

2019 Batch (III SEMESTER)

CSE -III Sem				
S.No	Course Code	Course Name	Dept	Instructor
1	CS 201	Data Structures and Algorithms	CSE	Prof. Sandeep R B
2	CS 203	Discrete Structures	CSE	Prof. Prabuchandran
3	CS 213	Software Systems Lab	CSE	Prof. Prabuchandran
4	CS 211	Data Structures and Algorithms Lab	CSE	Prof. Sandeep R B
5	EE 201	Data Analysis	EE	Prof. Naveen M B, Prof. Sudhanshu Shukla
6	HS 201	Economics	HSS	Prof.Gopal Sharan Parashari

Syllabus

Name of Academic Unit: Computer Science and Engineering

Level: B. Tech.

Programme: B.Tech.

i	Title of the course	CS 201 Data Structures and Algorithms
ii	Credit Structure (L-T-P-C)	(3-0-0-6)
iii	Type of Course	Core course
iv	Semester in which normally to be offered	Autumn
v	Whether Full or Half Semester Course	Full
vi	Pre-requisite(s), if any (For the students) – specify course number(s)	Exposure to Computer Programming (CS 102)
vii	Course Content	Introduction: data structures, abstract data types, analysis of algorithms. Creation and manipulation of data structures: arrays, lists, stacks, queues, trees, heaps, hash tables, balanced trees, tries, graphs. Algorithms for sorting and searching, order statistics, depth-first and breadth-first search, shortest paths and minimum spanning tree.
viii	Texts/References	1. Introduction to Algorithms, 3rd edition, by T. Cormen, C. Leiserson, R. Rivest, C. Stein, MIT Press and McGraw-Hill, 2009. 2. Data structures and algorithms in C++, by Michael T. Goodrich, Roberto Tamassia, and David M. Mount, Wiley, 2004.
ix	Name(s) of Instructor(s)	SRB
x	Name(s) of other Departments/ Academic Units to whom the course is relevant	NA
xi	Is/Are there any course(s) in the same/ other academic unit(s) which is/ are equivalent to this course? If so, please give details.	No
xii	Justification/ Need for introducing the course	Basic course in data structures and algorithms.

Name of Academic Unit: Computer Science and Engineering

Level: B. Tech.

Programme: B.Tech.

i	Title of the course	CS 203 Discrete Structures
ii	Credit Structure (L-T-P-C)	(3-0-0-6)
iii	Type of Course	Core course
iv	Semester in which normally to be offered	Autumn
v	Whether Full or Half Semester Course	Full
vi	Pre-requisite(s), if any (For the students) – specify course number(s)	--
vii	Course Content	<p>There are four modules in the course:</p> <p>1) Proofs and structures Introduction, propositions, predicates, examples of theorems and proofs, types of proof techniques, Axioms, Mathematical Induction, Well-ordering principle, Strong Induction, Sets, Russell’s paradox, infinite sets, functions, Countable and uncountable sets, Cantor’s diagonalization technique, Relations, Equivalence relations, partitions of a set.</p> <p>2) Counting and Combinatorics Permutations, combinations, binomial theorem, pigeon hole principle, principles of inclusion and exclusion, double counting. Recurrence relations, solving recurrence relations.</p> <p>3) Elements of graph theory Graph models, representations, connectivity, Euler and Hamiltonian paths, planar graphs, Trees and tree traversals.</p> <p>4) Introduction to abstract algebra and number theory Semigroups, monoids, groups, homomorphisms, normal subgroups, congruence relations. Ceiling, floor functions, divisibility. Modular arithmetic, prime numbers, primality theorems.</p>
viii	Texts/References	<p>1. Discrete Mathematics and its applications with Combinatorics and graph theory, 7th edition, by Kenneth H Rosen. Special Indian Edition published by McGraw-Hill Education, 2017.</p> <p>2. Introduction to Graph Theory, 2nd Edition, by Douglas B West. Eastern Economy Edition published by PHI Learning Pvt. Ltd, 2002.</p> <p>3. Discrete Mathematics, 2nd Edition, by Norman L Biggs. Indian Edition published by Oxford University Press, 2003.</p>
ix	Name(s) of Instructor(s)	PRB

x	Name(s) of other Departments/ Academic Units to whom the course is relevant	NA
xi	Is/Are there any course(s) in the same/ other academic unit(s) which is/ are equivalent to this course? If so, please give details.	No
xii	Justification/ Need for introducing the course	This is a fundamental and core course which forms the foundations for all theory courses in Computer Science.

Name of Academic Unit: Electrical Engineering

Level: B.Tech.

Programme: B.Tech.

i	Title of the course	EE 201 Data Analysis
ii	Credit Structure (L-T-P-C)	(3-0-0-6)
iii	Type of Course	Core course
iv	Semester in which normally to be offered	Autumn
v	Whether Full or Half Semester Course	Full
vi	Pre-requisite(s), if any (For the students) – specify course number(s)	--
vii	Course Content	The role of statistics. Graphical and numerical methods for describing and summarising data. Probability. Population distributions. Sampling variability and sampling distributions. Estimation using a single sample. Hypothesis testing a single sample. Comparing two populations or treatments. Simple linear regression and correlation. Case studies.
viii	Texts/References	1. Introduction to Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, Elsevier, New Delhi, 3rd edition (Indian), 2014. 2. Probability, Random Variables and Stochastic processes by Papoulis and Pillai, 4th Edition, Tata McGraw Hill, 2002. 3. An Introduction to Probability Theory and Its Applications, Vol. 1, William Feller, 3rd edition, Wiley International, 1968.
ix	Name(s) of Instructor(s)	SRMP
x	Name(s) of other Departments/ Academic Units to whom the course is relevant	CSE & ME
xi	Is/Are there any course(s) in the same/ other academic unit(s) which is/ are equivalent to this course? If so, please give details.	No
xii	Justification/ Need for introducing the course	Analyzing data and interpreting results are integral part of almost every research and it finds extensive use in industry as well. From Machine learning to Finance, its applications are enormous.

Name of Academic Unit: Humanities and Social Sciences

Level: B.Tech.

Programme: B.Tech.

i	Title of the course	HS 201 Economics
ii	Credit Structure (L-T-P-C)	(2-1-0-6)
iii	Type of Course	Core course
iv	Semester in which normally to be offered	Autumn
v	Whether Full or Half Semester Course	Full
vi	Pre-requisite(s), if any (For the students) – specify course number(s)	--
vii	Course Content	Basic economic problems. resource constraints and Welfare maximizations. Nature of Economics: Positive and normative economics; Micro and macroeconomics, Basic concepts in economics. The role of the State in economic activity; market and government failures; New Economic Policy in India. Theory of utility and consumer's choice. Theories of demand, supply and market equilibrium. Theories of firm, production and costs. Market structures. Perfect and imperfect competition, oligopoly, monopoly. An overview of macroeconomics, measurement and determination of national income. Consumption, savings, and investments. Commercial and central banking. Relationship between money, output and prices. Inflation - causes, consequences and remedies. International trade, foreign exchange and balance payments, stabilization policies : Monetary, Fiscal and Exchange rate policies.
viii	Texts/References	1. P. A. Samuelson & W. D. nordhaus, Economics, McGraw Hill, NY, 1995. 2. A. Koutsoyiannis, Modern Microeconomics, Macmillan, 1975. R. Pindyck and D. L. Rubinfeld, Microeconomics, Macmillan publishing company, NY, 1989. 3. R. J. Gordon, Macroeconomics 4th edition, Little Brown and Co., Boston, 1987. 4. William F. Shughart II, The Organization of Industry, Richard D. Irwin, Illinois, 1990. 5. R.S. Pindyck and D.L. Rubinfeld. Microeconomics (7 th Edition), Pearson Prentice Hall, New Jersey, 2009. 6. R. Dornbusch, S. Fischer, and R. Startz. Macroeconomics (9th Edition), McGraw-Hill Inc. New York, 2004.
ix	Name(s) of Instructor(s)	--

x	Name(s) of other Departments/ Academic Units to whom the course is relevant	CSE, EE & ME
xi	Is/Are there any course(s) in the same/ other academic unit(s) which is/ are equivalent to this course? If so, please give details.	No
xii	Justification/ Need for introducing the course	This course is a basic course on economics and useful for all students of B.Tech.

Name of Academic Unit: Computer Science and Engineering

Level: B. Tech.

Programme: B.Tech.

i	Title of the course	CS 211 Data Structures and Algorithms Laboratory
ii	Credit Structure (L-T-P-C)	(0-0-3-3)
iii	Type of Course	Core course
iv	Semester in which normally to be offered	Autumn
v	Whether Full or Half Semester Course	Full
vi	Pre-requisite(s), if any (For the students) – specify course number(s)	Exposure to Computer Programming (CS 102)
vii	Course Content	Laboratory course for CS 211 is based on creating and manipulating various data structures and implementation of algorithms.
viii	Texts/References	1. Introduction to Algorithms, 3rd edition, by T. Cormen, C. Leiserson, R. Rivest, C. Stein, MIT Press and McGraw-Hill, 2009. 2. Data structures and algorithms in C++, by Michael T. Goodrich, Roberto Tamassia, and David M. Mount, Wiley, 2004.
x	Name(s) of Instructor(s)	SRB
x	Name(s) of other Departments/ Academic Units to whom the course is relevant	NA
xi	Is/Are there any course(s) in the same/ other academic unit(s) which is/ are equivalent to this course? If so, please give details.	No
xii	Justification/ Need for introducing the course	Basic Laboratory course in data structures and algorithms.

Name of Academic Unit: Computer Science and Engineering

Level: B.Tech.

Programme: B.Tech.

i	Title of the course	CS 213 Software Systems Laboratory
ii	Credit Structure (L-T-P-C)	(1-3-0-8)
iii	Type of Course	Core course
iv	Semester in which normally to be offered	Autumn
v	Whether Full or Half Semester Course	Full
vi	Pre-requisite(s), if any (For the students) – specify course number(s)	--
vii	Course Content	<p>Vim/emacs HTML, CSS</p> <p>2. Report and presentation software: latex, beamer, drawing software (e.g. inkscape, xfig, open-office)</p> <p>3. IDE (e.g. eclipse, netbeans), code reading, debugging Basic Java Java collections, interfaces</p> <p>4. Java threads Java GUI Introduction to documentation: e.g. doxygen/javadocs</p> <p>5. Version management: SVN/Git</p> <p>6. Unix basics: shell, file system, permissions, process hierarchy, process monitoring, ssh, rsync</p> <p>7. Unix tools: e.g. awk, sed, grep, find, head, tail, tar, cut, sort</p> <p>8. Bash scripting: I/O redirection, pipes</p> <p>9. Python programming</p> <p>10. Makefile, libraries and linking</p> <p>11. Graph plotting software (e.g., gnuplot)</p> <p>12. Profiling tools (e.g., gprof, prof)</p> <p>13. Optional topics (may be specific to individual students302222 projects): intro to sockets, basic SQL for datastorage,JDBC/pygresql</p> <p>A project would be included which touches upon many of the above topics, helping students see the connect across seemingly disparate topics. The project is also expected to be a significant load: 20-30 hours of work.</p>
viii	Texts/References	<p>1. Online tutorials for HTML/CSS, Inkscape, OODrawUnix Man Pages for all unix tools, Advanced Bash Scripting Guide from the Linux Documentation Project (www.tldp.org).</p> <p>2. The Python Tutorial Online Book (http://docs.python.org/3/tutorial/index.html).</p> <p>3. The Java Tutorials (http://docs.oracle.com/javase/tutorial/).</p> <p>4. Latex - A document preparation system, 2/e, by Leslie Lamport, Addison-Wesley, 1994.</p>
ix	Name(s) of Instructor(s)	PRB, RK, SRB
x	Name(s) of other Departments/ Academic Units to whom the course is	NA

	relevant	
xi	Is/Are there any course(s) in the same/ other academic unit(s) which is/ are equivalent to this course? If so, please give details.	No
xii	Justification/ Need for introducing the course	This is a fundamental and core course which trains students on different programming platforms, as well as on basic software engineering principles.