FOURTH YEAR
COURSE BOOKLET

B. Tech (Information Technology)

Affiliated to Maulana Abul Kalam Azad University of Technology
(erstwhile WBUT) and Approved by AICTE

Department of Information Technology

RCC Institute of Information Technology
(Unit of an Autonomous Society of Department of Higher Education, Government of West Bengal)

Canal South Road, Beliaghata, Kolkata – 700 015
www.rcciit.org

This revised version of Course booklet is being published in accordance with Outcome Based Technical Education (OBTE) policy approved by Departmental Advisory Board (DAB), Department of IT

First Edition: December 2014
First Edition (Revised): June 2015

Edited by: Dr. Indrajit Pan, Dr. Anirban Mukherjee and Dr. Siddhartha Bhattacharyya

All faculty members associated with Department of Information Technology, concerned faculty members of Basic Science and Humanities and the honorable members of DAB, Department of Information Technology of RCCIIT are acknowledged for their timely support and relevant inputs towards the preparation of this booklet.

Contents

Preface

The Department of Information Technology of RCC Institute of Information Technology, Kolkata is one of the oldest departments of the institute. It boasts of a pool of well versed faculty members supported by some efficient technical and administrative staff members.

The department is all set to implement the Outcome Based Technical Education (OBTE) from the current semester in the undergraduate discipline for the 2nd, 3rd and 4th year students. This course booklet is a repository of the different facets of OBTE which includes the undergraduate course curriculum, detailed University syllabus, course structure and assessment rubrics.

OBTE is the need of the hour in this rapidly evolving era of technical education in the nation. It is targeted to achieve the objectives of complete professional development of students taking Bachelors in Technology. This implies that the students while graduating after their Bachelors fulfill certain prerequisites which are commensurable to the internationally acclaimed standards. These prerequisites include the aspects of values and ethics of professionalism apart from the technical knowledge and skill achieved during the graduate program.

OBTE is characterized by Program Educational Objectives (PEOs) and their corresponding Program Outcomes (POs). Similar to any other premier department delivering technical education, the department of Information Technology of RCC Institute of Information Technology, Kolkata has laid down its well directed PEOs and POs in line with its well defined mission and vision to fulfill the aspirations of the future graduates. These are well documented in the course booklet.

OBTE is primarily adjudged by a set of assessment rubrics pertaining to each and every course subject undertaken in the graduate study by the student. These rubrics are qualitative assessment tools for computing the degree of attainment of the POs by the graduates. Typical examples of assessment components include (i) class attendance, (ii) assignments, (iii) classroom demonstration, (iv) micro project, (v) employer survey to name a few.

All the components of OBTE viz., mission, vision, PEOs, POs and assessment rubrics have been approved by the Departmental Advisory Board (DAB) [the highest academic body of the department]. The aspiring graduates and other stakeholders are requested to peruse through the course booklet to grasp the essence of OBTE. Any suggestions or feedback may please be forwarded to the respective mentors in the department.

Dr. Siddhartha Bhattacharyya

Head, Department of IT

Vision of the Department

To empower students to become global leaders in the IT based sector that would cater the needs of the local and global community.

Mission of the Department

To create a global ambience that fosters excellence in teaching-learning, research and development aided by state-of-the-art infrastructure, a dedicated pool of faculty and staff members and an inspired group of alumni that would help the department in facilitating the students to excel in IT and ITES.

Program Educational Objectives (PEOs)

PEO1. **Excellence in IT and Allied Services:** To enable graduates to contribute with excellence in IT-Enabled and Allied Services.

PEO2. **Problem Solving Ability:** To imbibe into the graduates, the ability to apply Engineering principles creatively in solving problems of the community & society.

PEO3. **Spirit of Teamwork:** To infuse into the students a spirit of collaboration, leadership and team-work.

PEO4. **Communicational Skill:** To develop their communication and managerial skills to handle challenges in projects and works in multidisciplinary teams by understanding societal and professional responsibility and initiate lifelong learning opportunities.

PEO5. **Research and Development:** To undertake research, design and developmental projects in the frontier areas of technology.

PEO6. **Versatility:** To prosper in a multinational, multilingual and multicultural atmosphere.

Program Outcomes (POs)

PO1. Apply the elementary concepts of mathematics, engineering sciences and core engineering in smart deployment of IT skills for development and derivation of contemporary methods and systems.

PO2. Analyze various correlated domains through extensive survey of literature to identify possible directives for new development.

PO3. Design a one shot and prototyped solution to solve different problems specific to the need of client or the society/economy.

PO4. Alter the design and architecture by investigating the pitfalls of the legacy system.

PO5. Use modern IT tools and adapt to new tools to deliver best possible applications/solutions.

PO6. Encompass IT for the betterment and societal need of public health services, different legal and cultural issues without truncating safety and security of the mass.

PO7. Realize the impact of ITES solutions in environmental contexts and reveal knowledge of and need for sustainable development.

PO8. Demonstrate professional, social, and ethical responsibilities.

PO9. Work under diverse multidisciplinary, multicultural, multinational environments and teams.

PO10. Communicate effectively in terms of technical documents, reports (verbal/written), presentations to a diverse client portfolio and general public.

PO11. Deliver quality work through cozy and high end researches as a part of project dissertation.

PO12. Demonstrate efficient and adaptable self-learning of ever changing technologies and practices of life-long learning.

B. Tech (IT) Curriculum

Year	Odd Semester Courses	Even Semester Courses
1st	HU101: English Language & Technical Communication HU181: Language Laboratory PH101: Physics – 1(Gr-A) PH191: Physics – 1(Gr-A) Lab CH101: Chemistry -1(Gr-B) CH191: Chemistry -1(Gr-B) Lab M101: Mathematics-1 ME101: Engg. Mechanics ME191: Engg.Drawing & Computer Graphics(Gr-B) ME192: Workshop Practice (Gr-A) ES101: Basic Electrical & Electronic Engineering-I (Gr-A +Gr-B) ES191: Basic Electrical & Electronic Engineering-I(Gr-A +Gr-B)Lab	PH201: Physics – 1(Gr-B) PH291: Physics – 1(Gr-B) Lab CH201: Chemistry -1(Gr-A) CH291: Chemistry -1(Gr-A) Lab M201: Mathematics-2 ES201: Basic Electrical & Electronic Engineering-II ES291: Basic Electrical & Electronic Engineering-II Lab CS201: Basic Computation & Principles of Computer Programming CS291: Basic Computation & Principles of Computer Programming Lab
2nd	HU301: Values & Ethics in Profession PH301: Physics- 2 PH391:Physics-2 Lab CH301: Basic Environmental Engineering & Elementary Biology. CS301: Analog & Digital Electronics CS391: Analog & Digital Electronics Lab CS302: Data Structure & Algorithm CS392:Data Structure & Algorithm Lab CS303 :Computer Organization CS393: Computer Organization Lab	HU481:Technical Report Writing & Language Lab Practice M401: Mathematics-3 CS401:Communication Engg& Coding Theory CS491:Communication Engg& Coding Theory Lab CS402: Formal Language & Automata Theory CS492:Software Tools MCS401: Numerical Methods MCS491: Numerical Methods Lab IT401:Object Oriented Programming & UML IT491: Object Oriented Programming & UML Lab
3rd	HU501: Economics for Engineers IT501: Design & Analysis of Algorithm IT591: Design & Analysis of Algorithm Lab IT502: Computer Architecture IT592:Computer Architecture Lab IT503: Operating System IT593: Operating System Lab IT504A: Circuit Theory & Network(EE) IT504B: Data Communication(ECE) IT504C: Digital Signal Processing(ECE) IT504D: Operation Research(M) IT504E: Microprocessors & Microcontrollers(CSE) IT504F: Programming Practices using C++. IT594A: Circuit Theory & Network(EE) Lab IT594B: Data Communication (ECE) Lab. IT594C: Digital Signal Processing(ECE) Lab IT594D: Operation Research(M) Lab IT594E: Microprocessors & Microcontrollers (CSE) Lab IT594F: Programming Practices using C++ Lab	HU601: Principals of Management IT601: Database Management System IT691: Database Management System Lab IT602: Computer Networking IT692: Computer Networking Lab IT603 : Software Engineering IT693: Software Engineering Lab IT604A : Information Theory & Coding IT604B : Computer Graphics IT604C: Pattern Recognition IT604D: ERP IT605A: Discrete Mathematics(M) IT605B: Human Resource Management(HSS) IT605C: Compiler Design(CSE) IT605D: Artificial Intelligence(CSE) IT681: Seminar
4th	HU781:Group Discussion IT701: Internet Technology IT791: Internet Technology Lab IT703A: E-Commerce IT703B: Soft Computing	HU801A:OrganizationalBehaviour HU801B: Project Management. IT801A: Advance computer architecture IT801B: Parallel Computing IT801C: Natural Language Processing

	IT703C: Image Processing IT704A: Distributed Operating System IT704B : Cloud Computing IT704C: Data Warehousing & Data Mining IT704D: Sensor Networks IT704E : Mobile Computing IT705A: Bio Informatics(BI) IT705B: Control System(EE) IT705C: Modeling & Simulation(M) IT705D: Microelectronics & VLSI Design(ECE) IT705E: Advance Data Communication & Coding IT793A: E-Commerce Lab IT793B: Soft Computing Lab IT793C: Image Processing Lab IT794: Industrial training. IT795: Project – I.	IT801D: Cryptography & Network Security IT802A: Technology Management(HSS) IT802B : Cyber Law & Security Policy(HSS) IT802C: Optical Networking(ECE) IT802D: Low Power Circuits & Systems(ECE) IT802E: Business Analytics(CSE) IT802F: Robotics(EE & ME) IT891: Design Lab/ Industrial problem related practical training IT892: Project -2. IT893: Grand Viva.

Curricular Distribution B. Tech (IT)

Module	Course Code	Total no of contact hours			Total hours	Credit
		L	T	P		
Humanities & Social Sc.	HU101, HU301,HU481,HU781, HU801, HU181, HU501, HU601	7	0	6	13	10
Basic Sc.	PH101,PH191,PH201,PH291,PH301,PH391, CH101,CH191,CH201,CH291, CH301M101,M201,M401	21	6	9	36	28.5
Engg Sc.	ME101,ME191,ME192, ES101,ES191,ES201,ES291	10	3	9	22	16
Professional Core	CS201,CS291,CS301, CS391,CS302, CS392, CS303,CS393,CS401,CS491, CS402,CS492,MCS401,MCS491 IT401,IT491,IT501,IT591,IT502,IT592,IT503,IT593,IT601,IT691,IT602,IT692,IT603,IT693,IT701,IT791	46	8	44	98	72
Professional Electives	IT604A,IT604B,IT604C, IT604D IT703A, IT703B,IT703C IT704A,IT704B,IT704C,IT704D,IT704E IT705A,IT705B,IT705C, IT705D,IT705EIT793A, IT793B,IT793C IT801A,IT801B,IT801C,IT801D IT802A,IT802B,IT802C,IT802D,IT802E,IT802F	18	0	3	21	19.5
Open Electives	IT504A,IT504B,IT504C,IT504D, IT504E, IT504F,IT594A,IT594B, IT594C,IT594D, IT594E, IT594F,IT605A,IT605B,IT605C, IT605D	6	2	3	11	8.5
Project	IT681, IT794, IT795, IT891, IT892, IT893	0	0	35	35	17.5
	Total	**108**	**19**	**109**	**236**	**172**

Fourth Year First Semester

Syllabus of B.Tech (IT)

Fourth Year – Seventh Semester

A. THEORY							
Sl. No.	**Field**	**Theory**	**Contact Hours/Week**				**Cr. Pts**
			L	**T**	**P**	**Total**	
1	**IT701**	Internet Technology	3	0	0	3	3
2	**IT702**	Multimedia	3	0	0	3	3
3	**IT703**	A. E-Commerce B. Soft Computing C. Image Processing	3	0	0	3	3
4	**IT704**	A. Distributed Operating System B. Cloud Computing C. Data Warehousing & Data Mining D. Sensor Networks E. Mobile Computing	3	0	0	3	3
5	**IT705**	A. Bio Informatics (BI) B. Control System (EE) C. Modelling & Simulation (M) D. Microelectronics & VLSI Design(ECE) E. Advanced Data Communication & Coding	3	0	0	3	3
Total of Theory						**15**	**15**
B. PRACTICAL							
6	**HU781**	Group Discussion	0	0	3	3	2
7	**IT791**	Internet Technology	0	0	3	3	2
8	**IT792**	Multimedia	0	0	3	3	2
9	**IT793**	A. E-Commerce B. Soft Computing C. Image Processing	0	0	3	3	2
10	**IT794**	Industrial training	4 wks during 6th -7 th Sem-break				2
11	**IT795**	Project-1				3	2
Total of Practical						**15**	**12**
Total of Semester						**30**	**27**

SEMESTER - VII

Theory

Internet Technology
IT701
Contracts: 3L
Credits- 3

Module I-
Introduction: Overview, Network of Networks, Intranet, Extranet and Internet. World Wide Web: Domain and Sub domain, Address Resolution, DNS, Telnet, FTP, HTTP.

Review of TCP/IP: Features, Segment, Three-Way Handshaking, Flow Control, Error Control, Congestion control, IP Datagram, IPv4 and IPv6.

IP Subnetting and addressing: Classful and Classless Addressing, Subnetting. NAT, IP masquerading, IP tables.

Internet Routing Protocol: Routing -Intra and Inter Domain Routing, Unicast and Multicast Routing, Broadcast.

Electronic Mail: POP3, SMTP.

Module II
HTML: Introduction, Editors, Elements, Attributes, Heading, Paragraph. Formatting, Link, Head, Table, List, Block, Layout, CSS. Form, Iframe, Colors, Colorname, Colorvalue.

Image Maps: map, area, attributes of image area.

Extensible Markup Language (XML) : Introduction, Tree, Syntax, Elements, Attributes, Validation, Viewing. XHTML in brief.

CGI Scripts : Introduction, Environment Variable, GET and POST Methods.

Module III
PERL: Introduction, Variable, Condition, Loop, Array, Implementing data structure, Hash, String, Regular Expression, File handling, I/O handling.

JavaScript: Basics, Statements, comments, variable, comparison, condition, switch, loop, break. Object – string, ar ray, Boolean, reg-ex. Function, Errors, Validation.

Cookies: Definition of cookies, Create and Store a cookie with example.

Java Applets: Container Class, Components, Applet Life Cycle, Update method; Parameter passing applet, Applications.

Module IV
Client-Server programming In Java (2L): Java Socket, Java RMI. Threats: Malicious code-viruses, Trojan horses, worms; eavesdropping, spoofing, modification, denial of service attacks.

Network security techniques: Password and Authentication; VPN, IP Security, security in electronic transaction, Secure Socket Layer (SSL), Secure Shell (SSH).

Firewall: Introduction, Packet filtering, Stateful, Application layer, Proxy.

Module V
Internet Telephony: Introduction, VoIP.
Multimedia Applications: Multimedia over IP: RSVP, RTP, RTCP and RTSP. Streaming media, Codec and Plugins, IPTV.
Search Engine and Web Crawler: Definition, Meta data, Web Crawler, Indexing, Page rank, overview of SEO.

Text Books

1. Web Technology: A Developer's Perspective, N.P. Gopalan and J. Akilandeswari, PHI Learning, Delhi, 2013. (Chapters 1-5,7,8,9).
2. Internetworking Technologies, An Engineering Perspective, Rahul Banerjee, PHI Learning, Delhi, 2011. (Chapters 5,6,12)

Multimedia
IT702
Contracts: 3L
Credits- 3

Introduction
Multimedia today, Impact of Multimedia, Multimedia Systems, Components and Its Applications

Text and Audio
Text: Types of Text, Ways to Present Text, Aspects of Text Design, Character, Character Set, Codes, Unicode, Encryption; Audio: Basic Sound Concepts, Types of Sound, Digitizing Sound, Computer Representation of Sound (Sampling Rate, Sampling Size, Quantization), Audio Formats, Audio tools, MIDI

Image and Video
Image: Formats, Image Color Scheme, Image Enhancement; Video: Analogue and Digital Video, Recording Formats and Standards (JPEG, MPEG, H.261) Transmission of Video Signals, Video Capture, and Computer based Animation.

Synchronization
Temporal relationships, synchronization accuracy specification factors, quality of service

Storage models and Access Techniques
Magnetic media, optical media, file systems (traditional, multimedia)
Multimedia devices – Output devices, CD-ROM, DVD, Scanner, CCD

Image and Video Database
Image representation, segmentation, similarity based retrieval, image retrieval by color, shape and texture; indexing- k-d trees, R-trees, quad trees; Case studies- QBIC, Virage. Video Content, querying, video segmentation, indexing

Document Architecture and Content Management
Content Design and Development, General Design Principles

Hypertext: Concept, Open Document Architecture (ODA), Multimedia and Hypermedia Coding Expert Group (MHEG), Standard Generalized Markup Language (SGML), Document Type Definition (DTD), Hypertext Markup Language (HTML) in Web Publishing. Case study of Applications

Multimedia Applications: Interactive television, Video-on-demand, Video Conferencing, Educational Applications, Industrial Applications, Multimedia archives and digital libraries, media editors.

Text Books

1. Ralf Steinmetz and Klara Nahrstedt , Multimedia: Computing, Communications & Applications , Pearson Ed.
2. Nalin K. Sharda , Multimedia Information System , PHI.
3. Fred Halsall , Multimedia Communications , Pearson Ed.
4. Koegel Buford , Multimedia Systems , Pearson Ed.
5. Fred Hoffstetter , Multimedia Literacy , McGraw Hill.
6. Ralf Steinmetz and Klara Nahrstedt , Multimedia Fundamentals: Vol. 1- Media Coding and Content Processing , PHI.
7. J. Jeffcoate , Multimedia in Practice: Technology and Application , PHI.
8. Prabhat K. Andleigh & Kiran Thakrar , Multimedia Systems Design , PHI.

E Commerce
IT703A
Contracts: 3L
Credits- 3

Introduction to E-Commerce: Definition, Scope of E-Commerce, Hardware requirements, E-Commerce and Trade Cycle, Electronic Markets, Electronic Data Interchange and Internet Commerce.

Business to Business E-Commerce: Electronic Markets, Electronic Data Interchange (EDI): Technology, Standards (UN/EDIFACT), Communications, Implementations, Agreements, Security, EDI and Business, Inter-Organizational E-commerce.

Legal issues: Risks: Paper Document vs. Electronic document, Authentication of Electronic document, Laws, Legal issues for Internet Commerce: Trademarks and Domain names, Copyright, Jurisdiction issues, Service provider liability, Enforceable online contract.

Security Issues: Security Solutions: Symmetric and Asymmetric Cryptosystems, RSA, DES, and Digital Signature, Protocols for secure messaging, Secure Electronic Transaction (SET) Protocol, Electronic cash over internet, Internet Security.

Business to Consumer E-Commerce: Consumer trade transaction, Internet, Page on the Web, Elements of E-Commerce with VB, ASP, SQL.

E-business: Internet bookshops, Software supplies and support, Electronic Newspapers, Internet Banking, Virtual Auctions, Online Share Dealing, Gambling on the net, E-Diversity, Case studies through internet.

Text Books

1. E-Commerce-Strategy, Technologies & Applications by David Whitley, TMH
2. E-Commerce- The cutting edge of business by Kamlesh K. Bajaj, TMH
3. E-Commerce through ASP by W Clarke- BPB
4. Beginning E-Commerce with VB, ASP, SQL Server 7.0 & MTS by Mathew Reynolds, Wrox Publishers
5. Global Electronic Commerce- Theory and Case Studies by J. Christopher Westland and Theodore H. K Clark, University Press

Soft Computing
IT703B
Contracts: 3L
Credits- 3

Module-I
Introduction: Introduction to soft computing; introduction to fuzzy sets and fuzzy logic systems; introduction to biological and artificial neural network; introduction to Genetic Algorithm.

Module-II
Fuzzy sets and Fuzzy logic systems:
Classical Sets and Fuzzy Sets and Fuzzy relations : Operations on Classical sets, properties of classical sets, Fuzzy set operations, properties of fuzzy sets, cardinality, operations, and properties of fuzzy relations.
Membership functions : Features of membership functions, standard forms and boundaries, different fuzzification methods. Fuzzy to Crisp conversions: Lambda Cuts for fuzzy sets, fuzzy Relations, Defuzzification methods.
Classical Logic and Fuzzy Logic: Classical predicate logic, Fuzzy Logic, Approximate reasoning and Fuzzy Implication Fuzzy Rule based Systems: Linguistic Hedges, Fuzzy Rule based system – Aggre gation of fuzzy Rules, Fuzzy Inference System- Mamdani Fuzzy Models – Sugeno Fuzzy Models.
Applications of Fuzzy Logic: How Fuzzy Logic is applied in Home Appliances, General Fuzzy Logic controllers, Basic Medical Diagnostic systems and Weather forecasting

Module-III
Neural Network
Introduction to Neural Networks: Advent of Modern Neuroscience, Classical AI and Neural Networks, Biological Neurons and Artificial neural network; model of artificial neuron.
Learning Methods : Hebbian, competitive, Boltzman etc.,
Neural Network models: Perceptron, Adaline and Madaline networks; single layer network; Back-propagation and multi layer networks.
Competitive learning networks: Kohonen self organizing networks, Hebbian learning; Hopfield Networks.
Neuo-Fuzzy modelling:
Applications of Neural Networks: Pattern Recognition and classification

Module-IV
Genetic Algorithms: Simple GA, crossover and mutation, Multi-objective Genetic Algorithm (MOGA). Applications of Genetic Algorithm: genetic algorithms in search and optimization, GA based clustering Algorithm, Image processing and pattern Recognition

Module-V
Other Soft Computing techniques: Simulated Annealing, Tabu search, Ant colony optimization (ACO), Particle Swarm Optimization (PSO).

Text Books

1. Fuzzy logic with engineering applications, Timothy J. Ross, John Wiley and Sons.
2. S. Rajasekaran and G.A.V.Pai, "Neural Networks, Fuzz y Logic and Genetic Algorithms", PHI
3. Principles of Soft Computing , S N Sivanandam, S. Sumathi, John Wiley & Sons
4. Genetic Algorithms in search, Optimization & Machine Learning by David E. Goldberg

5. Neuro-Fuzzy and Soft computing, Jang, Sun, Mizutani, PHI
6. Neural Networks: A Classroom Approach,1/e by Kumar Satish, TMH,
7. Genetic Algorithms in search, Optimization & Machine Learning by David E. Goldberg, Pearson/PHI
8. A beginners approach to Soft Computing, Samir Roy & Udit Chakraborty, Pearson

Reference Books

1. Fuzzy Sets and Fuzzy Logic: Theory and Applications, George J. Klir and Bo Yuan, Prentice Hall
2. Neural Networks: A Comprehensive Foundation (2nd Edition), Simon Haykin, Prentice Hall.

Image Processing
IT703C
Contracts: 3L
Credits- 3

Introduction
Background, Digital Image Representation, Fundamental steps in Image Processing, Elements of Digital Image Processing - Image Acquisition, Storage, Processing, Communication, Display.

Digital Image Formation
A Simple Image Model, Geometric Model- Basic Transformation (Translation, Scaling, Rotation), Perspective Projection, Sampling & Quantization - Uniform & Non uniform.

Mathematical Preliminaries
Neighbour of pixels, Connectivity, Relations, Equivalence & Transitive Closure; Distance Measures, Arithmetic/Logic Operations, Fourier Transformation, Properties of The Two Dimensional Fourier Transform, Discrete Fourier Transform, Discrete Cosine & Sine Transform.

Image Enhancement
Spatial Domain Method, Frequency Domain Method, Contrast Enhancement -Linear & Nonlinear Stretching, Histogram Processing; Smoothing - Image Averaging, Mean Filter, Low-pass Filtering; Image Sharpening. High-pass Filtering, High-boost Filtering, Derivative Filtering, Homomorphic Filtering; Enhancement in the frequency domain - Low pass filtering, High pass filtering.

Image Restoration
Degradation Model, Discrete Formulation, Algebraic Approach to Restoration - Unconstrained & Constrained; Constrained Least Square Restoration, Restoration by Homomorphic Filtering, Geometric Transformation - Spatial Transformation, Gray Level Interpolation.

Image Segmentation
Point Detection, Line Detection, Edge detection, Combined detection, Edge Linking & Boundary Detection - Local Processing, Global Processing via The Hough Transform; Thresholding - Foundation, Simple Global Thresholding, Optimal Thresholding; Region Oriented Segmentation - Basic Formulation, Region Growing by Pixel Aggregation, Region Splitting & Merging.

Text Books

1. Digital Image Processing, Gonzalves, Pearson
2. Digital Image Processing, Jahne, Springer India
3. Digital Image Processing & Analysis,Chanda & Majumder,PHI
4. Fundamentals of Digital Image Processing, Jain, PHI
5. Image Processing, Analysis & Machine Vision, Sonka, VIKAS
6. Getting Started with GIS- Clarke Keith. C; PE.
7. Concepts & Techniques of GIS - Lo C.P, Albert, Yeung K.W- PHI.

Distributed Operating System
IT704A
Contracts: 3L
Credits- 3

Introduction to Distributed System
Introduction, Examples of distributed system, Resource sharing, Challenges

Operating System Structures:
Review of structures: monolithic kernel, layered systems, virtual machines. Process based models and client server architecture; The micro-kernel based client-server approach.

Communication
Inter-process communication , Remote Procedure Call, Remote Object Invocation, Tasks and Threads. Examples from LINUX, Solaris 2 and Windows NT.

Theoretical Foundations:
Introduction. Inherent Limitations of distributed Systems. Lamport's Logical clock. Global State

Distributed Mutual Exclusion
Classification of distributed mutual exclusion algorithm. NonToken based Algorithm:Lamport's algorithm, Ricart-Agrawala algorithm. Token based Algorithm: Suzuki-Kasami's broadcast algorithm.

Distributed Deadlock Detection
Deadlock handling strategies in distributed systems. Control organizations for distributed deadlock detection. Centralized and Distributed deadlock detection algorithms: Completely Centralized algorithms, path pushing, edge chasing, global state detection algorithm.

Protection and Security:
Requirements for protection and security regimes. The access matrix model of protection. System and user modes, rings of protection, access lists, capabilities. User authentication, passwords and signatures. Use of single key and public key encryption.

Distributed file systems:
Issues in the design of distributed file systems: naming, transparency, update semantics and fault resilience. Use of the Virtual File System layer. Examples of distributed systems including Sun NFS, the Andrew filestore, CODA file system and OSF DCE.

Distributed Shared Memory
Architecture and motivations. Algorithms for implementing DSM. Memory Coherence

CORBA
The Common Object Request Broker Architecture model and software and its relationship to Operating Systems.

Text Books

1 Andrew S. Tanenbaum and Maarten Van Steen, Distributed Systems Principles and Paradigms,PHI
2. Singhal Mukesh & Shivaratri N. G., Advanced Concepts in Operating Systems, TMH
3. Tanenbaum, A. S. Distributed Operating Systems, (ISBN 0-131-439-340), Prentice Hall 199
4. Tanenbaum, A. S. Modern Operating Systems, 2nd Edition (ISBN 0-13-031358-0), Prentice Hall 2001.
5. Bacon, J., Concurrent Systems, 2nd Edition, (ISBN 0-201-177-676), Addison Wesley 1998.
6. Silberschatz, A., Galvin, P. and Gagne, G., Applied Operating Systems Concepts, 1st Edition, (ISBN 0-471-36508-4), Wiley 2000.

7. Coulouris, G. et al, Distributed Systems: Concepts and Design, 3rd Edition, (ISBN 0-201-61918-0), Addison Wesley 2001.
8. Galli, D.L., Distributed Operating Systems: Concepts and Practice (ISBN 0-13-079843-6), Prentice-Hall 2000.

Cloud Computing
IT704B
Contracts: 3L
Credits- 3

Module 1: Definition of Cloud Computing and its Basics

Definition of Cloud Computing:
Defining a Cloud, Cloud Types – NIST model, Cloud Cube model, Deployment models (Public , Private, Hybrid and Community Clouds), Service models – Infrastructur e as a Service, Platform as a Service, Software as a Service with examples of services/ service providers, Cloud Reference model

Characteristics of Cloud Computing – a shift in parad igm Benefits and advantages of Cloud Computing

Cloud Architecture:
A brief introduction on Composability, Infrastructure, Platforms, Virtual Appliances, Communication Protocols, Applications, Connecting to the Cloud by Clients

Services and Applications by Type

IaaS – Basic concept, Workload, partitioning of virt ual private server instances, Pods, aggregations, silos
PaaS – Basic concept, tools and development environm ent with examples
SaaS - Basic concept and characteristics, Open SaaS and SOA, examples of SaaS platform Identity as a Service (IDaaS)

Compliance as a Service (CaaS)

Module 2 : Use of Platforms in Cloud Computing

Concepts of Abstraction and Virtualization

Virtualization technologies : Types of virtualization (access, application, CPU, storage), Mobility patterns (P2V, V2V, V2P, P2P, D2C, C2C, C2D, D2D)

Load Balancing and Virtualization: Basic Concepts, Network resources for load balancing, Advanced load balancing (including Application Delivery Controller and Application Delivery Network), Mention of The Google Cloud as an example of use of load balancing

Hypervisors: Virtual machine technology and types, VMware vSphere Machine Imaging (including mention of Open Virtualization Format – OVF)
Porting of applications in the Cloud: The simple Cloud API and AppZero Virtual Application appliance

Concepts of Platform as a Service

Definition of services, Distinction between SaaS and PaaS (knowledge of Salesforce.com and Force.com), Application development

Use of PaaS Application frameworks

Use of Google Web Services

Discussion of Google Applications Portfolio – Index ed search, Dark Web, Aggregation and disintermediation, Productivity applications and service, Adwords, Google Analytics, Google Translate, a brief discussion on Google Toolkit (including introduction of Google APIs in brief), major features of Google App Engine service.

Use of Amazon Web Services

Amazon Web Service components and services: Amazon Elastic Cloud, Amazon Simple Storage system, Amazon Elastic Block Store, Amazon SimpleDB and Relational Database Service

Use of Microsoft Cloud Services

Windows Azure platform: Microsoft's approach, architecture, and main elements, overview of Windows Azure AppFabric, Content Delivery Network, SQL Azure, and Windows Live services

Module 3 : Cloud Infrastructure
Types of services required in implementation – Consu lting, Configuration, Customization and Support

Cloud Management
An overview of the features of network management systems and a brief introduction of related products from large cloud vendors, Monitoring of an entire cloud computing deployment stack – an overview with menti on of some products, Lifecycle management of cloud services (six stages of lifecycle)

Concepts of Cloud Security
Cloud security concerns, Security boundary, Security service boundary Overview of security mapping

Security of data: Brokered cloud storage access, Storage location and tenancy, encryption, and auditing and compliance

Identity management (awareness of Identity protocol standards)

Module 4 : Concepts of Services and Applications
1. Service Oriented Architecture: Basic concepts of message-based transactions, Protocol stack for an SOA architecture, Event-driven SOA, Enterprise Service Bus, Service catalogs
2. Applications in the Cloud: Concepts of cloud transactions, functionality mapping, Application attributes, Cloud service attributes, System abstraction and Cloud Bursting, Applications and Cloud APIs
3. Cloud-based Storage: Cloud storage definition – Manned and Unmanned
4. Webmail Services: Cloud mail services including Google Gmail, Mail2Web, Windows Live Hotmail, Yahoo mail, concepts of Syndication services

Text Books

1. Cloud Computing Bible by Barrie Sosinsky, Wiley India Pvt. Ltd, 2013
2. Mastering Cloud Computing by Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, McGraw Hill Education (India) Private Limited, 2013
3. Cloud computing: A practical approach, Anthony T. Velte, Tata Mcgraw-Hill
4. Cloud Computing, Miller, Pearson
5. Building applications in cloud:Concept, Patterns and Projects, Moyer, Pearson

Reference Books

1. Cloud Computing – Second Edition by Dr. Kumar Saurabh , Wiley India

Data Warehousing & Data Mining
IT704C
Contracts: 3L
Credits- 3

Module 1: Overview and Concepts of Data Warehousing

Overview of Data warehousing

Strategic information and the need for Data warehousing, Defining a Data warehouse, Evolution of Data warehousing, Data warehousing and Business Intelligence

The Building Blocks of Data warehouse

Defining features – Subject-oriented data, Integrat ed data, Time-variant data, Nonvolatile data, Data granularity Data warehouses and Data marts

Architectural Types – Centralized, Independent data marts, Federated, Hub-and-Spoke, Data mart bus Overview of components - Source Data, Data Staging, Data Storage, Information Delivery, Metadata, and Management and Control components

Business Requirements and Data warehouse

Dimensional nature of Business data and Dimensional Analysis, Dimension hierarchies and categories, Key Business Metrics (Facts), Requirement Gathering methods and Requirements Definition Document (contents) Business Requirements and Data Design – Structure for Business Dimensions and Key Measurements, Levels of detail

Business Requirements and the Architecture plan Business Requirements and Data Storage Specifications Business Requirements and Information Delivery Strategy

Module 2 : Data warehouse Architecture and Infrastructure

Architectural components

Concepts of Data warehouse architecture – Definition and architecture in the areas of Data acquisition, Data storage, and Information delivery

Distinguishing characteristics – Different objectiv es and scope, Data content, Complex analysis for faster response, Flexible and Dynamic, Metadata-driven etc

Architectural Framework – supporting flow of data, and the Management and Control module Technical architecture – Data acquisition, Data sto rage, and Information delivery

Overview of the components of Architectural Types introduced in Module 1.

Infrastructure for Data warehousing

Distinction between architecture and infrastructure, Understanding of how data warehouse infrastructure supports its architecture, Components of physical infrastructure, Hardware and Operating systems for data warehouse, Database Software, Collection of Tools, Data warehouse Appliances – evolution and benefits

The role of Metadata

Understanding the importance of Metadata Metadata types by functional areas – Data acquisiti on, Data storage, and Information delivery Business Metadata – overview of content and examples

Technical Metadata – overview of content and examples Metadata Requirements, Sources of Metadata, Metadata management – challenges, Metadata Repository, Metad ata integration and standards

Module 3 : Data Design and Data Preparation

Principles of Dimensional Modeling

Data Design – Design decisions, Basics of Dimensiona l modeling, E-R modeling versus Dimensional modeling The STAR schema – illustration, Dimension Table, Fac t Table, Factless Fact Table, Data granularity
STAR schema keys – Primary, Surrogate, and Foreign Advantages of the STAR schema, STAR schema examples

Data Extraction, Transformation, and Loading

Overview of ETL, Requirements of ETL and steps
Data extraction – identification of sources and tec hniques
Data transformation – Basic tasks, Transformation ty pes, Data integration and consolidation, Transformation for dimension attributes
Data loading – Techniques and processes, Data refre sh versus update, Procedures for Dimension tables, Fact tables : History and incremental loads

ETL Tool options

Data Quality: Importance of data quality, Challenges for data quality, Data quality tools, Data cleansing and purification, Master Data Management

Module 4 : Information access and delivery

Matching information to classes of users: Information from Data warehouse versus Operational systems, Users of information – their needs and how to provide information

Information delivery – queries, reports, analysis, and applications Information delivery tools – Desktop environment, M ethodology and criteria for tool selection, Information delivery framework, Business Activity Monitoring, Dashboards and Scorecards

OLAP in Data warehouse

Overall concept of Online Analytical Processing (OLAP), OLAP definitions and rules, OLAP characteristics Major features and functions of OLAP – General feat ures, Dimensional analysis, Hypercubes, Drill Down and Roll Up, Slice and Dice, Rotation, Uses and Benefits Familiarity with OLAP models – Overview of variatio ns, MOLAP, ROLAP, HOLAP, DOLAP, Database OLAP, Web OLAP

Data Warehouse and the web
Web-enabled Data Warehouse – adapting data warehous e for the web
Web-based information delivery – Browser technology for data warehouse and Security issues OLAP and Web – Enterprise OLAP, Web-OLAP approaches , OLAP Engine design

Data Mining

Overview of Data mining – Definition, Knowledge Dis covery Process (Relationships, Patterns, Phases of the process), OLAP versus Data mining Some aspects of Data mining – Association rules, Ou tlier analysis, Predictive analytics etc) Concepts of Data mining in a Data warehouse environment Major Data Mining techniques – Cluster Detection, De cision Trees, Memory-based Reasoning, Link Analysis, Neural Networks, Genetic Algorithms etc Data Mining Applications in industry – Benefits of D ata mining, Discussion on applications in Customer Relationship Management (CRM), Retail, Telecommunication, Biotechnology, Banking and Finance etc

Text Books

1. Data Warehousing Fundamentals for IT Professionals, Second Edition by Paulraj Ponniah, Wiley India

Reference Books

1. Data Warehousing, Data Mining, & OLAP – Second Edit ion by Alex Berson and Stephen J. Smith, Tata McGraw Hill Education
2. Data warehouse Toolkit by Ralph Kimball, Wiley India

Sensor Networks
IT704D
Contracts: 3L
Credits- 3

Module I: Introduction and Overview
Learning Objective: To provide an overview about sensor networks and emerging technologies.

Overview of wireless networks, types, infrastructure-based and infrastructure-less, introduction to MANETs (Mobile Ad-hoc Networks), characteristics, reactive and proactive routing protocols with examples, introduction to sensor networks, commonalities and differences with MANETs, constraints and challenges, advantages, applications, enabling technologies for WSNs.

Module II: Architectures

Learning Objective: To study about the node and network architecture of sensor nodes and its execution environment.

Single-node architecture - hardware components, design constraints, energy consumption of sensor nodes ,

operating systems and execution environments, examples of sensor nodes, sensor network scenarios, types of sources and sinks – single hop vs. multi hop networks, multiple sources and sinks – mobility, optimization goals and figur es of merit, gateway concepts, design principles for WSNs, service interfaces for WSNs.

Module III: Communication Protocols

Learning Objective: To understand the concepts of communication, MAC, routing protocols and also study about the naming and addressing in WSN.

Physical layer and transceiver design considerations, MAC protocols for wireless sensor networks, low duty cycle protocols and wakeup concepts - S-MAC , the mediation device protocol, wakeup radio concepts, address and name management, assignment of MAC addresses, routing protocols- classification, gossiping, flooding, energy-efficient routing, unicast protocols, multi-path routing, data-centric routing, data aggregation, SPIN, LEACH, Directed-Diffusion, geographic routing.

Module IV: Infrastructure Establishment

Learning Objective: To learn about topology control and clustering in networks with timing synchronization for localization services with sensor tasking and control.

Topology control, flat network topologies, hierarchical networks by clustering, time synchronization, properties, protocols based on sender-receiver and receiver-receiver synchronization, LTS, TPSN, RBS, HRTS, localization and positioning, properties and approaches, single-hop localization, positioning in multi-hop environment, range based localization algorithms – location services, sensor tasking and control.

Module V: Sensor Network Platforms and Tools
Learning Objective: To study about sensor node hardware and software platforms and understand the simulation and programming techniques. Sensor node hardware, Berkeley motes, programming challenges, node-level software platforms, node-level simulators, state-centric programming, Tiny OS, nesC components, NS2 simulator, TOSSIM.

Text Books

1. Holger Karl & Andreas Willig, “Protocols and Archit ectures for Wireless Sensor Networks”, John Wiley, 2005.
2. Feng Zhao & Leonidas J. Guibas, “Wireless Sensor Ne tworks- An Information Processing Approach", Elsevier, 2007.

Reference Books

1. Kazem Sohraby, Daniel Minoli, & Taieb Znati, “Wirel ess Sensor Networks- Technology, Protocols, and Applications”, John Wiley, 2007.
2. Anna Hac, “Wireless Sensor Network Designs”, John W iley, 2003.
3. Thomas Haenselmann, "Sensor Networks", available online for free, 2008.
4. Edgar Callaway, "Wireless Sensor Networks: Architectures and Protocols", Auerbach, 2003.

Mobile Computing
IT704E
Contracts: 3L
Credits- 3

Introduction to Personal Communications Services (PCS): PCS Architecture, Mobility management, Networks signalling. Global System for Mobile Communication (GSM) system overview: GSM Architecture, Mobility management, Network signalling.

General Packet Radio Services (GPRS): GPRS Architecture, GPRS Network Nodes. Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 standard, Mobile IP.

Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, wireless mark up Languages (WML). Wireless Local Loop(WLL): Introduction to WLL Architecture, wireless Local Loop Technologies.

Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000

(IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G.

Global Mobile Satellite Systems; case studies of the IRIDIUM and GLOBALSTAR systems. Wireless Enterprise Networks: Introduction to Virtual Networks, Blue tooth technology, Blue tooth Protocols.

Server-side programming in Java, Pervasive web application architecture, Device independent example application

Text Books

1. "Pervasive Computing", Burkhardt, Pearson
2. "Mobile Communication", J. Schiller, Pearson
3. "Wireless and Mobile Networks Architectures", Yi-Bin g Lin & Imrich Chlamtac, John Wiley & Sons, 2001
4. "Mobile and Personal Communication systems and serv ices", Raj Pandya, Prentice Hall of India, 2001.

Reference Books

1. "Guide to Designing and Implementing wireless LANs" , Mark Ciampa, Thomson learning, Vikas Publishing House, 2001.
2. "Wireless Web Development", Ray Rischpater, Springer Publishing,
3. "The Wireless Application Protocol", Sandeep Singha l, Pearson .
4. "Third Generation Mobile Telecommunication systems" , by P.Stavronlakis, Springer Publishers,

Bio Informatics
IT705A
Contracts: 3L
Credits- 3

MODULE 1: INTRODUCTION TO MOLECULAR BIOLOGY
Concepts of Cell, tissue, types of cell, components of cell, organelle. Functions of different organelles.
Concepts of DNA: Basic Structure of DNA; Double Helix structure; Watson and crick model. Exons and Introns and Gene Concept.
Concepts of RNA : Basic structure, Difference between RNA and DNA. Types of RNA.
Concept of Protein: Basic components and structure. Introduction to Central Dogma: Transcription and Tranlation Introduction to Metabolic Pathways.

Module 2: Sequence Databases

Introduction to Bioinformatics. Recent challenges in Bioinformatics. Protein Sequence Databases, DNA sequence databases. sequence database search programs like BLAST and FASTA. NCBI different modules: GenBank; OMIM, Taxonomy browser, PubMed;

Module 3 DNA SEQUENCE ANALYSIS

DNA Mapping and Assembly : Size of Human DNA ,Copying DNA: Polymerase Chain Reaction (PCR), Hybridization and Microarrays, Cutting DNA into Fragments, Sequencing Short DNA Molecules, Mapping Long DNA Molecules. DeBruijn Graph.
Sequence Alignment: Introduction, local and global alignment, pair wise and multiple alignment, Dynamic Programming Concept. Alignment algorithms: Needleman and Wunsch algorithm, Smith-Waterman.

Module 4 : Introduction Probabilistic models used in Computational Biology

Probabilistic Models; Hidden Markov Model : Concepts, Architecture, Transition matrix, estimation matrix. Application of HMM in Bioinformatics : Genefinding, profile searches, multiple sequence alignment and regulatory site identification. Bayesian networks Model :Architecture, Principle ,Application in Bioinformatics.

Module 5: Biological Data Classification and Clustering

Assigning protein function and predicting splice sites: Decision Tree

IT705B
Contracts: 3L
Credits- 3

Module – I:

a) INTRODUCTION
Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations, Impul se Response and transfer functions - Translational and Rotational mechanical systems

b) TRANSFER FUNCTION REPRESENTATION
Transfer Function of linear systems, Block diagram representation of systems considering electrical systems as examples - Block diagram algebra – Representation by Signal flow graph - Reduction using mason's gain formula.

Module – II:

a) TIME RESPONSE ANALYSIS
Standard test signals - Time response of first order systems – Characteristic Equation of Feedback cont rol systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state e rrors and error constants.

b) STABILITY ANALYSIS IN S-DOMAIN
The concept of stability – Routh's stability criteri on – limitations of Routh's stability. Root Locus Technique: The root locus concept - construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

Module – III:

a) FREQUENCY RESPONSE ANALYSIS
Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

b) : STABILITY ANALYSIS IN FREQUENCY DOMAIN
Polar Plots, Nyquist Plots Stability Analysis.

Module - IV:

a) CLASSICAL CONTROL DESIGN TECHNIQUES
Compensation techniques – Lag, Lead, Lead-Lag Control lers design in frequency Domain, PID Controllers.

b) STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS

Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and it's Properties – Concepts of Controllab ility and Observability

Text Books

1. Automatic Control Systems 8th edition– by B. C. Kuo 20 03– John Wiley and son's.,
2. Control Systems Engineering – by I. J. Nagrath an d M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.

Reference Books

1. Modern Control Engineering – by Katsuhiko Ogata –
2. Control Systems Engg. by NISE 3rd Edition – John Prentice Hall of India Pvt. Ltd., 3rd edition, 1998. Wiley

IT705C
Contracts: 3L
Credits- 3

Module-I: Introduction to Modeling and Simulation :

Nature of Simulation. Systems , Models and Simulation, Continuous and Discrete Systems, system modelling, Components of a simulation study, Introduction to Static and Dynamic System simulation , Application areas, Advantages ,Disadvantages and pitfalls of Simulation.

Module –II : System Dynamics & Probability concepts in Simulation :

Exponential growth and decay models, Generalization of growth models, Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of a Random numbers, Generating Discrete distributions, Non-Uniform Continuously Distributed Random Numbers, Rejection Method.

Module-III : Simulation of Queuing Systems and Discrete System Simulation :

Poisson arrival patterns, Exponential distribution, Service times, Normal Distribution Queuing Disciplines, Simulation of single and two server queue. Application of queuing theory in computer system. Discrete Events ,Generation of arrival patterns ,Simulation programming tasks , Gathering statistics, Measuring occupancy and Utilization , Recording Distributions and Transit times .

Module-IV : Analysis of Simulation output :

Sensitivity Analysis, Validation of Model Results

Text Books

1. Jerry Banks, John Carson, B.L.Nelson and D.M.Nicol " D iscrete Event System Simulation", Fifth Edition, Pearson.
2. Narsingh Deo, 1979, System Simulation with Digital Computers, PHI.
3. Geoffrey Gordon, "System Simulation", PHI.
4. Averill M. Law and W.David Kelton, "Simulation Mode lling and Analysis", Third Edition, McGraw Hill
5. J. N. Kapoor.. Mathematical Modelling, Wiley eastern Limited.

Reference Books

1. Sankar Sengupta, "System Simulation and Modeling", Pearson.
2. C.Dennis Pegden, Robert E.Shannon and Randall P.Sadowski, 1995, Introduction to Simulation using SIMAN, 2nd Edn., Tata McGraw-Hill.
3. A.M.Law and W.D.Kelton.. Simulation Modelling and Analysis, T.M.H. Edition.

Microelectronics & VLSI Design
IT705D
Contracts: 3L
Credits- 3

Introduction to VLSI Design: VLSI Design Concepts, Moor's Law, Scale of Integration
(SSI, MSI, LSI, VLSI, ULSI – basic idea only), Types of VLSI Chips (Analog & Digital VLSI chips, General purpose, ASIC, PLA, FPGA), Design principles (Digital VLSI – Concept of Regularity, Granularity etc), Design Domains (Behavioral, Structural, Physical), Y-Chart, Digital VLSI Design Steps.

MOS structure: E-MOS & D-MOS, Charge inversion in E-MOS, Threshold voltage, Flat-band voltage, Potential balance & Charge balance, Inversion, MOS capacitances. Three Terminal MOS Structure: Body effect.

Four Terminal MOS Transistor: Drain current, I-V characteristics. Current-voltage equations (simple derivation).

Scaling in MOSFET: Short Channel Effects, General scaling, Constant Voltage & Field scaling

CMOS: CMOS inverter, Simple Combinational Gates, NAND gate and NOR Gate using CMOS.

Micro-electronic Processes for VLSI Fabrication: Silicon Semiconductor Technology- An Overview, Wafer processing, Oxidation, Epitaxial deposition, Ion-implantation & Diffusion, Cleaning, Etching, Photo-lithography – Positive & Negative photo-resist Basic CMOS Technology – (Steps in fabricating CMOS), Basic n-well CMOS proc ess, p-well CMOS process, Twin tub process, Silicon on insulator Layout Design Rule: Stick diagram with examples, Layout rules. Hardware Description Language – VHDL or Verilog Combinational & Sequential Logic circuit Design.

Text Books

1. Digital Integrated Circuit, J.M.Rabaey, Chandrasan, Nicolic, Pearson Education.
2. CMOS Digital Integrated Circuit, S.M.Kang & Y.Leblebici, TMH.
3. Modern VLSI Design, Wayne Wolf, Pearson Education.
4. VHDL, Bhaskar, PHI.
5. Advance Digital Design Using Verilog , Michel D. Celliti, PHI

Reference Books

1. Digital Integrated Circuits, Demassa & Ciccone, John Willey & Sons .
2. Modern VLSI Design: system on silicon, Wayne Wolf; Addison Wesley Longman Publisher
3. Basic VLSI Design, Douglas A. Pucknell & Kamran Eshranghian, PHI
4. CMOS Circuit Design, Layout & Simulation, R.J.Baker, H.W.Lee, D.E. Boyee, PHI

Advanced Data Communication & Coding
IT705E
Contracts: 3L
Credits- 3

1. Prerequisites: Data and signals, Classification of signals, Communications systems, analog and digital communication systems, Applications of communication systems.

2. Digital Communication: Nyquist Sampling theorem, Inter-symbol interference and its removal, line codes (polar, unipolar, bipolar, Manchester), Detection error probability (polar, unipolar, bipolar), Digital Modulation techniques (ASK, FSK, BPSK, QPSK, QAM, PCM, DPCM, Delta Modulation, Adaptive Delta Modulation), Digital Transmission and Transmission Impairments.

3. Optical Networks: WDM, Telecommunication Infrastructure, Switching, SONET, PDH and SDH, bit interleaving, Architecture of Optical Transport Network, Link Management Protocols, Solutions.

4. Satellite Communication: Basic Transmission Theory, System Noise Temperature and G/T Ratio, Design Of Down Links, Domestic Satellite Systems Using Small Earth Stations, Uplink Design, Design Of Satellite Link For Specified (C/N). Multiple Access Techniques, Frequency Division Multiple Access (FDMA), TDMA, CDMA, Estimating Channel Requirements, Practical Demand Access Systems, Random Access, Multiple Access With On Board Processing, VSAT.

5. Mobile Communications: Mobile telephone service, Transmission protocols, Introduction to GSM, GPRS, CDMA, Switching techniques, Fading, Quality of service (QOS).
Books Recommended:

Text Books

1. Advanced Communication Systems by Wayne Tomasi; Pearson.
2. Digital Communication by Proakis; PHI
3. Optical Networks by Uyless Black; Pearson
4. Satellite Communication by Timothy Pratt; Addison Wesley.

Practical

Group Discussion
HU781
Contracts: 3L
Credits- 2

Internet Technology Lab
IT791
Contracts: 3L
Credits- 2

Applet

1. Create a banner using Applet
2. Display clock using Applet
3. Create different shapes using Applet
4. Fill colors in shapes using Applet
5. Goto a link using Applet
6. Create an event listener in Applet
7. Display image using Applet
8. Open a link in a new window using Applet
9. Play sound using Applet
10. Read a file using Applet
11. Write to a file using Applet JavaScript
12. Validate the fields of a form using JavaScript.
13. Guess a number based on user input.
14. Program on image rollover using JavaScript.
15. Display clock using JavaScript.
16. Prompt, alert, array, looping in JavaScript.
17. Calculator using JavaScript.
18. Validate e-mail, phone no. using reg-ex in JavaScript. Perl
19. Write a perl script to implement associative array.
20. Write a perl script to implement the regular expression as follows: a). If a string contains any vowel, count the total number of vowels. b). If a string starts with MCA and end with bw, print 1 else 0. c). If string starts with 0 or any no. a's, then print 1 else 0.
21. Write an html code to call a perl script from cgi-bin.
22. Implement the following with regular expression in Perl: a). a*bc b). a* at least 2 b's c). a*exactly 3 b's
23. A simple File operation using Perl.

Client Server Programming

24. Write a socket program to get the current date and time from the server.
25. Write a socket program where the client will send lowercase letters and the server will return uppercase letter.
26. Write a server and a client program to implement TCP chat server-client.
27. Create a simple calculator application using Java RMI.

HTML

1. Start your web page with an <html> tag
   - i) Add a heading.
   - ii) Add a title.
   - iii) Start the <body> section.
   - iv) Add the following text using <H1> and </H1> tags: This Web page was designed by (your name)
   - v) Add the following text using <H2> and </H2> tags: My HTML assignment
   - vi) Add a horizontal line
   - vii) Insert an image to your web page.

   Note: You should then refer to your image with just the filename, and NOT the entire pathname to the file.
   - viii) Add another horizontal line.
   - ix) Enter a paragraph of text. Write about things you have learned in html.

Make sure the text in this paragraph is a color other than black, but something one can see. Add a link that takes you to your favorite webpage.

x) Start a new paragraph. Add a three item ordered list. Make it creative (don't just say item 1, item 2, etc… and keep it clean)!
xi) Close out your body and html tags.

2. Start your web page with an <html> tag
   i) Add a heading.
   ii) Add a title.
   iii) Start the <body> section.
   iv) Start a new paragraph.

   Use alignment attribute,
   Use bold, italic, underline tags,
   Use font tag and associated attributes,
   Use heading tags,
   Use preserve tag,
   Use non breaking spaces (escape character).

3. Start your web page with an <html> tag

   i) Add a heading.
   ii) Add a title.
   iii) Start the <body> section.
   iv) Start a new paragraph.

   Create Hyperlinks:
   (a) Within the HTML document.
   (b) To another URL.
   (c) To a file that can be rendered in the browser.

4. Start your web page with an <html> tag
   i) Add a heading.
   ii) Add a title.
   iii) Start the <body> section.
   Create an unordered list,
   Create an ordered list,

   Use various bullet styles,
   Created nested lists,
   Use the font tag in conjunction with lists,
   Create definition lists,

   Use graphics as bullets.

5. Start your web page with an <html> tag
   i) Add a heading.
   ii) Add a title.
   iii) Start the <body> section.
   a) Create a simple table, Create borders and adjust border size. Adjust table cell spacing. Change border color. Change table background color.
   b) Align a new table on HTML page. Perform cell text alignment,

Create multi-column tables, Display information about your academic qualification into this table.

6. Start your web page with an <html> tag

   i) Add a heading.
   ii) Add a title.
   iii) Start the <body> section.
   Create a frameset:
   Use frame tags,

Create vertical (column) frames,
Create horizontal (row) frames,
Create complex framesets,
Use the hyperlink tag to target displaying an HTML page to another frame.

7. Start your web page with an <html> tag
   i) Add a heading.
   ii) Add a title.

   iii) Start the <body> section. Create a simple HTML form.

Use the input tag to create a: text box; text area box; check box; list box; radio button; password field; popup menu; hidden field. Use submit and reset buttons. Create an admission form using the above information.

8. Create a web page that will include an image. Then create image map to watch different parts of that image closely.

9. Using frames as an interface, create a series of web pages where the theme is to provide resources (internet, intranet, static HTML pages) pertaining to the subject of HTML. Ideally, your goal is to create a resource that you can use long after this module when needing information on HTML. As a minimum requirement to this assignment your webpage should:

• Consist of at least 3 frames.
• Contain at least 5 URLs to internet and/or intranet sites that you can reference as part of your job.
• Contain at least 5 references to documents that yo u have created that you use on a regular basis.
• Contain at least 5 references to documents others have created that you use on a regular basis.

• Be organized in a fashion that is logical and intu itive to you.
• Is done with enough quality that you would not be opposed to it being a link at another site.

10. Create a web page as you wish and the html elements of the page will be styled by CSS.

XML

1. Write a XML program that will create an XML document which contains your mailing address.
2. Write a XML program that will create an XML document which contains description of three book category.
3. Create an XML document that contains the name and price per pound of coffee beans.

   i) In your XML document mention all properties of XML declaration.
   ii) The root element has name <coffee_bean>
   iii) Create nested elements for different types of coffee.
   iv) Validate the document and if any parsing error is present, fix them.

4. Create an XML document that contains airline flight information.
   i) In your XML document mention all properties of XML declaration.
   ii) The root element has name <airlines>
   iii) Create three nested <carrier> elements for three separate airlines. Each element should include a name attribute.
   iv) Within each <carrier> nest at least two <flight> ,each of which contains departure_city, destination_ city, fl_no, dept_time.
   v) Validate the document and if any parsing error is present fix them.

5. Create an XML version of your resume. Include elements such as your name and position desired. Nest each of your former employers within an <employer> element. Also, nest your educational experience within an <education> element. Create any other nested elements that you deem appropriate, such as <references> or <spcl_skills> elements.

6. Create a DTD on product catalog.

Multimedia Lab
IT792
Contracts: 3L
Credits- 2

1. Sound capturing & editing using tools like SOUNDFORGE
2. Image editing using tools like Adobe Photoshop
3. Creating/editing motion video/animation clips (using tools like Flash / Adobe Premier)
4. Creation of Content using HTML (basic tags, table form, frame, link to other Image)
5. Creating stylesheet using DHTML
6. Home Page creation using HTML, DHTML.

Text Books

1. Adobe , Adobe Photoshop 6.0: Classroom in a book Pearson Ed.
2. Anushka Wirasinha , Flash in a Flash- Web Development , PHI
3. Macromedia Flash5 fast and easy Web Development, Design, PHI
4. Castro, HTML4 for the World Wide Web, Pearson Ed.
5. Schurman & Purdi , Dynamic HTML in Action, Second Edition , PHI
6. Lozano, Multimedia- Sound & Video , PHI

E Commerce Lab
IT793A
Contracts: 3L
Credits- 2

Following E-Commerce experiments are to be implemented using either VB, ASP, SQL or JAVA, JSP, SQL.

Creating E-Commerce Site: Designing and maint aining WebPages. Advertising in the Website, Portals and **Vortals. E-Commerce Interaction:** Comparison Shopping in B2C, Exchanges Handling in B2B, Interaction Examples: Virtual Shopping Carts.
E-Commerce Applications: Online Store, Online Banking, Credit Card Transaction Processing.

Text Books

1. E-Commerce through ASP by W Clarke- BPB
2. Beginning E-Commerce with VB, ASP, SQL Server 7.0 & MTS by Mathew Reynolds, Wrox Publishers
3. Professional Java Server Programming J2EE 1.3 Edition By Allamaraju et al, SPD.

Soft Computing Lab
IT793B
Contracts: 3L
Credits- 2

In this laboratory the students need to implement the soft computing tools in Matlab. Some exposure in C also can be used for neural network and Genetic Algorithm.

A sample assignment list is given below:

FUZZY LOGIC:
1. Write a Matlab program to implement the different Fuzzy Membership functions.
2. Write a Matlab program to implement Fuzzy set operations and its properties.
3. Write a Matlab code to implement composition of Fuzzy and Crisp Relations.
4. Write Matalab code to implement Fuzzy Information System (develop the system using command line and GUI based Fuzzy toolbox)

Neural network:
5. Write Matlab code to implement McCulloh-Pitts neural network for generate AND, OR functions.
6. Write Matlab code to implement Perceptron learning for particular set of problem.
7. Write Matlab code for OR function with bipolar inputs and targets using Adaline network.
8. Write Matlab code for XOR function with bipolar inputs and targets using Madaline network.
9. Write C program to implement McCulloh-Pitts model to generate AND, OR functions.

10. Write a Matlab code for maximizing F(x)=x2, , where x ranges from say 0 to 31 using Genetic Algorithm.
11. Use of Genetic Algorithm toolbox in matlab for optimization problem solving.
12. Implantation Simple Genetic Algorithm in C for solving optimization problem.

Image Processing Lab
IT793C
Contracts: 3L
Credits- 2

Display of Grayscale Images.
Histogram Equalization.
Non-linear Filtering.
Edge detection using Operators.
2-D DFT and DCT.
Filtering in frequency domain.
Display of color images.
Conversion between color spaces.
DWT of images.
Segmentation using watershed transform.

Department of Information Technology
RCC Institute of Information Technology, Kolkata
Canal South Road, Kolkata - 700015

Course Structure of IT701, Internet Technology

Format	Course Mapping
Department, Program, Course Number, Title of Course and Year of Study	IT, B.Tech-IT, **IT701**, **Internet Technology**, 4th Year
Identification of Course Designers: names of faculty (writers & editors/moderator) with designations & qualifications	• Writer: Dr. D Majumdar, PhD, Assoc. Prof., Dept of IT • Moderator: Dr. S Bhattacharyya, PhD, Assoc. Prof., Dept of IT
Mapping with Faculty Qualification & Expertise (Experience of teaching in UG Engg.)	• Dr. D Majumdar (12 years exp in teaching Automata, C++, Web Tech) • Dr. S Bhattacharyya (13 years exp in teaching Programming, Multimedia, etc.)
Designation as a Compulsory or Elective course (Module)	Professional Core
Pre-requisites Courses	Basic Programming and Computer Networks
Contact Hours, Credits and Type of course (theory, tutorial, seminar, project, etc.), Class/Laboratory/Tutorial schedule, Duration	L-T-P : 3-0-0 Credit – 3.0 Theory 3 hours Lecture One Semester
Course Outcomes	Upon successful completion of this course, students should be able to: 1. Describe the concept of computer networks and various protocols related to it 2. Explain the protocols related to networking such as TCP/IP , FTP, HTTP etc. 3. Explain the concepts of Internet Telephony, Multimedia Applications and Search Engines 4. Apply the concepts of Client-Server programming for a given problem and develop a solution using the technologies taught like PERL and Java 5. Understand the security issues while using different technologies for web programming

	6. Develop solutions for internet programming problems and implement the functionalities for the same
Topics covered based on syllabus of affiliating University WBUT	

Day	Duration	Topic	Assignment/Notes
1	1L	Overview, Network of Networks, Intranet, Extranet and Internet.	Chalk and Board Lecture with Handwritten Notes. Assignment – 1
2	2L	Domain and Sub domain, Address Resolution, DNS, Telnet, FTP, HTTP	Chalk and Board Lecture with Handwritten Notes
3	1L	Features, Segment, Three-Way Handshaking, Flow Control, Error Control, Congestion control, IP Datagram, IPv4 and IPv6.	Chalk and Board Lecture with Handwritten Notes
4	2L	Classful and Classless Addressing, Subnetting. NAT, IP masquerading, IP tables	Chalk and Board Lecture with Handwritten Notes
5	1L	Routing -Intra and Inter Domain Routing, Unicast and Multicast Routing, Broadcast.	Chalk and Board Lecture with Handwritten Notes
6	2L	POP3, SMTP.	Chalk and Board Lecture with Handwritten Notes
7	1L	Introduction, Editors, Elements, Attributes, Heading, and Body	Chalk and Board Lecture with Handwritten Notes
8	2L	Paragraph. Formatting, Link, Head, Table, List, Block	Chalk and Board Lecture with Handwritten Notes
9	1L	Layout, CSS. Form, Iframe, Colors, Colorname, Colorvalue.	Chalk and Board Lecture with Handwritten Notes
10	2L	Map, Area, Attributes of Image Area	Chalk and Board Lecture with Handwritten Notes
11	1L	Introduction to XML, Tree	Chalk and Board Lecture with Handwritten Notes
12	2L	XML Syntax, Elements, Attributes, Validation, Viewing	Chalk and Board Lecture with Handwritten Notes
13	1L	XHTML in brief.	Chalk and Board Lecture with Handwritten Notes
14	45 Mins	Class Test – 1	Written Test
15	2L	Introduction to CGI, Environment Variable, GET and POST Methods.	Chalk and Board Lecture with Handwritten Notes. Assignment - 2
16	1L	Introduction to PERL, Variable, Condition, Loop,	Chalk and Board Lecture with Handwritten Notes

		17	2L	Array, Implementing data structure, Hash, String,	Chalk and Board Lecture with Handwritten Notes
		18	1L	Regular Expression, File handling, I/O handling	Chalk and Board Lecture with Handwritten Notes
		19	2L	Basics of Javascript, Statements, comments,	Chalk and Board Lecture with Handwritten Notes. Assignment – 3
		20	1L	Variable, comparison, condition, switch, loop, break	Chalk and Board Lecture with Handwritten Notes
		21	2L	Object – string, array, Boolean, reg-ex.	Chalk and Board Lecture with Handwritten Notes
		22	1L	Function, Errors, Validation.	Chalk and Board Lecture with Handwritten Notes
		23	2L	Definition of cookies, Create and Store a cookie with example.	Chalk and Board Lecture with Handwritten Notes
		24	1L	Container Class, Components, Applet Life Cycle, Update method;	Chalk and Board Lecture with Handwritten Notes
		25	2L	Parameter passing applet, Applications.	Chalk and Board Lecture with Handwritten Notes
		26	1L	Java Socket Programming,	Chalk and Board Lecture with Handwritten Notes
		27	2L	Java RMI Programming.	Chalk and Board Lecture with Handwritten Notes
		28	1L	Malicious code-viruses, Trojan horses, worms; eavesdropping, spoofing, modification, denial of service attacks.	Chalk and Board Lecture with Handwritten Notes
		29	2L	Password and Authentication; VPN, IP Security, security in electronic transaction,	Chalk and Board Lecture with Handwritten Notes
		30	1L	Secure Socket Layer (SSL), Secure Shell (SSH)	Chalk and Board Lecture with Handwritten Notes
		31	2L	Introduction to Firewalls, Packet filtering, Stateful,	Chalk and Board Lecture with Handwritten Notes
		32	1L	Application layer, Proxy	Chalk and Board Lecture with Handwritten Notes
		33	45 Mins	Class Test – 2	Written Test
		34	2L	Introduction, VoIP	Chalk and Board Lecture with Handwritten Notes
		35	1L	Multimedia over IP: RSVP, RTP,	Chalk and Board

<table>
<tr><td></td><td><table>
<tr><td></td><td></td><td>RTCP and RTSP</td><td>Lecture with Handwritten Notes</td></tr>
<tr><td>36</td><td>2L</td><td>Streaming media, Codec and Plugins, IPTV.</td><td>Chalk and Board Lecture with Handwritten Notes</td></tr>
<tr><td>37</td><td>1L</td><td>Definition, Meta data, Web Crawler</td><td>Chalk and Board Lecture with Handwritten Notes</td></tr>
<tr><td>38</td><td>2L</td><td>Indexing, Page rank, overview of SEO.</td><td>Chalk and Board Lecture with Handwritten Notes</td></tr>
</table></td></tr>
<tr><td>Additional Topics (Class + Tutorial)</td><td>• Design of Static Page Website and uploading to free hoister sites
• Design of Animated Website and uploading to free hoister sites</td></tr>
<tr><td>Activities of Students and Assignments</td><td>• Take part in Quiz
• Prepare Home Assignments
• Prepare Library Assignments</td></tr>
<tr><td>Hints for Learning-Teaching Approach (Course Delivery)</td><td>• Regular Class Lectures (learner-centric) –
✓Involve students in discussion/expression of views
✓Ask students to explain on board
✓Ask questions to students on previously discussed /ongoing topic
• Class room Demonstration (on selected topics) by students in groups
• Home/Library Assignment and Notes/Study Material on topics not delivered in Class/Tutorial
• Outside the class interaction with individual students having difficulty</td></tr>
<tr><td>Course Assessment Policy</td><td>Assessment will be done in following two methods:
1. Direct Assessment – (a) Continuous Assessment throughout the semester, (b) Terminal Test at the end of the semester
2. Indirect Assessment – Opinion Survey
Grade will be awarded by University based on marks scored out of 100, the break-up of which is as follows:
• Attendance (Cont. Assmt. by Teacher): 5%
• Average of Quiz + Assignments: (Cont. Assmt. by Teacher): 10%
• Best of two 45-min Class Tests (Cont. Assmt. by Teacher): 15%
• One 3-hours Term-end Exam (Terminal Assmt. by Univ.): 70%
Points will be awarded by the Department upon assessing attainment of POs related to the course. Scores (1-4) assessed, using each different assessment tool, have weighted components against correlated POs (weights according to strong, medium or weak correlation). % attainment of each course-related PO is then found from the % of weighted average score w.r.t maximum avg score (4).</td></tr>
<tr><td>Hints for Course Assessment instruments & processes (both continuous and semester-end assessment)</td><td>In addition to direct assessment tools as per University norms, following direct and indirect assessment tools are used to measure attainments of POs related to the course outcome.
• 4 categories of questions in Class Tests
• Library Assignment
• Viva
• Student Semester Exit Survey
• Faculty & Staff Satisfaction Survey
The correlation mapping of assessment tools and POs related to the course are depicted in the Table of Assessment Tools. The grading criteria against each assessment tool to ascertain the scores (1-4) is depicted in the Assessment Rubrics Table.</td></tr>
<tr><td>Text Books and/or Reference Material</td><td>• Text Books:
1. Web Technology: A Developer's Perspective, N.P. Gopalan and J. Akilandeswari, PHI Learning, Delhi, 2013. (Chapters 1-5, 7, 8, 9).
2. Internetworking Technologies, An Engineering Perspective, Rahul Banerjee, PHI Learning, Delhi, 2011. (Chapters 5, 6, 12)</td></tr>
</table>

Mapping of Course Outcome with Program Outcome

S. No	Course Code	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	Internet Technology (IT 701)	1. Describe the concept of computer networks and various protocols related to it	S											
		2. Explain the protocols related to networking such as TCP/IP , FTP, HTTP etc.	S											
		3. Explain the concepts of Internet Telephony, Multimedia Applications and Search Engines	S											
		4. Apply the concepts of Client-Server programming for a given problem and develop a solution using the technologies taught like PERL and Java	M		S		S							
		5. Recognize the security issues while using different technologies for web programming		S			S							
		6. Develop solutions for internet programming problems and implement the functionalities for the same		M	S									

.

Selection of Assessment Components and Tools

IT – 701 (Internet Technology)							Score (1 – 4)	Weighted Evaluation of POs (W_S – 0.5 || W_M = 0.3 || W_W = 0.2)			
Assessment Tools			PO 1	PO 2	PO 3	PO 5		PO 1	PO 2	PO 3	PO 5
Component	Ast #	Method/Element									
Class Performance	1.1.1	Multiple Choice Questions or Quiz	*S*	-	-	-		0.5 × Score	-	-	-
	1.1.2	Short Answer type Questions (Class Test)	*S*	-	-	-		0.5 × Score	-	-	-
	1.1.3	Problem based Questions (Class Test)	*S*	*S*	-	-		0.5 × Score	0.5 × Score	-	-
	1.1.4	Design oriented Questions (Class Test)	*M*	*M*	*S*	S		0.3 × Score	0.3 × Score	0.5 × Score	0.5 × Score
	1.1.5	Open Ended Realistic Questions (Class Test)	*M*	*S*	-	M		0.3 × Score	0.5 × Score	-	0.3 × Score
	1.1.6	Library/ Home Assignment	*S*	-	-	-		0.5 × Score	-	-	-
	1.1.7	Viva	*S*	-	-	M		0.5 × Score	-	-	0.3 × Score
	1.1.9	Attendance	*M*	-	-	-		0.3 × Score	-	-	-
Micro Project	1.1.11	Research and gather information	*S*	-	-	-		0.5 × Score	-	-	-
		Analysis of Problem, Requirement Analysis	*M*	*S*	*M*	-		0.3 × Score	0.5 × Score	0.3 × Score	-
		Planning & Designing	*M*	*S*	*S*	-		0.3 × Score	0.5 × Score	0.5 × Score	-
		Application of Subject Knowledge	*S*	-	-	-		0.5 × Score	-	-	-
		Application of Related other Concept and Techniques - Integrated Approach	*S*	*M*	*S*	-		0.5 × Score	0.3 × Score	0.5 × Score	-
		Developing Solution/System using IT skill	*S*	-	*S*	S		0.5 × Score	-	0.5 × Score	0.5 × Score
Terminal Test	1.2.1	Written Semester Exam	*S*	*S*	-	-		0.5 × Score	0.5 × Score	-	-
Indirect Method	2.2.2	Student Semester Exit Survey	*S*	*S*	*S*	M		0.5 × Score	0.5 × Score	0.5 × Score	0.3 × Score
	2.2.5	Faculty and Staff Satisfaction Survey	*M*	*M*	*M*	-		0.3 × Score	0.3 × Score	0.3 × Score	-
						Weighted Score (WS)		**Total/7.3**	**Total / 3.9**	**Total / 3.1**	**Total / 1.9**
						%PO attained		**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**

Assessment Rubrics

IT – 701 (Internet Technology)					
Assessment Tools		**Grading Criteria**			
Method/Element	**Tool#**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Multiple Choice Questions or Quiz	1.1.1	≤40%	>40% - 60%	>60% - 80%	>80%
Short Answer type Questions (Class Test)	1.1.2	≤40%	>40% - 60%	>60% - 80%	>80%
Problem based Questions (Class Test)	1.1.3	≤40%	>40% - 60%	>60% - 80%	>80%
Design oriented Questions (Class Test)	1.1.4	≤40%	>40% - 60%	>60% - 80%	>80%
Open Ended Realistic Questions (Class Test)	1.1.5	≤40%	>40% - 60%	>60% - 80%	>80%
Assignment (Library/ Home)	1.1.6	Irregular, mostly copies from peers	Regular but often search help from instructor, Collects info - not always relevant	Regular and solves most problems by its own, Collects only basic relevant info	Regularly solves all problems, capable to generate new ideas, Collects great deal of relevant info
Viva	1.1.7	Poor subject knowledge; can't understand simple questions	Moderate subject knowledge, some good explanation; unable to answer harder questions	Good subject knowledge, mostly good explanation; attempts some harder questions	Sound subject knowledge, precise explanations; correctly answers most of the harder questions
Attendance	1.1.9	≤50%	>50% - 60%	>60% - 80%	>80%
Written Semester Exam	1.2.1	≤40%	>40% - 60%	>60% - 80%	>80%
Student Semester Exit Survey	2.2.2	Got poor marks in sem; no confidence on subject	Got fair marks in sem; unwilling to pursue further studies on subject	Got good marks in sem; confident that learnt something new and useful	Got excellent marks in sem, highly confident about the subject and willing to pursue projects or learn more on it
Faculty and Staff Satisfaction Survey	2.2.5	Poor understanding of any related questions	Tries to response queries if initial hints are given	Also attempts to answer conceptual questions	Can manage any types of questions at any difficulty level with utmost confidence

IT – 701 (Internet Technology)						
Assessment Tools			**Grading Criteria**			
Method/Element		**Tool#**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Micro Project	Research and gather information	1.1.11	Does not collect any information on the topic	Collects very limited info; some related to the topic	Collects some basic info; most refer to the topic	Collects a great deal of relevant information; all refer to the topic
	Analysis of Problem, Requirement Analysis		Asks every other person to explain the problem without any thinking	Understands the problem, cannot do requirement analysis correctly – requires guidance	Understands the problem and requirement; good attempt but incomplete documentation	Pinpoints the salient requirements, conceives additional features; prepares standard documentation
	Planning & Designing		Copies plan/design from peers	Cannot decide a plan – discusses with everybody to create a plan and design	Can plan and make a workable design by own	Plans the solution effectively with innovative ideas and effective design
	Application of Subject Knowledge		Poor subject knowledge; requires support of others; can't even use templates	Lack of knowledge forces copy-paste with not much understanding	Applies subject knowledge partly	Effectively applies subject knowledge
	Application of Related other Concept and Techniques - Integrated Approach		No real application of any engg. techniques; waits for others to do his part	Conceptually weak, aware of some techniques but cannot integrate; requires guidance	Theoretically strong; encouraging approach without much help –lacks optimization	Makes integrated approach and effective use of techniques /concept; guides others
	Developing a Solution/System		Poor IT skill - cannot implement	Can implement partly	Mostly implements but complexity higher	Implements fully with all requirements satisfied – effective and less complex soln

Department of Information Technology
RCC Institute of Information Technology, Kolkata
Canal South Road, Kolkata - 700015

Course Structure of IT 702, Multimedia

Format	Mapping	
Department, Program, Course Number, Title of Course and Year of Study	IT, B.Tech-IT, **IT702**, **Multimedia**, 4th Year	
Identification of Course Designers: names of faculty (writers & editors/moderator) with designations & qualifications	• Writer: Mr. Shuvajyoti Pal, M.E., Asst. Prof., Dept. of IT • Moderator: Dr. Pramathanath Basu, Professor, Dept. of IT	
Mapping with Faculty Qualification & Expertise (Experience of teaching in UG Engg.)	• Mr. Shuvajyoti Pal (6 years, M.E. in Information Technology) • Dr. Pramathanath Basu (41 years, PhD)	
Designation as a Compulsory or Elective course (Module)	Compulsory	
Pre-requisites Courses	Engineering level Fundamentals of Computers and Communication, DBMS	
Contact Hours, Credits and Type of course (theory, tutorial, seminar, project, etc.), Class/Laboratory/Tutorial schedule, Duration	L-T-P : 3-0-0 Credit – 3.0 Theory 3 hours Lecture One Semester	
Course Outcomes	Upon successful completion of this course, students should be able to: 1. Recognize the importance of multimedia technology in this era of digital technology 2. Discover the intricacies behind different applications of the technology	
Topics covered based on syllabus of affiliating University WBUT	Day-1	Definition of Multimedia, Multimedia today, Impact of Multimedia.
	Day-2	Different types of Multimedia Systems, Components and its Applications.
	Day-3	Text: Types of Text, Ways to Present Text, Aspects of Text Design.
	Day-4	Character, Character Set, Codes, Unicode, Encryption.
	Day-5	Compression : Lossy and Lossless, Run-Length Encoding.
	Day-6	Huffman Coding, Lempel-Ziv Coding.
	Day-7	Audio: Basic Sound Concepts, Types of Sound, Digitizing Sound, Computer Representation of Sound (Sampling Rate, Sampling Size, Quantization).

Format	Mapping	
Topics covered based on syllabus of affiliating University WBUT	Day-8	Different types of Audio Formats, Audio tools. MIDI : Components of MIDI, Different types of MIDI messages.
	Day-9	Image: Formats, Image Color Scheme, Image Enhancement.
	Day-10	Video: Analogue and Digital Video, Recording Formats and Standards.
	Day-11	Working principle of JPEG.
	Day-12	Working principle of MPEG and H.261.
	Day-13	Transmission of Video Signals, Video Capture.
	Day-14	Computer based Animation.
	Day-15	Synchronization: Temporal relationships, synchronization accuracy specification factors, quality of service.
	Day-16	Storage Models and Access Techniques: Magnetic media, Optical media, file systems (traditional, multimedia).
	Day-17	Multimedia devices – Output devices, CD-ROM, DVD, Scanner, CCD.
	Day-18	Image and Video Database: Image representation, segmentation, similarity based retrieval, image retrieval by color, shape and texture.
	Day-19	Indexing- k-d trees, R-trees, quad trees.
	Day-20	Case studies- QBIC, Virage. Video Content, querying, video segmentation, indexing.
	Day-21	Document Architecture and Content Management: Content Design and Development, General Design Principles.
	Day-22	Hypertext: Concept, Open Document Architecture (ODA), Multimedia and Hypermedia Coding Expert Group (MHEG).
	Day-23	Standard Generalized Markup Language (SGML), Document Type Definition (DTD), Hypertext Markup Language (HTML) in Web Publishing. Case study of Applications.
	Day-24	Multimedia Applications: Interactive television, Video-on-demand, Video Conferencing, Educational Applications, Industrial Applications.

<table>
<tr><th>Format</th><th colspan="2">Mapping</th></tr>
<tr><td rowspan="3">Topics covered based on syllabus of affiliating University WBUT</td><td>Day-25</td><td>Multimedia archives and digital libraries, media editors.</td></tr>
<tr><td>Day-26</td><td>Revision of important topics.</td></tr>
<tr><td>Day-27</td><td>WBUT previous years question paper solve.</td></tr>
<tr><td>Additional Topics, Activities and Assignments</td><td colspan="2">• Different Compression Techniques: Lossless and Lossy Compression
• Multimedia Operating Systems
• Special tips for weak areas identified through class performances in different assignments</td></tr>
<tr><td>Hints for Learning-Teaching Approach (Course Delivery)</td><td colspan="2">• Chalk-Board, PPT Lectures
• Class room Demonstration
• Notes in every class in lieu with discussion
• Pin pointed small assignments to revise the discussion through problem solving which are solved/ evaluated in the next lecture
• Quiz, Interaction
• Specific study assignment for every weekend which are discussed and analyzed during tutorial classes
• Outside the class interaction with individual students having problems</td></tr>
<tr><td>Course Assessment Policy</td><td colspan="2">Assessment will be done in following two methods:
1. Direct Assessment – (a) Continuous Assessment throughout the semester, (b) Terminal Test at the end of the semester
2. Indirect Assessment – Opinion Survey

• Attendance (Direct Cont. Assessment): 5%
• Quiz and Assignments: (Direct Cont. Assessment): 10%
• 2 Unit Tests of 45-min (Direct Cont. Assessment): 15%
• 1 Final 3-hour Term-end Exam (Direct Assessment): 70%
• Prog. & Dept. Eval. Survey and Employer Survey (Indirect Assessment)</td></tr>
<tr><td>Hints for Course Assessment instruments & processes (both continuous and semester-end assessment)</td><td colspan="2">In addition to direct assessment tools as per University norms, following direct and indirect assessment tools are used to measure attainments of POs related to the course outcome.
• 4 categories of questions in Class Tests
• Library Assignment
• Viva
• Employer Survey
• Prog & Dept Evaluation Survey

The correlation mapping of assessment tools and POs related to the course are depicted in the Table of Assessment Tools. The grading criteria against each assessment tool to ascertain the scores (1-4) is depicted in the Assessment Rubrics Table.</td></tr>
<tr><td>Text Books and/or Reference Material</td><td colspan="2">• Text Books:
1. Ralf Steinmetz and Klara Nahrstedt , Multimedia: Computing, Communications & Applications , Pearson Ed.
2. Ranjan Parekh, Principles of Multimedia, Tata McGraw Hill.
• Reference Books:
1. Nalin K. Sharda , Multimedia Information System , PHI.
2. Fred Halsall , Multimedia Communications , Pearson Ed.
3. Koegel Buford , Multimedia Systems , Pearson Ed.
Prabhat K. Andleigh & Kiran Thakrar , Multimedia Systems Design , PHI.</td></tr>
</table>

Mapping of Course Outcome with Program Outcome

S. No.	Course Code	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	Multimedia (IT702) - ***Theory***	1. Recognize the importance of multimedia technology in this era of digital technology	S				S							
		2. Discover the intricacies behind different applications of the technology	S				S							

Selection of Assessment Components

IT – 702 (Multimedia)							
Assessment Tools			**PO 1**	**PO 5**	**Score (1 – 4)**	**Weighted Evaluation of POs (W_S – 0.5 | | W_M = 0.3 | | W_W = 0.2)**	
Component	**Tool #**	**Method/Element**				**PO 1**	**PO 5**
Class Performance	1.1.1	Multiple Choice Question or Quiz	*S*	-		0.5 × Score	-
	1.1.2	Short Answer type Questions (Class Test)	*S*	-		0.5 × Score	-
	1.1.3	Problem based Questions (Class Test)	*S*	-		0.5 × Score	-
	1.1.4	Design oriented Questions (Class Test)	*M*	-		0.3 × Score	-
	1.1.5	Open Ended Realistic Questions (Class Test)	*S*	-		0.5 × Score	-
	1.1.6	Assignments (Library/ Home Assignment)	*M*	-		0.3 × Score	-
	1.1.9	Attendance	*S*	-		0.5 × Score	-
Terminal Test	1.2.1	Written Semester Exam (incl. MCQ, Short Answer type and Long Answer type Questions, Numerical & Design Problems)	*S*	*M*		0.5 × Score	0.3 × Score
Indirect Method	2.2.1	Employer Survey	*S*	*S*		0.5 × Score	0.5 × Score
	2.2.4	Program & Dept. Evaluation Survey	-	*M*		-	0.3 × Score
					Weighted Score (WS)	**Total / 4.1**	**Total / 1.1**
					% PO attained	**WS/2 * 100**	**WS/2 * 100**

Assessment Rubrics

IT 702 (Multimedia)					
Assessment Tools		**Grading Criteria**			
Method/Element	**Tool #**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Multiple Choice Question or Quiz	1.1.1	<40%	>40% - <60%	>60% - <80%	>80%
Short Answer type Questions (Class Test)	1.1.2	<40%	>40% - <60%	>60% - <80%	>80%
Problem based Questions (Class Test)	1.1.3	<40%	>40% - <60%	>60% - <80%	>80%
Design oriented Questions (Class Test)	1.1.4	<40%	>40% - <60%	>60% - <80%	>80%
Open Ended Realistic Questions (Class Test)	1.1.5	<40%	>40% - <60%	>60% - <80%	>80%
Assignment (Library/ Home)	1.1.6	Irregular	Regular but often search helps from instructor	Regular and solve all problems of its own	Regularly solves all problems and in addition to that is capable to generate new ideas
Attendance	1.1.9	<40%	>40% - <60%	>60% - <80%	>80%
Written Semester Exam	1.2.1	<40%	>40% - <60%	>60% - <80%	>80%
Employer survey	2.2.1	Can't answer anything	Try to answer basic questions	Good in both theory and programming, however weak skilled question	Promptly responses to any question, programming approach is efficient and confidently manages any program
Prog. & Dept. evaluation survey	2.2.4	Poor understanding of any related questions	Try to response queries if initial hints are given	Also attempts to answer conceptual questions	Can manage any types of questions at any difficulty level with utmost confidence

Department of Information Technology
RCC Institute of Information Technology, Kolkata
Canal South Road, Kolkata - 700015

Course Structure of IT703A, E-Commerce

Format	Mapping
Department, Program, Course Number, Title of Course and Year of Study	IT, B.Tech-IT, **IT703A**, **E-Commerce**, 4th Year
Identification of Course Designers: names of faculty (writers & editors/moderator) with designations & qualifications	• Writer: Abhijit Das, M.Tech, Assist. Prof., Dept of IT • Moderator: Ms. M. Deb, M.Tech, Assist. Prof., Dept of IT
Mapping with Faculty Qualification & Expertise (Experience of teaching in UG Engg.)	• Abhijit Das (11 years exp in teaching DSA, ST, INW, WT, SE, ECOMM etc.) • Ms. M. Deb (9 years exp in teaching OS, DBMS, Data Warehousing etc.)
Designation as a Compulsory or Elective course (Module)	Elective
Pre-requisites Courses	Basic knowledge of Web Technology and Internet and www
Contact Hours, Credits and Type of course (theory, tutorial, seminar, project, etc.), Class/Laboratory/Tutorial schedule, Duration	L-T-P : 3-0-0 Credit – 3.0 Theory 3 hours Lecture One Semester
Course Outcomes	Upon successful completion of this course, students should be able to: 1. Identify the need and scope for a commercial website in any real life scenarios 2. Map and implement the appropriate hardware, software tools in various E-Commerce models 3. Design and analyze methodologies to compute and calculate the budget, schedule and payment issues for any commercial website

Topics covered based on syllabus of affiliating University WBUT

Day	Duration	Topics	Assignment/Notes
Day 1	2L	E Commerce definition, Features, Evolution of web programming	
Day 2	1L	Traditional/manual vs. E Commerce	
Day 3	2L	E Commerce and Trade cycle, Buyer and Seller perspectives	Notes on E-Commerce basics
Day 4	1L	Models of E Commerce	
Day 5	2L	EDI description, EDI standards	
Day 6	1L	EDI security	
Day 7	2L	Relation of EDI with E Commerce, real life examples	Notes on EDI
Day 8	1L	E Business, relation with E Commerce	

	Day 9	2L	E Commerce website development life cycle	
	Day 10	1L	Elements of E Commerce	
	Day 11	2L	Technology requirements for various E Commerce models	Assignment on H/w S/w selection for E-Commerce models
	Day 12	1L	Case Study1	
	Day 13	1L	Various Risks and Threats in E Commerce	
	Day 14	2L	Importance of different Legal issues for Internet Commerce, Trademarks and Domain names, Jurisdiction issues	
	Day 15	1L	Various issues like Copyright, Service Provider liability, Online Contract etc.	Notes on E-Commerce legal issues
	Day 16	2L	Paper vs. E Document, Authentication of E document, Digital Signature	
	Day 17	1L	Symmetric and Asymmetric Cryptosystems, Internet Security	
	Day 18	2L	Algorithms: RSA, DES with example	Assignment on RSA
	Day 19	1L	Understanding Secure Electronic Transaction (SET) Protocol	Notes on Security in E-Commerce
	Day 20	2L	Different Elements of E-Commerce with VB, ASP, SQL	
	Day 21	1L	Understanding E-Diversity	
	Day 22	2L	E Commerce payment gateway: Mode and Security	
	Day 23	1L	Online Share Dealing, Gambling on the net	
	Day 24	2L	Electronic Newspapers, Internet Banking, Virtual Auctions	Notes on E-Commerce applications
	Day 25	1L	Case Study2	
Additional Topics, Activities and Assignments	• Details in session handling, cookies, DNS • Detail study in firewall, digital signature etc. • Stickiness of websites, Design issues in commercial websites			
Hints for Learning-Teaching Approach (Course Delivery)	• Lectures in the labs to relate theories with hands-on • Case study through PPT • Online demonstration - mapping with real life scenarios (B2C, C2C) • Class room interactive problem solving and presentation sessions • Outside the class interaction with individual students having problems			
Course Assessment Policy	Assessment will be done in following two methods: 1. Direct Assessment – (a) Continuous Assessment throughout the semester, (b) Terminal Test at the end of the semester 2. Indirect Assessment – Opinion Survey Grade will be awarded by University based on marks scored out of 100, the break-up of which is as follows: • Attendance (Cont. Assmt. by Teacher): 5% • Average of Quiz + Assignments: (Cont. Assmt. by Teacher): 10% • Best of two 45-min Class Tests (Cont. Assmt. by Teacher): 15% • One 3-hours Term-end Exam (Terminal Assmt. by Univ.): 70% Points will be awarded by the Department upon assessing attainment of POs related to the course. Scores (1-4) assessed, using each different assessment tool, have weighted components against correlated POs (weights according to strong, medium or weak correlation). % attainment of each course-related PO is then found from the % of weighted average score w.r.t maximum avg score (4).			

Hints for Course Assessment instruments & processes (both continuous and semester-end assessment)	In addition to direct assessment tools as per University norms, following direct and indirect assessment tools are used to measure attainments of POs related to the course outcome. • 4 categories of questions in Class Tests • Library Assignment • Employer Survey • Program & Dept. Evaluation Survey The correlation mapping of assessment tools and POs related to the course are depicted in the Table of Assessment Tools. The grading criteria against each assessment tool to ascertain the scores (1-4) is depicted in the Assessment Rubrics Table.
Text Books and/or Reference Material	• **Text Books:** 1. David Whitley – "E-Commerce-Strategy, Technologies & Applications" – TMH 2. Mathew Reynolds – "Beginning E-Commerce with VB, ASP, SQL Server 7.0 & MTS" – Wrox Publishers

Department of Information Technology
RCC Institute of Information Technology, Kolkata
Canal South Road, Kolkata - 700015

Course Structure of IT793A, E-Commerce Lab

Format	Course Mapping
Department, Program, Course Number, Title of Course and Year of Study	IT, B.Tech-IT, **IT793A**, **E-Commerce Lab**, 4th Year
Identification of Course Designers: names of faculty (writers & editors/moderator) with designations & qualifications	• Writer: Abhijit Das, M.Tech, Assist. Prof., Dept of IT • Moderator: Ms. M. Deb, M.Tech, Assist. Prof., Dept of IT
Mapping with Faculty Qualification & Expertise (Experience of teaching in UG Engg.)	• Abhijit Das (11 years exp in teaching DSA, ST, INW, WT, SE, ECOMM etc.) • Ms. M. Deb (9 years exp in teaching OS, DBMS, Data Warehousing etc.)
Designation as a Compulsory or Elective course (Module)	Elective
Pre-requisites Courses	Basic knowledge of Web based Programming, Internet and DBMS
Contact Hours, Credits and Type of course (theory, tutorial, seminar, project, etc.), Class/Laboratory/Tutorial schedule, Duration	L-T-P : 0-0-3 Credit – 2.0 Practical 3 hours Laboratory One Semester
Course Outcomes	Upon successful completion of this course, students should be able to: 3. Identify various phases required to develop a commercial website 4. Use various tools to design e-commerce website models like B2B, B2C, C2C etc. 5. Develop front ends and back ends using JAVA/VB, JSP/ASP, SQL etc.

Topics covered based on syllabus of affiliating University WBUT

Day	Duration	Topics
Week 1	3 Lab	To learn about a commercial website development phases
Week 2	3 Lab	To learn about hardware-software tools Requirements needed on specific e-commerce models
Week 3	3 Lab	To learn about using image and video editing tools
Week 4	3 Lab	To learn about database connectivity with websites
Week 5	3 Lab	To learn about payment mode variations in e-commerce
Week 6	3 Lab	To learn about business tier logic
Week 7	3 Lab	To learn about various free and paid web hosting options
Week 8-12	3 Lab	To learn about development of a complete commercial website

Hints for Learning-Teaching Approach (Course Delivery)	• Marker board instruction • Lab Assignments on different modules as per syllabus • Real life case scenarios in different development sessions introduced • Samples / templates supplied showing industry standards • Library assignment to solve different questions involving B2B, B2C, C2C,

	P2P commercial website designs and payment issues from previous placements drives and entrance examinations for higher studies • Additional assignment to practice beyond the laboratory hours
Course Assessment Policy	Assessment will be done in following two methods: 1. Direct Assessment – (a) Continuous Assessment throughout the semester, (b) Terminal Test at the end of the semester 2. Indirect Assessment – Opinion Survey Grade will be awarded by University based on marks scored out of 100, the break-up of which is as follows: • Attendance + weekly lab experiments + report (Cont. Assmt. by Teacher): 40% (5+20+15) • One 3-hours Term-end Lab Exam incl. experiment, viva-voce and report (Assmt. by Univ. Expert): 60% (20+20+20) Points will be awarded by the Department upon assessing attainment of POs related to the course. Scores (1-4) assessed, using each different assessment tool, have weighted components against correlated POs (weights according to strong, medium or weak correlation). % attainment of each course-related PO is found from the % of weighted average score w.r.t maximum avg score (4).
Hints for Course Assessment instruments & processes (both continuous and semester-end assessment)	In addition to direct assessment tools as per University norms, following direct and indirect assessment tools are used to measure attainments of POs related to the course outcome. • Additional Lab Assignments • Micro Project • Employer Survey • Student Semester Exit Survey • Prog. & Dept. Evaluation Survey The correlation mapping of assessment tools and POs related to the course are depicted in the Table of Assessment Tools. The grading criteria against each assessment tool to ascertain the scores (1-4) is depicted in the Assessment Rubrics Table.
Text Books and/or Reference Material	• **Text Books:** 3. W. Clarke – "E-Commerce through ASP" – BPB 4. Mathew Reynolds – "Beginning E-Commerce with VB, ASP, SQL Server 7.0 & MTS" – Wrox Publishers • **Reference Books:** 1. Allamaraju et. al. – "Professional Java Server Programming J2EE 1.3 Edition" (1.3 Ed.) – SPD

Mapping of Course Outcome with Program Outcome

S. No.	Course Code	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	E-Commerce (IT-703A) (Theory)	1. Identify the need and scope for a commercial website in any real life scenarios	M	-	-	-	-	M	-	-	-	-	-	-
		2. Map and implement the appropriate hardware, software tools in various E-Commerce models	M	M	S	-	-	M	-	-	-	-	-	-
		3. Design and analyze methodologies to compute and calculate the budget, schedule and payment issues for any commercial website	S	M	W	-	-	-	-	-	-	-	-	-
2	E-Commerce (IT-793A) (Practical)	1. Identify various phases required to develop a commercial website	M	-	-	M	-	-	-	-	-	W	-	-
		2. Use various tools to design e-commerce website models like B2B, B2C, C2C etc.	-	-	S	M	-	-	-	-	-	W	-	-
		3. Develop front ends and back ends using JAVA/VB, JSP/ASP, SQL etc.	M	-	-	S	-	-	-	-	-	-	-	-

Selection of Assessment Components and Tools

IT – 703A (E-Commerce)								Score (1 – 4)	Weighted Evaluation of POs (W_S – 0.5 || W_M = 0.3 || W_W = 0.2)			
Assessment Tools			PO1	PO2	PO3	PO6		PO1	PO2	PO3	PO6
Component	Ast-#	Method/Element									
Class Performance	1.1.1	Multiple Choice Question or Quiz	*S*	-	-	-		0.5 × Score	-	-	-
	1.1.2	Short Answer type Questions (Class Test)	*S*	*S*	-	-		0.5 × Score	0.5 × Score	-	-
	1.1.3	Problem based Questions (Class Test)	*S*	*S*	-	-		0.5 × Score	0.5 × Score	-	-
	1.1.4	Design oriented Questions (Class Test)	*M*	*S*	*S*	-		0.3 × Score	0.5 × Score	0.5 × Score	-
	1.1.5	Open Ended Realistic Questions (Class Test)	*S*	*S*	-	S		0.5 × Score	0.5 × Score	-	0.5 × Score
	1.1.6	Assignments (Library/ Home Assignment)	*M*	-	-	-		0.3 × Score	-	-	-
	1.1.9	Attendance	*M*	-	-	-		0.3 × Score	-	-	-
Terminal Test	1.2.1	Written Semester Exam (incl. MCQ, Short Answer type and Long Answer type Questions, Numerical & Design Problems)	*S*	*M*	*M*	-		0.5 × Score	0.3 × Score	0.3 × Score	-
Indirect method	2.2.1	Employer Survey	*S*	*M*	*S*	M		0.5 × Score	0.3 × Score	0.5 × Score	0.3 × Score
	2.2.4	Program & Dept. Evaluation Survey	*W*	*S*	*S*	S		0.2 × Score	0.5 × Score	0.5 × Score	0.5 × Score
							Weighted Score for each PO	**Total / 4.1**	**Total / 3.1**	**Total / 1.8**	**Total / 1.3**
							%PO attained	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**

Assessment Rubrics

IT – 703A (E-Commerce)					
Assessment Tools		**Grading Criteria**			
Method/Element	**Tool #**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Multiple Choice Question or Quiz	1.1.1	<40%	>40% - <60%	>60% - <80%	>80%
Short Answer type Questions (Class Test)	1.1.2	<40%	>40% - <60%	>60% - <80%	>80%
Problem based Questions (Class Test)	1.1.3	<40%	>40% - <60%	>60% - <80%	>80%
Design oriented Questions (Class Test)	1.1.4	<40%	>40% - <60%	>60% - <80%	>80%
Open Ended Realistic Questions (Class Test)	1.1.5	<40%	>40% - <60%	>60% - <80%	>80%
Assignment (Library/ Home)	1.1.6	Irregular	Regular but often search helps from instructor	Regular and solve all problems of its own	Regularly solves all problems and in addition to that is capable to generate new ideas
Attendance	1.1.9	<40%	>40% - <60%	>60% - <80%	>80%
Written Semester Exam	1.2.1	<40%	>40% - <60%	>60% - <80%	>80%
Employer Survey	2.2.1	Can't answer anything	Try to answer basic questions	Good in both theory and programming, however weak skilled question	Promptly responses to any question, programming approach is efficient and confidently manages any program
Prog. & Dept. Evaluation Survey	2.2.4	Poor understanding of any related questions	Try to response queries if initial hints are given	Also attempts to answer conceptual questions	Can manage any types of questions at any difficulty level with utmost confidence

Selection of Assessment Components and Tools

IT – 793A (E-Commerce Lab)							Score (1 – 4)	Weighted Evaluation of POs (W_S – 0.5 || W_M = 0.3 || W_W = 0.2)			
Assessment Tools			PO1	PO3	PO4	PO10		PO1	PO3	PO4	PO10
Component	Tool #	Method/Element									
Class Performance	1.1.9	Attendance	*S*	-	-	-		0.5 × Score	-	-	-
	1.1.10	Laboratory Experiments/ Assignments (incl. conducting physical tests using tools and preparing lab reports)	*M*	-	-	M		0.3 × Score	-	-	0.3 × Score
Micro Project	1.1.11	Micro Project (in labs) (to conduct experiments, integrate result, analyse result and report)	*S*	*M*	-	M		0.5 × Score	0.3 × Score	-	0.3 × Score
Terminal Test	1.2.2	Laboratory Exams (to conduct certain experiments, tool based assignments and report the procedure, results etc. followed by Viva Voce)	*M*	*S*	*M*	-		0.3 × Score	0.5 × Score	0.3 × Score	-
Indirect Method	2.2.1	Employer Survey	*M*	*S*	*M*	S		0.3 × Score	0.5 × Score	0.3 × Score	0.5 × Score
	2.2.2	Student Semester Exit Survey	*S*	-	-	S		0.5 × Score	-	-	0.5 × Score
	2.2.4	Program & Dept. Evaluation Survey	*S*	*S*	-	S		0.5 × Score	0.5 × Score	-	0.5 × Score
							Weighted Score for each PO	**Total / 2.9**	**Total / 1.8**	**Total / 0.6**	**Total / 2.1**
							%PO attained	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**

Assessment Rubrics

T – 793A (E-Commerce Lab)					
Assessment Tools		**Grading Criteria**			
Method/Element	**Tool #**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Attendance	1.1.9	<40%	>40% - <60%	>60% - <80%	>80%
Lab. Experiments & Assignment	1.1.10	Irregular	Regular but often search helps from instructor	Regular and solve all problems of its own	Regularly solves all problems and in addition to that is capable to generate new ideas
Micro Project (in Labs)	1.1.11	No Performance	Can design basic modules but poor in integration	Can integrate and execute the project but organization of code is very poor and hard to reuse	Develops the project with structured coding and proper comments. Reusability is high and proper documentation is done
Laboratory Exams	1.2.2	<40%	>40% - <60%	>60% - <80%	>80%
Employer Survey	2.2.1	Can't answer anything	Try to answer basic questions	Good in both theory and programming, however weak skilled question	Promptly responses to any question, programming approach is efficient and confidently manages any program
Student Semester Exit Survey	2.2.2	Can't answer adequately on overall course	Know the basics of every module but less confident to write program for new problem	Can identify and confident to apply techniques	Efficient in selection of approach, can reason out how to do and what to do
Prog. & Dept. Evaluation Survey	2.2.4	Can't solve many of the programming assignments	Can write previously seen programs but application to new program is poor	Can analysis a given problem very well but adopts complex strategy for programming	Efficient programming approach towards any problem

Department of Information Technology
RCC Institute of Information Technology, Kolkata
Canal South Road, Kolkata - 700015

Course Structure of IT704B, Cloud Computing

Format	Course Mapping
Department, Program, Course Number, Title of Course and Year of Study	IT, B.Tech-IT, **IT704B**, **Cloud Computing**, 4th Year
Identification of Course Designers: names of faculty (writers & editors/moderator) with designations & qualifications	• Writer: H. Bhaumik, Assoc. Prof., M.Tech(IT), Dept of IT • Moderator: Dr. S Bhattacharyya, PhD, Assoc. Prof., Dept of IT
Mapping with Faculty Qualification & Expertise (Experience of teaching in UG Engg.)	• Hrishikesh Bhaumik (13 years exp in teaching, worked in EU-India Grid Project) • Dr. S Bhattacharyya (14 years exp in teaching Programming, Multimedia, etc.)
Designation as a Compulsory or Elective course (Module)	Compulsory
Pre-requisites Courses	Computer Networking
Contact Hours, Credits and Type of course (theory, tutorial, seminar, project, etc.), Class/Laboratory/Tutorial schedule, Duration	L-T-P : 3-0-0 Credit – 3.0 Theory 3 hours Lecture One Semester
Course Outcomes	Upon successful completion of this course, students should be able to: 1. Explain the Cloud architecture. 2. Differentiate between the different types of applications and services 3. Explain the concepts of abstraction and different types of virtualization. 4. Illustrate the use of different web services. 5. Explain the underlying concepts of cloud management and security 6. Illustrate the use of Service Oriented Architecture(SOA) 7. Explain the different webmail services available.

Topics covered based on syllabus of affiliating University WBUT

Day	Duration	Topics	Assignment/Notes
Day 1	1L	Defining a Cloud, Cloud Types – NIST model, Cloud Cube model, Deployment models (Public , Private, Hybrid and Community Clouds),	Soft copy of study material on different cloud models
Day 2	2L	Service models – Infrastructure as a Service, Platform as a Service, Software as a Service with examples of services/ service providers, Cloud Reference model Characteristics of Cloud Computing – a shift in paradigm	Soft copy of study material on different service models

			Benefits and advantages of Cloud Computing	
	Day 3	1L	A brief introduction on Composability, Infrastructure, Platforms	Soft copy of study material on cloud infrastructure and platforms
	Day 4	2L	Virtual Appliances, Communication Protocols, Applications, Connecting to the Cloud by Clients	Soft copy of study material on communication protocols.
	Day 5	1L	IaaS – Basic concept, Workload, partitioning of virtual private server instances, Pods, aggregations, silos PaaS – Basic concept, tools and development environment with examples	Soft copy of study material on IaaS, PaaS and Saas
	Day 6	2L	SaaS - Basic concept and characteristics, Open SaaS and SOA, examples of SaaS platform Identity as a Service (IDaaS) Compliance as a Service (CaaS)	Assignment and case study on IaaS, PaaS and Saas
	Day 7	1L	Virtualization technologies : Types of virtualization (access, application, CPU, storage), Mobility patterns (P2V, V2V, V2P, P2P, D2C, C2C, C2D, D2D)	Soft copy of study material on virtualization
	Day 8	2L	Load Balancing and Virtualization: Basic Concepts, Network resources for load balancing, Advanced load balancing (including Application Delivery Controller and Application Delivery Network), Mention of The Google Cloud as an example of use of load balancing	Assignment on Load Balancing
	Day 9	1L	Hypervisors: Virtual machine technology and types, VMware vSphere Machine Imaging (including mention of Open Virtualization Format – OVF)	Soft copy of study material on Hypervisors
	Day 10	2L	Porting of applications in the Cloud: The simple Cloud API and AppZero Virtual Application appliance Definition of services, Distinction between SaaS and PaaS (knowledge of Salesforce.com and Force.com), Application development Use of PaaS Application frameworks	Soft copy of study material on porting. Assignment on distinction between SaaS and PaaS.
	Day 11	1L	Discussion of Google Applications Portfolio – Indexed search, Dark Web, Aggregation and disintermediation, Productivity applications and service,	Soft copy of study material on Google applications.

	Day 12	2L	Adwords, Google Analytics, Google Translate, a brief discussion on Google Toolkit (including introduction of Google APIs in brief), major features of Google App Engine service. Amazon Web Service components and services: Amazon Elastic Cloud, Amazon Simple Storage system, Amazon Elastic Block Store, Amazon SimpleDB and Relational Database Service	Soft copy of study material on Adwords, AdSense and Analytics. Assignments on Amazon Web Service components.
	Day 13	1L	Windows Azure platform: Microsoft's approach, architecture, and main elements, overview of Windows Azure AppFabric, Content Delivery Network, SQL Azure, and Windows Live services	Study material and assignment on Windows Azure
	Day 14	2L	Use of Microsoft Cloud Services: Windows Azure platform: Microsoft's approach, architecture, and main elements, overview of Windows Azure AppFabric, Content Delivery Network, SQL Azure, and Windows Live services	Study material and assignment on Microsoft Cloud Services.
	Day 15	1L	Types of services required in implementation – Consulting, Configuration, Customization and Support	Study material on implementation of Microsoft services
	Day 16	2L	Cloud Management An overview of the features of network management systems and a brief introduction of related products from large cloud vendors,	Study material on overview of cloud management.
	Day 17	1L	Monitoring of an entire cloud computing deployment stack – an overview with mention of some products, Lifecycle management of cloud services (six stages of lifecycle)	Study Material on lifecycle management of cloud services.
	Day 18	2L	Concepts of Cloud Security Cloud security concerns, Security boundary, Security service boundary. Overview of security mapping	Study material on cloud security
	Day 19	1L	Security of data: Brokered cloud storage access, Storage location and tenancy, encryption, and auditing and compliance Identity management (awareness of Identity protocol standards)	Study material on data security in cloud
	Day 20	2L	Service Oriented Architecture: Basic concepts of message-based transactions, Protocol stack for an SOA architecture, Event-driven SOA, Enterprise Service Bus, Service catalogs	Study material and assignment on SOA
	Day 21	1L	Applications in the Cloud: Concepts of cloud transactions, functionality mapping,	Study material on cloud transactions and APIs

			Application attributes, Cloud service attributes, System abstraction and Cloud Bursting, Applications and Cloud APIs	
	Day 22	2L	Cloud-based Storage: Cloud storage definition – Manned and Unmanned	Study material and assignment on cloud storage
	Day 23	1L	Webmail Services: Cloud mail services including Google Gmail, Mail2Web, Windows Live Hotmail, Yahoo mail, concepts of Syndication services	Study material and assignment on webmail services
	Day 24	2L	Doubt Clearing & Classroom Demonstration	
Additional Topics, Activities and Assignments	• Introduction to Cluster Computing • Introduction to Grid Computing • Logging and book-keeping service			
Hints for Learning-Teaching Approach (Course Delivery)	• Regular Chalk-Board Lectures • Case study through PPT • Class room Demonstration • Home/Library Assignment and Micro Project • Quiz, Interaction • Outside the class interaction with individual students having problems			
Course Assessment Policy	Assessment will be done in following two methods: 1. Direct Assessment – (a) Continuous Assessment throughout the semester, (b) Terminal Test at the end of the semester 2. Indirect Assessment – Opinion Survey Grade will be awarded by University based on marks scored out of 100, the break-up of which is as follows: • Attendance (Cont. Assmt. by Teacher): 5% • Average of Quiz + Assignments: (Cont. Assmt. by Teacher): 10% • Best of two 45-min Class Tests (Cont. Assmt. by Teacher): 15% • One 3-hours Term-end Exam (Terminal Assmt. by Univ.): 70% • Points will be awarded by the Department upon assessing attainment of POs related to the course. Scores (1-4) assessed, using each different assessment tool, have weighted components against correlated POs (weights according to strong, medium or weak correlation). % attainment of each course-related PO is then found from the % of weighted average score w.r.t maximum avg score (4).			
Hints for Course Assessment instruments & processes (both continuous and semester-end assessment)	In addition to direct assessment tools as per University norms, following direct and indirect assessment tools are used to measure attainments of POs related to the course outcome. • 4 categories of questions in Class Tests • Library Assignment • Classroom Demonstration • Micro Project • Viva • Student Semester Exit Survey • Faculty & Staff Satisfaction Survey • Employer Survey			
Text Books and/or Reference Material	• **Text Books:** 1. Cloud Computing Bible by Barrie Sosinsky, Wiley India Pvt. Ltd, 2013 2. Mastering Cloud Computing by Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, McGraw Hill Education (India) Private Limited, 2013 3. Cloud computing: A practical approach, Anthony T. Velte, Tata Mcgraw-Hill 4. Cloud Computing, Miller, Pearson 5. Building applications in cloud:Concept, Patterns and Projects, Moyer, Pearson • **Reference Books:** 1. Cloud Computing – 2nd Edition by Dr. Kumar Saurabh, Wiley India			

Mapping of Course Outcome with Program Outcome

S. No	Course Code	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	Cloud Computing (IT 704B)	1. Explain the Cloud architecture	S									W		
		2. Differentiate between the different types of applications and services	M						S			W		
		3. Explain the concepts of abstraction and different types of virtualization	S									M		
		4. Illustrate the use of different web services	M				W		M			W		
		5.Explain the underlying concepts of cloud management and security	S				S					W		
		6. Illustrate the use of Service Oriented Architecture(SOA)	M						W			M		
		7.Explain the different webmail services available	S				M		S			W		

Selection of Assessment Components and Tools

IT – 704B (Cloud Computing)							Score (1 – 4)	Weighted Evaluation of POs (W_S – 0.5 || W_M = 0.3 || W_W = 0.2)			
Assessment Tools			PO 1	PO 5	PO 7	PO 10		PO 1	PO 5	PO 7	PO 10
Component	Tool #	Method/Element									
Class Performance	1.1.1	Multiple Choice Questions or Quiz	*S*	-	*M*	-		0.5 × Score	-	0.3 × Score	-
	1.1.2	Short Answer type Questions (Class Test)	*S*	-	*M*	-		0.5 × Score	-	0.3 × Score	-
	1.1.3	Problem based Questions (Class Test)	*W*	*S*	-	*W*		0.2 × Score	0.5 × Score	-	0.2 × Score
	1.1.4	Design oriented Questions (Class Test)	*W*	-	-	*W*		0.2 × Score	-	-	0.2 × Score
	1.1.5	Open Ended Realistic Questions (Class Test)	*M*	-	*M*	-		0.3 × Score	-	0.3 × Score	-
	1.1.6	Library/ Home Assignment	*S*	*M*	-	-		0.5 × Score	0.3 × Score	-	-
	1.1.7	Viva	*S*	*W*	*M*	*S*		0.5 × Score	0.2 × Score	0.3 × Score	0.3 × Score
	1.1.9	Attendance	*M*	-	-	-		0.3 × Score	-	-	-
Class Demonstra-tion	1.1.8	Quality of Technical Content, Planning & Adherence to Context	*M*	-	-	-		0.3 × Score	-	-	-
		Study & Understanding of the Topic	*S*	-	*W*	-		0.5 × Score	-	0.2 × Score	-
		Basic Knowledge in the related Science & Technology	*S*	-	*M*	-		0.5 × Score	-	0.3 × Score	-
		Effective Use of Context Specific Examples, Test Cases and References	*S*	-	-	-		0.5 × Score	-	-	-
		Q&A and interaction	*S*	-	-	-		0.5 × Score	-	-	-
Micro Project	1.1.11	Research and gather information	*S*	-	-	-		0.5 × Score	-	-	-
		Analysis of Problem, Requirement Analysis	*M*	-	-	-		0.3 × Score	-	-	-
		Planning & Designing	*S*	-	-	-		0.5 × Score	-	-	-
		Application of Subject Knowledge	*S*	-	-	-		0.5 × Score	-	-	-
		Application of Related other Concept and Techniques - Integrated Approach	*S*	*M*	-	-		0.5 × Score	0.3 × Score	-	-
		Developing Solution/System using IT skill	*S*	*S*	-	*W*		0.5 × Score	0.5 × Score	-	0.2 × Score
Terminal Test	1.2.1	Written Semester Exam	*S*	-	*M*	*M*		0.5 × Score	-	0.3 × Score	0.3 × Score
Indirect Method	2.2.2	Student Semester Exit Survey	*S*	*S*	-	-		0.5 × Score	0.5 × Score	-	-
	2.2.5	Faculty and Staff Satisfaction Survey	*M*	*S*	*S*	*W*		0.3 × Score	0.5 × Score	0.5 × Score	0.2 × Score
	2.2.5	Employer Survey	*M*	*S*	*W*	*M*		0.3 × Score	0.5 × Score	0.2 × Score	0.3 × Score
						Weighted Score (WS)		Total/9.7	Total / 3.3	Total / 2.7	Total / 1.7
						%PO attained		WS/4 * 100	WS/4 * 100	WS/4 * 100	WS/4 * 100

Assessment Rubrics

IT 704B (Cloud Computing)					
Assessment Tools		**Grading Criteria**			
Method/Element	**Tool#**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Multiple Choice Questions or Quiz	1.1.1	≤40%	>40% - 60%	>60% - 80%	>80%
Short Answer type Questions (Class Test)	1.1.2	≤40%	>40% - 60%	>60% - 80%	>80%
Problem based Questions (Class Test)	1.1.3	≤40%	>40% - 60%	>60% - 80%	>80%
Design oriented Questions (Class Test)	1.1.4	≤40%	>40% - 60%	>60% - 80%	>80%
Open Ended Realistic Questions (Class Test)	1.1.5	≤40%	>40% - 60%	>60% - 80%	>80%
Assignment (Library/ Home)	1.1.6	Irregular, mostly copies from peers	Regular but often search help from instructor, Collects info - not always relevant	Regular and solves most problems by its own, Collects only basic relevant info	Regularly solves all problems, capable to generate new ideas, Collects great deal of relevant info
Viva	1.1.7	Poor subject knowledge; can't understand simple questions	Moderate subject knowledge, some good explanation; unable to answer harder questions	Good subject knowledge, mostly good explanation; attempts some harder questions	Sound subject knowledge, precise explanations; correctly answers most of the harder questions
Attendance	1.1.9	≤50%	>50% - 60%	>60% - 80%	>80%
Written Semester Exam	1.2.1	≤40%	>40% - 60%	>60% - 80%	>80%
Student Semester Exit Survey	2.2.2	Got poor marks in sem; no confidence on subject	Got fair marks in sem; unwilling to pursue further studies on subject	Got good marks in sem; confident that learnt something new and useful	Got excellent marks in sem, highly confident about the subject and willing to pursue projects or learn more on it
Faculty and Staff Satisfaction Survey	2.2.5	Poor understanding of any related questions	Tries to response queries if initial hints are given	Also attempts to answer conceptual questions	Can manage any types of questions at any difficulty level with utmost confidence
Employer Survey	2.2.1	Can't answer anything	Attempts to answer basic questions	Good in both theory and programming, however weak in skill -related question	Promptly responses to any question, programming approach is efficient and confidently manages any program

`IT 704B (Cloud Computing)						
Assessment Tools			**Grading Criteria**			
Method/Element		**#**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Classroom Demonstration	Quality of Technical Content, Planning & Adherence to Context	1.1.8	Sketchy and incoherent, mostly irrelevant and out of context	Moderate coverage of topic, sometimes out of context	Informative but not to the point always	Smart, comprehensive, very relevant and effective
	Study & Understanding of the Topic		Minimal or no use of examples/cases; hardly any reference used	Very few meaningful examples used, no reference used	Examples and test cases used but not explained properly; References used but not following norms	Optimal use of well-chosen examples to clearly explain the topic
	Basic Knowledge in the related Science & Technology		Wrong response or explanation, least awareness	sketchy explanation, skipping complicated parts	Good explanation at some places, lack of thorough study	Clear understanding, thorough preparation
	Effective Use of Context Specific Examples, Test Cases and References		Cannot connect and explain the scientific reason behind or related technology	Can connect but cannot explain properly relevant theory or technology	Explains but not convincing and clear; lacks good knowledge of related technology	Demonstrates sound knowledge of related theory and technology; appears aware of latest related developments
	Q&A and interaction		Hardly invites questions and monotonous delivery	Accepts limited questions and makes minimal interaction	Interacts only at the end of demonstration	Interactive demonstration involving the audience
Micro Project	Research and gather information	1.1.11	Does not collect any information on the topic	Collects very limited info; some related to the topic	Collects some basic info; most refer to the topic	Collects a great deal of relevant information; all refer to the topic
	Analysis of Problem, Requirement Analysis		Asks every other person to explain the problem without any thinking	Understands the problem, cannot do requirement analysis correctly – requires guidance	Understands the problem and requirement; good attempt but incomplete documentation	Pinpoints the salient requirements, conceives additional features; prepares standard documentation
	Planning & Designing		Copies plan/design from peers	Cannot decide a plan – discusses with everybody to create a plan and design	Can plan and make a workable design by own	Plans the solution effectively with innovative ideas and effective design
	Application of Subject Knowledge		Poor subject knowledge; requires support of others; can't even use templates	Lack of knowledge forces copy-paste with not much understanding	Applies subject knowledge partly	Effectively applies subject knowledge
	Application of Related other Concept and Techniques - Integrated Approach		No real application of any engg. techniques; waits for others to do his part	Conceptually weak, aware of some techniques but cannot integrate; requires guidance	Theoretically strong; encouraging approach without much help –lacks optimization	Makes integrated approach and effective use of techniques /concept; guides others
	Developing a Solution/System		Poor IT skill - cannot implement	Can implement partly	Mostly implements but complexity higher	Implements fully with all requirements satisfied – effective and less complex soln

Department of Information Technology
RCC Institute of Information Technology, Kolkata
Canal South Road, Kolkata - 700015

Course Structure of IT705B, Control System

Format	Course Curriculum
Department, Program, Course Number, Title of Course and Year of Study	IT, B.Tech-IT, **IT705B,Control System,4Th Year**
Identification of Course Designers: names of faculty (writers & editors/moderator) with designations & qualifications	• Writer: **Mr. Pankaj Pal**, M.Tech., Assistant. Professor, Dept of IT • Moderator: Dr. S. Bhattacharyya, PhD, Associate Professor, Dept of IT
Mapping with Faculty Qualification & Expertise (Experience of teaching in UG Engg.)	• Mr. Pankaj Pal (20 years exp in teaching) • Dr. S. Bhattacharyya, (15 years exp in teaching)
Designation as a Compulsory or Elective course (Module)	Professional Elective
Pre-requisites Courses	Class XII Mathematics, Basic Electrical Technology, Basic knowledge in Analogue and Digital Electronics, Circuit Theory, DSP, etc.
Contact Hours, Credits and Type of course (theory, tutorial, seminar, project, etc.), Class/Laboratory/Tutorial schedule, Duration	L-T-P : 3-0-0 Credit – 3.0 Theory 3 Hours Lecture One Semester
Course Outcomes	At the end of the course, students will be able to • Understand how the control system is useful in the IT industry • Solve simple problems in real life situations • Analyze whether a system is controllable or stable or both • Design simple control systems

Topics covered based on syllabus of affiliating University WBUT

Day	Duration	Topics	Assignment/Notes
Day 1	1L	Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems	Study Material on Open Loop and closed loop control systems and their differences
Day 2	2L	,Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations, Impulse Response	Study material based on feedback control system
Day 3	1L	Transfer functions - Translational and Rotational Mechanical Systems	Study material based on transfer function

	Day 4	2L	Transfer Function of linear systems,	Develop different types of Transfer Function
	Day 5	1L	Block diagram representation of systems considering electrical systems as examples , Block diagram algebra.	Reduce the Block diagram of different electrical systems
	Day 6	2L	Representation by Signal flow graph ,Reduction using Mason's Gain Formula	Practice on Signal Flow Graph
	Day 7	1L	Standard test signals - Time response of 1st Order Systems – Characteristic Equation of Feedback control systems	Practice Selected Problems 1st order system
	Day 8	2L	Transient Response of 2nd Order Systems - Time Domain Specifications – Steady state response	Study materials based on 2nd. Order system
	Day 9	1L	Steady State Errors and Error Constants.	Develops Notes on the given Questions
	Day 10	2L	Question and Answer session using Group wise	**Assignment 1**
	Day 11	1L	Baseband Pulse Transmission, Matched filter, Error rate	Notes preparation on Multivibrators
	Day 12	2L	ISI, Raised cosine function, Nyquist criterion for distortion-less base-band binary transmission, Eye pattern, Signal power in binary digital signals	Develop Study Material for the given topics
	Day 13	1L	The concept of stability – Routh's stability criterion – limitations of Routh's stability.	**Assignment 2**
	Day 14	2L	Root Locus Technique: The root locus concept	Home work on Root Locus
	Day 15	1L	Continue Root Locus	Home work on Root Locus
	Day 16	2L	Construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.	Selected Problems on Root Locus
	Day 17	1L	Question and Answer session using Group wise	**Assignment 3**
	Day 18	2L	Introduction to Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram	Study on Bode diagrams
	Day 19	1L	Phase margin and Gain margin-Stability Analysis from Bode Plots.	Notes on Phase margin and Gain margin-Stability Analysis from Bode Plots.
	Day 20	2L	Bode Diagram plot	Bode Diagram plot
	Day 21	1L	Polar Plots	Solving of H/W problems related to Bode Diagram and polar plot

	Day 22	2L	Continue Polar Plots, Nyquist Plots Stability Analysis.	Develop a note on Polar Plots, Nyquist Plots Stability Analysis.
	Day 23	1L	Continue Nyquist Plots and Stability Analysis.	**Assignment 4**
	Day 24	2L	Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain,	Study at home with different exam related questions
	Day 25	1L	PID Controllers.	Study on PID Controllers.
	Day 26	2L	Concepts of state, state variables and state model, derivation of state models from block diagrams,	Develop a note on Concepts of state, state variables and state model
	Day 27	1L	Diagonalization- Solving the Time invariant State Equations-	Home Work on Different State Equations
	Day 28	2L	State Transition Matrix and it's Properties – Concepts of Controllability and Observability	Revision on State Transition Matrix
Additional Topics (Class + Tutorial)	• Different types Controller design • Different Types of controller Design • Laplace Transform Representation • Time Domain and Frequency Domain Relationship			
Activities of Students and Assignments	• Take part in Classroom Demonstration (group activity) • Take part in Quiz • Prepare Home Assignments • Prepare Library Assignments			
Hints for Learning-Teaching Approach (Course Delivery)	• Regular Class Lectures (learner-centric) – ✓ Involve students in discussion/expression of views ✓ Ask students to explain on board ✓ Ask questions to students on previously discussed /ongoing topic • Class room Demonstration (on selected topics) by students in groups • Home/Library Assignment and Notes/Study Material on topics not delivered in Class • Outside the class interaction with individual students having difficulty			
Course Assessment Policy	Assessment will be done in following two methods: 1. Direct Assessment – (a) Continuous Assessment throughout the semester, (b) Terminal Test at the end of the semester 2. Indirect Assessment – Opinion Survey Grade will be awarded by University based on marks scored out of 100, the break-up of which is as follows: • Attendance (Cont. Assmt. by Teacher): 5% • Average of Quiz + Assignments: (Cont. Assmt. by Teacher): 10% • Best of two 45-min Class Tests (Cont. Assmt. by Teacher): 15% • One 3-hours Term-end Exam (Terminal Assmt. by Univ.): 70% Points will be awarded by the Department upon assessing attainment of POs related to the course. Scores (1-4) assessed, using each different assessment tool, have weighted components against correlated POs (weights according to strong, medium or weak correlation). % attainment of each course-related PO is then found from the % of weighted average score w.r.t maximum avg score (4).			
Hints for Course Assessment instruments & processes (both	In addition to direct assessment tools as per University norms, following direct and indirect assessment tools are used to measure attainments of POs related to the			

continuous and semester-end assessment)	course outcome. • 4 categories of questions in Class Tests • Library Assignment • Micro Project • Classroom Demonstration • Viva • Student Semester Exit Survey • Faculty & Staff Satisfaction Survey • Employer Survey The correlation mapping of assessment tools and POs related to the course are depicted in the Table of Assessment Tools. The grading criteria against each assessment tool to ascertain the scores (1-4) is depicted in the Assessment Rubrics Table.
Text Books and/or Reference Material	• **Text Books:** 1. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International 2. Automatic Control Systems 8th edition– by B. C. Kuo 2003– John Wiley and Son's. • **Reference Books:** 1. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd 2. Control Systems Engg. by NISE 3rd Edition – John Wiley

Mapping of Course Outcome with Program Outcome

S. No	Course Code	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	**Control System (IT705B)**	1. Understand how the control system is useful in the IT industry	S	M	M		M							M
		2. Solve simple problems in the real life situations	S	M	S		S							S
		3. Analyze whether a system is controllable or stable or both	S											M
		4. Design simple control systems	S		S	M	S							

Selection of Assessment Components and Tools

Control System (IT705B)									Score (1 – 4)	Weighted Evaluation of POs (W_S – 0.5 || W_M = 0.3 || W_W = 0.2)					
Assessment Tools			PO 1	PO 2	PO 3	PO4	PO 5	PO12		PO 1	PO 2	PO 3	PO4	PO 5	PO12
Component	Tool #	Method/Element													
Class Performance	1.1.1	Multiple Choice Questions or Quiz	*S*	-	-	-	-	-		0.5 × Score	-	-	-	-	-
	1.1.2	Short Answer type Questions (Class Test)	*S*	-	-	-	-	-		0.5 × Score	-	-	-	-	-
	1.1.3	Problem based Questions (Class Test)	*S*	*S*	-	-	-	*S*		0.5 × Score	0.5 × Score	-	-		0.5 × Score
	1.1.4	Design oriented Questions (Class Test)	*M*	*M*	*S*	-	-	-		0.3 × Score	0.3 × Score	0.5 × Score	-	-	-
	1.1.5	Open Ended Realistic Questions (Class Test)	*M*	*S*	-	-	-	-		0.3 × Score	0.5 × Score	-	-	-	-
	1.1.6	Library/ Home Assignment	*S*	-	-	-	-	*M*		0.5 × Score	-	-	-		0.3 × Score
	1.1.7	Viva	*S*	-	-	-	-	*S*		0.5 × Score	-	-	-		0.5 × Score
	1.1.9	Attendance	*S*	-	-	-	-	-		0.5 × Score	-	-	-	-	-
Class Demonstra-tion	1.1.8	Quality of Technical Content, Planning & Adherence to Context	*M*	-	-	*M*	-	-		0.3 × Score	-	-	0.3 × Score	-	-
		Study & Understanding of the Topic	*S*	-	-	-	-	-		0.5 × Score	-	-	-	-	-
		Basic Knowledge in the related Science & Technology	*S*	-	-	-	-	-		0.5 × Score	-	-	-	-	-
		Effective Use of Context Specific Examples, Test Cases and References	*S*	-	-	-	-	-		0.5 × Score	-	-	-	-	-
		Q&A and interaction	*S*	-	-	-	-	-		0.5 × Score	-	-	-	-	-
Micro Project	1.1.11	Research and gather information	*S*	-	-	-	-	-		0.5 × Score	-	-	-	-	-
		Analysis of Problem, Requirement Analysis	*M*	*S*	*M*	-	-	-		0.3 × Score	0.5 × Score	0.3 × Score	-	-	-
		Planning & Designing	*S*	*S*	*S*	-	-	-		0.5 × Score	0.5 × Score	0.5 × Score	-	-	-
		Application of Subject Knowledge	*S*	-	-	*M*	*S*	-		0.5 × Score	-	-	0.3 × Score	0.5 × Score	-
		Application of Related other Concept and Techniques - Integrated Approach	*S*	*M*	*M*	-	-	*M*		0.5 × Score	0.3 × Score	0.3 × Score	-	-	0.3 × Score

		Developing Solution/System using IT skill	*S*	-	*S*	-	*S*	*S*		0.5 × Score	-	0.5 × Score	-	0.5 × Score	0.5 × Score
Terminal Test	1.2.1	Written Semester Exams	*S*	*S*	-	-	-	-		0.5 × Score	0.5 × Score	-	-	-	-
Indirect Method	2.2.2	Student Semester Exit Survey	*S*	*S*	*S*	-	*M*	*S*		0.5 × Score	0.5 × Score	0.5 × Score	-	0.3 × Score	0.5 × Score
	2.2.1	Faculty and Staff Satisfaction Survey	*M*	*M*	*M*	-	*S*	*S*		0.3 × Score	0.3 × Score	0.3 × Score	-	0.5 × Score	0.5 × Score
	2.2.5	Employer Survey	*M*	*M*	*S*	-	-	*S*		0.3 × Score	0.3 × Score	0.5 × Score	-	-	0.5 × Score
									Weighted Score (WS)	**Total /11.3**	**Total / 4.2**	**Total / 3.4**	**Total / 0.6**	**Total / 1.8**	**Total / 3.6**
									%PO attained	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**

Assessment Rubrics

Control System (IT705B)					
Assessment Tools		**Grading Criteria**			
Method/Element	**Tool#**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Multiple Choice Questions (Class Test)	1.1.1	≤40%	>40% - 60%	>60% - 80%	>80%
Short Answer type Questions (Class Test)	1.1.2	≤40%	>40% - 60%	>60% - 80%	>80%
Problem based Questions (Class Test)	1.1.3	≤40%	>40% - 60%	>60% - 80%	>80%
Design oriented Questions (Class Test)	1.1.4	≤40%	>40% - 60%	>60% - 80%	>80%
Open Ended Realistic Questions (Class Test)	1.1.5	≤40%	>40% - 60%	>60% - 80%	>80%
Assignment (Library/ Home)	1.1.6	Irregular, mostly copies from peers	Regular but often search help from instructor, Collects info - not always relevant	Regular and solves most problems by its own, Collects only basic relevant info	Regularly solves all problems, capable to generate new ideas, Collects great deal of relevant info
Viva	1.1.7	Poor subject knowledge; can't understand simple questions	Moderate subject knowledge, some good explanation; unable to answer harder questions	Good subject knowledge, mostly good explanation; attempts some harder questions	Sound subject knowledge, precise explanations; correctly answers most of the harder questions
Tutorial	1.1.9	Hardly questions the teacher, does not try to solve assignments in class, does not discuss with peers	Does only what is asked to do in the class; seldom questions to clear doubts, interacts with peers	Comes prepared, asks questions, solves assignments in class, not that good in solving critical questions / problems	Asks interesting questions, guides the peers in solving critical questions / problems, explains on board if asked
Attendance	1.1.9	≤50%	>50% - 60%	>60% - 80%	>80%
Written exams	1.2.1	≤40%	>40% - 60%	>60% - 80%	>80%
Student Semester Exit Survey	2.2.2	Got poor marks in sem; no confidence on subject	Got fair marks in sem; unwilling to pursue further studies on subject	Got good marks in sem; confident that learnt something new and useful	Got excellent marks in sem, highly confident about the subject and willing to pursue projects or learn more on it
Faculty and Staff Satisfaction Survey	2.2.5	Poor understanding of any related questions	Tries to response queries if initial hints are given	Also attempts to answer conceptual questions	Can manage any types of questions at any difficulty level with utmost confidence
Employer Survey	2.2.1	Can't answer anything	Attempts to answer basic questions	Good in both theory and programming, however weak in skill -related question	Promptly responses to any question, programming approach is efficient and confidently manages any program

Classroom Demonstration	Quality of Technical Content, Planning & Adherence to Context	1.1.8	Sketchy and incoherent, mostly irrelevant and out of context	Moderate coverage of topic, sometimes out of context	Informative but not to the point always	Smart, comprehensive, very relevant and effective
	Study & Understanding of the Topic		Minimal or no use of examples/cases; hardly any reference used	Very few meaningful examples used, no reference used	Examples and test cases used but not explained properly; References used but not following norms	Optimal use of well-chosen examples to clearly explain the topic
	Basic Knowledge in the related Science & Technology		Wrong response or explanation, least awareness	sketchy explanation, skipping complicated parts	Good explanation at some places, lack of thorough study	Clear understanding, thorough preparation
	Effective Use of Context Specific Examples, Test Cases and References		Cannot connect and explain the scientific reason behind or related technology	Can connect but cannot explain properly relevant theory or technology	Explains but not convincing and clear; lacks good knowledge of related technology	Demonstrates sound knowledge of related theory and technology; appears aware of latest related developments
	Q&A and interaction		Hardly invites questions and monotonous delivery	Accepts limited questions and makes minimal interaction	Interacts only at the end of demonstration	Interactive demonstration involving the audience
Micro Project	Research and gather information	1.1.11	Does not collect any information on the topic	Collects very limited info; some related to the topic	Collects some basic info; most refer to the topic	Collects a great deal of relevant information; all refer to the topic
	Analysis of Problem, Requirement Analysis		Asks every other person to explain the problem without any thinking	Understands the problem, cannot do requirement analysis correctly – requires guidance	Understands the problem and requirement; good attempt but incomplete documentation	Pinpoints the salient requirements, conceives additional features; prepares standard documentation
	Planning & Designing		Copies plan/design from peers	Cannot decide a plan – discusses with everybody to create a plan and design	Can plan and make a workable design by own	Plans the solution effectively with innovative ideas and effective design
	Application of Subject Knowledge		Poor subject knowledge; requires support of others; can't even use templates	Lack of knowledge forces copy-paste with not much understanding	Applies subject knowledge partly	Effectively applies subject knowledge
	Application of Related other Concept and Techniques - Integrated Approach		No real application of any engg. techniques; waits for others to do his part	Conceptually weak, aware of some techniques but cannot integrate; requires guidance	Theoretically strong; encouraging approach without much help –lacks optimization	Makes integrated approach and effective use of techniques /concept; guides others
	Developing a Solution/System		Poor IT skill - cannot implement	Can implement partly	Mostly implements but complexity higher	Implements fully with all requirements satisfied – effective and less complex soln

Department of Information Technology
RCC Institute of Information Technology, Kolkata
Canal South Road, Kolkata - 700015

Course Structure of HU781, Group Discussion

	Course Curriculum		
Department, Program, Course Number, Title of Course and Year of Study	IT, B.Tech-IT, **HU781**, **Group Discussion**, 4th Year		
Identification of Course Designers: names of faculty (writers & editors/moderator) with designations & qualifications	• Writer: Amrita Bhaumik, Assist. Prof. (visiting), Dept of IT • Moderator: Ms. J. Roy, MBA, Assist. Prof., Dept of Sc. & Hu.		
Mapping with Faculty Qualification & Expertise (Experience of teaching in UG Engg.)	• Amrita Bhaumik (3 years exp in teaching Business English, TRW, GD etc.) • Ms. J. Roy (9 years exp in teaching PM, Values & Ethics etc.)		
Designation as a Compulsory or Elective course (Module)	Compulsory		
Pre-requisites Courses	Basic knowledge of Business Communication		
Contact Hours, Credits and Type of course (theory, tutorial, seminar, project, etc.), Class/Laboratory/Tutorial schedule, Duration	L-T-P : 0-0-3 Credit – 2.0 Practical 3 hours Laboratory One Semester		
Course Outcomes	Upon successful completion of this course, students should be able to: 1. Build up the proper soft skills for Group Discussion 2. Develop Vocabulary for fluent conversation 3. Update in recent technical and non-technical happenings		
Topics covered based on syllabus of affiliating University WBUT	**Day**	**Duration**	**Topics**
	Week 1	3 Lab	To learn about the general idea of Group Discussion
	Week 2	3 Lab	To learn about building personality traits through GD
	Week 3	3 Lab	To learn about various GD types
	Week 4	3 Lab	To learn about common mistakes in GD
	Week 5	3 Lab	To learn about performing as a team member through GD
	Week 6-7	3 Lab	GD on known/given topic and group of own choice
	Week 8-9	3 Lab	GD on known/given topic and group of Faculty's choice
	Week 10-11	3 Lab	GD on unknown/extempore topic and group of own choice
	Week 12-13	3 Lab	GD on unknown/extempore topic and group of Faculty's choice

Additional Topics, Activities and Assignments	• Library assignments to get familiar with and practice various GD topics from previous placements drives and entrance examinations for higher studies (CAT, MAT etc.) • Newspaper Samples / URLs supplied depicting recent trends • Role of individuals and team effort in the given group work
Hints for Learning-Teaching Approach (Course Delivery)	• Practice sessions on different GD topics • Previous year's GD topics of different placement drives practiced • Outside class interaction with individual students having doubts
Course Assessment Policy	Assessment will be done in following two methods: 1. Direct Assessment – (a) Continuous Assessment throughout the semester, (b) Terminal Test at the end of the semester 2. Indirect Assessment – Opinion Survey Grade will be awarded by University based on marks scored out of 100, the break-up of which is as follows: • Attendance + lab activities + report (Cont. Assmt. by Teacher): 40% • One Term-end Exam incl. viva-voce, GD and report submission (Assmt. by Univ. Expert): 60% Points will be awarded by the Department upon assessing attainment of POs related to the course. Scores (1-4) assessed, using each different assessment tool, have weighted components against correlated POs (weights according to strong, medium or weak correlation). % attainment of each course-related PO is found from the % of weighted average score w.r.t maximum avg score (4).
Hints for Course Assessment instruments & processes (both continuous and semester-end assessment)	In addition to direct assessment tools as per University norms, following direct and indirect assessment tools are used to measure attainments of POs related to the course outcome. • Library Assignment • Program and Dept. Evaluation Survey • Faculty & Staff Satisfaction Survey • Employer Survey The correlation mapping of assessment tools and POs related to the course are depicted in the Table of Assessment Tools. The grading criteria against each assessment tool to ascertain the scores (1-4) is depicted in the Assessment Rubrics Table.
Text Books and/or Reference Material	• **Text Books:** 1. H. M. Prasad – "How to Prepare for GD and Interview?" – McGraw Hill Education (India) Private Limited 2. P. N. Joshi – "Group Discussion on Current Topics" – Upkar's

Mapping of Course Outcome with Program Outcome

S. No.	Course Code	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	Group Discussion (HU-781)	1. Build up the proper soft skills for Group Discussion	-	-	-	-	-	-	-	S	S	S	-	M
		2. Develop Vocabulary for fluent conversation	-	-	-	-	-	-	-	M	-	S	-	M
		3. Update in recent technical and non-technical happenings	-	-	-	-	-	-	-	-	W	-	-	S

Selection of Assessment Components and Tools

HU – 781 (Group Discussion)							Score (1 – 4)	Weighted Evaluation of POs (W_S – 0.5 | | W_M = 0.3 | | W_W = 0.2)			
Assessment Tools			PO8	PO9	PO10	PO12		PO8	PO9	PO10	PO12
Component	Tool #	Method/Element									
Class Performance	1.1.9	Attendance	-	*S*	*S*	-		-	0.5 × Score	0.5 × Score	-
	1.1.10	Laboratory Practice/Assignments (incl. GD practice, Library Assignment etc.)	-	*S*	*M*	-		-	0.5 × Score	0.3 × Score	-
Terminal Test	1.2.2	Laboratory Exams (practical performance on allotted work, viva etc.)	-	-	-	-		-	-	-	-
Indirect Method	2.2.1	Employer Survey	*S*	*S*	*S*	S		0.5 × Score	0.5 × Score	0.5 × Score	0.5 × Score
	2.2.4	Program & Dept. Evaluation Survey	-	-	*S*	-		-	-	0.5 × Score	-
	2.2.5	Faculty & Staff Satisfaction Survey	*S*	-	*S*	M		0.5 × Score	-	0.5 × Score	0.3 × Score
						Weighted Score for each PO		**Total / 1.0**	**Total / 1.5**	**Total / 2.3**	**Total/ 0.8**
						%PO attained		**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**

Assessment Rubrics

HU – 781 (Group Discussion)					
Assessment Tools		**Grading Criteria**			
Method/Element	**Tool#**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Attendance	1.1.9	≤50%	>50% - 60%	>60% - 80%	>80%
Laboratory Practice/Assignments	1.1.10	Irregular , poor approach <40%	Regular but often searches help from instructor >40% - <60%	Regular and does activities and assignments by own >60% - <80%	Regular and self sufficient; activities and assignments are neat >80%
Laboratory Examination	1.2.2	<40%	>40% - <60%	>60% - <80%	>80%
Employer Survey	2.2.1	Lack managerial skill and attitude, unaware of new technology	Scope for improvement of managerial skill and attitude, lacks technical updates and understanding	Good managerial skill and attitude, lacks leadership and technical depth	Excellent managerial skill and attitude, has leadership quality and technically updated
Prog. & Dept. evaluation survey	2.2.4	Poor understanding of any related questions	Try to response queries if initial hints are given	Also attempts to answer conceptual questions	Can manage any types of questions at any difficulty level with utmost confidence
Faculty & Staff Satisfaction Survey	2.2.5	Poor technical knowledge and English speaking & writing skill, careless approach in team, weak soft skill, reluctant learner	Strives to learn but conceptually weak, needs guidance, plays some role in team, slow learner, lacks in soft skill and confidence	Has basic technical knowledge, good report writing skill and soft skill Lacks in technical depth and leadership, good learner	Has solid knowledge, always updated and confident, has excellent report writing and soft skill and leadership quality, an advanced learner

Department of Information Technology
RCC Institute of Information Technology, Kolkata
Canal South Road, Kolkata - 700015

Course Structure – IT 791, Internet Technology Lab

	Course Curriculum		
Department, Program, Course Number, Title of Course and Year of Study	IT, B.Tech-IT, **IT791**, **Internet Technology Lab**, 4th Year		
Identification of Course Designers: names of faculty (writers & editors/moderator) with designations & qualifications	• Writer: Dr. D. Majumdar, PhD, Assoc. Prof., Dept of IT • Moderator: Dr. S Bhattacharyya, PhD, Assoc. Prof., Dept of IT		
Mapping with Faculty Qualification & Expertise (Experience of teaching in UG Engg.)	• Dr. D Majumdar (12 years exp in teaching Automata, C++, Web Tech) • Dr. S Bhattacharyya (13 years exp in teaching Programming, Multimedia, etc.)		
Designation as a Compulsory or Elective course (Module)	Professional Core		
Pre-requisites Courses	Basic Programming and Computer Networks		
Contact Hours, Credits and Type of course (theory, tutorial, seminar, project, etc.), Class/Laboratory/Tutorial schedule, Duration	L-T-P : 0-0-3 Credit – 2.0 Practical 3 hours Laboratory One Semester		
Course Outcomes	Upon successful completion of this course, students should be able to: 1. Practice the usage of commonly used tags, methods and objects in HTML, CGI, PERL and Java 2. Develop simple client-side scripts using Javascript and applets 3. Create simple client-server applications using Java RMI, sockets and servlets 4. Develop simple website consisting of webpages written in HTML and Javascript 5. Analyse and develop solution to simple web programming problems applying the technologies like HTML, CGI, PERL and Java		
Topics covered based on syllabus of affiliating University WBUT	**Day**	**Duration**	**Topics**
	Week 1	3 P	• Write a Program to Illustrate body and pre tags • Write a Program to illustrate text Font tag. • Write a Program to illustrate comment,h1, h6, and div tag
	Week 2	3 P	• Write a Program to illustrate text formatting tags • Write a Program to illustrate Order List tag • Write a Program to illustrate Unorder List tag
	Week 3	3 P	• Write a Program to illustrate Nested and Definition tag • Write a Program to illustrate Img tag

	Week 4	3 P	• Write a Program to illustrate Hyper Link tag (Anchor tag) • Write a Program to illustrate Table tag
	Week 5	3 P	• Write a Program to illustrate Frame tag • Write a Program to illustrate Form tag
	Week 6	3 P	• Write a Program to illustrate span tag • Write a Program to illustrate CSS (cascading style sheet) • Write a Program to illustrate Embedded Multimedia
	Week 7	3 P	• Write HTML/JavaScript code for the page having three text boxes and a submit button. The three text boxes are email id, age and name. The email id text box has to contain @ symbol, age should be greater than 1 and less than or equal to 100 and name should not exceed 10 characters. If the email id doesnot contain @ symbol an alert message is fired. Similarly for age and name the corresponfing alert message is fired. • Write HTML/JavaScript code for the page showing currency conversion. The user enters the amount in rupees in the text box and selects a patrticular radio button for the currency conversion. On checking it must display the amount in the corresponding currency.
	Week 8	3 P	• Write HTML /JavaScript code for the page showing age calculation .The user enter his/her date of birth in the text box and click submit for the age calculation. • Write HTML/JavaScript code for the page showing EMI Calculation of House Lone. HTML form have three text box. The text box are Loan Amount, Interest Rate, Loan Tenure(in months) • Write HTML/Javascript code for the page showing a select box and a text box.The select box contains a list of names. When the user selects a name from the select box the corresponding phone number appears in the phone number input box.
	Week 9	3 P	• Write a HTML / Javascript code to display the current date at the click of a button using the Date() function in Javascript. • Write a HTML / Javascript code to display the line “This is RCCIIT”. The text must turn bold when the mouse pointer is taken over the text and return to normal text when the mouse pointer is moved away. • Write a HTML / Javascript code to validate a text field when a button is clicked. An alert should appear in case the value in the text field is a non-numeric value.

	Week 10	3 P	• Write a HTML / Javascript code to create two text fields and a button. One text field should take a number as input and another should take a name. At the click of a button, the name should be displayed the number of times as the number in the text box in the same webpage. • Write a HTML / Javascript code to display a line of text "How are you?" at the click of a button. At the click of the same button, the text should change to "I am fine." The text must toggle every time the button is clicked. • Write a HTML / Javascript code to create two text fields and a button. The text fields must take two numbers as input. At the click of the button, one of the following appropriate messages must be displayed:- "The 1st number is greater", "The 2nd number is greater" or "The numbers are equal".
	Week 11	3 P	• Write a HTML / Javascript code to validate an email field. • Write a HTML / Javascript code to take a number as input in a text field. At the click of a button, the multiplication table for the input number must be displayed on the page. • Write a HTML / Javascript code to print a message with the current day of the week at the click of a button. Use the getDay() function. Example:- "Today is Wednesday". • Writ e a HTML / Javascript code to print the number of letters in an input text. Example:- "This is Kolkata". Result:-15. • Create online CV with the following features: hyperlink, navigation buttons, tables and forms. Create the Home page of our college website. • Create a page to check the user id & password. Create a web page for West Bengal tourism, which will take the necessary input queries and show results from its database.
	Week 12	3 P	• Write a JavaScript code to check whether any field in a form has remained empty. • Write a servlet/JSP program to display the current date. • Design a home-page of your college alumni website using HTML. • Create a web page as you wish and the html elements of the page will be styled by CSS.
	Week 13	3 P	• Create Labels (One, Two & Three), add Buttons (Yes, No, Undecided) when user click any button show message regarding user click, add Checkboxes(Windows 98/XP, Windows NT/2000) when user chose any checkbox show message regarding user choice & add text boxes (name, password) and text on these textboxes should be displayed on Panel. • Create an applet program for Menu demonstration. Menu bar should contain File, Edit, View and its submenus.
	Week 14	3 P	• Write a Applet program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the Plus minus, multiplication, division operations. Add a text field to display the result.
Additional Topics	• Design of Static Page Website and uploading to free hoister sites. • Design of Animated Website and uploading to free hoister sites.		

Activities of Students and Assignments	• Do weekly laboratory experiments using HTML, Java Applets, Javascript and JSP. • Prepare and submit Lab Report • Complete Micro Project and submit Report
Hints for Learning-Teaching Approach (Course Delivery)	• Marker Board Instruction • Program/Software demonstration through projector • Interactive hands on operational guidance • Outside the class interaction with individual students having problems
Course Assessment Policy	Assessment will be done in following two methods: 1. Direct Assessment – (a) Continuous Assessment throughout the semester, (b) Terminal Test at the end of the semester 2. Indirect Assessment – Opinion Survey Grade will be awarded by University based on marks scored out of 100, the break-up of which is as follows: • Attendance + weekly lab experiments + report (Cont. Assmt. by Teacher): 40% (5+20+15) • One 3-hours Term-end Lab Exam incl. experiment, viva-voce and report (Assmt. by Univ. Expert): 60% (20+20+20) Points will be awarded by the Department upon assessing attainment of POs related to the course. Scores (1-4) assessed, using each different assessment tool, have weighted components against correlated POs (weights according to strong, medium or weak correlation). % attainment of each course-related PO is found from the % of weighted average score w.r.t maximum avg score (4).
Hints for Course Assessment instruments & processes (both continuous and semester-end assessment)	In addition to direct assessment tools as per University norms, following direct and indirect assessment tools are used to measure attainments of POs related to the course outcome. • Additional Lab Assignments • Micro Project • Employer Survey • Student Semester Exit Survey • Faculty & Staff Satisfaction Survey The correlation mapping of assessment tools and POs related to the course are depicted in the Table of Assessment Tools. The grading criteria against each assessment tool to ascertain the scores (1-4) is depicted in the Assessment Rubrics Table.
Text Books and/or Reference Material	• **Text Books:** 1. Web Technology: A Developer's Perspective, N.P. Gopalan and J. Akilandeswari, PHI Learning, Delhi, 2013. (Chapters 1-5, 7, 8, 9). 2. 2. Internetworking Technologies, An Engineering Perspective, Rahul Banerjee, PHI Learning, Delhi, 2011. (Chapters 5, 6, 12)

Mapping of Course Outcome with Program Outcome

Course Code	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Internet Technology Lab IT-791	1. Practice the usage of commonly used tags, methods and objects in HTML, CGI, PERL and Java	S				M							
	2. Develop simple client-side scripts using Javascript and applets	M		S		M							
	3. Create simple client-server applications using Java RMI, sockets and servlets			S		S							
	4. Develop simple website consisting of webpages written in HTML and Javascript			S		S							
	5. Analyse and develop solution to simple web programming problems applying the technologies like HTML, CGI, PERL and Java	M	M	S		S							

Selection of Assessment Components and Tools

IT-791 (Internet Technology Lab)							Score (1 – 4)	Weighted Evaluation of POs (W_S – 0.5 || W_M = 0.3 || W_W = 0.2)			
Assessment Tools			**PO 1**	**PO 2**	**PO 3**	**PO 5**					
Component	**Tool #**	**Method/Element**						**PO 1**	**PO 2**	**PO 3**	**PO 5**
Class Performance	1.1.9	Attendance	*M*	-	-	-		0.3 × Score	-	-	-
	1.1.10	Laboratory Experiments/Assignments (incl. conducting physical tests using tools and preparing lab reports)	*S*	*S*	*M*	*S*		0.5 × Score	0.5 × Score	0.3 × Score	0.3 × Score
Micro Project	1.1.11	Research and gather information	*S*	-	-	-		0.5 × Score	-	-	-
		Analysis of Problem, Requirement Analysis	*M*	*S*	*M*	-		0.3 × Score	0.5 × Score	0.3 × Score	-
		Planning & Designing	*M*	*S*	*S*	-		0.3 × Score	0.5 × Score	0.5 × Score	-
		Application of Subject Knowledge	*S*	-	-	*M*		0.5 × Score	-	-	0.3 × Score
		Application of Related other Concept and Techniques - Integrated Approach	*S*	*M*	*M*	*M*		0.5 × Score	0.3 × Score	0.3 × Score	0.3 × Score
		Developing Solution/System using IT skill	*S*	-	*S*	*S*		0.5 × Score	-	0.5 × Score	0.5 × Score
Terminal Test	1.2.2	Laboratory Exam (to conduct certain experiments, tool based assignments and report the procedure, results etc. followed by Viva Voce)	*S*	*S*	*M*	-		0.5 × Score	0.5 × Score	0.3 × Score	-
Indirect Method	2.2.1	Employer Survey	*M*	*S*	*S*	*S*		0.3 × Score	0.5 × Score	0.5 × Score	0.5 × Score
	2.2.2	Student Semester Exit Survey	*S*	-	*S*	*M*		0.5 × Score	-	0.5 × Score	0.3 × Score
	2.2.5	Faculty & Staff Satisfaction Survey	*S*	*S*	*M*	*M*		0.5 × Score	0.5 × Score	0.3 × Score	0.3 × Score
						Weighted Score (WS)		**Total / 5.2**	**Total / 3.3**	**Total / 3.5**	**Total / 2.5**
						% of PO attained		**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**

Assessment Rubrics

IT-791 (Internet Technology Lab)						
Assessment Tools			**Grading Criteria**			
Method/Element		**Tool#**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Attendance		1.1.9	≤50%	>50% - 60%	>60% - 80%	>80%
Lab. Experiments & Assignment		1.1.10	Irregular	Regular but often searches help from instructor	Regular and does experiments and assignments by its own	Regular and self sufficient; results are accurate and reports are neat
Laboratory Exam		1.2.2	<40%	>40% - <60%	>60% - <80%	>80%
Employer Survey		2.2.1	Can't answer anything	Try to answer basic questions	Good in both theory and programming, however weak at skill related question	Promptly responses to any question, programming approach is efficient and confidently manages any program
Student semester exit survey		2.2.2	Can't answer adequately on overall course	Know the basics of every module but less confident to write program for new problem	Can identify and confident to apply techniques	Efficient in selection of approach, can reason out how to do and what to do
Faculty & Staff Satisfaction Survey		2.2.5	Can't solve many of the programming assignments	Can write previously seen programs but application to new program is poor	Can analysis a given problem very well but adopts complex strategy for programming	Efficient programming approach towards any problem
Micro Project	Research and gather information	1.1.11	Does not collect any information on the topic	Collects very limited info; some related to the topic	Collects some basic info; most refer to the topic	Collects a great deal of relevant information; all refer to the topic
	Analysis of Problem, Requirement Analysis		Asks every other person to explain the problem without any thinking	Understands the problem, cannot do requirement analysis correctly – requires guidance	Understands the problem and requirement; good attempt but incomplete documentation	Pinpoints the salient requirements, conceives additional features; prepares standard documentation
	Planning & Designing		Copies plan/design from peers	Cannot decide a plan – discusses with everybody to create a plan and design	Can plan and make a workable design by own	Plans the solution effectively with innovative ideas and effective design
	Application of Subject Knowledge		Poor subject knowledge; requires support of others; can't even use templates	Lack of knowledge forces copy-paste with not much understanding	Applies subject knowledge partly	Effectively applies subject knowledge
	Application of Related other Concept and Techniques - Integrated Approach		No real application of any engg. techniques; waits for others to do his part	Conceptually weak, aware of some techniques but cannot integrate; requires guidance	Theoretically strong; encouraging approach without much help –lacks optimization	Makes integrated approach and effective use of techniques /concept; guides others
	Developing a Solution/System		Poor IT skill - cannot implement	Can implement partly	Mostly implements but complexity higher	Implements fully with all requirements satisfied – effective and less complex soln

Department of Information Technology
RCC Institute of Information Technology, Kolkata
Canal South Road, Kolkata - 700015

Course Structure - IT792, Multimedia Lab

Format	Mapping
Department, Program, Course Number, Title of Course and Year of Study	IT, B.Tech-IT, **IT792**, **Multimedia Lab**, 4th Year
Identification of Course Designers: names of faculty (writers & editors/moderator) with designations & qualifications	• Writer: Dr. S Bhattacharyya, PhD, Assoc. Prof., Dept of IT • Moderator: Dr. Pramatha Nath Basu, PhD, Prof., Dept of IT
Mapping with Faculty Qualification & Expertise (Experience of teaching in UG Engg.)	• Dr. S Bhattacharyya (13 years exp in teaching Programming, Multimedia, etc.) • Dr. Pramathanath Basu (41 years in teaching Educational Technology, Multimedia, etc.)
Designation as a Compulsory or Elective course (Module)	Compulsory
Pre-requisites Courses	Engineering level Fundamentals of Computers and Communication, DBMS
Contact Hours, Credits and Type of course (theory, tutorial, seminar, project, etc.), Class/Laboratory/Tutorial schedule, Duration	L-T-P : 0-0-3 Credit – 2.0 Practical 3 hours Laboratory One Semester
Course Outcomes	Upon successful completion of this course, students should be able to: 1. Develop indigenous multimedia applications 2. Exhibit creativity and innovation while designing multimedia applications using Flash and Photoshop

Topics covered based on syllabus of affiliating University WBUT

Day	Duration	Topics
Week 1	3 Lab	Assignment on Creation of Web Page using HTML (basic tags, table, link to other web page).
Week 2	3 Lab	Assignment on Creation of Form design using HTML.
Week 3	3 Lab	Assignment on using different graphical tools in Adobe Photoshop to draw a picture on a canvas.
Week 4	3 Lab	Assignment on using the Lasso Selection Tool (L) and/or Magic Wand Tool (W) to select a part of an image and paste it to create a new image.
Week 5	3 Lab	Assignment on using the Clone Stamp Tool (S) to create a clone of a given image.
Week 6	3 Lab	Assignment on using lighting and other effects available in Adobe Photoshop to add effects to a given image.
Week 7	3 Lab	Assignment on designing a Magazine Front Page (Sports or Nature Magazine) using Adobe Photoshop.
Week 8	3 Lab	Assignment on using Macromedia Flash to give motion to an object.
Week 9	3 Lab	Assignment on using Macromedia Flash to show the bouncing

<table>
<tr><th>Format</th><th colspan="3">Mapping</th></tr>
<tr><td></td><td></td><td></td><td>effect of a given object.</td></tr>
<tr><td></td><td>Week 10</td><td>3 Lab</td><td>Assignment on using Macromedia Flash to change the shape of a given image.</td></tr>
<tr><td>Additional Topics, Activities and Assignments</td><td colspan="3">• Design a webpage
• Assignment using Photoshop Clone Stamp and Pattern Stamp Tool
• Animation using Flash
• Micro Project in group
• Additional assignment to practice beyond the laboratory hours</td></tr>
<tr><td>Hints for Learning-Teaching Approach (Course Delivery)</td><td colspan="3">• Program/Software demonstration through projector
• Demonstration of different graphic operation tools
• Lab Assignments on different modules as per syllabus
• Interactive hands on operational guidance
• Outside the class interaction with individual students having problems</td></tr>
<tr><td>Course Assessment Policy</td><td colspan="3">Assessment will be done in following two methods:
1. Direct Assessment – (a) Continuous Assessment throughout the semester, (b) Terminal Test at the end of the semester
2. Indirect Assessment – Opinion Survey
Grade will be awarded by University based on marks scored out of 100, the break-up of which is as follows:
• Attendance + weekly lab experiments + report quizzes/assignment + (Cont. Assmt. by Teacher): 40%
• One 3-hours Term-end Lab Exam incl. experiment, viva-voce and report (Assmt. by Univ. Expert): 60%
Points will be awarded by the Department upon assessing attainment of POs related to the course. Scores (1-4) assessed, using each different assessment tool, have weighted components against correlated POs (weights according to strong, medium or weak correlation). % attainment of each course-related PO is found from the % of weighted average score w.r.t maximum score (4)</td></tr>
<tr><td>Hints for Course Assessment instruments & processes (both continuous and semester-end assessment)</td><td colspan="3">Continuous Assessment (40%)
• Attendance: 5%
• Performance/ Laboratory practice and problem solving: 15%
• Lab Report: 15%
• Interaction & Homework, Quizzes and Assignments: 5%

Terminal Assessment (60%)
• Final Exam (Practical test)
- Experiment report: 20%,
- Experiment performance: 20%,
- Comprehensive viva voce on the allotted work: 20%

In addition to direct assessment tools as per University norms, following direct and indirect assessment tools are used to measure attainments of POs related to the course outcome.
• Micro Project
• Employer Survey
• Student Semester Exit Survey
• Program & Dept. Evaluation Survey</td></tr>
<tr><td>Text Books and/or Reference Material</td><td colspan="3">• Text Books:
1. Adobe, Adobe Photoshop 6.0: Classroom in a book Pearson Ed.
2. Macromedia Flash5 fast and easy Web Development, Design, PHI.
3. Castro, HTML4 for the World Wide Web, Pearson Ed.

• Reference Books:
1. Lozano, Multimedia- Sound & Video , PHI</td></tr>
</table>

Mapping of Course Outcome with Program Outcome

S. No.	Course Code	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	Multimedia Lab (IT792) - *Practical*	1. Develop indigenous multimedia applications		S			M							
		2. Exhibit creativity and innovation while designing multimedia applications using Flash and Photoshop					S							

Selection of Assessment Components

IT – 792 (Multimedia Lab)					Score (1 – 4)	Weighted Evaluation of POs (W_S – 0.5 || W_M = 0.3 || W_W = 0.2)	
Assessment Tools			PO 2	PO 5			
Component	Tool #	Method/Element				PO 2	PO 5
Class Performance	1.1.9	Attendance	*S*	-		0.5 × Score	-
	1.1.10	Laboratory Experiments/Assignments (incl. conducting physical tests using tools and preparing lab reports)	*M*	-		0.3 × Score	-
Micro Project	1.1.11	Micro Project (in labs) (to conduct experiments, integrate result, analyse result and report)	*S*	-		0.5 × Score	-
Terminal Test	1.2.2	Laboratory Exams (to conduct certain experiments, tool based assignments and report the procedure, results etc. followed by Viva Voce)	*M*	*M*		0.3 × Score	0.3 × Score
Indirect Method	2.2.1	Employer Survey	*M*	*S*		0.3 × Score	0.5 × Score
	2.2.2	Student Semester Exit Survey	*S*	*S*		0.5 × Score	0.5 × Score
	2.2.4	Program & Dept. Evaluation Survey	*S*	*M*		0.5 × Score	0.3 × Score
					Weighted Score (WS)	**Total / 2.9**	**Total / 1.6**
					% PO attained	**WS/2 * 100**	**WS/2 * 100**

Assessment Rubrics

IT 792 (Multimedia Lab)					
Assessment Tools		**Grading Criteria**			
Method/Element	**Tool #**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Attendance	1.1.9	<40%	>40% - <60%	>60% - <80%	>80%
Lab. Experiments & Assignment	1.1.10	Irregular	Regular but often search helps from instructor	Regular and solve all problems of its own	Regularly solves all problems and in addition to that is capable to generate new ideas
Micro Project (in Labs)	1.1.11	No Performance	Can design basic modules but poor in integration	Can integrate and execute the project but organization of code is very poor and hard to reuse	Develops the project with structured coding and proper comments. Reusability is high and proper documentation is done
Laboratory Exams	1.2.2	<40%	>40% - <60%	>60% - <80%	>80%
Employer Survey	2.2.1	Can't answer anything	Try to answer basic questions	Good in both theory and programming, however weak skilled question	Promptly responses to any question, programming approach is efficient and confidently manages any program
Student Semester Exit Survey	2.2.2	Can't answer adequately on overall course	Know the basics of every module but less confident to write program for new problem	Can identify and confident to apply techniques	Efficient in selection of approach, can reason out how to do and what to do
Prog. & Dept. Evaluation Survey	2.2.4	Can't solve many of the programming assignments	Can write previously seen programs but application to new program is poor	Can analysis a given problem very well but adopts complex strategy for programming	Efficient programming approach towards any problem

Mapping of Course Outcome with Program Outcome

S. No	Course Code	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	Industrial Training (IT 794)	1. Map theoretical knowledge into practical implementation.	S	M	S	M	S							
		2. Write and understand documentation of a standard project work.										S	M	
		3. Build up team spirit and leadership qualities.									S	S		
		4. Get a brief exposure of doing a deadline specific software project before joining to industry / higher studies.						S		M			S	

Selection of Assessment Components and Tools

IT – 794 (Industrial Training)														Score (1 – 4)	Weighted Evaluation of POs (W_S – 0.5 || W_M = 0.3 || W_W = 0.2)									
Assessment Tools			PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 8	PO 9	PO 10	PO 11		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 8	PO 9	PO 10	PO 11
Comp-onent	#	Method/Element																					
- Major Project (Cont. Assmt..)	1.1.12	Research & Literature Survey	S	-	-	M	-	-	-	-	-	M		0.5 × Score	-	-	0.3 × Score	-	-	-	-	-	0.3 × Score
		Study, Investigation & Requirement Analysis	S	S	-	S	-	M	-	-	-	M		0.5 × Score	0.5 × Score	-	0.5 × Score	-	0.3 × Score	-	-	-	0.3 × Score
		Planning & Designing, Creative Ability	-	M	S	-	-	-	-	-	-	M		-	0.3 × Score	0.5 × Score	-	-	-	-	-	-	0.3 × Score
		Developing Solution/System	-	-	S	-	M	M	-	-	-	M		-	-	0.5 × Score	-	0.3 × Score	0.3 × Score	-	-	-	0.3 × Score
		Application of latest Technology /Concept	S	-	-	-	S	-	-	-	-	M		0.5 × Score	-	-	-	0.5 × Score	-	-	-	-	0.3 × Score
		Testing & Debugging	-	S	S	M	S	-	-	-	-	M		-	0.5 × Score	0.5 × Score	0.3 × Score	0.5 × Score	-	-	-	-	0.3 × Score
		Documentation & Report	-	-	-	-	-	-	-	-	S	S		-	-	-	-	-	-	-	-	0.5 × Score	0.5 × Score
		Leadership & Teamwork	-	-	-	-	-	-	M	S	-	S		-	-	-	-	-	-	0.3 × Score	0.5 × Score	-	0.5 × Score
		Regularity	-	-	-	-	-	-	S	-	-	-		-	-	-	-	-	-	0.5 × Score	-	-	-
Terminal Test : Project Presentation	1.2.3	Quality of Technical Content, Planning & Adherence to Context, Demo of Prototype	M		S	-	M	-	-	W	S	S		0.3 × Score	-	0.5 × Score	-	0.3 × Score	-	-	0.2 × Score	0.5 × Score	0.5 × Score
		Depth of Understanding & Preparation	S	M	-	-	-	-	-	M	-	-		0.5 × Score	0.3 × Score	-	-	-	-	-	0.3 × Score	-	-
		Body Language, Confidence & Communication Skill	-	-	-	-	-	-	-	-	S	W		-	-	-	-	-	-	-	-	0.5 × Score	0.2 × Score
		Q/A, Interaction, Manners	S	M	-	-	-	-	W	W	S	-		0.5 × Score	0.3 × Score	-	-	-	-	0.2 × Score	0.2 × Score	0.5 × Score	-
		Assessment by University Examiner	S	M	S	S	S	S	M	M	S	-		0.5 × Score	0.3 × Score	0.5 × Score	0.5 × Score	0.5 × Score	0.5 × Score	0.3 × Score	0.3 × Score	0.5 × Score	-
Indirect Method	2.2.5	Faculty and Staff Satisfaction Survey	S	-	M	-	-	-	-	M	S	-		0.5 × Score	-	0.3 × Score	-	-	-	-	0.3 × Score	0.5 × Score	-
	2.2.1	Employer Survey	M	-	S	-	S	-	W	M	S	S		0.3 × Score	-	0.5 × Score	-	0.5 × Score	-	0.2 × Score	0.3 × Score	0.5 × Score	0.5 × Score
													Weighted Score (WS)	**Total/ 4.1**	**Total/ 2.2**	**Total/ 3.3**	**Total/ 1.6**	**Total / 2.6**	**Total/ 1.1**	**Total / 1.5**	**Total/ 2.1**	**Total / 3.5**	**Total/ 4.0**
													%PO attained	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**

Assessment Rubrics

IT – 794 (Industrial Training)						
Assessment Tools			**Grading Criteria**			
Method/Element		**Tool#**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Major Project (Cont. Assessment)	Research & Literature Survey	1.1.12	Does not collect any information on the topic	Collects very limited info; some related to the topic	Collects some basic info; most refer to the topic	Collects a great deal of relevant information; all refer to the topic
	Study, Investigation & Requirement Analysis		Asks every other person to explain the project without any thinking or study of similar system	Understands the problem, studies similar system but cannot contribute to requirement analysis – requires guidance	Understands the problem and does most of requirement analysis, prepares basic documentation (SRS)	Takes lead role in pinpointing the salient requirements, conceives additional features, fine tunes and standardizes documentation (SRS)
	Planning & Designing Schema/Algorithm, Creative Ability		No contribution in planning & designing	Attempts to contribute but requires guidance to plan and design effectively	Contributes in planning and makes a workable design	Plans the solution effectively with innovative ideas and effective design
	Developing a Solution/System/Prototype/GUI		Poor IT skill - cannot contribute in developing modules	Attempts to develop few modules (case specific)	Develops some generic modules with higher complexity in coding, attempted GUI	Develops the critical modules & GUI, optimizes modules developed by peers – ensures adherence to SRS and less complex coding
	Application of latest Technology /Concept		Poor IT skill, also reluctant to learn new technology/concept	Conceptually weak, aware of some techniques but cannot apply; requires guidance	Have good technical knowledge/concept - applies some, ready to learn new techniques	Makes integrated approach and effective use of new techniques /concept, learns quickly and guides others
	Testing & Debugging		Poor IT skill – cannot test and debug	Can contribute in testing but cannot debug	Contributes fairly – debugs/repairs most error cases	Designs test cases, can test and debug critical errors
	Documentation & Report		Poor contribution in documentation and report preparation	Helps in documenting different stages but lacks report writing skills, plays supportive role	Develops the basic structure of project report, checks documentation standard	Does major part of report writing, makes the report technically comprehensive and ensures adherence to standards
	Leadership & Teamwork		Does not perform any duties assigned to team role	Performs minimal duties, cares for other team members	Performs nearly all duties, helps other team members	Performs all duties, takes additional responsibilities, guides other members and leads the team
	Regularity		Irregular	Fairly regular	Quite regular	Very much regular

IT – 794 (Industrial Training)						
Assessment Tools			**Grading Criteria**			
Method/Element		**Tool#**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Terminal Test (Project Presentation)	Quality of Technical Content, Planning & Adherence to Context , Demo of Prototype	1.2.3	Least contribution in making the ppt and prototype, Poor quality, Minimal part played in giving the presentation and the demo	Some contribution in making the ppt and the prototype, Average quality, Fair part played in giving the presentation and the demo	Significant contribution in making the ppt and the prototype, Good quality, Active part played in giving the presentation and the demo	Maximum contribution in making the ppt and the prototype, Best quality, Leading part played in giving the presentation and the demo
	Depth of Understanding and Preparation		Poor understanding	Does not understand all modules	Understands working of all modules but lacks knowledge about reason and remedies of project limitation;	Clearly understands working of all modules, limitations and possible remedies; thorough preparation
	Body Language, Confidence & Communication Skill		Unimpressive reflecting lack of confidence, low voice, poor linguistic skills	Starting well but frequently faltering and losing confidence, medium voice , limited linguistic skills	Acceptable but does not make impact on the audience, good linguistic skill but often fails to communicate effectively, acceptable voice,	Attracts attention and makes the demo lively, applies the art of effective communication, strong voice, strong linguistic skill
	Q&A and interaction, Manners		Wrong response or explanation, ill-mannered	Sketchy explanation, skips complicated parts, needs support, lacking manners	Good explanation at some Qs, helps other members while answering, good manners	Clear explanation with examples, volunteers answering hard/critical Qs, well mannered
	Assessment by University Examiner		≤40%	>40% - 60%	>60% - 80%	>80%
Faculty and Staff Satisfaction Survey		2.2.5	Generally poor knowledge understanding & programming skill, careless approach in team, weak soft skill	Conceptually weak, needs guidance in programming, plays some role in team, lacks in soft skill	Has basic knowledge, good programming skill, report writing skill and soft skill. lacks in technical depth and leadership, hard worker	Has solid knowledge, can manage any type of questions at any difficulty level with utmost confidence, has excellent report writing and soft skill and leadership quality, good finisher
Employer Survey		2.2.1	Lack professional skill and attitude, got poor exposure in SDLC	Scope for improvement of professional skill and attitude, lacks exposure in all stages of SDLC	Good professional skill and attitude, good exposure in SDLC stages, lacks leadership and technical depth	Excellent professional skill and attitude, has leadership quality and technically sound, proficient in conducting all stages of SDLC

Mapping of Course Outcome with Program Outcome

S. No	Course Code	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	Project- I (IT 795)	1. Map theoretical knowledge into practical implementation.	S	M	S	M	S							
		2. Write and understand documentation of a standard project work.										S	M	
		3. Build up team spirit and leadership qualities.									S	S		
		4. Get a brief exposure of doing a deadline specific software project before joining to industry / higher studies.						S		M			S	

Selection of Assessment Components and Tools

IT – 795 (Project I)													Score (1 – 4)	Weighted Evaluation of POs (W_S – 0.5 || W_M = 0.3 || W_W = 0.2)								
Assessment Tools																						
Comp-onent	#	Method/Element	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 8	PO 9	PO 10	PO 11		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 8	PO 9	PO 10	PO 11
Major Project (Cont. Assmt..)	1.1.12	Research & Literature Survey	S	-	-	M	-	-	-	-	-	M		0.5 × Score	-	-	0.3 × Score	-	-	-	-	-	0.3 × Score
		Study, Investigation & Requirement Analysis	S	S	-	S	-	M	-	-	-	M		0.5 × Score	0.5 × Score	-	0.5 × Score	-	0.3 × Score	-	-	-	0.3 × Score
		Planning & Designing, Creative Ability	-	M	S	-	-	-	-	-	-	M		-	0.3 × Score	0.5 × Score	-	-	-	-	-	-	0.3 × Score
		Developing Solution/System	-	-	S	-	M	M	-	-	-	M		-	-	0.5 × Score	-	0.3 × Score	0.3 × Score	-	-	-	0.3 × Score
		Application of latest Technology /Concept	S	-	-	-	S	-	-	-	-	M		0.5 × Score	-	-	-	0.5 × Score	-	-	-	-	0.3 × Score
		Testing & Debugging	-	S	S	M	S	-	-	-	-	M		-	0.5 × Score	0.5 × Score	0.3 × Score	0.5 × Score	-	-	-	-	0.3 × Score
		Documentation & Report	-	-	-	-	-	-	-	-	S	S		-	-	-	-	-	-	-	-	0.5 × Score	0.5 × Score
		Leadership & Teamwork	-	-	-	-	-	-	M	S	-	S		-	-	-	-	-	-	0.3 × Score	0.5 × Score	-	0.5 × Score
		Regularity	-	-	-	-	-	-	S	-	-	-		-	-	-	-	-	-	0.5 × Score	-	-	-
Terminal Test : Project Presentation	1.2.3	Quality of Technical Content, Planning & Adherence to Context, Demo of Prototype	M	-	S	-	M	-	-	W	S	S		0.3 × Score	-	0.5 × Score	-	0.3 × Score	-	-	0.2 × Score	0.5 × Score	0.5 × Score
		Depth of Understanding & Preparation	S	M	-	-	-	-	-	M	-	-		0.5 × Score	0.3 × Score	-	-	-	-	-	0.3 × Score	-	-
		Body Language, Confidence & Communication Skill	-	-	-	-	-	-	-	-	S	W		-	-	-	-	-	-	-	-	0.5 × Score	0.2 × Score
		Q/A, Interaction, Manners	S	M	-	-	-	-	W	W	S	-		0.5 × Score	0.3 × Score	-	-	-	-	0.2 × Score	0.2 × Score	0.5 × Score	-
		Assessment by University Examiner	S	M	S	S	S	S	M	M	S	-		0.5 × Score	0.3 × Score	0.5 × Score	0.5 × Score	0.5 × Score	0.5 × Score	0.3 × Score	0.3 × Score	0.5 × Score	-
Indirect Methid	2.2.5	Faculty and Staff Satisfaction Survey	S	-	M	-	-	-	-	M	S	-		0.5 × Score	-	0.3 × Score	-	-	-	-	0.3 × Score	0.5 × Score	-
	2.2.1	Employer Survey	M	-	S	-	S	-	W	M	S	S		0.3 × Score	-	0.5 × Score	-	0.5 × Score	-	0.2 × Score	0.3 × Score	0.5 × Score	0.5 × Score
													Weighted Score (WS)	**Total/ 4.1**	**Total/ 2.2**	**Total/ 3.3**	**Total/ 1.6**	**Total / 2.6**	**Total/ 1.1**	**Total / 1.5**	**Total/ 2.1**	**Total / 3.5**	**Total/ 4.0**
													%PO attained	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**

Assessment Rubrics

IT – 795 (Project I)						
Assessment Tools			**Grading Criteria**			
Method/Element		**#**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Major Project (Cont. Assessment)	Research & Literature Survey	1.1.12	Does not collect any information on the topic	Collects very limited info; some related to the topic	Collects some basic info; most refer to the topic	Collects a great deal of relevant information; all refer to the topic
	Study, Investigation & Requirement Analysis		Asks every other person to explain the project without any thinking or study of similar system	Understands the problem, studies similar system but cannot contribute to requirement analysis – requires guidance	Understands the problem and does most of requirement analysis, prepares basic documentation (SRS)	Takes lead role in pinpointing the salient requirements, conceives additional features, fine tunes and standardizes documentation (SRS)
	Planning & Designing Schema/Algorithm, Creative Ability		No contribution in planning & designing	Attempts to contribute but requires guidance to plan and design effectively	Contributes in planning and makes a workable design	Plans the solution effectively with innovative ideas and effective design
	Developing a Solution/System/Prototype/GUI		Poor IT skill - cannot contribute in developing modules	Attempts to develop few modules (case specific)	Develops some generic modules with higher complexity in coding, attempted GUI	Develops the critical modules & GUI, optimizes modules developed by peers – ensures adherence to SRS and less complex coding
	Application of latest Technology /Concept		Poor IT skill, also reluctant to learn new technology/concept	Conceptually weak, aware of some techniques but cannot apply; requires guidance	Have good technical knowledge/concept - applies some, ready to learn new techniques	Makes integrated approach and effective use of new techniques /concept, learns quickly and guides others
	Testing & Debugging		Poor IT skill – cannot test and debug	Can contribute in testing but cannot debug	Contributes fairly – debugs/repairs most error cases	Designs test cases, can test and debug critical errors
	Documentation & Report		Poor contribution in documentation and report preparation	Helps in documenting different stages but lacks report writing skills, plays supportive role	Develops the basic structure of project report, checks documentation standard	Does major part of report writing, makes the report technically comprehensive and ensures adherence to standards
	Leadership & Teamwork		Does not perform any duties assigned to team role	Performs minimal duties, cares for other team members	Performs nearly all duties, helps other team members	Performs all duties, takes additional responsibilities, guides other members and leads the team
	Regularity		Irregular	Fairly regular	Quite regular	Very much regular

IT – 795 (Project I)						
Assessment Tools			**Grading Criteria**			
Method/Element		**#**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Terminal Test (Project Presentation)	Quality of Technical Content, Planning & Adherence to Context , Demo of Prototype	1.2.3	Least contribution in making the ppt and prototype, Poor quality, Minimal part played in giving the presentation and the demo	Some contribution in making the ppt and the prototype, Average quality, Fair part played in giving the presentation and the demo	Significant contribution in making the ppt and the prototype, Good quality, Active part played in giving the presentation and the demo	Maximum contribution in making the ppt and the prototype, Best quality, Leading part played in giving the presentation and the demo
	Depth of Understanding and Preparation		Poor understanding	Does not understand all modules	Understands working of all modules but lacks knowledge about reason and remedies of project limitation;	Clearly understands working of all modules, limitations and possible remedies; thorough preparation
	Body Language, Confidence & Communication Skill		Unimpressive reflecting lack of confidence, low voice, poor linguistic skills	Starting well but frequently faltering and losing confidence, medium voice , limited linguistic skills	Acceptable but does not make impact on the audience, good linguistic skill but often fails to communicate effectively, acceptable voice,	Attracts attention and makes the demo lively, applies the art of effective communication, strong voice, strong linguistic skill
	Q&A and interaction, Manners		Wrong response or explanation, ill-mannered	Sketchy explanation, skips complicated parts, needs support, lacking manners	Good explanation at some Qs, helps other members while answering, good manners	Clear explanation with examples, volunteers answering hard/critical Qs, well mannered
	Assessment by University Examiner		≤40%	>40% - 60%	>60% - 80%	>80%
Faculty and Staff Satisfaction Survey		2.2.5	Generally poor knowledge understanding & programming skill, careless approach in team, weak soft skill	Conceptually weak, needs guidance in programming, plays some role in team, lacks in soft skill	Has basic knowledge, good programming skill, report writing skill and soft skill. lacks in technical depth and leadership, hard worker	Has solid knowledge, can manage any type of questions at any difficulty level with utmost confidence, has excellent report writing and soft skill and leadership quality, good finisher
Employer Survey		2.2.1	Lack professional skill and attitude, got poor exposure in SDLC	Scope for improvement of professional skill and attitude, lacks exposure in all stages of SDLC	Good professional skill and attitude, good exposure in SDLC stages, lacks leadership and technical depth	Excellent professional skill and attitude, has leadership quality and technically sound, proficient in conducting all stages of SDLC

Department of Information Technology
RCC Institute of Information Technology, Kolkata
Canal South Road, Kolkata - 700015

Course Structure of HU801B, Project Management

Format	Course Mapping	
Department, Program, Course Number, Title of Course and Year of Study	IT, B.Tech-IT, **HU801B**, **Project Management**, 4th Year	
Identification of Course Designers: names of faculty (writers & editors/moderator) with designations & qualifications	• Writer: Abantika Choudhury, M.Tech., Asst. Prof., Dept of IT • Moderator: Dr. Dipankar Majumdar, PhD, Associate Professor	
Mapping with Faculty Qualification & Expertise (Experience of teaching in UG Engg.)	• Abantika Choudhury (9 years in teaching) • Dr. Dipankar Majumdar (11 years in teaching)	
Designation as a Compulsory or Elective course (Module)	Compulsory	
Pre-requisites Courses	Knowledge of software engineering.	
Contact Hours, Credits and Type of course (theory, tutorial, seminar, project, etc.), Class/Laboratory/Tutorial schedule, Duration	L-T-P : 2-0-0 Credit – 2.0 Theory 3 hours Lecture One Semester	
Course Outcomes	Upon successful completion of this course, students should be able to: 1. Identify the need and scope for a software project in any real-life scenario. 2. Map and implement the appropriate software development life cycle (SDLC) model in a real-life application 3. Analyse and design methodologies to calculate the cost and schedule for any software project	
Topics covered based on syllabus of affiliating University WBUT	Day-1	Concept and Characteristics of a Project, Importance of Project Management.
	Day-2	Financial Sources.
	Day-3	Implement all pair of shortest path for a graph
	Day 4	Implement travelling sales problem.
	Day-5	Feasibility Studies
	Day-6	Importance of Project Scheduling, Work Breakdown Structure.

	Day-7	Organization Breakdown Structure,
Topics covered based on syllabus of affiliating University WBUT	Day 8	Scheduling Techniques- Gantt Chart
	Day-9	LOB, Network Analysis – CPM/PERT
	Day-10	Optimum Project Duration
	Day-11	Resource Allocation and Leveling.
	Day-12	Project Life Cycle.
	Day-13	Capital & Operating Costs
	Day 14	Project Life Cycle Costing, Project Cost Reduction Methods
	Day 15	Management: Concept of Project Quality, ,
	Day 16	TQM in Projects
	Day 17	Project Audit
	Day 18	Software Project Charateristics and Mangement
	Day 19	Overview of types of Softwares for Projects, Major Features of Project Management Softwares like MS Project,
	Day 20	Criterion for Software Selection
Additional Topics (Class + Tutorial) Activities and Assignments	• Discussion on micro project.	
Activities of students and Assignments	• Take part in Classroom Demonstration (group activity) • Take part in Quiz • Prepare Home Assignments • Prepare Library Assignments	
Hints for Learning-Teaching Approach (Course Delivery)	• Regular Class Lectures (learner-centric) – ✓Involve students in discussion/expression of views ✓Ask students to explain on board ✓Ask questions to students on previously discussed /ongoing topic • Class room Demonstration (on selected topics) by students in groups • Home/Library Assignment and Notes/Study Material on topics not delivered in Class/Tutorial • Outside the class interaction with individual students having difficulty	
Course Assessment Policy	Assessment will be done in following two methods: 1. Direct Assessment – (a) Continuous Assessment throughout the semester, (b) Terminal Test at the end of the semester 2. Indirect Assessment – Opinion Survey Grade will be awarded by University based on marks scored out of 100, the break-up of which is as follows: • Attendance (Cont. Assmt. by Teacher): 5% • Average of Quiz + Assignments: (Cont. Assmt. by Teacher): 10% • Best of two 45 mins Class Tests (Cont. Assmt. by Teacher): 15% • One 3-hours Term-end Exam (Terminal Assmt. by Univ.): 70% Points will be awarded by the Department upon assessing attainment of POs related to the course. Scores (1-4) assessed, using each different assessment tool, have weighted components against correlated POs (weights according to strong, medium or weak correlation). % attainment of each course-related PO is then found from the % of weighted average score w.r.t maximum avg score (4).	
Hints for Course Assessment instruments & processes (both	In addition to direct assessment tools as per University norms, following direct and indirect assessment tools are used to measure attainments of	

continuous and semester-end assessment)	POs related to the course outcome. • 4 categories of questions in Class Tests • Library Assignment • Classroom Demonstration • Micro Project • Viva • Student Semester Exit Survey • Faculty & Staff Satisfaction Survey • Employer Survey The correlation mapping of assessment tools and POs related to the course are depicted in the Table of Assessment Tools. The grading criteria against each assessment tool to ascertain the scores (1-4) is depicted in the Assessment Rubrics Table.
Text Books and/or Reference Material	• **Text Books:** 1. Gopalkrishnan P. and Rama Mmoorthy: Text Book of Project Management, Macmillan 2. Nicholas John M.: Project Management for Business and Technology – Principles and Practice, Prentice Hall India, 2nd Edn. 3. Levy Ferdinand K., Wiest Jerome D.: A Management Guide to PERT/CPM with GERT/PDM/DCPM and other networks, Prentice Hall India, 2nd Edn. 4. Mantel Jr., Meredith J. R., Shafer S. M., Sutton M. M., Gopalan M. R.: Project Management: Core Text Book, Wiley India, 1st Indian Edn. 5. Maylor H.: Project Management, Pearson, 3rd Edn. 6. Nagarajan K.: Project Management, New Age International Publishers, 5th Edn. 7. Kelkar. S.A, Sotware Project Management: A concise Study, 2nd Ed., PHI

Mapping of Course Outcome with Program Outcome

S. No.	Course Code	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	Project Management (HU-801B) - ***Theory***	1. Identify the need and scope for a software project in any real-life scenario.	M					M						
		2. Map and implement the appropriate software development life cycle (SDLC) model in a real-life application.		M	S			M						
		3. Analyse and design methodologies to calculate the cost and schedule for any software project	M	M										

Selection of Assessment Components & Tools

HU – 801B (Project Management)							Score (1 – 4)	Weighted Evaluation of POs (W_S – 0.5 || W_M = 0.3 || W_W = 0.2)			
Assessment Tools			PO 1	PO 2	PO 3	PO 6		PO 1	PO 2	PO 3	PO 6
Component	Tool #	Method/Element									
Class Performance	1.1.1	Multiple Choice Questions or Quiz	*S*	-	-	-		0.5 × Score	-	-	-
	1.1.2	Short Answer type Questions (Class Test)	*S*	-	-	-		0.5 × Score	-	-	-
	1.1.3	Problem based Questions (Class Test)	*S*	*S*	-	*S*		0.5 × Score	0.5 × Score	-	0.5 × Score
	1.1.4	Design oriented Questions (Class Test)	*M*	*M*	*S*	-		0.3 × Score	0.3 × Score	0.5 × Score	-
	1.1.5	Open Ended Realistic Questions (Class Test)	*M*	*S*	-	-		0.3 × Score	0.5 × Score	-	-
	1.1.6	Library/ Home Assignment	*S*	-	-	*M*		0.5 × Score	-	-	0.3 × Score
	1.1.7	Viva	*S*	-	-	*W*		0.5 × Score	-	-	0.5 × Score
	1.1.9	Attendance	*M*	-	-	-		0.3 × Score	-	-	-
Class Demonstration	1.1.8	Quality of Technical Content, Planning & Adherence to Context	*M*	-	-	-		0.3 × Score	-	-	-
		Study & Understanding of the Topic	*S*	-	-	-		0.5 × Score	-	-	-
		Basic Knowledge in the related Science & Technology	*S*	-	-	-		0.5 × Score	-	-	-
		Effective Use of Context Specific Examples, Test Cases and References	*S*	-	-	-		0.5 × Score	-	-	-
		Q&A and interaction	*S*	-	-	-		0.5 × Score	-	-	-
Micro Project	1.1.11	Research and gather information	*S*	-	-	-		0.5 × Score	-	-	-
		Analysis of Problem, Requirement Analysis	*M*	*S*	*M*	-		0.3 × Score	0.5 × Score	0.3 × Score	-
		Planning & Designing	*S*	*S*	*S*	-		0.5 × Score	0.5 × Score	0.5 × Score	-
		Application of Subject Knowledge	*S*	-	-	-		0.5 × Score	-	-	-
		Application of Related other Concept and Techniques - Integrated Approach	*S*	*M*	*M*	*M*		0.5 × Score	0.3 × Score	0.3 × Score	0.3 × Score
		Developing Solution/System using IT skill	*S*	-	*S*	*S*		0.5 × Score	-	0.5 × Score	0.5 × Score
Terminal Test	1.2.1	Written Semester Exam	*S*	*S*	-	-		0.5 × Score	0.5 × Score	-	-
Indirect Method	2.2.2	Student Semester Exit Survey	*S*	*S*	*S*	*S*		0.5 × Score	0.5 × Score	0.5 × Score	0.5 × Score
	2.2.5	Faculty and Staff Satisfaction Survey	*M*	*M*	*M*	*S*		0.3 × Score	0.3 × Score	0.3 × Score	0.5 × Score
	2.2.1	Employer Survey	*M*	*M*	*S*	*S*		0.3 × Score	0.3 × Score	0.5 × Score	0.5 × Score
						Weighted Score (WS)		**Total / 10.1**	**Total / 4.2**	**Total / 3.4**	**Total / 3.6**
						% of PO attained		**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**

Assessment Rubrics

HU 801B (Project Management)					
Assessment Tools		**Grading Criteria**			
Method/Element	**Tool#**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Multiple Choice Questions or Quiz	1.1.1	≤40%	>40% - 60%	>60% - 80%	>80%
Short Answer type Questions (Class Test)	1.1.2	≤40%	>40% - 60%	>60% - 80%	>80%
Problem based Questions (Class Test)	1.1.3	≤40%	>40% - 60%	>60% - 80%	>80%
Design oriented Questions (Class Test)	1.1.4	≤40%	>40% - 60%	>60% - 80%	>80%
Open Ended Realistic Questions (Class Test)	1.1.5	≤40%	>40% - 60%	>60% - 80%	>80%
Assignment (Library/ Home)	1.1.6	Irregular, mostly copies from peers	Regular but often search help from instructor, Collects info - not always relevant	Regular and solves most problems by its own, Collects only basic relevant info	Regularly solves all problems, capable to generate new ideas, Collects great deal of relevant info
Viva	1.1.7	Poor subject knowledge; can't understand simple questions	Moderate subject knowledge, some good explanation; unable to answer harder questions	Good subject knowledge, mostly good explanation; attempts some harder questions	Sound subject knowledge, precise explanations; correctly answers most of the harder questions
Attendance	1.1.9	≤50%	>50% - 60%	>60% - 80%	>80%
Written Semester Exam	1.2.1	≤40%	>40% - 60%	>60% - 80%	>80%
Student Semester Exit Survey	2.2.2	Got poor marks in sem; no confidence on subject	Got fair marks in sem; unwilling to pursue further studies on subject	Got good marks in sem; confident that learnt something new and useful	Got excellent marks in sem, highly confident about the subject and willing to pursue projects or learn more on it
Faculty and Staff Satisfaction Survey	2.2.5	Poor understanding of any related questions	Tries to response queries if initial hints are given	Also attempts to answer conceptual questions	Can manage any types of questions at any difficulty level with utmost confidence
Employer Survey	2.2.1	Can't answer anything	Attempts to answer basic questions	Good in both theory and programming, however weak in skill -related question	Promptly responses to any question, programming approach is efficient and confidently manages any program

Classroom Demonstration	Quality of Technical Content, Planning & Adherence to Context	1.1.8	Sketchy and incoherent, mostly irrelevant and out of context	Moderate coverage of topic, sometimes out of context	Informative but not to the point always	Smart, comprehensive, very relevant and effective
	Study & Understanding of the Topic		Minimal or no use of examples/cases; hardly any reference used	Very few meaningful examples used, no reference used	Examples and test cases used but not explained properly; References used but not following norms	Optimal use of well-chosen examples to clearly explain the topic
	Basic Knowledge in the related Science & Technology		Wrong response or explanation, least awareness	sketchy explanation, skipping complicated parts	Good explanation at some places, lack of thorough study	Clear understanding, thorough preparation
	Effective Use of Context Specific Examples, Test Cases and References		Cannot connect and explain the scientific reason behind or related technology	Can connect but cannot explain properly relevant theory or technology	Explains but not convincing and clear; lacks good knowledge of related technology	Demonstrates sound knowledge of related theory and technology; appears aware of latest related developments
	Q&A and interaction		Hardly invites questions and monotonous delivery	Accepts limited questions and makes minimal interaction	Interacts only at the end of demonstration	Interactive demonstration involving the audience
Micro Project	Research and gather information	1.1.11	Does not collect any information on the topic	Collects very limited info; some related to the topic	Collects some basic info; most refer to the topic	Collects a great deal of relevant information; all refer to the topic
	Analysis of Problem, Requirement Analysis		Asks every other person to explain the problem without any thinking	Understands the problem, cannot do requirement analysis correctly – requires guidance	Understands the problem and requirement; good attempt but incomplete documentation	Pinpoints the salient requirements, conceives additional features; prepares standard documentation
	Planning & Designing		Copies plan/design from peers	Cannot decide a plan – discusses with everybody to create a plan and design	Can plan and make a workable design by own	Plans the solution effectively with innovative ideas and effective design
	Application of Subject Knowledge		Poor subject knowledge; requires support of others; can't even use templates	Lack of knowledge forces copy-paste with not much understanding	Applies subject knowledge partly	Effectively applies subject knowledge
	Application of Related other Concept and Techniques - Integrated Approach		No real application of any engg. techniques; waits for others to do his part	Conceptually weak, aware of some techniques but cannot integrate; requires guidance	Theoretically strong; encouraging approach without much help –lacks optimization	Makes integrated approach and effective use of techniques /concept; guides others
	Developing a Solution/System		Poor IT skill - cannot implement	Can implement partly	Mostly implements but complexity higher	Implements fully with all requirements satisfied – effective and less complex soln

Department of Information Technology
RCC Institute of Information Technology, Kolkata
Canal South Road, Kolkata - 700015

Course Structure of IT801D, Cryptograph & Network Security

Format	Course Mapping
Department, Program, Course Number, Title of Course and Year of Study	IT, B.Tech-IT, **IT801D**, **Cryptograph & Network Security**, 4th Year
Identification of Course Designers: names of faculty (writers & editors/moderator) with designations & qualifications	• Writer: Mr. Sudarsan Biswas, M.E., Asst. Prof., Dept of IT • Moderator: Dr. Dipankar Majumdar, PhD, Associate Professor, Dept of IT
Mapping with Faculty Qualification & Expertise (Experience of teaching in UG Engg.)	• Mr. Sudarsan Biswas (6 years exp in teaching DS,CO, Analog & Digital etc.) • Dr. Dipankar Majumdar (11 years exp in teaching)
Designation as a Compulsory or Elective course (Module)	Professional Elective
Pre-requisites Courses	Discreet Mathematics, Graph Theory, Basic of knowledge Computer Network ,Engineering level Fundamentals of Computers and Communication
Contact Hours, Credits and Type of course (theory, tutorial, seminar, project, etc.), Class/Laboratory/Tutorial schedule, Duration	L-T-P : 3-0-0 Credit – 3.0 Theory 3 hours Lecture One Semester
Course Outcomes	Upon successful completion of this course, students should be able to: 1. Analyze the security of different computer systems & networks 2. Identify the appropriate cryptography scheme & security mechanism for different computing environment and information systems 3. Identity security weaknesses in different networking environment 4. Design & Evaluate the quality of algorithms 5. Identify and investigate network security threats

Topics covered based on syllabus of affiliating University WBUT

Day	Duration	Topics	Assignment/Notes
Day 1	1L	Introduction to Network security and cryptography, How they are related, Impact of Cryptography in real life.	Study material
Day 2	2L	Need for Security, Security approaches, Principles of Security.	Study material
Day 3	1L	Discuss different types of attack related to network Security..	Study material
Day 4	2L	Cryptography: Concepts, Plaintext & Cipher text, Substitution Techniques,	Study material

			Transposition Techniques	
	Day 5	1L	Encryption & Decryption, Symmetric key Cryptography Problem Space & search: Defining the problem as state space search.	Study material
	Day 6	2L	Asymmetric key Cryptography, Key Range & Key Size.	Study material
	Day 7	1L	Symmetric Key Algorithm: Overview of Symmetric Key Cryptography, Algorithm types & Modes	Study material
	Day 8	2L	DES(Data Encryption Standard) algorithm	Study material
	Day 9	1L	IDEA(International Data Encryption Algorithm) algorithm	Study material
	Day 10	2L	Asymmetric Key Algorithm: Introduction, Overview of Asymmetric key Cryptography	Study material
	Day 11	1L	Types of algorithms ,Digital Signature	Study material
	Day 12	2L	RSA algorithm	Study material
	Day 13	1L	Basic concepts of Message Digest and Hash Function.	Study material
	Day 14	2L	Internet Security Protocols: Definition ,Basic Concepts	Study material
	Day 15	1L	Secure Socket Layer protocol	Study material
	Day 16	2L	Types of authentication procedure	Study material
	Day 17	1L	Authentication Basics, Password,.	Study material
	Day 18	2L	Discuss about different Authentication Token	Study material
	Day 19	1L	Certificate based Authentication,	Study material
	Day 20	2L	Biometric Authentication.	Study material
	Day 21	2L	Electronic Mail Security: Basics of mail security.	Study material
	Day 22	1L	Discuss about different protocol used in mail security	Study material
	Day 23	2L	SMTP protocol, POP protocol	Study material
	Day 24	2L	Pretty Good Privacy protocol, S/MIME.	Study material
	Day 25	1L	Firewall: Definition, Introduction deferent aspect of firewall	Study material
	Day 26	2L	Types of firewall, Application of firewall	Study material
	Day 27	1L	Different types Firewall Configurations	Study material
	Day 28	2L	Discuss on demilitarized zone network	Study material
	Day 29	1L	Revision of important topics.	Worked out example
	Day 30	2L	WBUT previous years question paper solve.	Worked out example
	Day 31	1L	Revision of important topics.	Worked out example
Additional Topics (Class + Tutorial	• Detailed discussion on demilitarized zone network (perimeter network) • Architecture and layout and different security aspect of DZN			

Activities of Students and Assignments	• Take part in Classroom Demonstration (group activity) • Take part in Quiz • Prepare Home Assignments • Prepare Library Assignments
Hints for Learning-Teaching Approach (Course Delivery)	• Regular Class Lectures (learner-centric) – ✓Involve students in discussion/expression of views ✓Ask students to explain on board ✓Ask questions to students on previously discussed /ongoing topic • Class room Demonstration (on selected topics) by students in groups • Home/Library Assignment and Notes/Study Material on topics not delivered in Class • Guidance to individual groups in Micro Project • Outside the class interaction with individual students having difficulty
Course Assessment Policy	Assessment will be done in following two methods: 1. Direct Assessment – (a) Continuous Assessment throughout the semester, (b) Terminal Test at the end of the semester 2. Indirect Assessment – Opinion Survey Grade will be awarded by University based on marks scored out of 100, the break-up of which is as follows: • Attendance (Cont. Assmt. by Teacher): 5% • Average of Quiz + Assignments: (Cont. Assmt. by Teacher): 10% • Best of two 45-min Class Tests (Cont. Assmt. by Teacher): 15% • One 3-hours Term-end Exam (Terminal Assmt. by Univ.): 70% Scores (1-4) will be awarded by the Department upon assessing attainment of POs related to the course.
Hints for Course Assessment instruments & processes (both continuous and semester-end assessment)	In addition to direct assessment tools as per University norms, following direct and indirect assessment tools are used to measure attainments of POs related to the course outcome. • 4 categories of questions in Class Tests • Library Assignment • Classroom Demonstration • Micro Project • Viva • Faculty & Staff Satisfaction Survey • Employer Survey
Text Books and/or Reference Material	**Text Books:** 1. Cryptography and Network Security", William Stallings, 2nd Edition, Pearson Education Asia 2. Cryptography & Network Security: Atul Kahate, TMH. 3. Network Security private communication in a public world", C. Kaufman, R. Perlman and M. Speciner, Pearson 4. References: 5. Designing Network Security, Merike Kaeo, 2nd Edition, Pearson Books. 6. Building Internet Firewalls", Elizabeth D. Zwicky, Simon Cooper, D. Brent Chapman, 2nd Edition, Oreilly.

Mapping of Course Outcome with Program Outcome

S. No.	Course Code	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	Cryptography & Network Security IT-801D	1. Analyze the security of different computer systems & networks	S	S		M								
		2. Identify the appropriate cryptography scheme & security mechanism for different computing environment and information systems	M	S		M								
		3. Identify and investigate network security threats		M	S									
		4. Design & Evaluate the quality of algorithms	S	S	S									
		5. Identity security weaknesses in different networking environment		S	M	S								

Selection of Assessment Components and Tools

IT-801D (Cryptography & Network Security)							Score (1 – 4)	Weighted Evaluation of POs (W_S – 0.5 || W_M = 0.3 || W_W = 0.2)			
Assessment Tools											
Component	**Tool #**	**Method/Element**	**PO 1**	**PO 2**	**PO 3**	**PO 4**		**PO 1**	**PO 2**	**PO 3**	**PO 4**
Class Performance	1.1.1	Multiple Choice Questions or Quiz	*S*	*S*	-	-		0.5 × Score	0.5 × Score	-	-
	1.1.2	Short Answer type Questions (Class Test)	*S*	*S*	-	-		0.5 × Score	0.5 × Score	-	-
	1.1.3	Problem based Questions (Class Test)	*M*	*S*	*S*	M		0.3 × Score	0.5 × Score	0.5 × Score	0.3 × Score
	1.1.4	Design oriented Questions (Class Test)	*S*	*S*	-	*S*		0.5 × Score	0.5 × Score	-	0.5 × Score
	1.1.5	Open Ended Realistic Questions (Class Test)	*M*	-	-	-		0.3 × Score	-	-	-
	1.1.6	Library/ Home Assignment	-	-	-	*S*		-	-	-	0.5 × Score
	1.1.7	Viva	*S*	-	-	*W*		0.5 × Score	-	-	0.2 × Score
	1.1.9	Attendance	*S*	*W*	*W*	-		0.5 × Score	0.2 × Score	0.2 × Score	
Class Demonstra-tion	1.1.8	Quality of Technical Content, Planning & Adherence to Context	*M*	-	-	-		0.3 × Score	-	-	-
		Study & Understanding of the Topic	*S*	-	-	-		0.5 × Score	-	-	-
		Basic Knowledge in the related Science & Technology	*S*	-	-	-		0.5 × Score	-	-	-
		Effective Use of Context Specific Examples, Test Cases and References	*S*	-	-	-		0.5 × Score	-	-	-
		Q&A and interaction	*S*	-	-	-		0.5 × Score	-	-	-
Micro Project	1.1.11	Research and gather information	*S*	-	-	-		0.5 × Score	-	-	-
		Analysis of Problem, Requirement Analysis	*M*	*S*	*M*	-		0.3 × Score	0.5 × Score	0.3 × Score	-
		Planning & Designing	*S*	*S*	*S*	-		0.5 × Score	0.5 × Score	0.5 × Score	-

		Application of Subject Knowledge	*S*	-	-	-		0.5 × Score	-	-	-
		Application of Related other Concept and Techniques - Integrated Approach	*S*	*M*	*M*	*M*		0.5 × Score	0.3 × Score	0.3 × Score	0.3 × Score
		Developing Solution/System using IT skill	*S*	-	*S*	*S*		0.5 × Score	-	0.5 × Score	0.5 × Score
Terminal Test	1.2.1	Written Semester Exam	*S*	*M*	*M*	*W*		0.5 × Score	0.3 × Score	0.3 × Score	0.2 × Score
Indirect Method	2.2.1	Employer Survey	*S*	*M*	*S*	*M*		0.5 × Score	0.3 × Score	0.5 × Score	0.3 × Score
	2.2.5	Faculty and Staff Satisfaction Survey	-	*S*	*S*	-			0.5 × Score	0.5 × Score	
							Weighted Score (WS)	**Total / 9.2**	**Total / 4.6**	**Total / 3.6**	**Total / 2.8**
							% of PO attained	**WS * 100/4**	**WS * 100/4**	**WS * 100/4**	**WS * 100/4**

Assessment Rubrics

IT-801D (Cryptography & Network Security)					
Assessment Tools		**Grading Criteria**			
Assessment Method	**Tool #**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Short Answer type Questions or Quiz	1.1.1	<40%	>40% - <60%	>60% - <80%	>80%
Problem based Questions (Class Test)	1.1.3	<40%	>40% - <60%	>60% - <80%	>80%
Design oriented Questions (Class Test)	1.1.4	<40%	>40% - <60%	>60% - <80%	>80%
Open Ended Realistic Questions (Class Test)	1.1.5	<40%	>40% - <60%	>60% - <80%	>80%
Assignment (Library/ Home)	1.1.6	Irregular	Regular but often search helps from instructor	Regular and solve all problems of its own	Regularly solves all problems and in addition to that is capable to generate new ideas
Viva	1.1.7	Poor subject knowledge; can't understand simple questions	Moderate subject knowledge, some good explanation; unable to answer harder questions	Good subject knowledge, mostly good explanation; attempts some harder questions	Sound subject knowledge, precise explanations; correctly answers most of the harder questions
Attendance	1.1.9	≤50%	>50% - 60%	>60% - 80%	>80%
Written Semester Exams	1.2.1	<40%	>40% - <60%	>60% - <80%	>80%
Faculty and Staff Satisfaction Survey	2.2.5	Poor understanding of any related questions	Tries to response queries if initial hints are given	Also attempts to answer conceptual questions	Can manage any types of questions at any difficulty level with utmost confidence
Employer Survey	2.2.1	Can't answer anything	Attempts to answer basic questions	Good in both theory and programming, however weak in skill -related question	Promptly responses to any question, programming approach is efficient and confidently manages any program

IT-801D (Cryptography & Network Security)						
Assessment Tools			**Grading Criteria**			
Method/Element		**#**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Classroom Demonstration	Quality of Technical Content, Planning & Adherence to Context	1.1.8	Sketchy and incoherent, mostly irrelevant and out of context	Moderate coverage of topic, sometimes out of context	Informative but not to the point always	Smart, comprehensive, very relevant and effective
	Study & Understanding of the Topic		Minimal or no use of examples/cases; hardly any reference used	Very few meaningful examples used, no reference used	Examples and test cases used but not explained properly; References used but not following norms	Optimal use of well-chosen examples to clearly explain the topic
	Basic Knowledge in the related Science & Technology		Wrong response or explanation, least awareness	sketchy explanation, skipping complicated parts	Good explanation at some places, lack of thorough study	Clear understanding, thorough preparation
	Effective Use of Context Specific Examples, Test Cases and References		Cannot connect and explain the scientific reason behind or related technology	Can connect but cannot explain properly relevant theory or technology	Explains but not convincing and clear; lacks good knowledge of related technology	Demonstrates sound knowledge of related theory and technology; appears aware of latest related developments
	Q&A and interaction		Hardly invites questions and monotonous delivery	Accepts limited questions and makes less interaction	Interacts only at the end of demonstration	Interactive demonstration involving the audience
Micro Project	Research and gather information	1.1.11	Does not collect any information on the topic	Collects very limited info; some related to the topic	Collects some basic info; most refer to the topic	Collects a great deal of relevant information; all refer to the topic
	Analysis of Problem, Requirement Analysis		Asks every other person to explain the problem without any thinking	Understands the problem, cannot do requirement analysis correctly – requires guidance	Understands the problem and requirement; good attempt but incomplete documentation	Pinpoints the salient requirements, conceives additional features; prepares standard documentation
	Planning & Designing		Copies plan/design from peers	Cannot decide a plan – discusses with everybody to create a plan and design	Can plan and make a workable design by own	Plans the solution effectively with innovative ideas and effective design
	Application of Subject Knowledge		Poor subject knowledge; requires support of others; can't even use templates	Lack of knowledge forces copy-paste with not much understanding	Applies subject knowledge partly	Effectively applies subject knowledge
	Application of Related other Concept and Techniques - Integrated Approach		No real application of any engg. techniques; waits for others to do his part	Conceptually weak, aware of some techniques but cannot integrate; requires guidance	Theoretically strong; encouraging approach without much help –lacks optimization	Makes integrated approach and effective use of techniques /concept; guides others
	Developing a Solution/System		Poor IT skill - cannot implement	Can implement partly	Mostly implements but complexity higher	Implements fully with all requirements satisfied

Department of Information Technology
RCC Institute of Information Technology, Kolkata
Canal South Road, Kolkata - 700015

Course Structure of HU801B, Project Management

Format	Course Mapping	
Department, Program, Course Number, Title of Course and Year of Study	IT, B.Tech-IT, **HU801B**, **Project Management**, 4th Year	
Identification of Course Designers: names of faculty (writers & editors/moderator) with designations & qualifications	• Writer: Abantika Choudhury, M.Tech., Asst. Prof., Dept of IT • Moderator: Dr. Dipankar Majumdar, PhD, Associate Professor	
Mapping with Faculty Qualification & Expertise (Experience of teaching in UG Engg.)	• Abantika Choudhury (9 years in teaching) • Dr. Dipankar Majumdar (11 years in teaching)	
Designation as a Compulsory or Elective course (Module)	Compulsory	
Pre-requisites Courses	Knowledge of software engineering.	
Contact Hours, Credits and Type of course (theory, tutorial, seminar, project, etc.), Class/Laboratory/Tutorial schedule, Duration	L-T-P : 2-0-0 Credit – 2.0 Theory 3 hours Lecture One Semester	
Course Outcomes	Upon successful completion of this course, students should be able to: 1. Identify the need and scope for a software project in any real-life scenario. 2. Map and implement the appropriate software development life cycle (SDLC) model in a real-life application 3. Analyse and design methodologies to calculate the cost and schedule for any software project	
Topics covered based on syllabus of affiliating University WBUT	Day-1	Concept and Characteristics of a Project, Importance of Project Management.
	Day-2	Financial Sources.
	Day-3	Implement all pair of shortest path for a graph
	Day 4	Implement travelling sales problem.
	Day-5	Feasibility Studies
	Day-6	Importance of Project Scheduling, Work Breakdown Structure.

	Day-7	Organization Breakdown Structure,
Topics covered based on syllabus of affiliating University WBUT	Day 8	Scheduling Techniques- Gantt Chart
	Day-9	LOB, Network Analysis – CPM/PERT
	Day-10	Optimum Project Duration
	Day-11	Resource Allocation and Leveling.
	Day-12	Project Life Cycle.
	Day-13	Capital & Operating Costs
	Day 14	Project Life Cycle Costing, Project Cost Reduction Methods
	Day 15	Management: Concept of Project Quality, ,
	Day 16	TQM in Projects
	Day 17	Project Audit
	Day 18	Software Project Charateristics and Mangement
	Day 19	Overview of types of Softwares for Projects, Major Features of Project Management Softwares like MS Project,
	Day 20	Criterion for Software Selection
Additional Topics (Class + Tutorial) Activities and Assignments	• Discussion on micro project.	
Activities of students and Assignments	• Take part in Classroom Demonstration (group activity) • Take part in Quiz • Prepare Home Assignments • Prepare Library Assignments	
Hints for Learning-Teaching Approach (Course Delivery)	• Regular Class Lectures (learner-centric) – ✓Involve students in discussion/expression of views ✓Ask students to explain on board ✓Ask questions to students on previously discussed /ongoing topic • Class room Demonstration (on selected topics) by students in groups • Home/Library Assignment and Notes/Study Material on topics not delivered in Class/Tutorial • Outside the class interaction with individual students having difficulty	
Course Assessment Policy	Assessment will be done in following two methods: 1. Direct Assessment – (a) Continuous Assessment throughout the semester, (b) Terminal Test at the end of the semester 2. Indirect Assessment – Opinion Survey Grade will be awarded by University based on marks scored out of 100, the break-up of which is as follows: • Attendance (Cont. Assmt. by Teacher): 5% • Average of Quiz + Assignments: (Cont. Assmt. by Teacher): 10% • Best of two 45 mins Class Tests (Cont. Assmt. by Teacher): 15% • One 3-hours Term-end Exam (Terminal Assmt. by Univ.): 70% Points will be awarded by the Department upon assessing attainment of POs related to the course. Scores (1-4) assessed, using each different assessment tool, have weighted components against correlated POs (weights according to strong, medium or weak correlation). % attainment of each course-related PO is then found from the % of weighted average score w.r.t maximum avg score (4).	
Hints for Course Assessment instruments & processes (both	In addition to direct assessment tools as per University norms, following direct and indirect assessment tools are used to measure attainments of	

continuous and semester-end assessment)	POs related to the course outcome. • 4 categories of questions in Class Tests • Library Assignment • Classroom Demonstration • Micro Project • Viva • Student Semester Exit Survey • Faculty & Staff Satisfaction Survey • Employer Survey The correlation mapping of assessment tools and POs related to the course are depicted in the Table of Assessment Tools. The grading criteria against each assessment tool to ascertain the scores (1-4) is depicted in the Assessment Rubrics Table.
Text Books and/or Reference Material	• **Text Books:** 1. Gopalkrishnan P. and Rama Mmoorthy: Text Book of Project Management, Macmillan 2. Nicholas John M.: Project Management for Business and Technology – Principles and Practice, Prentice Hall India, 2nd Edn. 3. Levy Ferdinand K., Wiest Jerome D.: A Management Guide to PERT/CPM with GERT/PDM/DCPM and other networks, Prentice Hall India, 2nd Edn. 4. Mantel Jr., Meredith J. R., Shafer S. M., Sutton M. M., Gopalan M. R.: Project Management: Core Text Book, Wiley India, 1st Indian Edn. 5. Maylor H.: Project Management, Pearson, 3rd Edn. 6. Nagarajan K.: Project Management, New Age International Publishers, 5th Edn. 7. Kelkar. S.A, Sotware Project Management: A concise Study, 2nd Ed., PHI

Department of Information Technology
RCC Institute of Information Technology, Kolkata
Canal South Road, Kolkata - 700015

Course Structure of IT801D, Cryptograph & Network Security

Format	Course Mapping
Department, Program, Course Number, Title of Course and Year of Study	IT, B.Tech-IT, **IT801D**, **Cryptograph & Network Security**, 4th Year
Identification of Course Designers: names of faculty (writers & editors/moderator) with designations & qualifications	• Writer: Mr. Sudarsan Biswas, M.E., Asst. Prof., Dept of IT • Moderator: Dr. Dipankar Majumdar, PhD, Associate Professor, Dept of IT
Mapping with Faculty Qualification & Expertise (Experience of teaching in UG Engg.)	• Mr. Sudarsan Biswas (6 years exp in teaching DS,CO, Analog & Digital etc.) • Dr. Dipankar Majumdar (11 years exp in teaching)
Designation as a Compulsory or Elective course (Module)	Professional Elective
Pre-requisites Courses	Discreet Mathematics, Graph Theory, Basic of knowledge Computer Network ,Engineering level Fundamentals of Computers and Communication
Contact Hours, Credits and Type of course (theory, tutorial, seminar, project, etc.), Class/Laboratory/Tutorial schedule, Duration	L-T-P : 3-0-0 Credit – 3.0 Theory 3 hours Lecture One Semester
Course Outcomes	Upon successful completion of this course, students should be able to: 1. Analyze the security of different computer systems & networks 2. Identify the appropriate cryptography scheme & security mechanism for different computing environment and information systems 3. Identity security weaknesses in different networking environment 4. Design & Evaluate the quality of algorithms 5. Identify and investigate network security threats

Topics covered based on syllabus of affiliating University WBUT

Day	Duration	Topics	Assignment/Notes
Day 1	1L	Introduction to Network security and cryptography, How they are related, Impact of Cryptography in real life.	Study material
Day 2	2L	Need for Security, Security approaches, Principles of Security.	Study material
Day 3	1L	Discuss different types of attack related to network Security..	Study material
Day 4	2L	Cryptography: Concepts, Plaintext & Cipher text, Substitution Techniques,	Study material

			Transposition Techniques	
	Day 5	1L	Encryption & Decryption, Symmetric key Cryptography Problem Space & search: Defining the problem as state space search.	Study material
	Day 6	2L	Asymmetric key Cryptography, Key Range & Key Size.	Study material
	Day 7	1L	Symmetric Key Algorithm: Overview of Symmetric Key Cryptography, Algorithm types & Modes	Study material
	Day 8	2L	DES(Data Encryption Standard) algorithm	Study material
	Day 9	1L	IDEA(International Data Encryption Algorithm) algorithm	Study material
	Day 10	2L	Asymmetric Key Algorithm: Introduction, Overview of Asymmetric key Cryptography	Study material
	Day 11	1L	Types of algorithms ,Digital Signature	Study material
	Day 12	2L	RSA algorithm	Study material
	Day 13	1L	Basic concepts of Message Digest and Hash Function.	Study material
	Day 14	2L	Internet Security Protocols: Definition ,Basic Concepts	Study material
	Day 15	1L	Secure Socket Layer protocol	Study material
	Day 16	2L	Types of authentication procedure	Study material
	Day 17	1L	Authentication Basics, Password,.	Study material
	Day 18	2L	Discuss about different Authentication Token	Study material
	Day 19	1L	Certificate based Authentication,	Study material
	Day 20	2L	Biometric Authentication.	Study material
	Day 21	2L	Electronic Mail Security: Basics of mail security.	Study material
	Day 22	1L	Discuss about different protocol used in mail security	Study material
	Day 23	2L	SMTP protocol, POP protocol	Study material
	Day 24	2L	Pretty Good Privacy protocol, S/MIME.	Study material
	Day 25	1L	Firewall: Definition, Introduction deferent aspect of firewall	Study material
	Day 26	2L	Types of firewall, Application of firewall	Study material
	Day 27	1L	Different types Firewall Configurations	Study material
	Day 28	2L	Discuss on demilitarized zone network	Study material
	Day 29	1L	Revision of important topics.	Worked out example
	Day 30	2L	WBUT previous years question paper solve.	Worked out example
	Day 31	1L	Revision of important topics.	Worked out example
Additional Topics (Class + Tutorial	• Detailed discussion on demilitarized zone network (perimeter network) • Architecture and layout and different security aspect of DZN			

Activities of Students and Assignments	• Take part in Classroom Demonstration (group activity) • Take part in Quiz • Prepare Home Assignments • Prepare Library Assignments
Hints for Learning-Teaching Approach (Course Delivery)	• Regular Class Lectures (learner-centric) – ✓Involve students in discussion/expression of views ✓Ask students to explain on board ✓Ask questions to students on previously discussed /ongoing topic • Class room Demonstration (on selected topics) by students in groups • Home/Library Assignment and Notes/Study Material on topics not delivered in Class • Guidance to individual groups in Micro Project • Outside the class interaction with individual students having difficulty
Course Assessment Policy	Assessment will be done in following two methods: 1. Direct Assessment – (a) Continuous Assessment throughout the semester, (b) Terminal Test at the end of the semester 2. Indirect Assessment – Opinion Survey Grade will be awarded by University based on marks scored out of 100, the break-up of which is as follows: • Attendance (Cont. Assmt. by Teacher): 5% • Average of Quiz + Assignments: (Cont. Assmt. by Teacher): 10% • Best of two 45-min Class Tests (Cont. Assmt. by Teacher): 15% • One 3-hours Term-end Exam (Terminal Assmt. by Univ.): 70% Scores (1-4) will be awarded by the Department upon assessing attainment of POs related to the course.
Hints for Course Assessment instruments & processes (both continuous and semester-end assessment)	In addition to direct assessment tools as per University norms, following direct and indirect assessment tools are used to measure attainments of POs related to the course outcome. • 4 categories of questions in Class Tests • Library Assignment • Classroom Demonstration • Micro Project • Viva • Faculty & Staff Satisfaction Survey • Employer Survey
Text Books and/or Reference Material	**Text Books:** 1. Cryptography and Network Security", William Stallings, 2nd Edition, Pearson Education Asia 2. Cryptography & Network Security: Atul Kahate, TMH. 3. Network Security private communication in a public world", C. Kaufman, R. Perlman and M. Speciner, Pearson 4. References: 5. Designing Network Security, Merike Kaeo, 2nd Edition, Pearson Books. 6. Building Internet Firewalls", Elizabeth D. Zwicky, Simon Cooper, D. Brent Chapman, 2nd Edition, Oreilly.

Department of Information Technology
RCC Institute of Information Technology, Kolkata
Canal South Road, Kolkata - 700015

Course Structure of IT802B, Cyber Laws & Security Policies

Format	Course Curriculum
Department, Program, Course Number, Title of Course and Year of Study	IT, B.Tech-IT, **IT802B**, **Cyber Laws & Security Policies**, 4th Year
Identification of Course Designers: names of faculty (writers & editors/moderator) with designations & qualifications	• Writer: Mr. Amit Khan, M.E. Asst. Prof., Dept of IT • Moderator: Dr. Dipankar Majumdar, PhD, Associate Professor, Dept of IT
Mapping with Faculty Qualification & Expertise (Experience of teaching in UG Engg.)	• Mr. Amit Khan (9 years exp in teaching) • Dr. Dipankar Majumdar (11 years exp in teaching)
Designation as a Compulsory or Elective course (Module)	Professional Elective
Pre-requisites Courses	Engineering level Fundamentals of Computers and Computer Networks
Contact Hours, Credits and Type of course (theory, tutorial, seminar, project, etc.), Class/Laboratory/Tutorial schedule, Duration	L-T-P : 3-0-0 Credit – 3.0 Theory 3 hours Lecture One Semester
Course Outcomes	Upon successful completion of this course, students should be able to: 1. Interpret the concept of Cybercrime and its categories 2. Describe how cybercrime is carried out using wireless and mobile devices. 3. Recognize the tools and methods used in cybercrime. 4. Describe the phishing and Identity theft techniques 5. Apply the legal implications of cybercrime for a given scenario in the perspective of existing IT laws

Topics covered based on syllabus of affiliating University WBUT

Day	Duration	Topics	Assignment/Notes
Day 1	2L	Introduction of Cybercrime: What is cybercrime? Issues of Cybercrime. Purpose of Cybercrime. Forgery, Hacking.	Power point slide
Day 2	1L	Software Piracy, Computer Network intrusion. Intrusion Detection System.	Printed study material
Day 3	2L	Category of Cybercrime	Power point slide
Day 4	1L	How criminals plan attacks, passive attack, Active attacks.	Power point slide
Day 5	2L	Cyberstalking, Cybercrime activities in different countries.	Printed study material

			cryptographic security for mobile devices.	
	Day 6	1L	Cybercrime Mobile & Wireless devices: Security challenges posted by mobile devices,.	Class notes
	Day 7	2L	Attacks on mobile/cell phones, Theft, Virus, Hacking.	Power point slide
	Day 8	1L	Bluetooth; Different viruses on laptop	Printed study material
	Day 9	2L	Tools and Methods used in Cyber crime: Proxy servers, password checking, Random checking.	
	Day 10	1L	Trojan Horses and Backdoors; DOS & DDOS attacks	Class notes
	Day 11	2L	SQL injection: buffer over flow.	Printed study material
	Day 12	1L	Phishing & Identity Theft: Phising methods.	Power point slide
	Day 13	2L	ID Theft; Online identity method.	Classroom discussion
	Day 14	1L	Cybercrime & Cybersecurity: Legal aspects, Indian laws, IT act,	Power point slide
	Day 15	2L	Public key certificate.	Power point slide
	Day 16	1L	Strategies to tackle cyber crime and trends	Power point slide
	Day 17	2L	Criminal Justice in India and implication on cyber crime.	Printed study material
	Day 18	1L	Other IT act offences	
	Day 19	2L	Introduction to patent and copyright	Printed study material
	Day 20	1L	Introduction to copyright term and respect for foreign works	Printed study material
	Day 21	2L	Revision and questionnaires	
	Day 22	1L	Revision and questionnaires	
Additional Topics (Class + Tutorial)	• Introduction to patent and copyright • Introduction to copyright term and respect for foreign works			
Activities of Students and Assignments	• Take part in Quiz • Prepare Home Assignments • Prepare Library Assignments			
Hints for Learning-Teaching Approach (Course Delivery)	• Regular Class Lectures (learner-centric) – ✓Involve students in discussion/expression of views ✓Ask students to explain on board ✓Ask questions to students on previously discussed /ongoing topic • Tutorial for interactive problem solving and doubt-clearing • Class room Demonstration (on selected topics) by students in groups • Home/Library Assignment and Notes/Study Material on topics not delivered in Class • Outside the class interaction with individual students having difficulty			
Course Assessment Policy	Assessment will be done in following two methods: 1. Direct Assessment – (a) Continuous Assessment throughout the semester, (b) Terminal Test at the end of the semester 2. Indirect Assessment – Opinion Survey Grade will be awarded by University based on marks scored out of 100, the break-up of which is as follows: • Attendance (Cont. Assmt. by Teacher): 5% • Average of Quiz + Assignments: (Cont. Assmt. by Teacher): 10% • Best of two 45-min Class Tests (Cont. Assmt. by Teacher): 15% • One 3-hours Term-end Exam (Terminal Assmt. by Univ.): 70% Points will be awarded by the Department upon assessing attainment of			

	POs related to the course. Scores (1-4) assessed, using each different assessment tool, have weighted components against correlated POs (weights according to strong, medium or weak correlation). % attainment of each course-related PO is then found from the % of weighted average score w.r.t maximum avg score (4).
Hints for Course Assessment instruments & processes (both continuous and semester-end assessment)	In addition to direct assessment tools as per University norms, following direct and indirect assessment tools are used to measure attainments of POs related to the course outcome. • 4 categories of questions in Class Tests • Library Assignment • Micro Project • Student Semester Exit Survey • Employer Survey The correlation mapping of assessment tools and POs related to the course are depicted in the Table of Assessment Tools. The grading criteria against each assessment tool to ascertain the scores (1-4) is depicted in the Assessment Rubrics Table.
Text Books and/or Reference Material	• **Text Books:** 1. Nina Godbole & Sunit Belapune – "Cyber Security" – Wiley India • **Reference Books:** 1. Vivek Sood – "Cyber Law Simplified" – Mc Graw Hill Education 2. Amit Kr. Mishra – "Information security and Cyber Laws"-S.K. KATARIA & SONS

Mapping of Course Outcome with Program Outcome

S. No.	Course Code	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	Cyber Laws & Security Policies IT802B	1. Interpret the concept of Cybercrime and its categories					M	S	S					
		2. Describe how cybercrime is carried out using wireless and mobile devices.	M			M	S		S					
		3. Recognize the tools and methods used in cybercrime.					S	W	M					
		4. Describe the phishing and Identity theft techniques					S	W	M					
		5. Apply the legal implications of cybercrime for a given scenario in the perspective of existing IT laws						M	M					

Selection of Assessment Components and Tools

IT – 802B (Cyber Laws & Security Policies)								Score (1 – 4)	Weighted Evaluation of POs (W_S – 0.5 || W_M = 0.3 || W_W = 0.2)				
Assessment Tools			PO 1	PO 4	PO 5	PO 6	PO 7		PO 1	PO 4	PO 5	PO 6	PO 7
Component	Tool #	Method/Element											
	1.1.1	Multiple Choice Questions or Quiz	*S*	-	-	-	-		0.5 × Score	-	-	-	-
Class Performance	1.1.2	Short Answer type Questions (Class Test)	*S*	-	-	-	-		0.5 × Score	-	-	-	-
	1.1.3	Problem based Questions (Class Test)	*S*	-	-	-	-		0.5 × Score	-	-	-	-
	1.1.4	Design oriented Questions (Class Test)	*M*	*M*	*S*	-	-		0.3 × Score	0.3 × Score	0.5 × Score	-	-
	1.1.5	Open Ended Realistic Questions (Class Test)	*S*	*S*	-	*S*	*M*		0.5 × Score	0.5 × Score	-	0.5 × Score	0.3 × Score
	1.1.6	Assignments (Library/ Home Assignment)	*M*	-	-	*W*	*W*		0.3 × Score	-	-	0.2 × Score	0.2 × Score
	1.1.9	Attendance	*M*	-	-	-	-		0.3 × Score	-	-	-	-
Micro Project	1.1.11	Research and gather information	*S*	-	-	*W*	*W*		0.5 × Score	-	-	0.2 × Score	0.2 × Score
		Analysis of Problem, Requirement Analysis	*M*	*S*	-	*W*	*W*		0.3 × Score	0.5 × Score	-	0.2 × Score	0.2 × Score
		Planning & Designing	*M*	*M*	-	-	-		0.3 × Score	0.3 × Score	-	-	-
		Application of Subject Knowledge	*S*	-	*M*	-	-		0.5 × Score	-	0.3 × Score	-	-
		Application of Related other Concept and Techniques - Integrated Approach	*S*	-	*M*	*W*	*S*		0.5 × Score	-	0.3 × Score	0.2 × Score	0.5 × Score
		Developing Solution/System using IT skill	*S*	-	*S*	*M*	*M*		0.5 × Score	-	0.5 × Score	0.3 × Score	0.3 × Score
Terminal Test	1.2.1	Written Semester Exam	*S*	*W*	-	-	-		0.5 × Score	0.2× Score			
Indirect Method	2.2.1	Employer Survey	*S*	*M*	*S*	*M*	*W*		0.5 × Score	0.3 × Score	0.5 × Score	0.3 × Score	0.2× Score
	2.2.2	Student Semester Exit Survey	-	-	*S*	-	-		-	-	0.5 × Score	-	-
								Weighted Score (WS)	**Total / 6.5**	**Total / 2.1**	**Total / 2.6**	**Total / 1.9**	**Total / 1.9**
								% of PO attained	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**

Assessment Rubrics

IT – 802B (Cyber Laws & Security Policies)					
Assessment Tools		**Grading Criteria**			
Method/Element	**Tool#**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Multiple Choice Questions or Quiz	1.1.1	<40%	>40% - <60%	>60% - <80%	>80%
Short Answer type Questions (Class Test)	1.1.2	<40%	>40% - <60%	>60% - <80%	>80%
Problem based Questions (Class Test)	1.1.3	<40%	>40% - <60%	>60% - <80%	>80%
Design oriented Questions (Class Test)	1.1.4	<40%	>40% - <60%	>60% - <80%	>80%
Open Ended Realistic Questions (Class Test)	1.1.5	<40%	>40% - <60%	>60% - <80%	>80%
Assignment (Library/ Home)	1.1.6	Irregular	Regular but often search helps from instructor	Regular and solve all problems of its own	Regularly solves all problems and in addition to that is capable to generate new ideas
Attendance	1.1.9	<40%	>40% - <60%	>60% - <80%	>80%
Written Semester Exam	1.2.1	<40%	>40% - <60%	>60% - <80%	>80%
Employer survey	2.2.1	Can't answer anything	Try to answer basic questions	Good in both theory and programming, however weak skilled question	Promptly responses to any question, programming approach is efficient and confidently manages any program
Student Semester Exit Survey	2.2.2	Can't answer anything	Try to answer basic questions	Good in both theory and programming, however weak skilled question	Promptly responses to any question, programming approach is efficient and confidently manages any program

IT – 802B (Cyber Laws & Security Policies)						
Assessment Tools			**Grading Criteria**			
Method/Element		**Tool#**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Micro Project	Research and gather information	1.1.11	Does not collect any information on the topic	Collects very limited info; some related to the topic	Collects some basic info; most refer to the topic	Collects a great deal of relevant information; all refer to the topic
	Analysis of Problem, Requirement Analysis		Asks every other person to explain the problem without any thinking	Understands the problem, cannot do requirement analysis correctly – requires guidance	Understands the problem and requirement; good attempt but incomplete documentation	Pinpoints the salient requirements, conceives additional features; prepares standard documentation
	Planning & Designing		Copies plan/design from peers	Cannot decide a plan – discusses with everybody to create a plan and design	Can plan and make a workable design by own	Plans the solution effectively with innovative ideas and effective design
	Application of Subject Knowledge		Poor subject knowledge; requires support of others; can't even use templates	Lack of knowledge forces copy-paste with not much understanding	Applies subject knowledge partly	Effectively applies subject knowledge
	Application of Related other Concept and Techniques - Integrated Approach		No real application of any engg. techniques; waits for others to do his part	Conceptually weak, aware of some techniques but cannot integrate; requires guidance	Theoretically strong; encouraging approach without much help –lacks optimization	Makes integrated approach and effective use of techniques /concept; guides others
	Developing a Solution/System		Poor IT skill - cannot implement	Can implement partly	Mostly implements but complexity higher	Implements fully with all requirements satisfied – effective and less complex soln.

Mapping of Course Outcome with Program Outcome

S. No	Course Code	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	Design Lab (IT 891)	1. Map theoretical knowledge into practical implementation.	S	M	S	M	S	W			M	M	M	W
		2. Study and investigate a given industrial problem		S	M	S					M	S	M	M
		3. Design a solution and write a standard system specification document	M	M	S	W		M		W	S	S	S	M
		4. Implementation of an industrial problem	M		W	M	M	S				M	S	S
		5. Build up team spirit and leadership qualities.								M	S	S		W
		6. Get a brief exposure of doing a deadline specific industrial project before joining to industry / higher studies.						W						M

Selection of Assessment Components and Tools

IT – 891 (Design Lab)															Score (1 – 4)	Weighted Evaluation of POs (W_S – 0.5 | | W_M = 0.3 | | W_W = 0.2)										
Assessment Tools			PO 1	PO 2	PO 3	PO 4	PO 5	PO 6		PO 8	PO 9	PO 10	PO 11	PO 12		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 8	PO 9	PO 10	PO 11	PO 12
Comp-onent	Tool#	Method/Element																								
Design Lab (Cont. Assmt..)		Research & Literature Survey	S			M							M	M		0.5 × Score			0.3 × Score						0.3 × Score	0.3 × Score
		Study, Investigation & Requirement Analysis	S	S		S		M					M	M		0.5 × Score	0.5 × Score		0.5 × Score		0.3 × Score				0.3 × Score	0.3 × Score
		Planning & Designing, Creative Ability		M	S								M	M			0.3 × Score	0.5 × Score								0.3 × Score	0.3 × Score
		Developing Solution/System			S		M	M					M	M				0.5 × Score		0.3 × Score	0.3 × Score					0.3 × Score	0.3 × Score
	1.1.12	Application of latest Technology /Concept	S				S						M	M		0.5 × Score				0.5 × Score						0.3 × Score	0.3 × Score
		Testing & Debugging		S	S	M	S						M				0.5 × Score	0.5 × Score	0.3 × Score	0.5 × Score						0.3 × Score	
		Documentation & Report										S	S												0.5 × Score	0.5 × Score	
		Leadership & Teamwork								M	S		S									0.3 × Score	0.5 × Score			0.5 × Score	
		Regularity								S												0.5 × Score					
Terminal Test : Design Lab Presentation		Quality of Technical Content, Planning & Adherence to Context, Demo of Prototype	M		S		M				W	S	S	W		0.3 × Score		0.5 × Score		0.3 × Score			0.2 × Score	0.5 × Score	0.5 × Score	0.2 × Score
		Depth of Understanding & Preparation	S	M							M			M		0.5 × Score	0.3 × Score						0.3 × Score			0.3 × Score
	1.2.3	Body Language, Confidence & Communication Skill										S	W											0.5 × Score	0.2 × Score	
		Q/A, Interaction, Manners	S	M						W	W	S				0.5 × Score	0.3 × Score					0.2 × Score	0.2 × Score	0.5 × Score		
		Assessment by University Examiner	S	M	S	S	S	S		M	M	S		W		0.5 × Score	0.3 × Score	0.5 × Score	0.5 × Score	0.5 × Score	0.5 × Score	0.3 × Score	0.3 × Score	0.5 × Score		0.2 × Score
	2.2.5	Faculty and Staff Satisfaction Survey	S		M						M	S		M		0.5 × Score		0.3 × Score					0.3 × Score	0.5 × Score		0.3 × Score
	2.2.1	Employer Survey	M		S		S			W	M	S	S	S		0.3 × Score		0.5 × Score		0.5 × Score		0.2 × Score	0.3 × Score	0.5 × Score	0.5 × Score	0.5 × Score
														Weighted Score (WS)		**Total/ 4.1**	**Total/ 2.2**	**Total/ 3.3**	**Total/ 1.6**	**Total / 2.6**	**Total/ 1.1**	**Total / 1.5**	**Total/ 2.1**	**Total / 3.5**	**Total/ 4.0**	**Total/ 3.0**
														%PO attained		**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4* 100**

Assessment Rubrics

IT – 891 (Design Lab)						
Assessment Tools			**Grading Criteria**			
Method/Element		**#**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Major Project (Cont. Assessment)	Research & Literature Survey	1.1.12	Does not collect any information on the topic	Collects very limited info; some related to the topic	Collects some basic info; most refer to the topic	Collects a great deal of relevant information; all refer to the topic
	Study, Investigation & Requirement Analysis		Asks every other person to explain the project without any thinking or study of similar system	Understands the problem, studies similar system but cannot contribute to requirement analysis – requires guidance	Understands the problem and does most of requirement analysis, prepares basic documentation (SRS)	Takes lead role in pinpointing the salient requirements, conceives additional features, fine tunes and standardizes documentation (SRS)
	Planning & Designing Schema/Algorithm, Creative Ability		No contribution in planning & designing	Attempts to contribute but requires guidance to plan and design effectively	Contributes in planning and makes a workable design	Plans the solution effectively with innovative ideas and effective design
	Developing a Solution/System/Pro-totype/GUI		Poor IT skill - cannot contribute in developing modules	Attempts to develop few modules (case specific)	Develops some generic modules with higher complexity in coding, attempted GUI	Develops the critical modules & GUI, optimizes modules developed by peers – ensures adherence to SRS and less complex coding
	Application of latest Technology /Concept		Poor IT skill, also reluctant to learn new technology/concept	Conceptually weak, aware of some techniques but cannot apply; requires guidance	Have good technical knowledge/concept - applies some, ready to learn new techniques	Makes integrated approach and effective use of new techniques /concept, learns quickly and guides others
	Testing & Debugging		Poor IT skill – cannot test and debug	Can contribute in testing but cannot debug	Contributes fairly – debugs/repairs most error cases	Designs test cases, can test and debug critical errors
	Documentation & Report		Poor contribution in documentation and report preparation	Helps in documenting different stages but lacks report writing skills, plays supportive role	Develops the basic structure of project report, checks documentation standard	Does major part of report writing, makes the report technically comprehensive and ensures adherence to standards
	Leadership & Teamwork		Does not perform any duties assigned to team role	Performs minimal duties, cares for other team members	Performs nearly all duties, helps other team members	Performs all duties, takes additional responsibilities, guides other members and leads the team
	Regularity		Irregular	Fairly regular	Quite regular	Very much regular

Terminal Test (Project Presentation)	Quality of Technical Content, Planning & Adherence to Context , Demo of Prototype	1.2.3	Least contribution in making the ppt and prototype, Poor quality, Minimal part played in giving the presentation and the demo	Some contribution in making the ppt and the prototype, Average quality, Fair part played in giving the presentation and the demo	Significant contribution in making the ppt and the prototype, Good quality, Active part played in giving the presentation and the demo	Maximum contribution in making the ppt and the prototype, Best quality, Leading part played in giving the presentation and the demo
	Depth of Understanding and Preparation		Poor understanding	Does not understand all modules	Understands working of all modules but lacks knowledge about reason and remedies of project limitation;	Clearly understands working of all modules, limitations and possible remedies; thorough preparation
	Body Language, Confidence & Communication Skill		Unimpressive reflecting lack of confidence, low voice, poor linguistic skills	Starting well but frequently faltering and losing confidence, medium voice , limited linguistic skills	Acceptable but does not make impact on the audience, good linguistic skill but often fails to communicate effectively, acceptable voice,	Attracts attention and makes the demo lively, applies the art of effective communication, strong voice, strong linguistic skill
	Q&A and interaction, Manners		Wrong response or explanation, ill-mannered	Sketchy explanation, skips complicated parts, needs support, lacking manners	Good explanation at some Qs, helps other members while answering, good manners	Clear explanation with examples, volunteers answering hard/critical Qs, well mannered
	Assessment by University Examiner		≤40%	>40% - 60%	>60% - 80%	>80%
Faculty and Staff Satisfaction Survey		2.2.5	Generally poor knowledge understanding & programming skill, careless approach in team, weak soft skill	Conceptually weak, needs guidance in programming, plays some role in team, lacks in soft skill	Has basic knowledge, good programming skill, report writing skill and soft skill. lacks in technical depth and leadership, hard worker	Has solid knowledge, can manage any type of questions at any difficulty level with utmost confidence, has excellent report writing and soft skill and leadership quality, good finisher
Employer Survey		2.2.1	Lack professional skill and attitude, got poor exposure in SDLC	Scope for improvement of professional skill and attitude, lacks exposure in all stages of SDLC	Good professional skill and attitude, good exposure in SDLC stages, lacks leadership and technical depth	Excellent professional skill and attitude, has leadership quality and technically sound, proficient in conducting all stages of SDLC

Mapping of Course Outcome with Program Outcome

S. No	Course Code	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	Major Project (IT 892)	1. Map theoretical knowledge into practical implementation.	S	M	S	M	S							
		2. Write and understand documentation of a standard project work.										S	M	
		3. Build up team spirit and leadership qualities.									S	S		
		4. Get a brief exposure of doing a deadline specific software project before joining to industry / higher studies.						S		M			S	

Selection of Assessment Components and Tools

IT – 892 (Major Project)														Weighted Evaluation of POs (W_S – 0.5 || W_M = 0.3 || W_W = 0.2)									
Assessment Tools													Score (1 – 4)										
Comp-onent	Tool#	Method/Element	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 8	PO 9	PO 10	PO 11		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 8	PO 9	PO 10	PO 11
Major Project (Cont. Assmt..)	1.1.12	Research & Literature Survey	S			M						M		0.5 × Score			0.3 × Score						0.3 × Score
		Study, Investigation & Requirement Analysis	S	S		S		M				M		0.5 × Score	0.5 × Score		0.5 × Score		0.3 × Score				0.3 × Score
		Planning & Designing, Creative Ability		M	S							M			0.3 × Score	0.5 × Score							0.3 × Score
		Developing Solution/System			S		M	M				M				0.5 × Score		0.3 × Score	0.3 × Score				0.3 × Score
		Application of latest Technology /Concept	S				S					M		0.5 × Score				0.5 × Score					0.3 × Score
		Testing & Debugging		S	S	M	S					M			0.5 × Score	0.5 × Score	0.3 × Score	0.5 × Score					0.3 × Score
		Documentation & Report									S	S										0.5 × Score	0.5 × Score
		Leadership & Teamwork							M	S		S								0.3 × Score	0.5 × Score		0.5 × Score
		Regularity							S											0.5 × Score			
Terminal Test : Project Presentation	1.2.3	Quality of Technical Content, Planning & Adherence to Context, Demo of Prototype	M		S		M			W	S	S		0.3 × Score		0.5 × Score		0.3 × Score			0.2 × Score	0.5 × Score	0.5 × Score
		Depth of Understanding & Preparation	S	M						M				0.5 × Score	0.3 × Score						0.3 × Score		
		Body Language, Confidence & Communication Skill									S	W										0.5 × Score	0.2 × Score
		Q/A, Interaction, Manners	S	M					W	W	S			0.5 × Score	0.3 × Score					0.2 × Score	0.2 × Score	0.5 × Score	
		Assessment by University Examiner	S	M	S	S	S	S	M	M	S			0.5 × Score	0.3 × Score	0.5 × Score	0.5 × Score	0.5 × Score	0.5 × Score	0.3 × Score	0.3 × Score	0.5 × Score	
	2.2.5	Faculty and Staff Satisfaction Survey	S		M					M	S			0.5 × Score		0.3 × Score					0.3 × Score	0.5 × Score	
	2.2.1	Employer Survey	M		S		S		W	M	S	S		0.3 × Score		0.5 × Score		0.5 × Score		0.2 × Score	0.3 × Score	0.5 × Score	0.5 × Score
												Weighted Score (WS)		**Total/ 4.1**	**Total/ 2.2**	**Total/ 3.3**	**Total/ 1.6**	**Total / 2.6**	**Total/ 1.1**	**Total / 1.5**	**Total/ 2.1**	**Total / 3.5**	**Total/ 4.0**
												%PO attained		**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**	**WS/4 * 100**

Assessment Rubrics

IT – 892 (Major Project)						
Assessment Tools			**Grading Criteria**			
Method/Element		**#**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Major Project (Cont. Assessment)	Research & Literature Survey	1.1.12	Does not collect any information on the topic	Collects very limited info; some related to the topic	Collects some basic info; most refer to the topic	Collects a great deal of relevant information; all refer to the topic
	Study, Investigation & Requirement Analysis		Asks every other person to explain the project without any thinking or study of similar system	Understands the problem, studies similar system but cannot contribute to requirement analysis – requires guidance	Understands the problem and does most of requirement analysis, prepares basic documentation (SRS)	Takes lead role in pinpointing the salient requirements, conceives additional features, fine tunes and standardizes documentation (SRS)
	Planning & Designing Schema/Algorithm, Creative Ability		No contribution in planning & designing	Attempts to contribute but requires guidance to plan and design effectively	Contributes in planning and makes a workable design	Plans the solution effectively with innovative ideas and effective design
	Developing a Solution/System/Prototype/GUI		Poor IT skill - cannot contribute in developing modules	Attempts to develop few modules (case specific)	Develops some generic modules with higher complexity in coding, attempted GUI	Develops the critical modules & GUI, optimizes modules developed by peers – ensures adherence to SRS and less complex coding
	Application of latest Technology /Concept		Poor IT skill, also reluctant to learn new technology/concept	Conceptually weak, aware of some techniques but cannot apply; requires guidance	Have good technical knowledge/concept - applies some, ready to learn new techniques	Makes integrated approach and effective use of new techniques /concept, learns quickly and guides others
	Testing & Debugging		Poor IT skill – cannot test and debug	Can contribute in testing but cannot debug	Contributes fairly – debugs/repairs most error cases	Designs test cases, can test and debug critical errors
	Documentation & Report		Poor contribution in documentation and report preparation	Helps in documenting different stages but lacks report writing skills, plays supportive role	Develops the basic structure of project report, checks documentation standard	Does major part of report writing, makes the report technically comprehensive and ensures adherence to standards
	Leadership & Teamwork		Does not perform any duties assigned to team role	Performs minimal duties, cares for other team members	Performs nearly all duties, helps other team members	Performs all duties, takes additional responsibilities, guides other members and leads the team
	Regularity		Irregular	Fairly regular	Quite regular	Very much regular

IT – 892 (Major Project)						
Assessment Tools			**Grading Criteria**			
Method/Element		**#**	**Poor (Score – 1)**	**Developing (Score – 2)**	**Good (Score – 3)**	**Excellent (Score – 4)**
Terminal Test (Project Presentation)	Quality of Technical Content, Planning & Adherence to Context , Demo of Prototype	1.2.3	Least contribution in making the ppt and prototype, Poor quality, Minimal part played in giving the presentation and the demo	Some contribution in making the ppt and the prototype, Average quality, Fair part played in giving the presentation and the demo	Significant contribution in making the ppt and the prototype, Good quality, Active part played in giving the presentation and the demo	Maximum contribution in making the ppt and the prototype, Best quality, Leading part played in giving the presentation and the demo
	Depth of Understanding and Preparation		Poor understanding	Does not understand all modules	Understands working of all modules but lacks knowledge about reason and remedies of project limitation;	Clearly understands working of all modules, limitations and possible remedies; thorough preparation
	Body Language, Confidence & Communication Skill		Unimpressive reflecting lack of confidence, low voice, poor linguistic skills	Starting well but frequently faltering and losing confidence, medium voice , limited linguistic skills	Acceptable but does not make impact on the audience, good linguistic skill but often fails to communicate effectively, acceptable voice,	Attracts attention and makes the demo lively, applies the art of effective communication, strong voice, strong linguistic skill
	Q&A and interaction, Manners		Wrong response or explanation, ill-mannered	Sketchy explanation, skips complicated parts, needs support, lacking manners	Good explanation at some Qs, helps other members while answering, good manners	Clear explanation with examples, volunteers answering hard/critical Qs, well mannered
	Assessment by University Examiner		≤40%	>40% - 60%	>60% - 80%	>80%
Faculty and Staff Satisfaction Survey		2.2.5	Generally poor knowledge understanding & programming skill, careless approach in team, weak soft skill	Conceptually weak, needs guidance in programming, plays some role in team, lacks in soft skill	Has basic knowledge, good programming skill, report writing skill and soft skill. lacks in technical depth and leadership, hard worker	Has solid knowledge, can manage any type of questions at any difficulty level with utmost confidence, has excellent report writing and soft skill and leadership quality, good finisher
Employer Survey		2.2.1	Lack professional skill and attitude, got poor exposure in SDLC	Scope for improvement of professional skill and attitude, lacks exposure in all stages of SDLC	Good professional skill and attitude, good exposure in SDLC stages, lacks leadership and technical depth	Excellent professional skill and attitude, has leadership quality and technically sound, proficient in conducting all stages of SDLC