AC–
Item No. –

As Per NEP 2020

Tolani College of Commerce (Autonomous)

Knowledge is Supreme

Title of the Course: Software Quality Assurance

Programme: B.Sc(Information Technology) Semester VI

Syllabus for 2 credits

From the academic year-2024-2025

Name of the Course: : Software Quality Assurance

Sr. No.	Heading	Particulars
1	**Description the course :**	Quality Assurance (QA) in software testing is a crucial process that ensures software products meet the highest quality requirements, ensuring flawless performance and customer satisfaction..
2	**Vertical:**	Skill Enhancement courses
3	**Type:**	Theory and Practical
4	**Credit**:	2 credits
5	**Hours Allotted:**	60 Hours
6	**Marks Allotted**:	200 Marks Continuous Evaluation: 40Marks Semester-End: 60 Marks Project Evaluation :150 Marks
7	**Course Objectives**: 1. To understand and be able to apply software quality fundamentals to real-world software projects, including an ethical approach to Quality, value and cost considerations, quality models and safety considerations. 2. To demonstrate by means of example – software quality management processes such as quality assurance, verification and validation, and reviews/audits. 3. To illustrate the essential software practical considerations such as quality requirements, defect characterization, SQM techniques and software quality measurement. 4. To Employ the latest software quality tools.	
8	**Course Outcomes**: 1. The learners will be familiar with the process of verification and validation. 2. The learners will understand the process of applying tests to software and the fundamental components of a test case. 3. The learners will be able to derive test cases from software requirement specifications - including being able to partition input and output domains, form test specifications, and identify valid combinations of input. 4. The learners will understand and be able to distinguish between methods of judging test case adequacy and how to design tests that will accomplish the obligations of methods.	

9	**Modules**:-
	Module1: Introduction to Quality, Software Quality
	• Historical Perspective of Quality, What is Quality? (Is it a fact or perception?), Definitions of Quality, Core Components of Quality, Quality View, Financial Aspect of Quality, Customers, Suppliers and Processes, Total Quality Management (TQM), Quality Principles of Total Quality Management, Quality Management Through Statistical Process Control, Quality Management Through Cultural Changes, Continual (Continuous) Improvement Cycle, Quality in Different Areas, Benchmarking and Metrics, Problem Solving Techniques, Problem Solving Software Tools. • Introduction, Constraints of Software Product Quality Assessment, Customer is a King, Quality and Productivity Relationship, Requirements of a Product, Organisation Culture, Characteristics of Software, Software Development Process, Types of Products, Schemes of Criticality Definitions, Problematic Areas of Software Development Life Cycle, Software Quality Management, Why Software Has Defects? Processes Related to Software Quality, Quality Management System Structure, Pillars of Quality Management System, Important Aspects of Quality Management.
	Module2: Fundamentals of testing
	• Introduction, Necessity of testing, What is testing? Fundamental test process, The psychology of testing, Historical Perspective of Testing, Definitions of Testing, Approaches to Testing, Testing During Development Life Cycle, Requirement Traceability Matrix, Essentials of Software Testing, Workbench, Important Features of Testing Process, Misconceptions About Testing, Principles of Software Testing, Salient Features of Good Testing, Test Policy, Test Strategy or Test Approach, Test Planning, Testing Process and Number of Defects Found in Testing, Test Team Efficiency, Mutation Testing, Challenges in Testing, Test Team Approach, Process Problems Faced by Testing, Cost Aspect of Testing, Establishing Testing Policy, • Methods, Structured Approach to Testing, Categories of Defect, Defect, Error, or Mistake in Software, Developing Test Strategy, Developing Testing Methodologies (Test Plan), Testing Process, Attitude Towards Testing (Common People Issues), Test Methodologies/Approaches, People Challenges in Software Testing, • Raising Management Awareness for Testing, Skills Required by Tester,Testing throughout the software life cycle, Software development models, Test levels, Test types, the targets of testing, Maintenance testing

Module3: **Unit Testing**

- **Boundary Value Testing:** Normal Boundary Value Testing, Robust Boundary Value Testing, Worst-Case Boundary Value Testing, Special Value Testing, Examples, Random Testing, Guidelines for Boundary Value Testing,
- **Equivalence Class Testing:** Equivalence Classes, Traditional Equivalence Class Testing, Improved Equivalence Class Testing, Edge Testing, Guidelines and Observations.
- **Decision Table–Based Testing:** Decision Tables, Decision Table Techniques, Cause-and-Effect Graphing, Guidelines and Observations,
- **Path Testing:** Program Graphs, DD-Paths, Test Coverage Metrics, Basis Path Testing, Guidelines and Observations,
- **Data Flow Testing:**
  Define/Use Testing, Slice-Based Testing, Program Slicing Tools

Module 4: **Software Verification and Validation, V-test Model**

- Introduction, Verification, Verification Workbench, Methods of Verification, Types of reviews on the basis od Stage Phase, Entities involved in verification, Reviews in testing lifecycle, Coverage in Verification, Concerns of Verification, Validation, Validation Workbench, Levels of Validation, Coverage in Validation, Acceptance Testing, Management of Verification and Validation, Software development verification and validation activities.
- Introduction, V-model for software, testing during Proposal stage, Testing during requirement stage, Testing during test
  planning phase, Testing during design phase, Testing during coding, VV Model,
  Critical Roles and Responsibilities.

Module 5: Levels of Testing, Special Tests

- Introduction, Proposal Testing, Requirement Testing, Design Testing, Code Review, Unit Testing, Module Testing, Integration Testing, Big-Bang Testing, Sandwich Testing, Critical Path First, Sub System Testing, System Testing, Testing Stages.
- Introduction, GUI testing, Compatibility Testing, Security Testing, Performance Testing, Volume Testing, Stress Testing, Recovery Testing, Installation Testing, Requirement Testing, Regression Testing, Error Handling Testing, Manual Support Testing, Intersystem Testing, Control Testing, Smoke Testing, Adhoc Testing, Parallel Testing, Execution Testing, Operations Testing, Compliance Testing, Usability Testing, Decision Table Testing, Documentation Testing,Training testing, Rapid Testing, Control flow graph, Generating tests on the basis of Combinatorial Designs, State Graph, Risk Associated with New Technologies, Process maturity level of Technology, Testing Adequacy of Control in New technology usage, Object Oriented Application Testing, Testing of Internal Controls, COTS Testing, Client Server Testing, Web Application Testing, Mobile Application Testing, eBusiness eCommerce Testing, Agile Development Testing, Data Warehousing Testing.

10	**Reference Books:** 1. **Author:** William E. Lewis, **Title:** SoftwareTesting and Continuous Quality Improvement **Publisher:** CRC Press 3rd Edition **year**:2016 2. **Author:** M. G. Limaye, **Title:** Software Testing:Principles, Techniques and Tools **Publisher:** TMH **year**:2017 3. **Author:** Paul C. Jorgenson, **Title:** Software Testing: A Craftsman's Approach, **Publisher:** CRC Press 4th Edition **year**:2017
11	**Internal Continuous Assessment:40%** / **Semester End Examination:60%**
12	**Practical Evaluation through:** / **50%**
13	**Format of Question Paper:**

Scheme of Evaluation Pattern
Table 1A: Scheme of Continuous Evaluation (CE)
Scheme of Evaluation Pattern

Sub-components	Maximum Marks	Conditions for passing
1) Assignment/Project Work/Presentation/Case Study	30	a) A learner must be present for each of the sub-components.
2) Online MCQ Objective Test	10	
Total	40	

Q.1.		Attempt any two of the following	10
	a)		
	b)		
	c)		
	d)		
	e)		
		Attempt any two of the following	10
Q.2.	**a)**		
	b)		
	c)		

	d)		
	e)		
		Attempt any two of the following	10
Q.3.	**a)**		
	b)		
	c)		
	d)		
	e)		
		Attempt any two of the following	10)
Q.4.	**a)**		
	b)		
	c)		
	d)		
	e)		
Q.5.		Attempt any two of the following	10
	a)		
	b)		
	c)		
	d)		
	e)		
Q.6.		Attempt any two of the following	10
	a)		
	b)		
	c)		
	d)		
	e)		

B. Sc. (Information Technology)		**Semester – VI**	
Course Name: Project Implementation		**Course Code: TCC.UITVIP1**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**150**
	Internal	**--**	**-**

AC–
Item No. –

As Per NEP 2020

Tolani College of Commerce (Autonomous)

Title of the Course: Security in Computing

Programme: B.Sc(Information Technology) Semester VI

Syllabus for 2 credits

From the academic year-2024-2025

Name of the Course: Security in Computing

Sr. No.	Heading	Particulars
1	**Description the course :**	Information security is concerned with protecting information in all its forms, whether written, spoken, electronic, graphical, or using other methods of communication. Network security is concerned with protecting data, hardware, and software on a computer network.
2	**Vertical:**	Skill Enhancement Course
3	**Type:**	Theory and Practical
4	**Credit**:	2 credits
5	**Hours Allotted:**	60 Hours
6	**Marks Allotted**:	150 Marks Continuous Evaluation: 40Marks Semester-End: 60 Marks Practical Evaluation :50 Marks
7	**Course Objectives** **1.** To prepare students with the technical knowledge and skills needed to protect and defend computer systems and networks. **2.** To develop graduates that can plan, implement, and monitor cyber security mechanisms to help ensure the protection of information technology assets.	
8	**Course Outcomes**: 1. Upon successful completion of the programme, candidates will be familiar with cyber security landscapes 2. Analyze and evaluate the cyber security needs of an organization. 3. Determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation.	

9	**Modules**:-
	Module1:Information Security, Risk Analysis, **Secure Design Principles**
	• The Importance of Information Protection, The Evolution of Information Security, Justifying Security Investment, Security Methodology, How to Build a Security Program, The Impossible Job, The Weakest Link, Strategy and Tactics, Business Processes vs. Technical Controls. • Threat Definition, Types of Attacks, Risk Analysis. • The CIA Triad and Other Models, Defense Models, Zones of Trust, Best Practices for Network Defense
	Module2:Authentication and Authorization, Encryption, **Storage Security, Database Security**:
	• Authentication, Authorization • A Brief History of Encryption, Symmetric-Key Cryptography, Public Key Cryptography, Public Key Infrastructure. • Storage Security Evolution, Modern Storage Security, Risk Remediation, Best Practices. • General Database Security Concepts, Understanding Database Security Layers, Understanding Database- Level Security, Using Application Security, Database Backup and Recovery, Keeping Your Servers Up to Date, Database Auditing and Monitoring.
	Module3:**Secure Network Design, Network Device Security**, **Firewalls , Wireless Network Security**
	• Introduction to Secure Network Design, Performance, Availability, Security. • Switch and Router Basics, Network Hardening. • Overview, The Evolution of Firewalls, Core Firewall Functions, Additional Firewall Capabilities, Firewall Design. • Radio Frequency Security Basics, Data- Link Layer Wireless Security Features, Flaws, and Threats, Wireless Vulnerabilities and Mitigations, Wireless Network Hardening Practices and Recommendations, Wireless Intrusion Detection and Prevention, • Wireless Network Positioning and Secure Gateways
	Module4:**Intrusion Detection and Prevention Systems, Voice over IP (VoIP) and PBX Security, Operating System Security Models**
	• IDS Concepts, IDS Types and Detection Models, IDS Features, IDS Deployment Considerations, Security Information and Event Management (SIEM). • Background, VoIP Components, VoIP Vulnerabilities and Countermeasures, PBX, TEM: Telecom Expense Management. • Operating System Models, Classic Security Models, Reference Monitor, Trustworthy Computing, International Standards for Operating System Security

	Module5: Virtual Machines and Cloud Computing, Secure Application Design, Physical Security
	• Virtual Machines, Cloud Computing. • Secure Development Lifecycle, Application Security Practices, Web Application Security, Client Application Security, Remote Administration Security. • Classification of Assets, Physical Vulnerability Assessment, Choosing Site Location for Security, Securing Assets: • Locks and Entry Controls, Physical Intrusion Detection.
11	**Reference Books:** 1. **Author:**Mark Rhodes- Ousley, **Title:**The Complete Reference: Information Security,**Publisher:**McGraw- Hill 2nd Edition**year**:2013 2. **Author:**Josiah Dykstra**Title:**Essential Cybersecurity Science, **Publisher:**O'Reilly 5th Edition **year**:2017 3. **Author:**Wm.Arthur Conklin, GregWhite**Title:**Principles of Computer Security: CompTIA Security+ and Beyond, **Publisher:**McGraw Hill2nd Edition **year**:2010
12	**Internal Continuous Assessment:40%** / **Semester End Examination:60%**
13	**Practical Evaluation through:** / **50%**
14	**Format of Question Paper:**

Scheme of Evaluation Pattern
Table 1A: Scheme of Continuous Evaluation (CE)
Scheme of Evaluation Pattern

Sub-components	Maximum Marks	Conditions for passing
3) Assignment/Project Work/Presentation/Case Study	30	b) A learner must be present for each of the sub-components.
4) Online MCQ Objective Test	10	
Total	40	

Q.1.		Attempt any two of the following	10
	a)		
	b)		
	c)		

	d)		
	e)		
		Attempt any two of the following	10
Q.2.	**a)**		
	b)		
	c)		
	d)		
	e)		
		Attempt any two of the following	10
Q.3.	**a)**		
	b)		
	c)		
	d)		
	e)		
		Attempt any two of the following	10)
Q.4.	**a)**		
	b)		
	c)		
	d)		
	e)		
Q.5.		Attempt any two of the following	10
	a)		
	b)		
	c)		
	d)		
	e)		
Q.6.		Attempt any two of the following	10
	a)		
	b)		
	c)		
	d)		
	e)		

B. Sc. (Information Technology)		**Semester – VI**	
Course Name: Security in Computing Practical		**Course Code: TCC.UITVIP2**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**-**

Practical No	Details
1	**Configure Routers**
a	OSPF MD5 authentication.
b	NTP.
c	to log messages to the syslog server.
d	to support SSH connections.
2	**Configure AAA Authentication**
a	Configure a local user account on Router and configure authenticate on the console and vty lines using local AAA
b	Verify local AAA authentication from the Router console and the PC-A client
3	**Configuring Extended ACLs**
a	**Configure, Apply and Verify an Extended Numbered ACL**
4	**Configure IP ACLs to Mitigate Attacks and IPV6 ACLs**
a	Verify connectivity among devices before firewall configuration.
b	Use ACLs to ensure remote access to the routers is available only from management station PC-C.
c	Configure ACLs on to mitigate attacks.
d	Configuring IPv6 ACLs
5	**Configuring a Zone-Based Policy Firewall**
6	Configure IOS Intrusion Prevention System (IPS) Using the CLI
a	Enable IOS IPS.
b	Modify an IPS signature.
7	**Layer 2 Security**
a	Assign the Central switch as the root bridge.
b	Secure spanning-tree parameters to prevent STP manipulation attacks.
c	Enable port security to prevent CAM table overflow attacks.

8	**Layer 2 VLAN Security**
9	**Configure and Verify a Site-to-Site IPsec VPN Using CLI**

1	Q.1	20
2	Q.2	20
3	Viva	5
4	Journal	5
5	**Total**	**50**

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As Per NEP 2020

Tolani College of Commerce (Autonomous)

Title of the Course: Business Intelligence

Programme: B.Sc(Information Technology) Semester VI

Syllabus for 2 credits

From the academic year-2024-2025

Name of the Course: Business Intelligence

Sr. No.	Heading	Particulars
1	**Description the course ::**	Business intelligence may be defined as a set of mathematical models. and analysis methodologies that exploit the available data to generate information and knowledge useful for complex decision-making processes.
2	**Vertical:**	Skill Enhancement courses
3	**Type:**	Theory and Practical
4	**Credit**:	2 credits
5	**Hours Allotted:**	60 Hours
6	**Marks Allotted**:	150 Marks Continuous Evaluation: 40Marks Semester-End: 60 Marks Practical Evaluation :50 Marks
7	**Course Objectives** 1. To support better business decision making. 2. This course provides an overview of the technology of BI and the application of BI to an organization's strategies and goals.	
8	**Course Outcomes** 1. Enable all participants to recognise, understand and apply the language, theory and models of the field of business analytics 2. Foster an ability to critically analyse, synthesise and solve complex unstructured business problems 3. Encourage an aptitude for business improvement, innovation and entrepreneurial action 4. Encourage the sharing of experiences to enhance the benefits of collaborative learning	

9	**Modules**:-
	Module1:Business intelligence, Decision support systems
	• Effective and timely decisions, Data, information and knowledge, The role of mathematical models, Business intelligence architectures, Ethics and business intelligence • Definition of system, Representation of the decision-making process, Evolution of information systems, Definition of decision support system, Development of a decision support system
	Module2:Mathematical models for decision making, Data mining, Data preparation
	• Structure of mathematical models, Development of a model, Classes of models • Definition of data mining, Representation of input data , Data mining process, Analysis methodologies • Data validation, Data transformation, Data reduction
	Module3:**Classification, Clustering**
	• Classification problems, Evaluation of classification models, Bayesian methods, Logistic regression, Neural networks, Support vector machines • Clustering methods, Partition methods, Hierarchical methods, Evaluation of clustering models
	Module4:**Business intelligence applications, Marketing models, Logistic and production models, Data envelopment analysis**
	• Business intelligence applications**:** • Relational marketing, Sales force management, • Supply chain optimization, Optimization models for logistics planning, Revenue management systems. • Efficiency measures, Efficient frontier, The CCR model, Identification of good operating practices
	Module 5:Knowledge Management, Artificial Intelligence and Expert Systems
	• Introduction to Knowledge Management, Organizational Learning and Transformation, Knowledge Management Activities, Approaches to Knowledge Management,Information Technology (IT) In Knowledge Management, Knowledge Management Systems Implementation, Roles of People in Knowledge Management • Concepts and Definitions of Artificial Intelligence, Artificial Intelligence Versus Natural Intelligence, Basic Concepts of Expert Systems, Applications of Expert Systems, Structure of Expert Systems, Knowledge Engineering, Development of Expert Systems

11 **Reference Books:**

1. **Author:** Carlo Vercellis, **Title:** Business Intelligence: DataMining and Optimization for Decision Making, **Publisher:**Wiley 1st Edition**year**:2009
2. **Author:** Efraim Turban,RameshSharda, DursunDelen, **Title:** Decision support andBusiness Intelligence Systems, **Publisher:**Pearson 9th Edition **year**:2011
3. **Author:**Grossmann W, Rinderle-Ma, **Title:**Fundamental of Business Intelligence, **Publisher:**Springer 1st Edition **year**:2015

12	**Internal Continuous Assessment:40%**	**Semester End Examination:60%**
13	**Practical Evaluation through:**	**50%**

14 **Format of Question Paper:**

Scheme of Evaluation Pattern
Table 1A: Scheme of Continuous Evaluation (CE)
Scheme of Evaluation Pattern

Sub-components	Maximum Marks	Conditions for passing
5) Assignment/Project Work/Presentation/Case Study	30	c) A learner must be present for each of the sub-components.
6) Online MCQ Objective Test	10	
Total	40	

Q.1.		Attempt any two of the following	10
	a)		
	b)		
	c)		
	d)		
	e)		
		Attempt any two of the following	10
Q.2.	**a)**		
	b)		
	c)		
	d)		
	e)		
		Attempt any two of the following	10

Q.3.	**a)**		
	b)		
	c)		
	d)		
	e)		
		Attempt any two of the following	10
Q.4.	**a)**		
	b)		
	c)		
	d)		
	e)		
Q.5.		Attempt any two of the following	10
	a)		
	b)		
	c)		
	d)		
	e)		
Q.6.		Attempt any two of the following	10
	a)		
	b)		
	c)		
	d)		
	e)		

B. Sc. (Information Technology)		**Semester – VI**	
Course Name: Business Intelligence Practical		**Course Code: TCC.UITVIP3**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**-**

Practical No	**Details**
1	Import the legacy data from different sources such as (Excel , SqlServer, Oracle etc.) and load in the target system. (You can download sample database such as Adventureworks, Northwind, foodmart etc.)

2	Perform the Extraction Transformation and Loading (ETL) process to construct the database in the Sqlserver.
3	a. Create the Data staging area for the selected database. b. Create the cube with suitable dimension and fact tables based on ROLAP, MOLAP and HOLAP model.
4	a. Create the ETL map and setup the schedule for execution. b. Execute the MDX queries to extract the data from the data warehouse.
5	a. Import the data warehouse data in Microsoft Excel and create the Pivot table and Pivot Chart. b. Import the cube in Microsoft Excel and create the Pivot table and Pivot Chart to perform data analysis.
6	Apply the what – if Analysis for data visualization. Design and generate necessary reports based on the data warehouse data.
7	Perform the data classification using classification algorithm.
8	Perform the data clustering using clustering algorithm.
9	Perform the Linear regression on the given data warehouse data.
10	Perform the logistic regression on the given data warehouse data.

1	Q.1	20
2	Q.2	20
3	Viva	5
4	Journal	5
5	**Total**	**50**

AC–
Item No. –

As Per NEP 2020

Tolani College of Commerce (Autonomous)

Knowledge is Supreme

Title of the Course: Principles of Geographic Information

Programme: B.Sc (Information Technology) Semester VI

Syllabus for 2 credit

From the academic year-2024-2025

Name of the Course: Principles of Geographic Information system

Sr. No.	Heading	Particulars
1	**Description the course:**	A geographic information system (GIS) is a computer system for capturing, storing, checking, and displaying data related to positions on Earth's surface. By relating seemingly unrelated data, GIS can help individuals and organizations had better understand spatial patterns and relationships.
2	**Vertical:**	Skill Enhancement courses
3	**Type:**	Theory and Practical
4	**Credit**:	2 credits
5	**Hours Allotted:**	60 Hours
6	**Marks Allotted**:	150 Marks Continuous Evaluation: 40Marks Semester-End: 60 Marks Practical Evaluation :50 Marks
7	**Course Objectives:** **1.** For students to become skilled with the acquisition, handling and analysis of geographic data **2.** These skills to problems within their profession or discipline.	
8	**Course Outcomes:** **1.** Demonstrate organizational skills in file and database management. **2.** Give examples of interdisciplinary applications of Geospatial Information Science and Technology. **3.** Apply GIS analysis to address geospatial problems and/or research questions. **4.** Demonstrate proficiency in the use of GIS tools to create maps that are fit-for-purpose and effectively convey the information they are intended to.	

9	**Modules**:-
	Module1:A Gentle Introduction to GIS, Geographic Information and Spatial Database Models and Representations of the real world
	• **The nature of GIS:** Some fundamental observations, Defining GIS, GISystems, GIScience and GIApplications, Spatial data and Geoinformation. • **The real world and representations of it:** Models and modelling, Maps, Databases, Spatial databases and spatial analysis • **Geographic Phenomena:** Defining geographic phenomena, types of geographic phenomena, Geographic fields, Geographic objects, Boundaries • **Computer Representations of Geographic Information:** Regular tessellations, irregular tessellations, Vector representations, Topology and Spatial relationships, Scale and Resolution, Representation of Geographic fields, Representation of Geographic objects • **Organizing and Managing Spatial Data The Temporal Dimension**
	Module2:Data Management and Processing Systems Hardware and Software Trends
	• **Geographic Information Systems:** GIS Software, GIS Architecture and functionality, Spatial Data Infrastructure (SDI) • **Stages of Spatial Data handling:** Spatial data handling and preparation, Spatial Data Storage and maintenance, Spatial Query and Analysis, Spatial Data Presentation. • **Database management Systems:** Reasons for using a DBMS, Alternatives for data management, The relational data model, Querying the relational database. • **GIS and Spatial Databases:** Linking GIS and DBMS, Spatial database functionality.
	• **Module3**:**Spatial Referencing and Positioning,Data Entry and Preparation**
	• **Spatial Referencing:** Reference surfaces for mapping, Coordinate Systems, Map Projections, Coordinate Transformations • **Satellite-based Positioning:** Absolute positioning, Errors in absolute positioning, Relative positioning, Network positioning, code versus phase measurements, Positioning technology • **Spatial Data Input:** Direct spatial data capture, Indirect spatial data capture, Obtaining spatial data elsewhere • **Data Quality:** Accuracy and Positioning, Positional accuracy, Attribute accuracy, temporal accuracy, Lineage, Completeness, Logical consistency • **Data Preparation:** Data checks and repairs, Combining data from multiple sources • **Point Data Transformation:** Interpolating discrete data, Interpolating continuous data
	Module4:**Spatial Data Analysis, Classification of analytical GIS Capabilities**
	• **Retrieval, classification and measurement:** Measurement, Spatial selection queries, Classification • **Overlay functions:** Vector overlay operators,Raster overlay operators **Neighbourhood functions:** Proximity computations, Computation of diffusion, Flow computation, Raster based surface analysis

- **Analysis:** Network analysis, interpolation, terrain modeling
- **GIS and Application models:** GPS, Open GIS Standards, GIS Applications and Advances
- **Error Propagation in spatial data processing:** How Errors propagate, Quantifying error propagation

Module5:Data VisualizationGIS and Maps, The Visualization Process Visualization

- **Strategies: Present or explore?**
- **The cartographic toolbox:** What kind of data do I have? How can I map my data?
- **How to map?** How to map qualitative data, How to map quantitative data, How to map the terrain elevation, How to map time series
- **Map Cosmetics, Map Dissemination**

11	**Reference Books:** 1. **Author:** otto huisman and Rolf A, **Title:**principal of geografic information system,**Publisher:**the international institute of geo information science and Earth observation 4th Edition year 2009 2. **Author:** P A Burrough an R A McDonnel, **Title:** principal of geografic information system,**Publisher:**Oxford univercity press 3rd Edition year:1999 3. **Author:** Michel N, Demers **Title:** Fundamental of geografic information system,**Publisher:** Wiley 4th Edition year:2009	
12	**Internal Continuous Assessment:40%**	**Semester End Examination:60%**
13	**Practical Evaluation through:**	**50%**
14	**Format of Question Paper:**	

Scheme of Evaluation Pattern
Table 1A: Scheme of Continuous Evaluation (CE)
Scheme of Evaluation Pattern

Sub-components	Maximum Marks	Conditions for passing
7) Assignment/Project Work/Presentation/Case Study	30	d) A learner must be present for each of the sub-components.
8) Online MCQ Objective Test	10	
Total	40	

Q.1.		Attempt any two of the following	10
	a)		
	b)		
	c)		
	d)		
	e)		
		Attempt any two of the following	10
Q.2.	**a)**		
	b)		
	c)		
	d)		
	e)		
		Attempt any two of the following	10
Q.3.	**a)**		
	b)		
	c)		
	d)		
	e)		
		Attempt any two of the following	10)
Q.4.	**a)**		
	b)		
	c)		
	d)		
	e)		
Q.5.		Attempt any two of the following	10
	a)		
	b)		
	c)		
	d)		
	e)		
Q.6.		Attempt any two of the following	10
	a)		
	b)		
	c)		
	d)		
	e)		

B. Sc. (Information Technology)		Semester – VI	
Course Name: Principles of Geographical Information System Practical		Course Code: TCC.UITVIP4(Elective II)	
Periods per week (1 Period is 50 minutes)		3	
Credits		2	
		Hours	Marks
Evaluation System	Practical Examination	2½	50
	Internal	--	-

Practical No	Details
0	Familiarizing Quantum GIS: Installation of QGIS, datasets for both Vector and Raster data, Maps.
1	Creating and Managing Vector Data: Adding vector layers, setting properties, formatting, calculating line lengths and statistics
2	Exploring and Managing Raster data: Adding raster layers, raster styling and analysis, raster mosaicking and clipping
3	Making a Map, Working with Attributes, Importing Spreadsheets or CSV filesUsing Plugins, Searching and Downloading OpenStreetMap Data
4	Working with attributes, terrain Data
5	Working with Projections and WMS Data
6	Georeferencing Topo Sheets and Scanned Maps Georeferencing Aerial Imagery Digitizing Map Data
7	Managing Data Tables and Saptial data Sets: Table joins, spatial joins, points in polygon analysis, performing spatial queries
8	Advanced GIS Operations 1: Nearest Neighbor Analysis, Sampling Raster Data using Points or Polygons, Interpolating Point Data
9	Advance GIS Operations 2: Batch Processing using Processing Framework Automating Complex Workflows using Processing Modeler Automating Map Creation with Print Composer Atlas
10	Validating Map data

		1	Q.1	20
		2	Q.2	20
		3	Viva	5
		4	Journal	5
		5	**Total**	**50**

AC–
Item No. –

As Per NEP 2020

Tolani College of Commerce (Autonomous)

Knowledge is Supreme

Title of the Course: Cyber Laws

Programme: B.Sc(Information Technology) Semester VI

Syllabus for 2 credits

From the academic year-2024-2025

Name of the Course: Cyber Laws

Sr. No.	Heading	Particulars
1	**Description the course**	The main subjects of Cyber Law course include Digital Signatures, E-commerce, Copyright Issues, Trademark Issues and Information and Technology Act, 2000
2	**Vertical:**	Skill Enhancement Course
3	**Type:**	Theory and Practical
4	**Credit**:	2 credits
5	**Hours Allotted:**	60 Hours
6	**Marks Allotted**:	150 Marks Continuous Evaluation: 40Marks Semester-End: 60 Marks Practical Evaluation :50 Marks
7	**Course Objectives**: 1. To achieve a fair and sound understanding of the concepts of the Cyber Crime Law. 2. To demonstrate good comprehension of cybercrime in areas of aspirant's interest or professional field. 3. To apply basic research methods, data analysis, and interpretation in the field of cybercrime law.	
8	**Course Outcomes**: **1.** Make Learner Conversant With The Social And Intellectual Property Issues Emerging From 'Cyberspace. **2.** Explore The Legal And Policy Developments In Various Countries To Regulate Cyberspace; **3.** Develop The Understanding Of Relationship Between Commerce And Cyberspace	

9	**Modules**:-
	Module1: Power of Arrest Without Warrant Under the IT Act, 2000 and Cyber Crime and Criminal Justice: Penalties, Adjudication and Appeals Under the IT Act, 2000
	• A Critique, Crimes of this Millennium, Section 80 of the IT Act, 2000 – A Weapon or a Farce? Forgetting the Line Between Cognizable and Non- Cognizable Offences, Necessity of Arrest without Warrant from Any Place, Public or Otherwise, Check and Balances Against Arbitrary Arrests, Arrest for "About to Commit" an Offence Under the IT Act: A Tribute to Draco, Arrest, But NO Punishment! • Concept of "Cyber Crime " and the IT Act , 2000, Hacking, Teenage Web Vandals, Cyber Fraud and Cyber Cheating, Virus on the Internet, Defamation, Harassment and E- mail Abuse, Cyber Pornography, Other IT Act Offences, Monetary Penalties, Adjudication and Appeals Under IT Act , 2000, Network Service Providers, Jurisdiction and Cyber Crime, Nature of Cyber Criminality, Strategies to Tackle Cyber Crime and Trends, Criminal Justice in India and Implications on Cyber Crime
	Module2: Contracts in the Infotech World, Jurisdiction in the Cyber World
	• Contracts in the Infotech World, Click-Wrap and Shrink-Wrap Contract: Status under the Indian Contract Act, 1872, Contract Formation Under the Indian Contract Act, 1872, Contract Formation on the Internet, Terms and Conditions of Contracts. • Questioning the Jurisdiction and Validity of the Present Law of Jurisdiction, Civil Law of Jurisdiction in India, Cause of Action, Jurisdiction and the Information Technology Act,2000, Foreign Judgements in India, Place of Cause of Action in Contractual and IPR Disputes, Exclusion Clauses in Contracts, Abuse of Exclusion Clauses, Objection of Lack of Jurisdiction, Misuse of the Law of Jurisdiction, Legal Principles on Jurisdiction in the United State of America, Jurisdiction Disputes w.r.t. the Internet in the United State of America.
	Module3: **Battling Cyber Squatters and Copyright Protection in the Cyber World**
	• Concept of Domain Name and Reply to Cyber Squatters, Meta- Tagging, Legislative and Other Innovative Moves Against Cyber Squatting, The Battle Between Freedom and Control on the Internet, Works in Which Copyright Subsists and meaning of Copyright, Copyright Ownership and Assignment, License of Copyright,Copyright Terms and Respect for Foreign Works, Copyright • Infringement, Remedies and Offences, Copyright Protection of Content on the Internet; Copyright Notice, Disclaimer and Acknowledgement, Downloading for Viewing Content on the Internet, Hyper-Linking and Framing, Liability of ISPs for Copyright Violation in the Cyber World: Legal Developments in the US, Napster and its Cousins: A Revolution on the Internet but a Crisis for Copyright Owners, Computer Software Piracy

	Module4: **E-Commerce Taxation: Real Problems in the Virtual World, Digital Signature, Certifying Authorities and E-Governance**
	• A Tug of War on the Concept of 'Permanent Establishment', Finding the PE in Cross Border E-Commerce, The United Nations Model Tax Treaty, The Law of Double Taxation Avoidance Agreements and Taxable Jurisdiction Over Non-Residents, Under the Income Tax Act, 1961, Tax Agents of Non-Residents under the Income Tax Act,1961 and the Relevance to E-Commerce, Source versus Residence and Classification between Business Income and Royalty, The Impact of the Internet on Customer Duties, Taxation Policies in India: At a Glance. • Digital Signatures, Digital Signature Certificate, Certifying Authorities and Liability in the Event of Digital Signature Compromise, E- Governance in India: A Warning to Babudom
	Module 5: The Indian Evidence Act of 1872 v. Information Technology Act, 2000, Protection of Cyber Consumers in India
	• Status of Electronic Records as Evidence, Proof and Management of Electronic Records; Relevancy, Admissibility and Probative Value of E-Evidence, Proving Digital Signatures, Proof of Electronic Agreements, Proving Electronic Messages, Other Amendments in the Indian Evidence Act by the IT Act, Amendments to the Bankers Books Evidence Act, 1891 and Reserve Bank of India Act, 1934. • Are Cyber Consumers Covered Under the Consumer Protection Act? Goods and Services, Consumer Complaint, Defect in Goods and Deficiency in Services, Restrictive and Unfair Trade Practices, Instances of Unfair Trade Practices, Reliefs Under CPA, Beware Consumers, Consumer Foras, Jurisdiction and Implications on cyber Consumers in India, Applicability of CPA to Manufacturers, Distributors, Retailers and Service Providers Based in Foreign Lands Whose Goods are Sold or Services Provided to a Consumer in India.Amendments in Indian IT Act 2000

11	**Reference Books:** • **Author:** Vivek Sood**, Title:** Cyber Law Simplified **Publisher:** TMH Education **year:2001** • **Author:** Jeff Kosseff**, Title:** Cybersecurity Law**, Publisher:** Wiley **year:** 2017	
12	**Internal Continuous Assessment:40%**	**Semester End Examination:60%**
13	**Practical Evaluation through:**	**50%**
14	**Format of Question Paper:** **Scheme of Evaluation Pattern** **Table 1A: Scheme of Continuous Evaluation (CE)** **Scheme of Evaluation Pattern**	

Sub-components	Maximum Marks	Conditions for passing
9) Assignment/Project Work/Presentation/Case Study	30	
10) Online MCQ Objective Test	10	

Total	40	e) A learner must be present for each of the sub-components.

Q.1.		Attempt any two of the following	10
	a)		
	b)		
	c)		
	d)		
	e)		
		Attempt any two of the following	10
Q.2.	**a)**		
	b)		
	c)		
	d)		
	e)		
		Attempt any two of the following	10
Q.3.	**a)**		
	b)		
	c)		
	d)		
	e)		
		Attempt any two of the following	10)
Q.4.	**a)**		
	b)		
	c)		
	d)		
	e)		
Q.5.		Attempt any two of the following	10
	a)		
	b)		
	c)		
	d)		
	e)		
Q.6.		Attempt any two of the following	10
	a)		

	b)		
	c)		
	d)		
	e)		

B. Sc. (Information Technology)		**Semester – VI**	
Course Name: Advanced Mobile Programming Practical		**Course Code: TCC.UITVIP6**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Practical No	**Details**
1	**Introduction to Android, Introduction to Android Studio IDE, Application Fundamentals:** Creating a Project, Android Components, Activities, Services, Content Providers, Broadcast Receivers, Interface overview, Creating Android Virtual device, USB debugging mode, Android Application Overview. Simple "Hello World" program.
2	**Programming Resources** Android Resources: (Color, Theme, String, Drawable, Dimension, Image),
3	**Programming Activities and fragments** Activity Life Cycle, Activity methods, Multiple Activities, Life Cycle of fragments and multiple fragments.
4	**Programs related to different Layouts** Coordinate, Linear, Relative, Table, Absolute, Frame, List View, Grid View.
5	**Programming UI elements** AppBar, Fragments, UI Components
6	**Programming menus, dialog, dialog fragments**

7	**Programs on Intents, Events, Listeners and Adapters** The Android Intent Class, Using Events and Event Listeners
8	**Programs on Services, notification and broadcast receivers**
9	**Database Programming with SQLite**
10	**Programming threads, handles and asynchronized programs**
11	**Programming Media API and Telephone API**
12	**Programming Security and permissions**
13	**Programming Network Communications and Services (JSON)**

1	Q.1	20
2	Q.2	20
3	Viva	5
4	Journal	5
5	**Total**	**50**

Signatures of Team Members

Sr.No	Name	Signature
1.	Deepak Sharma	
2.	Sabiha Malik	
3.	Shraddha Parab	
4.	Vibhuti Barad	