (Block diagram) Types of communication channels, Frequency / Spectrum allocations, Need for modulation Noise parameters: Signal to noise ratio, Noise factor, Noise figure, Friis formula and Equivalent noise temperature	**06**
2	Amplitude Modulation and Demodulation (AM) AM generation and Transmission: DSBFC, DSBSC, SSB, Equation, generation, waveforms, bandwidth, power calculations. AM Receivers: Block diagram of TRF receivers and Super heterodyne receiver. Receiver characteristics - Sensitivity, Selectivity, Fidelity, Image frequency and its rejection and double spotting	**08**
3	Frequency Modulation and Demodulation (FM) FM Transmission: Principle, waveform, spectrum, bandwidth, Pre-emphasis and de-emphasis, noise triangle, FM generation: Direct method (FET reactance modulator), Indirect method (Armstrong method) FM Receiver: Block diagram of receiver, Foster Seely discriminator, Ratio detector Comparison of AM and FM	**06**
4	Pulse Modulation and Multiplexing Sampling theorem for low pass and band pass signals with proof, aliasing Analog pulse modulation: PAM, PWM and PPM generation and detection Digital pulse modulation: PCM, DM, DPCM, ADM Multiplexing: TDM, FDM and applications	**12**
5	Digital Transmission techniques Introduction to Line codes ASK, FSK,PSK BPSK, DPSK, QPSK, M-ary PSK, QAM	**10**

List of Laboratory Experiments: (Minimum Eight)

1. Demonstration of Amplitude modulation.
2. Demonstration of Frequency modulation.
3. Study of AM/ FM receiver.
4. Demonstration of Signal sampling and reconstruction.
5. Study of PWM generation and detection.
6. Study of PCM coding and decoding.
7. Study of Delta modulation and demodulation
8. Demonstration of TDM/ FDM.
9. Demonstration of BPSK.
10. Demonstration of BFSK.
11. Demonstration of BASK
12. Study of Line coding.
13. Study of Resonance circuit .
14. Study of Pre-emphasis and de-emphasis.

Any other experiment based on syllabus may be included, which would help the learner to understand topic/concept.

Books Recommended:

Text Books :

1. Simon Haykin, Michael Moher, Introduction to Analog & Digital Communications, Wiley India Pvt. Ltd., 2nd Ed.
2. Herbert Taub, Donald L Schilling, Goutam Saha, Principles of Communication Systems, Tata McGraw Hill, 3rdEd.
3. V Chandrasekar, Communication Systems, Oxford University Press, Ist Ed.

Reference Books:

1. George Kennedy, Bernard Davis, SRM Prasanna, Electronic Communication Systems, Tata
2. McGraw Hill, 5th Ed.
3. Wayne Tomasi, Electronic Communications Systems, Pearson Publication, 5th Ed.
4. BP Lathi, Zhi Ding, Modern Digital and Analog Communication Systems, Oxford University.
5. K Sam Shanmugam, Digital and Analog Communication Systems, Wiley India Pvt. Ltd, 1st Ed.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper will be based on the entire syllabus summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

*Laboratory: (*Term work : 25 Marks)

1. Term work evaluation shall be based on laboratory work of minimum 8 experiments and 2 assignments.
2. Term work shall carry total of 25 marks based on the performance in the experiments and assignments.
3. The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the term work.

<table>
<tr><td colspan="6">Program: Second Year B.Tech. in Biomedical Engineering</td><td colspan="4">Semester : III</td></tr>
<tr><td colspan="6">Course : Object Oriented Programming Laboratory</td><td colspan="4">Course Code : DJ19BMSBL1</td></tr>
<tr><td colspan="4" rowspan="3">Teaching Scheme (Hours / week)</td><td colspan="6">Evaluation Scheme</td></tr>
<tr><td colspan="3">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="2">Lectures</td><td rowspan="2">Practical</td><td rowspan="2">Tutorial</td><td rowspan="2">Total Credits</td><td colspan="3">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
<tr><td colspan="3">-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td rowspan="3">-</td><td rowspan="3">02</td><td rowspan="3">-</td><td rowspan="3">01</td><td colspan="3">Laboratory Examination</td><td colspan="3">Term Work</td><td rowspan="3">50</td></tr>
<tr><td>Oral</td><td>Practical</td><td>Oral & Practical</td><td colspan="3" rowspan="2">25</td></tr>
<tr><td>-</td><td>-</td><td>25</td></tr>
</table>

Objectives:

1. To learn the object oriented programming concepts.
2. To study various java programming constructs like multithreading, exception handling, packages etc.
3. To explain components of GUI based programming.

Outcomes: On completion of the course, learner will be able to

1. To apply fundamental programming constructs.
2. To illustrate the concept of packages, classes and objects.
3. To elaborate the concept of strings, arrays and vectors.
4. To implement the concept of inheritance and interfaces.
5. To implement the notion of exception handling and multithreading.
6. To develop GUI based application.

Detailed Syllabus : (unit wise)		
Unit	**Description**	**Duration**
1	**Introduction to Object Oriented Programming** Object Oriented Concepts: Object, Class, Encapsulation, Abstraction, Inheritance, Polymorphism. Features of Java, JVM. Basic Constructs/Notions: Constants, variables and data types, Operators and Expressions, Revision of Branching and looping.	02
2	**Classes, Object and Packages** Class, Object, Method, Constructor, Static members and method, Passing and returning Objects. Method Overloading, Packages in java, creating user defined packages, access specifiers.	05
3	**Array, String and Vector** : Arrays, Strings, String Buffer Wrapper classes, Vector **Inheritance and Interface** : Types of Inheritance, super keyword, Method Overriding, abstract class and abstract method, final keyword, Implementing interfaces, extending interfaces	07
4	**Exception Handling and Multithreading** Error vs Exception, try, catch, finally, throw, throws, creating own exception, Thread lifecycle, Thread class methods, creating threads, Synchronization	04
5	**GUI programming in JAVA** Applet: Applet life cycle, Creating applets, Graphics class methods, Font and Color class, parameter passing, Event Handling: Event classes and event listener, Introduction to AWT: Working with windows, Using AWT controls- push Buttons, Label, Text Fields, Text Area, Check Box, and Radio Buttons	06

List of Laboratory Experiments: (Minimum 10)

Below is a list of experiments and is just indicative. Any other experiment based on syllabus may be included, which would help the learner to best understand Topic's/ Concept's.

1. Program on various ways to accept data through keyboard and unsigned right shift operator.
2. Program on branching, looping, labelled break and labelled continue.
3. Program to create class with members and methods, accept and display details for single object.
4. Program on constructor and constructor overloading
5. Program on method overloading
6. Program on passing object as argument and returning object
7. Program on creating user defined package
8. Program on 1D array
9. Program on 2D array
10. Program on String
11. Program on String Buffer
12. Program on Vector
13. Program on single and multilevel inheritance (Use super keyword)
14. Program on abstract class
15. Program on interface demonstrating concept of multiple inheritance
16. Program on dynamic method dispatch using base class and interface reference.

17. Program to demonstrate try, catch, throw, throws and finally.
18. Program to demonstrate user defined exception
19. Program on multithreading
20. Program on concept of synchronization
21. Program on Applet to demonstrate Graphics, Font and Colour class.
22. Program on passing parameters to applets
23. Program to create GUI application without event handling using AWT controls
24. Program to create GUI application with event handling using AWT controls

Books Recommended :

Text books:

1. Herbert Schildt , 'JAVA: The Complete Reference', Ninth Edition, Oracle Press.
2. Sachin Malhotra and Saurabh Chaudhary, "Programming in Java", Oxford University

Reference Books:

1. Ivor Horton, 'Beginning JAVA', Wiley India.
2. Dietel and Dietel, 'Java: How to Program', 8/e,PHI
3. JAVA Programming, Black Book, Dreamtech Press.

Evaluation Scheme

Semester End Examination (A):

Theory:

1. No theory Paper

Laboratory: (Practical's and Oral's Exam: 25 Marks)

1. Practical and Oral examination will be based on the entire syllabus including, the practical's performed during laboratory sessions.

Continuous Assessment (B):

Theory :

1. No MT1 and MT2

Laboratory: (Term work : 25 Marks)

1. Term work evaluation shall be based on laboratory work of minimum 10 experiments.
2. Term work shall carry total of 25 marks based on the performance in the Laboratory Experiments.
3. The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the term work.

<table>
<tr><td colspan="5">Program: Common for all programs</td><td colspan="5">Semester : III</td></tr>
<tr><td colspan="5">Course : Innovative Product Development - I</td><td colspan="5">Course Code: DJ19A2</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme (Hours/week)</td><td colspan="9">Evaluation Scheme</td></tr>
<tr><td colspan="4">Semester End Examination Marks (A)</td><td colspan="4">Continuous Assessment Marks (B)</td><td>Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="4">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td><td rowspan="2"></td></tr>
<tr><td colspan="4">--</td><td>--</td><td>--</td><td>--</td></tr>
<tr><td colspan="4" rowspan="2">Laboratory Examination</td><td colspan="3">Semester review</td><td rowspan="2">Total</td><td rowspan="3">100</td></tr>
<tr><td rowspan="2">--</td><td rowspan="2">--</td><td rowspan="2">--</td><td rowspan="2">--</td><td>Oral</td><td>Practical</td><td>Oral & Practical</td><td>Review 1</td><td>Review 2</td></tr>
<tr><td>--</td><td>--</td><td>--</td><td>50</td><td>50</td><td>100</td></tr>
</table>

Objectives:

1. To acquaint the students with the process of identifying the need (considering a societal requirement) and ensuring that a solution is found out to address the same by designing and developing an innovative product.
2. To familiarize the students with the process of designing and developing a product, while they work as part of a team.
3. To acquaint the students with the process of applying basic engineering fundamentals, so as to attempt at the design and development of a successful value added product.
4. To inculcate the basic concepts of entrepreneurship and the process of self-learning and research required to conceptualize and create a successful product.

Outcome:

Learner will be able to:

1. Identify the requirement for a product based on societal/research needs.
2. Apply knowledge and skills required to solve a societal need by conceptualizing a product, especially while working in a team.
3. Use standard norms of engineering concepts/practices in the design and development of an innovative product.
4. Draw proper inferences through theoretical/ experimental/simulations and analyze the impact of the proposed method of design and development of the product.
5. Develop interpersonal skills, while working as a member of the team or as the leader.
6. Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare themselves to be successful entrepreneurs.
7. Demonstrate product/project management principles during the design and development work and also excel in written (Technical paper preparation) as well as oral communication.

Guidelines for the proposed product design and development:

1. Students shall form a team of 3 to 4 students (max allowed: 5-6 in extraordinary cases, subject to the approval of the department review committee and the Head of the department).
2. Students should carry out a survey and identify the need, which shall be converted into conceptualization of a product, in consultation with the faculty supervisor/head of department/internal committee of faculty members.
3. Students in the team shall understand the effective need for product development and accordingly select the best possible design in consultation with the faculty supervisor.
4. Students shall convert the best design solution into a working model, using various components drawn from their domain as well as related interdisciplinary areas.
5. Faculty supervisor may provide inputs to students during the entire span of the activity, spread over 2 semesters, wherein the main focus shall be on self-learning.
6. A record in the form of an activity log-book is to be prepared by each team, wherein the team can record weekly progress of work. The guide/supervisor should verify the recorded notes/comments and approve the same on a weekly basis.
7. The design solution is to be validated with proper justification and the report is to be compiled in a standard format and submitted to the department. Efforts are to be made by the students to try and publish a technical paper, either in the institute journal, "Techno Focus: Journal for Budding Engineers" or at a suitable publication, approved by the department research committee/ Head of the department.
8. The focus should be on self-learning, capability to design and innovate new products as well as on developing the ability to address societal problems. Advancement of entrepreneurial capabilities and quality development of the students through the year long course should ensure that the design and development of a product of appropriate level and quality is carried out, spread over two semesters , i.e. during the semesters III and IV.

Guidelines for Assessment of the work:

1. The review/ progress monitoring committee shall be constituted by the Head of the Department. The progress of design and development of the product is to be evaluated on a continuous basis, holding a minimum of two reviews in each semester.
2. In the continuous assessment, focus shall also be on each individual student's contribution to the team activity, their understanding and involvement as well as responses to the questions being raised at all points in time.
3. Distribution of marks individually for the both reviews as well as for the first review during the subsequent semester shall be as given below:
    A. Marks awarded by the supervisor based on log-book :20
    B. Marks awarded by review committee : 20
    C. Quality of the write-up : 10

Note:- A candidate needs to secure minimum of 50% marks to be declared to have completed the audit course.

Review/progress monitoring committee may consider the following points during the assessment.

In the semester III, the entire design proposal shall be ready, including components/system selection as well as the cost analysis. Two reviews will be conducted based on the presentation given by the student's team.

- First shall be for finalization of the product selected.
- Second shall be on finalization of the proposed design of the product.

The overall work done by the team shall be assessed based on the following criteria;

1. Quality of survey/ need identification of the product.
2. Clarity of Problem definition(design and development) based on need.
3. Innovativeness in the proposed design.
4. Feasibility of the proposed design and selection of the best solution.
5. Cost effectiveness of the product.
6. Societal impact of the product.
7. Functioning of the working model as per stated requirements.
8. Effective use of standard engineering norms.
9. Contribution of each individual as a member or the team leader.
10. Clarity on the write-up and the technical paper prepared.

The semester III reviews may be based on relevant points listed above, as applicable.

Guidelines for Assessment of Semester Reviews:

- The write-up should be prepared as per the guidelines given by the department.
- The design and the development of the product shall be assessed through a presentation and demonstration of the working model by the student team to a panel of Internal and External Examiners, preferably from industry or any research organizations having an experience of more than five years, approved by the Head of the Institution. The presence of the external examiner is desirable only for the 2nd presentation in semester IV. Students are compulsorily required to present the outline of the technical paper prepared by them during the final review in semester IV.

Program: Common for All programs								**Semester :** III
Course : Constitution of India								**Course Code :** DJ19A3
Teaching Scheme (Hours / week)				**Evaluation Scheme**				
				Semester End Examination Marks (A)		**Continuous Assessment Marks (B)**		**Total marks (A+ B)**
Lectures	**Practical**	**Tutorial**	**Total Credits**	**Theory**		**TT1**	**TT2**	**Avg.**
				-		-	-	-
				Laboratory Examination		**Term Work**		
01	-	-	-	**Oral**	**Practical**	**Oral & Practical**	-	-
				-	-	-		

Objectives:

1. To provide basic information about Indian constitution.
2. To identify individual role and ethical responsibility towards society.
3. To understand human rights and its implications.

Outcomes: On completion of the course, learner will be able to

1. Have general knowledge and legal literacy and thereby to take up competitive examinations.
2. Understand state and central policies, fundamental duties.
3. Understand Electoral Process, special provisions.
4. Understand powers and functions of Municipalities, Panchayat's and Co- operative Societies,
5. Understand Engineering ethics and responsibilities of Engineers
6. Understand Engineering Integrity & Reliability

Detailed Syllabus (unit wise)		
Unit	**Description**	**Duration**
1	**Introduction to the Constitution of India** The Making of the Constitution and Salient features of the Constitution. Preamble to the Indian Constitution Fundamental Rights & its limitations.	2
2	**Directive Principles of State Policy:** Relevance of Directive Principles State Policy Fundamental Duties. Union Executives – President, Prime Minister Parliament Supreme Court of India.	3
3	**State Executives:** Governor, Chief Minister, State Legislature High Court of State. Electoral Process in India, Amendment Procedures, 42nd, 44th, 74th, 76th, 86th & 91st Amendments.	3
4	**Special Provision**s: For SC & ST Special Provision for Women, Children & Backward Classes, Emergency Provisions. **Human Rights:** Meaning and Definitions, Legislation Specific Themes in Human Rights- Working of National Human Rights Commission in India Powers and functions of Municipalities, Panchyats and Co – Operative Societies.	3
5	**Scope & Aims of Engineering Ethics:** Responsibility of Engineers Impediments to Responsibility. Risks, Safety and liability of Engineers, Honesty, Integrity & Reliability in Engineering	3

Books Recommended :

Text books:

1. Durga Das Basu: "Introduction to the Constitution on India", (Students Edn.) Prentice –Hall EEE, 19th / 20th Edn., 2001
2. Charles E. Haries, Michael S Pritchard and Michael J. Robins "Engineering Ethics" Thompson Asia, 2003-08-05.

Reference Books:

1. M.V.Pylee, "An Introduction to Constitution of India", Vikas Publishing, 2002.
2. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, "Engineering Ethics", Prentice – Hall of India Pvt. Ltd. New Delhi, 2004
3. Brij Kishore Sharma," Introduction to the Constitution of India", PHI Learning Pvt. Ltd., New Delhi, 2011.
4. Latest Publications of Indian Institute of Human Rights, New Delhi

Web Resources :

1. www.nptel.ac.in
2. www.hnlu.ac.in
3. www.nspe.org
4. www.preservearticles.com