Samrat Ashok Technological Institute (Engg. College), Vidisha (M.P.)
(An autonomous Institute Affiliated to RGPV, Bhopal)
Computer Science Engineering Department

VIII-SEM B.Tech.	Subject Code	Subject Name / Title	Maximum Marks Allotted						Contract Hrs.			Total Credits
			Theory			Practical						
			End Sem	Mid Sem Exam	Quiz Assign ment	End Sem	Lab Work & Sessional	Total Marks	L	T	P	
	CS-1881(A)	Network Security and cryptography	70	20	10	-	-	100	3	-	-	3

Prerequisite:

Student should have prior knowledge of Discrete structure, Theory of computation and Computer Networks.

Course Objectives:

Understand OSI security architecture and classical encryption techniques.
Acquire fundamental knowledge on the concepts of finite fields and number theory.
Understand various block cipher and stream cipher models.
Describe the principles of public key cryptosystems, hash functions and digital signature.

Course Contents:

UNIT -I: Introduction to network security: Security Needs and Threats, Goals of network security, Types of Computer Crime and Criminals-scavenging, leakage, wire taping etc. Controlling Physical Access: Role of physical Security, Weakness, Types of Identification Badges, security factors. Desktop security: Challenges, security techniques, physical security and procedural methods, Protecting data hardware and software problem and their solutions. Role of Password network security, strength and weakness of password, Administering a password system, Virus, Worms, Trap doors, Trojan horse, Firewall.

UNIT-II: Security: Attacks, Services, Mechanism, OSI security architecture, Symmetric ciphers: Substitution Ciphers: Caesar cipher, Hill cipher, Play fair cipher, Mono-alphabetic Cipher, Poly-alphabetic cipher, Shannon Theorem, One Time pad, Transposition Cipher: Rail fence technique, Steganography.

UNIT- III: Block Cipher: Data confidentiality, Simplified DES, Feistal Structure, Blowfish, RC5, Data Encryption Standard, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design principles, Block Cipher Modes of Operation. Advanced Encryption standard

UNIT- IV: Number Theory: Group, Ring, Field, Modular Arithmetic, Euclidean Theorem, Fermat's Theorem, Euler's Theorem, Chinese Remainder Theorem, Public Key Cryptography: RSA algorithm. Diffie-Hellman Key Exchange Algorithm, Elliptic Curve Cryptography.

UNIT- V: Cryptographic Data Integrity: Hash Function, Requirement and security, Secure hash algorithm (SHA) and its Version, Message Digest MD-4 and MD-5, RIPMED, Message Authentication Codes, Digital Signature standard, Key Management and Distribution, PKI,

User Authentication Protocol: Kerberos. Transport layer Security: SSL, TLS, HTTPS, Email Security: PGP, S/MIME, IP Security.

Reference Books: -

1. William Stallings "Cryptography and Network Security-Principles and Practice Forth Edition", Prentice Hall Publication.
2. Behrouz A. Forouzan, Debdeep Mukhopadhyay "Cryptography and Network Security Second Edition" Tata Macgraw Hill Education.

Course Outcomes: Student will be able to

CO-1: Define basic concepts and algorithms of cryptography, including encryption/decryption and hash functions.
CO-2: Solve and Relate mathematic concepts behind the cryptographic algorithms.
CO-3: Define various network security practice applications.
CO-4: Analyze protocols for various security objectives with cryptographic tools.
CO-5: Apply various security algorithms to solve security related problem.

Mapping of CO and PO:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	2		1	1								2	
CO-2	3	2			1								1	
CO-3	3		2	3									2	
CO-4					2								2	2
CO-5			3					2					2	

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	CS-1881(C)	Bio-Informatics	70	20	10	-	-	100	3	-	-	3

Prerequisites:

Concepts in chemistry, Databases & Information retrieval.

Course objectives:

To provide the knowledge of information storage, management, retrieval and analysis procedures and techniques which are useful and applicable in the field of biosciences.

Course Contents:

UNIT I: Introduction to bioinformatics, objectives of bioinformatics, Basic chemistry of nucleic acids, structure of DNA and RNA, Genes, structure of bacterial chromosome, cloning methodology, Data maintenance and Integrity Tasks.

UNIT II:Bioinformatics Databases and Image Processing: Types of databases, Nucleotide sequence databases, Protein sequence databases, Protein structure databases, Normalization, Data cleaning and transformation, Protein folding, protein function, protein purification and characterization, Introduction to Java clients, CORBA, Using MYSQL, Feature Extraction.

UNIT III:Sequence Alignment and database searching: Introduction to sequence analysis, Models for sequence analysis, Methods of optimal alignment, Tools for sequence alignment, Dynamics Programming, Heuristic Methods, Multiple sequence Alignment.

UNIT IV:Gene Finding and Expression: Cracking the Genome, Biological decoder ring, finding genes through mathematics and learning, Genes prediction tools, Gene Mapping, Application of Mapping, Modes of Gene Expression data, Mining the Gene Expression Data.

UNIT V: Proteomics and Problem solving in Bioinformatics: Proteome analysis, tools for proteome analysis, Genetic networks, Network properties and analysis, complete pathway simulation: E-cell, Genomic analysis for DNA and Protein sequences, Strategies and options for similarity search , flowcharts for protein structure prediction.

Course Outcomes:

CO-1: Understanding of retrieval and analysis techniques and approaches for the data related to biosciences

CO-2: Familiarity with the application of molecular hylogenetic analysis and structural prediction approaches.

CO-3: Ability to perform molecular modelling and simulation.

Mapping of COs and POs

COs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO_{11}	PO_{12}
CO-1	3	3	2	1	1	2	2	3	2	1	2	3
CO-2	3	3	3	2		1	1	2	1		1	1
CO-3	3	3		3	2	1	3	1	2	3	2	2
CO-4	3	3	2	2	1		1	2		1	3	1

References:

1. Gopal and Jones, "BIOINFORMATICS with fundamentals of Genomics and Proteomics", TMH Pub.
2. Rastogi, "Bioinformatics – Concepts, skills and Applications", CBS Pub.
3. Bergeron, "Bioinformatics computing", PHI.
4. Claverie , "Bioinformatics", Wiley pub

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			End Sem	Mid Sem Exam	Quiz Assignment	End Sem	Lab Work & Sessional	Total Marks	L	T	P	
	CS-1882(A)	Internet of Things	70	20	10	-	-	100	3	-	-	3

Course Objectives:

1..Vision and Introduction to IoT.
2.Understand IoT Market perspective.
3.Data and Knowledge Management and use of Devices in IoT Technology.
4.Understand State of the Art – IoT Architecture.
5.Real World IoT Design Constraints, Industrial Automation and Commercial Building Automation in IoT.

Unit –I: M2M to IoT-The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics. M2M to IoT – A Market Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains.

Unit-II: An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An architecture IoT outline, standards considerations.

Unit-III: M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management.

Unit-IV: IoT Architecture-State of the Art – Introduction, State of the art, Architecture Reference Model- Introduction, Reference Model and architecture, IoT reference Model. IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views

Unit-V:. Real-World Design Constraints- Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control. Industrial Automation- Service-oriented architecture-based device integration, SOCRADES: realizing the enterprise integrated Web of Things, IMC-AESOP: from the Web of Things to the Cloud of Things, Commercial Building Automation- Introduction, Case study: phase one-commercial building automation.

Reference Books:

1.Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.

2.Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014.

3.Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013

Course Outcomes: The students would be able to

CO-1: To Understand the Architectural Overview of IoT

CO-2: To Understand the IoT Reference Architecture and RealWorld Design Constraints

CO-3: To Understand the various IoT Protocols (Datalink, Network, Transport, Session, Service.

CO-4: Discuss the architecture, operation an business benefits of IOT solution.

CO-5: Design IoT applications in different domain and be able to analyze their performance.

Mapping of CO and PO:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO_{11}	PO_{12}	PSO 1	PSO 2
CO-1	2	2		1	1							2	2	
CO-2	3	2	2		1							2	1	1
CO-3	3	2	2	3								1	1	
CO-4	2	2			2							2	2	2
CO-5			3					2				2	2	

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	CS-1882(B)	Android Programming	70	20	10	-	-	100	3	-	-	3

Prerequisite: Building an Android app comes down to two major skills/languages: Java and Android.

Course Objectives:

- Explain different techniques for developing applications for mobile devices.
- Understand the Android OS architecture.
- Understand the operation of the application, application lifecycle, configuration files, intents, and activities, services & Receivers.
- Install and use appropriate tools for Android development, including IDE, device emulator, and profiling tools.

Course Contents:

UNIT I: Introduction to Android, A little Background about mobile technologies , Overview of Android - An Open Platform for Mobile development, Open Handset Alliance Developing for Android:First Android Application, setup Android Development Environment. Android development Framework - Android-SDK, Eclipse Emulators, Creating & setting up custom Android emulator Android Project Framework.

UNIT II: Android Activities and UI Design, Understanding Intent, Activity, Activity Lifecycle and Manifest, Creating Application and new Activities, Expressions and Flow control, Android Manifest Simple UI -Layouts and Layout properties, Fundamental Android UI Design, introducing Layouts, Creating new Layouts, Drawable Resources, Resolution and density independence (px ,dip, dp, sip, sp) XML Introduction to GUI objects viz. Push Button, Text / Labels, EditText, ToggleButton, WeightSum Padding, Layout Weight.

UNIT III: Advanced UI Programming , Event driven Programming in Android(Text Edit, Button clicked etc.),Creating a splash screen, Event driven Programming in Android, Android Activity Lifecycle, Creating threads for gaming requirement, Understanding the Exception handler, Toast, Menu, Dialog, List and Adapters, Custom Vs. System Menus Creating and Using Handset menu Button (Hardware), Android Themes, Dialog, create an Alter Dialog, Toast in Android, List & Adapters, Manifest.xml File Update.

UNIT IV: Multimedia Programming using Android, Multimedia audio formats - Creating and Playing, Multimedia audio formats - Kill / Releasing (Memory Management),e audio in any application video playback with an event, Database - SQLite, SQLiteOpenHelper and creating a database, Opening and closing a database, Working with cursors Inserts, updates, and deletes, Location Based Services and Google Maps, Using Location Based Services, Working with Google Maps.

UNIT V: Notifications Notification Manager, Pending Intent Notifications (Show and Cancel), custom made Web browser, WebView object in XML, Methods for associated with 'Go', 'Back', 'Forward' etc. Android Development using other Tools, Other ways to Develop Android Applications, Graphics / Game development using , Installation of .apk, install .apk into your Android Mobile.

References Books:

1. Android Developer Tools Essentials by Mike Wolfson - O'Reilly Media Publication
2. Learn Java for Android Development, 2nd Edition - Jeff Friesen- Apress Publications
3. OpenGL ES 2 for Android - Kevin Brothaler - The Pragmatic Programmers.

Course Outcomes: The students would be able to:

CO-1: Explain the purpose of different development tools for Android
CO-2: Utilize Android Studio to Design simple and complex graphical user interface
CO-3: Develop the algorithm to manage simple and complex Event handle
CO-4 : Develop and design the database design for storage based application
CO-5: Plan, prepare, build and Publish an application to the Android Market

Mapping of CO and PO

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO11	PO12	PSO 1	PSO 2
CO-1	2				2				1			1	2	
CO-2	3	2	2	2	2			2	2		1	1	2	2
CO-3	2	2	3	2	2	2		2	2	1	1	2	2	2
CO-4	3	3	3	2	3	3		2	2	2	2	2	2	2
CO-5	3	3	2	2	3	3		2	3	2	2	2	2	2

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	CS-1882(C)	Digital Image Processing	70	20	10	-	-	100	3	-	-	3

Course Objective

1.To study the image fundamentals and mathematical transforms necessary for image processing.
2.To study the image enhancement techniques
3.To study image restoration procedures.
4.To study the image compression procedures.

UNIT I

Digital Image Fundamentals A simple image model, Sampling and Quantization. Relationship between pixels. Imaging geometry. Image acquisition systems, Different types of digital images.

UNIT II

Image Transformations Introduction to Fourier transforms, Discrete Fourier transforms, Fast Fourier transform, Walsh transformation, Hadmord transformation, Discrete Cosine Transformation.

UNIT III

Image Enhancement Filters in spatial and frequency domains, Histogram based processing. Image subtraction, Averaging, Image smoothing, Nedion filtering, Low pass filtering, Image sharpening by High pass filtering.

UNIT IV

Image Encoding and Segmentation Encoding: Mapping, Quantizer, Coder. Error free compression, Lossy Compression schemes. JPEG Compression standard. Detection of discontinuation by point detection, Line detection, edge detection, Edge linking and boundary detection, Local analysis, Global processing via Hough transforms and graph theoretic techniques.

UNIT V

Mathematical Morphology Binary, Dilation, crosses, Opening and closing, Simple methods of representation, Signatures, Boundary segments, Skeleton of a region, Polynomial approximation.

Course Outcomes:

CO-1: Ability to apply principles and techniques of digital image processing in applications related to design and analysis of digital imaging systems.

CO-2: Ability to analyze and implement image processing algorithms to real problems.

CO-3: Gaining of hands-on experience in using software tools for processing digital images.

CO-4: Interpret image segmentation and representation techniques.

Mapping of COs and POs.

COs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO_{11}	PO_{12}
CO-1	3	1	3	1	1	3	3	3	1	1	1	2
CO-2	3	1	1	2	1	2	1	2	2	1	2	3
CO-3	2	1	2	3	2	1	3	3	3	1	3	2
CO-4	1	3	3	2	1	3	2	1	2	2	2	0

References Books:

1. Rafael C Gonzalez, Richard E Woods 3rd Edition, Digital Image Processing Pearson.
2. Sonka, Digital Image Processing & Computer Vision, Cengage Learning.
3. Jayaraman, Digital Image Processing, TMH.
4. Pratt, Digital Image Processing, Wiley India.
5. Annadurai, Fundamentals of Digital Image Processing,Pearson Education.

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			End Sem	Mid Sem Exam	Quiz Assign ment	End Sem	Lab Work & Sessional	Total Marks	L	T	P	
	CS-1883	Major Project Final	-	-	-	400	150	550	-	-	16	8

Procedure:

a) Each defined project needs to be from Industry/Research organization/Govt. organization/socio-technical issues.
b) Project identification should be based on Analysis carried out by the students after completion of B.E Semester 6th Examination but before starting of the 7th Semester.
c) Problem definition for the project needs to be submitted by every student in the first week of the 7th Semester to his/her college.
d) Each definition will be evaluated based on merit in the beginning of the 7^{th} semester itself by the College.

Facilitation:

You may contact your Major Project In charge co-ordinator/Faculty /Department Head for skilful Analysis.

Guidelines for the Students:

1. The project work will be in-house industry project, where student need to implement project related to any domain of industry like education, legal, manufacturing, design, pharmaceutical, Ecommerce, etc.

2. Students are required to get approval of project definition from the department.

3. After approval of project definition students are required to report their project work weekly to respective internal guide.
4. Maximum 4 students can allow working in particular project group.

5. The students are required to identify their project within two weeks of the commencement of the classes and they are required to follow all the rules and instructions issued by department.

6. Each student or student group would work under the guidance of the Faculty from the College. In case any problem/other issue arises for the smooth progress of Inter Departmental project work discovery/Practical Training, it should be immediately brought to the notice of the major project in charge co-ordinator/Faculty.

7. The students are required to submit **Project Report** to their Head of the Department with the remarks of guide in their College during **Eighth week** of the semester.

Major Project CO's:

Part-I-VII Semester

CO1- Identify the problem domain correctly and to represent problem using mathematical structures and logics.

CO2- Analyze possible solution strategies and investigate problem domain and design feasible solutions for it.

Part-II-VIII Semester

CO3- Make use of cutting edge tools and technologies to derive solutions for the problems and carried a detailed studied about the feasibility and societal impact of solutions.

CO4- Acknowledges the previous work and support required in the solution. Justify the role of individual in project work. Demonstrate leadership skills in team work.

CO5- Present and communicate the importance of solutions of problem domain. Conduct and accomplish all the subtasks for project completion in time and cost effective manner and conclude the project work with possible scopes.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3			2								2	2
CO2	2	3		3		1	2						2	
CO3			3		3	2	3						2	2
CO4								3	3					
CO5					2					3	3	3		2

Mapping COs-POs: