

FOUR YEAR BACHELOR OF ENGINEERING (B.E.) DEGREE COURSE

**SEMESTER: FIFTH (C.B.S.)**

**BRANCH: COMPUTER SCIENCE & ENGINEERING**

Sr. No.	Subject	Workload				Credit				Marks				
		L	P	T	Total	L	P	T	Total	Theory		Practical		Total Marks
										Sess	Univ.	Sess.	Uni	
1 BECSE301T	Data Communication	3	-	1	4	3	-	1	4	20	80	-	-	100
2 BECSE302T	Object Oriented Programming	4	-	1	5	4	-	1	5	20	80	-	-	100
3 BECSE302P	Object Oriented Programming Lab	-	2	-	2	-	1	-	1	-	-	25	25	50
4 BECSE303T	Database Management System	4	-	1	5	4	-	1	5	20	80	-	-	100
5 BECSE303P	Database Management System Lab	-	2	-	2	-	1	-	1	-	-	25	25	50
6 BECSE304T	Computer Graphics	4	-	1	5	4	-	1	5	20	80	-	-	100
7 BECSE305T	Design & Analysis of Algorithms	4	-	1	5	4	-	1	5	20	80	-	-	100
8 BECSE305P	Design & Analysis of Algorithms lab	-	2	-	2	-	1	-	1	-	-	25	25	50
	<b>Total</b>	<b>19</b>	<b>6</b>	<b>5</b>	<b>30</b>	<b>19</b>	<b>3</b>	<b>5</b>	<b>27</b>	<b>100</b>	<b>400</b>	<b>75</b>	<b>75</b>	<b>650</b>

**FOUR YEAR BACHELOR OF ENGINEERING (B.E.) DEGREE COURSE**  
**SEMESTER: SIXTH (C.B.S.)**  
**BRANCH: COMPUTER SCIENCE & ENGINEERING**

Sr. No.	Subject	Workload				Credit				Marks				Total Marks
		L	P	T	Total	L	P	T	Total	Theory		Practical		
										Sess.	Univ.	Sess.	Uni	
1 BECSE306T	Artificial Intelligence	4	-	1	5	4	-	1	5	20	80	-	-	100
2 BECSE307T	Design Patterns	4	-	1	5	4	-	1	5	20	80	-	-	100
3 BECSE307P	Design Patterns lab	-	2	-	2	-	1	-	1	-	-	25	25	50
4 BECSE308T	Software Engineering & Project Management	4	-	1	5	4	-	1	5	20	80	-	-	100
5 BECSE309T	Computer Networks	4	-	1	5	4	-	1	5	20	80	-	-	100
6 BECSE309P	Computer Networks Lab	-	2	-	2	-	1	-	1	-	-	25	25	50
7 BECSE310T	Functional English	2	-	1	3	2	-	1	3	10	40	-	-	50
8 BECSE311P	Mini Project	-	2	-	2	-	2	-	2	-	-	25	25	50
	<b>Total</b>	<b>18</b>	<b>6</b>	<b>5</b>	<b>29</b>	<b>18</b>	<b>4</b>	<b>5</b>	<b>27</b>	<b>90</b>	<b>360</b>	<b>75</b>	<b>75</b>	<b>600</b>



## **SYLLABUS: V SEMESTER (Computer Science and Engineering) (C.B.S.)**

### **BECSE301T: Data Communication**

Load	Credit	Total marks	Sessional marks	University marks	Total
3 hrs (Theory) 1 hr (Tutorial)	4	100	20	80	100

#### **UNIT - 1**

Analog and digital signals; periodic and non periodic signals analog signals time and frequency domains; COMPOSITE SIGNALS: Frequency spectrum and Bandwidth; TRANSMISSION MODES: Serial and Parallel transmission, Asynchronous and Synchronous Transmission, Simplex, Half-Duplex and Full-Duplex communication.

#### **UNIT - 2**

Signal conversions: digital-to-digital conversion, digital-to-analog conversion, analog to digital conversion, analog-to-analog conversion in detail, Basics of Image and Video Compression.

#### **UNIT - 3**

COMMUNICATION MEDIA: guided media and unguided media, Radio frequency allocation, Propagation of Radio waves, Terrestrial microwave, Satellite communication, Cellular Telephony

#### **UNIT - 4**

Multiplexing and Spread Spectrum, frequency division multiplexing (FDM). Time division multiplexing (TDM): inverse multiplexing, wave-division multiplexing, FHSS AND DSSS multiplexing applications: the telephone system: Common carrier services and hierarchies, Analog services, Digital Services; DIGITAL SUBSCRIBER LINE (DSL): ADSL, RADSL, HSDL, SDSL, VDSL

#### **UNIT - 5**

Introduction to Image and Video Compression

Image Compression, JPEG, MPEG compression techniques

Digitizing Audio and Video data representation formats, Compression of Audio and Video files. Comparison of various methods of compression.

#### **UNIT – 6**

Image and Video Compression Techniques

Huffman code, Run-Length Encoding, Relative Encoding, Lempel-Ziv Encoding, Real Time Interactive Audio/Video, RTP, HTTP and WWW.

#### **Text / Reference Books:**

1. Data Communications and Networking by Behrouz A. Forouzan, 4th Edition, Tata McGraw Hill
2. Packet guide to core network protocol by Bruce Hartpence, Oreilly
3. Understanding Data Communications and Networks by William A. Shay, 2nd Edition, Vikas Publishing House.
4. Electronic Communication Systems by Kennedy

## **BECSE302T: Object Oriented Programming**

Load	Credit	Total marks	Sessional marks	University marks	Total
4 hrs (Theory) 1 hr (Tutorial)	5	100	20	80	100

**Unit I: Introduction:** OOP concept, Procedural vs OOP programming, OOP terminology and features(data encapsulation, inheritance, polymorphism and late binding), Tokens, Character set, Keywords, Data-types, Data Types declarations, Constants and variables, expressions, Standard Library and header files. Objects & Classes in C++: Declaring & using classes, Constructors, Objects as functions arguments, Copy Constructor, Static class data. Arrays of objects, C++ String class.

**Unit II:** Operator overloading: Overloading unary & binary operators. Data conversion. Pitfalls of operator overloading. Pointers & arrays. Pointers & functions. New& delete operators. Pointers for objects.

**Unit III:** Inheritance in C++: Derived class & base class, Derived class constructors, Function overloading, class hierarchies, Public and private inheritance, Multiple inheritance. containership: classes within classes.

**Unit IV:** Virtual functions concepts, Abstracts classes & pure virtual functions. Virtual base classes, Friend functions, Static functions, Assignment and copy initialization, the this pointer. Dynamic type information.

**Unit V:** Streams & Files in C++: Stream classes, stream errors, disk file I/O with streams, File pointers, Error handling in file I/O. File I/O with members functions, overloading the extractions & insertion operators, Memory as a stream object, command-line arguments, Persistent Objects

**Unit VI:** Function Template, Class templates, Exception syntax, Multiple exceptions, exception with arguments. Introduction to the Standard Template Library. Algorithms, Sequential Containers, Iterates, Specialized iterates, Associative containers. Function objects.

1. C++: The Complete Reference, by Herbert Schildt 4<sup>th</sup> edition Mc-Graw-Hill
2. Object-Oriented Programming in C++ by Robert Lafore 4<sup>th</sup> edition Pearson Education
3. The C++ Programming Language by Bjarne Stroustrup 3<sup>rd</sup> edition Pearson Education

### **Reference books:**

1. Object Oriented Programming in C++ by Subhash K U Pearson Education
2. Mastering C++ by K R Venugopal Tata Mc-Graw-Hill Education

**BECSE302P: Object Oriented Programming: Practical based on above syllabus using C++**

Load	Credit	Total marks	Sessional marks	University marks	Total
2 hrs (Practical)	1	50	25	25	25

**Some practicals can be conducted on core JAVA**

## **BECSE303T: Database Management System**

Load	Credit	Total marks	Sessional marks	University marks	Total
4 hrs (Theory) 1 hr (Tutorial)	5	100	20	80	100

### **Syllabus**

#### **UNIT-I**

General introduction to database systems, Database-DBMS distinction, Approaches to building a database, Data models, Three-schema architecture of a database, Challenges in building a DBMS, Various components of a DBMS, E/R Data model. SQL, PL/SQL Concept

#### **UNIT-II**

Relational Data Model, Concept of relations, Schema-instance distinction, Keys, referential integrity and foreign keys, Relational algebra operators, Tuple relation calculus, Domain relational calculus.

#### **UNIT-III**

Physical and logical hierarchy. Concept of index, B-trees, hash index, function index, bitmap index. Concepts of Functional dependency, Normalization, Business data analysis, tools & techniques for business data analysis.

#### **UNIT-IV**

Overview: Query Processing and Optimization, measures of query cost estimation in query optimization, pipelining and Materialization, Structure of query evaluation plans.

#### **UNIT-V**

Transaction concepts, properties of transactions, serializability of transactions, testing for serializability, System recovery, Two- Phase Commit protocol, Recovery and Atomicity, Log-based recovery, concurrent executions of transactions and related problems, Locking mechanism, solution to concurrency related problems, deadlock, , two-phase locking protocol, Isolation, Intent locking

#### **UNIT-VI**

Recovery System: failure classification, recovery and atomicity, log based recovery, checkpoints, buffer management, advanced recovery techniques. Introduction to Web databases, distributed databases, data warehousing and data mining, Data Security.

#### **TextBooks:**

1. Database System Concepts by AviSilberschatz , Henry F. Korth , S. Sudarshan, Tata McGraw Hill, Fifth Edition
2. Fundamentals of Database Systems – Elmasiri and Navathe, Addison Wesley, 2000.
3. An introduction to Database Systems,C J Date,A.Kannan,S.Swamynathan –Eight Edition

**Reference Books:**

1. Database Management Systems - by Raghu Ramakrishnan and Johannes Gehrke, Tata McGraw Hill Publication, Third Edition
2. Introduction to Database Management Systems by Kahate

**BECSE303P: Database Management System: Practical based on above syllabus.**

Load	Credit	Total marks	Sessional marks	University marks	Total
2 hrs (Practical)	1	50	25	25	25

**Some Practicals can be based on following OPEN SOURCES:**

1. Informatica
2. Micro Strategy
3. ETL
4. HADOOP Technology

## **BECSE304T: Computer Graphics**

Load	Credit	Total marks	Sessional marks	University marks	Total
4 hrs (Theory) 1 hr (Tutorial)	5	100	20	80	100

### **UNIT I**

#### **Introduction to Computer Graphics**

Overview of Computer Graphics, Computer Graphics Application and Software, Graphics Areas, Graphics Pipeline, Graphics API's, Numerical issues, Efficiency Display and Hardcopy Technologies, Display Technologies – Raster scan Display System, Video Controller – Vector scan display system, Random Scan Display Processor, Input Devices for Operator Interaction, Image Scanners

### **UNIT II**

Basic Raster Graphics Algorithms for Drawing 2D primitives, aliasing and ant aliasing, Polygon filling methods: Scan Conversion Algorithms: Simple Ordered edge list, Edge Fill, Fence fill and Edge Flag Algorithm. Seed fill Algorithms: Simple and Scan Line Seed Fill Algorithm, Halftoning techniques

### **UNIT III**

Graphics Programming using OPENGL: Why OpenGL, Features in OpenGL, OpenGL operations, Abstractions in OpenGL – GL, GLU & GLUT, 3D viewing pipeline, viewing matrix specifications, a few examples and demos of OpenGL programs, Animations in OpenGL

### **UNIT IV**

2D Clipping algorithms for regular and irregular windows: Sutherland Cohen Outcode, Sutherland Cohen Subdivision, Mid-Point subdivision, Cyrus Beck and Sutherland Hodgman, Cohen-Sutherland Polygon clipping Algorithm. Clipping about Concave regions.

2D Transformations, Translation, Rotation, Reflection, Scaling, Shearing Combined Transformation, Rotation and Reflection about an Arbitrary Line

### **UNIT V**

Normalized Device Coordinates and Viewing Transformations, 3D System Basics and 3D Transformations, 3D graphics projections, parallel, perspective, viewing transformations. 3D graphics hidden surfaces and line removal, painter's algorithm, Z -buffers, Warnock's algorithm.

### **UNIT VI**

Basic Ray tracing Algorithm, Perspective, Computing Viewing Rays, Ray-Object Intersection Shading, A Ray tracing Program, Shadows, Ideal Specular Reflection.

Curves and Surfaces: Polygon Mesh, Parametric Cubic Curves, Parametric Bicubic Surfaces, Quadratic Surface, Bezier Curves and B-spline curves.

**Text Books:**

1. Fundamentals of Computer Graphics, Peter Shirley and Steve Marschner, Third Edition.(A.K.Peters Publication house)
2. Procedural Elements of Computer Graphics III Edition, Rogers, McGraw Hill.
3. Computer Graphics - Principles and Practice, J. D. Foley, A. Van Dam, S. K. Feiner and J. F. Hughes, Second Edition in C, Pearson Education.
4. Computer Graphics with OpenGL, Donald D. Hearn, M. Pauline Baker, Warren Carithers, Fourth Edition, Pearson Education.
5. Computer Graphics, Hearn and Baker, PHI, India

**BECSE305T: Design & Analysis of Algorithms**

Load	Credit	Total marks	Sessional marks	University marks	Total
4 hrs (Theory) 1 hr (Tutorial)	5	100	20	80	100

**UNIT-I**

Mathematical foundations, summation of arithmetic and geometric series,  $n$ ,  $n^2$ , bounding summations using integration, Recursion and Induction: recurrence relations, solutions of recurrence relations using techniques of characteristic equation, generating functions, master method and substitution method. Complexity calculation of various standard functions, principles of designing algorithms.

**UNIT-II**

Asymptotic notations of analysis of algorithms, analyzing control structures, worst case and average case analysis, amortized analysis, application of amortized analysis, Sorting networks, comparison networks, bio-tonic sorting network, advanced data structures like Fibonacci heap, disjoint set representation

**UNIT-III**

Divide and conquer basic strategy, binary search, quick sort, merge sort, matrix operations, Multiplication Algorithm Greedy method – basic strategy, Knapsack Problem, application to job sequencing with deadlines problem, minimum cost spanning trees, single source shortest path, Optimal Search Patterns.

**UNIT-IV**

Dynamic Programming basic strategy, multistage graphs, all pairs shortest path, single source shortest paths, optimal binary search trees, traveling salesman problem, Longest Common Subsequence problem, 0/1 Knapsack Problem, Chained Matrix Multiplication

**UNIT-V**

Basic Traversal and Search Techniques, breadth first search and depth first search, connected components. Backtracking basic strategy, 8-Queen's problem, graph coloring, Hamiltonian cycles etc, Introduction to Approximation algorithm.

**UNIT-VI**

NP-hard and NP-complete problems, basic concepts, non-deterministic algorithms, NP-hard and NP-complete, decision and optimization problems, graph based problems on NP Principle.

**Text Books:**

1. Introduction to Algorithms, Thomas H. Cormen et.al. Prentice Hall of India.
2. Design & Analysis of Algorithms, Horowitz Sahani, University Press.
3. The Design and Analysis of Algorithms Alfred V. Aho, John E. Hopcraft, Jeffrey D. Ullman, Pearson Publication.

**BECSE305P: Design & Analysis of Algorithms lab: Practical will be based on above syllabus**

Load	Credit	Total marks	Sessional marks	University marks	Total
2 hrs (Practical)	1	50	25	25	50

**Practicals based on C, C++ or Java**

4.

**SYLLABUS: VI SEMESTER (Computer Science and Engineering) (C.B.S.)**

**BECSE306T:Artificial Intelligence**

Load	Credit	Total marks	Sessional marks	University marks	Total
4 hrs (Theory) 1 hr (Tutorial)	5	100	20	80	100

**UNIT - I:**

**Introduction:** What is AI? History & Applications, Artificial intelligence as representation & Search, Production system, Basics of problem solving: problem representation paradigms, defining problem as a state space representation, Characteristics.

**UNIT - II:**

**Search Techniques:** Uninformed Search techniques, Informed Heuristic Based Search, Generate and test, Hill-climbing, Best-First Search, Problem Reduction, and Constraint Satisfaction.

**UNIT - III:**

**Knowledge representation:** Knowledge representation Issues: First order logic, Predicate Logic, Structured Knowledge Representation: Backward Chaining , Backward Chaining , Resolution ,Semantic Nets, Frames, and Scripts, Ontology.

**UNIT - IV:**

**Uncertainty:** Handling uncertain knowledge, rational decisions, basics of probability, axioms of probability, Baye's Rule and conditional independence , Bayesian networks , Exact and Approximate inference in Bayesian Networks, Fuzzy Logic .

**UNIT - V:**

**Learning:** What is learning?, Knowledge and learning, Learning in Problem Solving, Learning from example, learning probabilistic models, Formal Learning Theory

**UNIT - VI:**

**Expert Systems:** Fundamental blocks, Knowledge Engineering, Knowledge Acquisition, Knowledge Based Systems, Automated Reasoning, Understanding Natural language

**Text Books:**

1. E.Rich and K. Knight, Artificial Intelligence, Tata McGraw Hill, 2008.
2. Artificial intelligence and soft computing for beginners by Anandita Das Bhattachargee, Shroff Publishers
3. Artificial Intelligence – A Practical Approach : Patterson , Tata McGraw Hill, 3<sup>rd</sup> Edition

**Reference Books:**

1. Introduction to Artificial Intelligence – Charniak (Pearson Education)

### **BECSE307T: Design Patterns**

Load	Credit	Total marks	Sessional marks	University marks	Total
4 hrs (Practical) 1 hr (Tutorial)	5	100	20	80	100

#### UNIT – 1

Introduction to Design Patterns and Observer Pattern: Basics of Design patterns, Description of design patterns, Catalog and organization of catalog, design patterns to solve design problems, selection of design pattern, Use of design patterns.

#### UNIT - 2

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Creational Patterns

#### UNIT - 3

Structural Pattern: Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy, Discussion of Structural Patterns

#### UNIT - 4

Behavioral Patterns: Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns

#### UNIT – 5

A Case Study: Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations, Spelling Checking and Hyphenation, Summary

#### UNIT – 6

Complexity Analysis of Design Patterns, Methods to analyze the complexity of design patterns, Implementation techniques and applications of design pattern in game design, product design,

#### TextBooks:

1. Head First Design Patterns, by Eric Freeman and Elisabeth Freeman
2. Design Patterns Explained, by Shalloway and Trott

#### Reference Books

3. Introduction to design Patterns in C++ with Qt by Alan Ezust, Paul Ezust

### **BECSE307P: Design PatternsLab : Practical based on above syllabus using JAVA or .net**

Load	Credit	Total marks	Sessional marks	University marks	Total
2 hrs (Practical)	1	50	25	25	50

**Some Practicals based can be based Open Source Technology**

**BECSE309T:Software Engineering & Project Management**

Load	Credit	Total marks	Sessional marks	University marks	Total
4 hrs (Theory) 1 hr (Tutorial)	5	100	20	80	100

**UNIT - I**

**Introduction:** Software Characteristics, Software Engineering- A Layered Technology, Software Process Framework, Software Process Models, Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, The Unified Process Model, Agile Process Models.

**UNIT - II**

**Software engineering Principles and Practice :**Communication Practices, Planning Practices, Modeling Practices, Construction Practice & Deployment, System Engineering Hierarchy, Business Process Engineering, Product Engineering, System Modeling, Requirements Engineering.

**UNIT - III**

**System Analysis:** Structured Analysis, Data modeling, Object-Oriented Analysis, Scenario-Based Modeling, Flow-Oriented Modeling, Class-based Modeling, Behavioral Model, Design Concepts : Abstraction , Pattern modularity, Information hiding, Design classes, Refactoring.

**UNIT - IV**

**Software Testing:**Testing Fundamentals, Black-Box Testing, White-Box Testing, Unit Testing, Integration Testing, Validation Testing, System Testing, Debugging.

**UNIT - V**

**Quality Management:** Product Metrics, Metrics for Analysis & Design Models, Metrics for Source Code, Metrics for Testing & Maintenance. Quality concepts, Evolution of Quality Management, Quality assurance, Software reviews, Statistical quality assurance.

**UNIT - VI**

**Project management :** Introduction to Software Project Management, Project Planning, Project scheduling, Risk management , Change Management, Software reengineering, Restructuring Reverse engineering, Forward Engineering

**Text Books:**

1. Software Engineering-A Practitioner's Approach (Sixth Edition)-Roger Pressman (TMH)
2. Software Engineering (Ninth Edition)-Ian Sommerville (Pearson Education)
3. Software Engineering: Theory and Practice (Fourth Edition – Pfleeger)
4. Software Engineering- Mishra /Mohanty (Pearson Education)

**Reference Books:**

1. Software Engineering-Schaum's Series (TMH)
2. Software Project Management - Sanjay Mohapatra (Cengage Learning)
3. Quantitive techniques in project management byRettyvellayudam

**BECSE310T: Computer Networks**

Load	Credit	Total marks	Sessional marks	University marks	Total
4 hrs (Theory) 1 hr (Tutorial)	5	100	20	80	100

**UNIT-I**

Introduction to computer Networks, direction of data flow (simplex, Half duplex, full duplex); Networks: distributed processing, network criteria, physical structure (type of connection, topology), categories of network (LAN, MAN, WAN); Internet: brief history, internet today; Protocols and standards; Reference models: OSI reference model, TCP/IP reference model, their comparative study.

**UNIT-II**

**Physical Layer:** Types of errors, framing (character and bit stuffing), error detection & correction methods; Flow control; Protocols: Stop & wait ARQ, Go-Back- N ARQ, Selective repeat ARQ, HDLC;

**UNIT-III**

Point to point protocol, LCP, NCP, FDDI, token bus, token ring; Reservation, polling, concentration; Multiple access protocols: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, FDMA, TDMA, CDMA; Traditional Ethernet, fastEthernet;

**UNIT-IV**

Routing : techniques, static vs. dynamic routing , routing table for classful address; Routing algorithms: shortest path algorithm, flooding, distance vector routing, link state routing, Mobile routing basic algorithms.

**UNIT-V**

Protocols: ARP, RARP, IP, ICMP, IPV6; Unicast and multicast routing protocols. Congestion control algorithm: Leaky bucket algorithm, Token bucket algorithm, choke packets. Congestion control protocols.

**UNIT-VI**

Process to process delivery; UDP; TCP; Quality of service: techniques to improve Qos. ISDN services & ATM; DSL technology, Cable modem, Sonet. Wireless LAN: IEEE 802.11; Introduction to blue-tooth, VLAN's, Cellular telephony & Satellite network.

## Text Books:

1. B. A. Forouzan – “Data Communications and Networking (3rd Ed.)” – TMH
2. A. S. Tanenbaum – “Computer Networks (4th Ed.)” – Pearson Education/PHI
3. W. Stallings – “Data and Computer Communications (8th Ed.)” – PHI/ Pearson Education

## Reference Books:

1. Kurose and Rose – “Computer Networking -A top down approach featuring the internet” – Pearson Education
2. Introduction to Data Communications and Networking by Wayne Tomasi-Pearson Edition
3. Comer – “Internetworking with TCP/IP, vol. 1, 2, 3(4th Ed.)” – Pearson Education/PHI

**BECSE310P: Computer Networks: Practical  
based on above syllabus.**

Load	Credit	Total marks	Sessional marks	University marks	Total
2 hrs (Practical)	1	50	25	25	25

**Practicals based on tools**

**1. Omnet**

**2. Castella**

**And JAVA, J2EE**

R.T.M.N.U Nagpur  
Syllabus of B.E 6<sup>th</sup> Semester,  
Computer Science Engineering

BECSE310T

**Functional English**

Sr. No.	Subject Code	Subject	Workload				Credit				Marks				
			Lecture	Practical	Tutorial	Total Hrs/Week	Lecture	Practical	Tutorial	Total	Theory		Practical		Total Marks
											Sessional	University	Sessional	University	
1	BECSE310T	Functional English	2	-	1	3	2	-	1	3	10	40	-	-	50

Syllabus:

**Unit 1. Functional Grammar: (4 Hours) (3+3+4=10)**

Common errors, Transformation of Sentences, Phrases, Idioms & Proverbs. [ 50 sentences of common errors, 50 examples of Transformation of Sentences, (5 each type), 50 noun/prepositional phrases, 50 idioms/proverbs]

**Unit II. English for Competitive Exams & Interview Techniques: (6 Hours) (3+3+4=10)**

IPA (vowel & consonant phonemes), Word building [ English words /phrases derived from other languages), Technical Jargons, Synonyms/Antonyms, Analogies, Give one word for, Types & Techniques of Interview Assignment : [ 25 Words for teaching IPA, 25 words/phrases of foreign origin, 25 technical jargons, 25 words for Synonyms/ Antonyms, 25 words for Analogies, 50 examples of give one word for ]

**Unit III**

**(A) Formal Correspondence (4 Hours) (5X2=10)**

Business Letters, Technical Report Writing, Writing Resumes, e-mail etiquettes  
[Orders, Complaints, Enquiries, Job applications & Resume Writing, Writing Memoranda]

**(B) Analytical comprehension: (4 Hours)**

[Four fictional & four non-fictional unseen texts]

**Unit IV. Technical & Scientific Writing: (4 Hours) (5X2=10)**

Writing Reviews, Features of Technical Writing, Writing Scientific Projects, Writing Research papers. Assignment: ( Any one project/review as assignment)

**Total number of periods required = 22 for each Branch of Engineering**

**Reference Books:**

1. Effective technical Communication by Barun K. Mitra, Oxford University Press,
2. *Technical Communication-Principles and Practice* by Meenakshi Raman & Sharma, Oxford University Press, 2011, ISBN-13-978-0-19-806529-
3. *The Cambridge Encyclopedia of the English Language* by David Crystal, Cambridge University Press

4. *Contemporary Business Communication* by Scot Ober , Published by Biztantra,
5. *BCOM- A South-Asian Perspective* by C.Lehman, D. DuFrene & M. Sinha, Cenage Learning Pvt. Ltd.2012
6. *Business English*, by Dept of English, University of Delhi, Published by Dorling Kindersley (India), Pvt .Ltd.,2009, ISBN 978 81 317 2077 6
7. *How to Prepare a Research Proposal: Guidelines for Funding and Dissertations in the Social and Behavioral Sciences* by Krathwohl & R David
8. *Technical Writing- Process and Product* by Sharon J. Gerson & Steven M. Gerson, 3<sup>rd</sup> edition, Pearson Education Asia, 2000
9. *Developing Communication skills* by Krishna Mohan & Meera Banerjee

**EVALUATION PATTERN:**

Internal Examination: Weightage = 10 marks

Written Examination: 05 marks

Project Seminar : 05 marks

External Examination: Weightage = 40 marks

**Question pattern for end semester examination**

Unit No	Q. No	Question type	No. of Questions	Weightage
Unit 1	1(A)	objective	3 out of 5	3+3+4=10
	1(B)	objective	3 out of 5	
	1( C)	objective	4 out of 6	
Unit 2	2 (A)	objective	3 out of 5	3+3+4=10
	2(B)	objective	3 out of 5	
	2( C)	subjective	1 ( no choice)	
Unit 3 &	3 (A)	Subjective	1 set (out of 2 sets)	5
Unit4	3(B)	subjective	1(no choice)	5
Unit 5	4(A)	subjective	1 out of 2	5
	4(B)	subjective	1 out of 2	5

