Tribhuvan University
Faculty of Education
Office of the Dean

BACHELOR OF INFORMATION AND COMMUNICATION TECHNOLOGY EDUCATION
(BICTE)
Seventh Semester Curriculum
(2081)

List of Subjects

Ed. 472: Research Project | **Program: BICTE**

Course No. : Ed. 472 | **Nature of course: Theory + Practical**

Level: Bachelor | **Credit Hours: 3 (2T+1P)**

Semester: Seven | **Teaching hours: 64 Hours(32T+32P)**

1. Course Description:

This course provides students with the foundational knowledge and practical skills needed to conduct a research project, culminating in a thesis. Students will learn how to design, conduct, and present research effectively. This course emphasizes critical thinking, methodological rigor, and the articulation of research findings.

2. Course Objectives:

- Develop knowledge and skills in research methodologies and approaches.
- Identify and formulate research questions and hypotheses.
- Conduct literature reviews and synthesize relevant information.
- Design and implement research methods appropriate for the project.
- Competency in collecting and analyzing data using appropriate tools and techniques.
- Write and present a coherent and well-structured research thesis.
- Develop skills in academic writing and formatting.
- Prepare and deliver effective presentations of research findings.

3. Course Details

To achieve the expected outcomes of the course, the contents are organized as follows:

Specific Objectives	Contents
• Analyze the concept of research • Illustrate different research approaches and methodologies • Identify and apply research ethics • Finding and stating the	**Unit 1. Introduction to Research Projects (8 Hours)** 1.1 Overview of research in academia. 1.2 Objectives of Research 1.3 Research Approaches 1.4 Research Methods versus Research Methodology 1.5 Importance of research ethics and integrity. (Ethics Considerations in Research) 1.6 Identifying research gaps and formulating research

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research gap • Formulating research hypothesis/ research question	hypotheses/questions.
• Develop a research proposal in a step-by-step manner in the chosen problem • State objective, formulate a hypothesis, and determine the methodology for the selected issue •	**Unit 2 Writing the Research Project Proposal (10 Hours)** 2.1 Components of Research Project Proposal 2.2 Structuring a research proposal. 2.3 Develop objectives, hypotheses, and methodology. **Practical** Preparation of research project proposal for contemporary issues such as social issues, circular economic issues, environmental issues, educational, cultural, technology etc.
• Identify related literature • Evaluate the credibility and relevance of various sources • Write a review of related literature	**Unit 3 Review of Related Literature (10 Hours)** **3.1** Conducting a literature review: Systematic review and Thematic review **3.2** Developing conceptual framework **3.3** Verification of authentic sources and integrating findings. **Practical** Review literature for the selected research topic minimum three including books, reports and articles using APA7th Edition.
• **Identify** related research design for a specific topic. • Define the population and use the appropriate sampling technique • Adopt ethical acceptance in the research project • Select the appropriate data	**Unit 4 Major Concepts Regarding Research Design (16 Hours)** 4.1.Qualitative vs. quantitative research methods. 4.2 Population, Sampling procedure (sample size, techniques) 4.3 Tools and techniques for data collection (surveys, interviews, experiments, questionnaires, and Checklist). 4.4 Use of Statistical Measures (Central Tendency, Measures of Dispersion, and Measures of Relationship)

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collection tool for collecting data 4.1 Apply suitable scales for measuring variables • Explain the technique of analysis and interpretation of data • Interpret the fringing using the support of statistical tools •	4.5 Interpreting data (Frequency, Table, Charts, and graphs) and drawing conclusions 4.6 Ethical considerations and obtaining approvals 4.7 Finding and discussion **Practical** ➢ Develop a research design based on a selected topic including methods, sampling (probability and non-probability). ➢ Develop a research tool and collect data for the selected topic using tools such as google form, ➢ Analysis of data and interpret using suitable tools such as SPSS, NVivo
• Apply the layout and structure of a research report • Develop effective writing skills in academic style with referencing and citations • Prepare and present research findings to peers and instructors, incorporating feedback for improvement, and complete the final submission process	**Unit 5 Preparing and Presenting research report (20 hours)** 5.1 Layout of the Research Report 5.2 Structure of a project report: introduction, literature review, methodology, results, discussion. 5.3 Referencing and citations (APA 7th Editions) 5.4 Finalizing the Research Report. Project: ➢ Develop research project report incorporating unit 2,3,4 practical task and prepare and submit final report in concerned department. ➢ Student present their report. ➢ Peer and Instructor Evaluations. ➢ Reflection and Wrap-up.

4. Instructional Techniques

The instructional techniques for this course are divided into two groups. The first group consists of general instructional techniques applicable to most units. The second group consists of specific

instructional techniques applicable to particular units.

4.1 General Techniques

Reading materials will be provided to students in each unit. Lecture, Discussion, use of the multi-media projector, and brainstorming are used in all units.

4.2 Specific Instructional Techniques

A demonstration is an essential instructional technique for all units in this course during the learning process. Specifically, demonstration with practical works will be the specific instructional technique in this course. The details of suggested instructional techniques are presented below:

5. Evaluation

Evaluation of students' performance is divided into parts: Internal assessment (theory and practical and internal External examinations (theory and practical). The distribution of points is given below:

Internal Assessment Theory	Internal Assessment Practical	Semester Examination (Theoretical exam)	External Practical Exam/Viva	Total Points
25 Points	15 Points	40 Points	20 Points	100 Points

***Note**: Students must pass separately in the internal assessment, external practical exam, and semester examination.*

5.1 Internal Assessment (25 Points) of Theoretical Part

Internal assessment will be conducted by subject teacher based on following criteria:

Attendance and learning Activities	5 points
First assignment (Written assignment)	5 points
Second assignment (Project work with presentation)	10 points
Third assignment/written examination	5 point
Total	25 points

5.2 Internal Assessment (15 Points) of practical part

Internal practical assessment will be conducted by subject teacher based on following criteria:

Attendance and learning Activities	5 points
Practical work/project work/lab work	10 points
Total	15 points

5.3 Semester Final Examination (40 Points) Theoretical part

Examination Division, the Dean's office will conduct the final examination at the end of the semester.	
Objective question (Multiple choice questions 10 x 1 point)	10 Points
Subjective questions (6 questions x 5 marks with 'OR" two questions)	30 Points
Total 40points	

5.1 Practical Exam/Viva (20 Points)

Examination Division, Office of the Dean will appoint an external examiner for conducting the practical examination

Items	Points
Evaluation of Record Book	4
Project work/practical work presentation/skill test	10
Viva	6
Total	20

6. Recommended books and Reference materials (including relevant published articles in national and international journals)

Creswell, J.W. & Plano Clark, V,L (2011). *Designing and conducting mixed methods research*(2nd ed.) Thousands Oak CA: Sage.

Good, C.V. 1996. Essential of Educational research: Methodology and design. New York: Appleton, Century Crofts.

Gronlund, N.E. 1985. Measurement and evaluation in testing (6th edition)New York Collinear Macmillan Publishers.

Kothari,C. R., *Quantitative Techniques*, 2nd edition., New Delhi: Vikas Publishing House Pvt. Ltd

Khanal P., *Research methodology in Education*, 2nd Edition, Sunlight Publication, Kathmandu.

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ICT. Ed. 473: Geographic Information System

Course No. : ICT. Ed. 473 | Nature of course: Theoretical + Practical
Level: Bachelor | Credit hours: 3 (2T+1P)
Semester: Seven | Teaching hours: 64 (32T+32P)

1. Course Description

The aim of the course is to impart knowledge of the basic concepts of geographic information system (GIS) and to help the students build skills for solving problems using it. It provides the students with the basic features of the GIS such as spatial data, reading, analyzing and interpreting maps, GIS data models, finding information in raster system and vector system. It also provides knowledge about pattern analysis which includes networks, statistical surface and topological surfaces. Students are more engaged in laboratory work to realize GIS experiments rather than theoretical concept.

2. General Objectives of the Course

Following are the general objective of this course:

- To make the student knowledgeable about the geographic information system concept.
- To enable the student in implement the map analysis in practices.
- To acquaint the student in organization of geographic objects and to locate them in map.
- To explore the raster model, vector model and representing surface with these models.
- To provide the students with the skills of using GIS tool to solve the real world problems.

3. Specific Objectives and Contents

Specific Objectives	Contents
• Describe geographic information system and its scope. • Explain spatial data and how to think spatially. • Install and configure QGIS app. • Learn to use QGIS interface.	**Unit 1: Introduction to GIS** **[8 Hours]** 1.1 GIS Introduction 1.2 Scope of GIS 1.3 Think Spatially **Practical Works** • *Installing QGIS* • *Running QGIS for the first time* • *Introducing the QGIS user interface* • *Finding help and reporting issues*
• Categorizing the space on a map.	**Unit 2: Reading, Analyzing and Interpreting Maps [12 Hours]** 2.1 Space Categorization on a map 2.2 Levels of measurement

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• find the levels of measurement and relationship between data measurement and symbology. • Recognize, analyze, quantify patterns and make decisions. • Make use of QGIS to load raster data, vector data from files and style the layers • Create new vector layers and edit vector geometries	2.3 Relationship between symbology and data measurement 2.4 Pattern Recognition - Random, Clustered, Uniform distributional patterns 2.5 Pattern Analysis and Quantification 2.6 Result Interpretation and Decision Making **Practical Works** Use QGIS Application to perform following task: • *Loading vector data from files* • *Loading raster files* • *Styling raster layers* • *Styling vector layers* • *Creating new vector layers* • *Editing vector geometries* • *Editing attributes*
• Describe GIS data models • Elaborate Raster model and vector model. • Represent surface in raster and vector models. • Use QGIS tool to analyze raster data, combine raster and vector data. • Design printing maps and present map online.	**Unit 3: GIS Data Model [14 Hours]** 3.1 Raster Model and Structure 3.2 Vector Representation 3.3 Surface Representation in Raster Model 3.4 Surface Representation in Vector Model **Practical Works** Use QGIS Application to perform following task: • *Analyzing raster data* • *Combining raster and vector data* • *Leveraging the power of spatial databases* • *Advanced vector styling* • *Labeling* • *Designing print maps* • *Presenting your maps online*
• Define Geographic objects.	**Unit 4: Searching for Geographic Objects [12 Hours]** 4.1 Finding Information in Raster Systems 4.2 Finding Features in Vector Systems

• Demonstrate searching different geographic objects in GIS. • Extract, transform and load vector data and visualize GIS data. • Make use of Postgres with PostGIS and pgRouting. • Elaborate database importing and topological relationships. • Establish travel time isochron polygons.	4.3 Searching Polygons in a GIS 4.4 Locating 2-D Map Objects 4.5 Defining the Groups for Searching **Practical Works** Use QGIS Application to perform following task: • *Acquiring data for geospatial applications* • *Visualizing GIS data* • *Vector data – Extract, Transform, and Load* • *Raster analysis* • *Publishing the results as a web application* • *Postgres with PostGIS and pgRouting* • *OpenStreetMap data for topology* • *Database importing and topological relationships* • *Creating the travel time isochron polygons*
• Clarify the concept of distance measurement. • Analyze different geographic patterns • Explain statistical surface, topological surface and networks. • Measure connectivity and direct traffic in roads • Make use of Road graph plugin. • Calculate the shortest paths using the Road graph plugin • Visualize pgRouting result in QGIS tool • Automate multiple route computation using batch processing	**Unit 5: Geographic Pattern Analysis [18 Hours]** 5.1 Distance Measurement -absolute, relative, functional distance 5.2 Statistical Surfaces Characteristics, working with surface data, predicting values with interpolation 5.3 Topological Surfaces 5.4 Networks - Connectivity measurement, impedance values, one way paths, circuits, turns and intersections, directing traffic and exploiting networks **Practical Works** Use QGIS Application to perform following task: • *Creating a simple routing network* • *Calculating the shortest paths using the Road graph plugin* • *Routing with one-way streets in the Road graph plugin*

	• *Calculating the shortest paths with the QGIS network analysis library* • *Routing point sequences* • *Automating multiple route computation using batch processing* • *Matching points to the nearest line* • *Creating a routing network for pgRouting* • *Visualizing the pgRouting results in QGIS* • *Using the pgRoutingLayer plugin for convenience* • *Getting network data from the OSM*

Note: The figures in square brackets indicate approximate teaching hours allotted to respective units.

4. General Instructional Techniques

Lecture preferably with the use of multi-media projector, demonstration, practical classes, discussion, and brain storming in all units as far as practicable.

4.1 Specific Instructional Techniques

Demonstration is an essential instructional technique for all units in this course during teaching-learning process. Specifically, demonstration with practical works will be specific instructional technique in this course. The details of suggested instructional techniques are presented below:

Units	Activities
Unit 1 to 5	• QGIS tool is used to elaborate each units concepts • Monitoring of students' work by reaching each student and providing feedback for improvement • Presentation by students followed by peers' comments and teacher's feedback • Demonstration by the teacher on practical works mentioned in each unit • Lab work individually or in pairs is assigned by the teacher to understand each unit • Assignment should be assigned to prepare lab report/project report for individual student

5. Evaluation

Evaluation of students' performance is divided into parts: Internal assessment and internal and external practical examination and theoretical examinations. The distribution of points is given below:

Internal Assessment Theory	Internal Assessment Practical	Semester Examination (Theoretical exam)	External Practical Exam/Viva	Total Points
25 Points	15 Points	40 Points	20 Points	100 Points

***Note**: Students must pass separately in internal assessment, external practical exam and semester examination.*

5.1 Internal Evaluation (25 Marks):

Internal assessment will be conducted by subject teacher based on following criteria:

Attendance and learning Activities	5 points
First assignment (Written assignment)	5 points
Second assignment (Project work with presentation)	10 points
Third assignment/written examination	5 point
Total	25 points

5.2 Internal Assessment (15 Points) of the practical part

Internal practical assessment will be conducted by subject teacher based on following criteria:

Attendance and learning Activities	5 points
Practical work/project work/lab work	10 points
Total	15 points

5.3 Semester Examination (40 Marks)

Examination Division, Dean office will conduct final examination at the end of semester.

• Objective question (Multiple choice questions 10 x 1 point) 10 Points • Short answer questions (6 questions x 5 marks with Two OR questions) 30 Points
Total 40points

5.4 Practical Exam/Viva (20 Points)

Examination Division, Office of the Dean will appoint an external examiner for conducting the practical examination

Items	Points
Evaluation of Record Book	4
Project work/practical work presentation/skill test	10
Viva	6
Total	20

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6. Recommended Books and References materials (including relevant published articles in national and international journals)

6.1 Prescribed Textbook

DeMers, M. N. *GIS For Dummies,* For Dummies

Graser, A. et al. *QGIS Becoming a GIS Power User*-Packt Publisher

6.2 Recommended Books

Bolstad, P. & Manson, S. (2022). *GIS Fundamentals A first text on Geographic information systems (7th Ed.)*, Eider Press

Bearman, N. (2021). *GIS Research Methods (1st Ed.),* Bloomsbury Academic

Wegmann, M. et al. (2020). *An introduction to spatial data analysis (1st Ed.),* Pelagic Publishing

Shekhar, S., Xiong, H. & Zhou, X. (2017). *Encyclopedia of GIS (2nd Ed.),* Springer International Publishing

Dale, P. (2014). *Mathematical Techniques in GIS* (2nd Ed.), CRC Press

ICT. Ed. 474: Multimedia in Education

Course No.: ICT. Ed. 474	Nature of course: Theoretical
Level: Bachelor (BICTE)	Credit Hour: 3(2T+1P) hours
Semester: Seven	Teaching Hour: 64(32T+32P) hours

1. Course Description

This course provides complete instruction in the creation and manipulation of digital media, covering key elements of image, audio, and video processing, as well as live broadcasting. Students will gain practical skills in using various multimedia authoring tools and methodologies, equipping them to create excellent digital content for educational and professional applications.

2. General Objectives

The general objectives of this course are as follows:

- To define the scope and applications of multimedia in education utilizing various authoring tools and digital media formats.
- To demonstrate the image capture and manipulation techniques for enhanced visual appeal of educational resources.
- To record and edit high-quality audio files for educational podcasts and other platforms.
- To develop professional educational video clips with engaging visual effects.
- To implement live streaming through mobile applications, audio live podcasting, and other platforms for educational purposes.

3. Course Outlines:

Specific Objectives	Contents
• Explain the definition and scope of multimedia. • Identify and describe the components of multimedia. • Explore the applications of multimedia in education and future trends.	**Unit I: Introduction to multimedia (6 Hours)** 1.1 Definition and scope 1.2 Components of multimedia 1.3 Applications of multimedia in education 1.4 Multimedia authoring tools 1.5 Digital media formats and standards 1.6 Current trends in multimedia

• Describe media file formats and standards. • Utilize multimedia authoring tools.	
• Define the basics of digital photography concept. • Describe image formats and compression techniques. • Remove unwanted objects from images. • Fix lighting issues and make adjustment to improve image quality. • Demonstrate tasks about layers, filters, and text to enhance images.	**Unit II: Capture and Manipulate Image (12 Hours)** 2.1 Basics of Digital Photography 2.2 Image format and compression 2.3 Removing Unwanted Objects 2.4 Fixing Lighting Issues with Adjustments 2.5 Working with Layers 2.6 Exploring Filters 2.7 Adding Text to an Image ***Practical Tasks:*** • Remove unwanted objects from an image. • Improve image quality by adjusting lighting issues • Work with multiple layers to create a composite image • Apply and explore various filters to enhance an image • Add and style text within an image
• Describe concept of audio. • Differentiate and utilize various audio file formats. • Record and edit audio clips, performing simple edits and splitting tracks. • Manage audio tracks by labeling and adding new tracks. • Improve audio quality through noise reduction, normalization, and speed adjustment. • Apply metadata and export audio files for various uses, including	**Unit III: Audio Recording and Editing (12 Hours)** 3.1 Concept of audio 3.2 Audio file format 3.3 Recording and Editing Audio 3.4 Track Management: Labeling Tracks, Adding Tracks 3.5 Audio Enhancement: Noise Reduction and Normalization, Adjusting Audio Speed 3.6 Metadata and Exporting: Adding Metadata, Exporting Audio 3.7 Live Recording **on social media** ***Practical Tasks:*** • Record a short audio clip, perform simple edits, and split the track.

live recording for social media sharing.	• Manage multiple tracks within a project • Enhance audio quality using noise reduction, normalization, and speed adjustment. • Add metadata to a project and export the final audio file • Record a live session and prepare it for social media sharing
• Describe video file format compression techniques. • Demonstrate video recording methods and skills. • Trim and cut video clips effectively. • Merge multiple video clips into a cohesive single video. • Overlay and style text for titles, captions, and subtitles. • Adjust brightness and saturation to enhance video quality. • Create smooth animations using keyframes and apply filters and effects for improved visual appeal.	**Unit IV: Video Capturing and Editing (10 Hours)** 4.1 Video file format compression 4.2 Video recording methods and skills 4.3 Trimming and Cutting Clips 4.4 Merging Clips 4.5 Adding Text 4.6 Adjusting Brightness and Saturation 4.7 Keyframe Animation ***Practical Tasks*** • Remove unwanted sections or create shorter segments from video clips • Combine multiple video clips into a single video • Overlay text for titles, captions, or subtitles • Enhance the visual quality of a video by adjusting brightness and saturation. • Create smooth animations using keyframes • Enhance the video with background music • Apply filters and effects to enhance the video's visual appeal.
• Describe the concept of live streaming. • Utilize mobile applications for live streaming on platforms like Facebook Live or Instagram Live or TikTok.	**Unit V: Online Broadcasting (22 Hours)** 5.1 Concept of live streaming 5.2 Mobile application and live streaming 5.3 Audio Live podcasting 5.4 Video and live streaming ***Practical Tasks***

• Set up and execute audio live podcasting, including arranging essential equipment. • Demonstrate video live streaming techniques using OBS or YouTube. • Evaluate and reflect on student learning through live streaming sessions.	• Demo live streaming using mobile application such as Facebook live, Instagram live, ticktack for student learning reflection. • Demo **Audio Live Podcasting include a**rranging essential equipment such as microphones, headphones, and audio interfaces in a dedicated space. • Demo Live Streaming Using OBS or YouTube

4. Instructional Techniques

The instructional techniques for this course are divided into two groups. The first group consists of general instructional techniques applicable to most of the units. The second group consists of specific instructional techniques applicable to particular units.

4.1 General Techniques

Reading materials will be provided to students in each unit. Lecture, Discussion, use of multi-media projector, brain storming are used in all units.

4.2 Specific Instructional Techniques

The demonstration is an essential instructional technique for all units in this course during teaching teaching-learning process. Specifically, demonstration with practical works will be a specific instructional technique in this course. The following tools and applications can use for classroom teaching.

Unit	Issues	Suggestive tools/application
2	Image capturing and editing	Use any one or more tools/application such as Adobe Photoshop, Pixlr, GIMP (GNU Image Manipulation Program), Paint.NET, Canva or similar online or offline tools
3	Audio capturing and editing	Use any one or more tools/application such Adobe Audition, Audacity, GarageBand, FL Studio or similar

		online or offline tools.
4	Video capturing and editing	Use any one or more tools/application such Adobe Premiere Pro, Final Cut Pro, DaVinci Resolve, Cap Cut or similar online or offline tools.
5	Broadcasting and Live Streaming	Use any one or more tools/application such OBS Studio (Open Broadcaster Software), Facebook Live, YouTube Live, Instagram Live, X (formerly Twitter) or similar online or offline tools

5. Evaluation:

Evaluation of students' performance is divided into parts: Internal assessment (theory and practical and internal External examinations (theory and practical). The distribution of points is given below:

Internal Assessment Theory	Internal Assessment Practical	Semester Examination (Theoretical exam)	External Practical Exam/Viva	Total Points
25 Points	15 Points	40 Points	20 Points	100 Points

***Note**: Students must pass separately in internal assessment and semester examination.*

5.1 Internal Evaluation (25 Marks):

Internal assessment will be conducted by the subject teacher based on the following criteria:

Attendance and learning Activities	5 points
First assignment (Written assignment)	5 points
Second assignment (Project work with presentation)	10 points
Third assignment/written examination	5 point
Total	25 points

5.2 Internal Assessment (15 Points) of the practical part

Internal practical assessment will be conducted by subject teacher based on following criteria:

Attendance and learning Activities	5 points
Practical work/project work/lab work	10 points
Total	15 points

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5.3 Semester Examination (40 Marks)

Examination Division, Dean's office will conduct the final examination at the end of the semester.

Objective question (Multiple choice questions 10 x 1 point)	10 Points
Short answer questions (6 questions x 5 marks with Two OR Questions)	30 Points
Total points	40

5.4 **Practical Exam/Viva (20 Points)**

Internal assessment (Record Book-4 points, Project work Presentation- 2, Internal Practical Test-2 Points)	Semester final examination	Total
8 Points	12 Points	20 Points

6. Recommended Books and References Materials:

Maxim, J. (2024). *Adobe Premiere Pro: 2024 release*. Adobe Press.

Costello, V. (2023). *Multimedia foundations: Core concepts for digital design*. Elsevier Focal Press.

Carlson, J. (2020). *Adobe Photoshop Elements 2021 Classroom in a Book* (1st edition). Adobe Press.

Maxim, J. & Adobe Creative Team. (2019). *Adobe Audition CC Classroom in a Book (2nd Ed)*. Adobe Press.

Audacity. (2024, July 16). *Tutorials for Audacity - Audacity Manual*. Manual.audacityteam.org. https://manual.audacityteam.org/man/tutorials_for_audacity.html

Bailey, L. (2024). *Welcome to OBS Studio's documentation! — OBS Studio 29.1.1 documentation*. Docs.obsproject.com. https://docs.obsproject.com/

CapCut. (2023). *CapCut Online Tutorials | Explore, Learn, and Create Videos and Images with Ease*. Www.capcut.com. https://www.capcut.com/tutorial

ICT. Ed. 477: Python Programming

Course No. : ICT. Ed. 477 | Nature of course: Theoretical + Practical
Level: Bachelor | Credit hours: 3 (2T+1P)
Semester: Seventh | Teaching hours: 64 (32T+32P)

1. Course Description

The aim of the course is to impart knowledge of the basic concepts of python programming and to help the students build skills for solving problems using it. It provides the students with the basic features of the language such as data types, operators, control structure, list, dictionaries, sets, tuples, string manipulation, functions, exception and file handling which are the common features of programming languages. It also provides knowledge about object-oriented paradigm, database programming and building graphical user interfaces. Students are more engaged in laboratory work to exaction of programing experiments rather than theoretical concept.

2. General Objectives of the Course

Following are the general objective of this course:

- To make the student knowledgeable about the python programming concept.
- To enable the student in implement the essential programming concepts and methods in practices.
- To acquaint the student in organization of data in lists, dictionaries, sets and tuples.
- To explore the database programming, graphical user interface programming using python.
- To provide the students with the skills of object orientated programming to solve the real-world problems.

3. Specific Objectives and Contents

Specific Objectives	Contents
• Write and Execute Python Program • Describe basic structure of python program, data types, variables, operators, comments and constants. • Perform input and output operation • Explore print function and display formatted output with f-string	**Unit 1: Python Programming Fundamentals [8 Hours]** 1.4 Python Introduction 1.5 Data Types and Type Conversion 1.6 Comments 1.7 Variables, Constants, Operators and Performing Calculations 1.8 Reading Input from Keyboard 1.9 Print function, Displaying Formatted Output with F-strings **Practical Works** • *Write program to illustrate variables, constants, data types and type conversion.* • *Write program to demonstrate different types of operators available in python and perform calculations.*

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	• *Write program to make use of I/O functions.*
• Explain control statements. • Write decision making problems using if, match, break and continue statements • Apply different types of loop and make distinction among them through program. • Discuss different problems and how they are transformed to programs using nested loop and infinite loop. • Demonstrate skills to write program using control statements in Python	**Unit 2: Control Statements in Python [8 Hours]** 2.7 if statement 2.8 match statement 2.9 break statement 2.10 continue statement 2.11 Loop statement 2.11.1 while 2.11.2 for 2.12 Nested loop 2.13 Infinite loop **Practical Works** • *Write program to apply if, match, break and continue statements for decision making.* • *Write program to utilize different loop statements to solve meaningful problems.* • *Write program to demonstrate input validation using loop.* • *Write program to create different patterns using nested loop.* • *Write program to make use of infinite loop.*
• Describe List, Tuples, Dictionary, Sets and Strings in python • Elaborate List Comprehension, Dictionary operations, Set Operations, Tuples Operations, List slicing. • Solve simple computing problems using List methods.	**Unit 3: List, Tuple, Dictionaries, Sets and Strings [16]** 3.1 Introduction to Lists - List Slicing, in operator, List Methods : append, index, insert, sort, remove, reverse, min, max 3.2 List Comprehension 3.3 Two-Dimensional Lists 3.4 Tuples 3.5 Dictionaries - Creating dictionary, retrieving, adding and removing elements 3.6 Sets - Creating Set, Adding and Removing Elements

• Use different string methods to manipulate strings. • Describe Searching and Sorting problem. • Demonstrate skills for writing program	-Set Operations: union, intersection, difference 3.7 Strings - String Operations : Slicing, Testing, Searching, and Manipulating **Practical Works** • *Write program to create list, add elements in list, remove elements from list and display list items.* • *Write program to make use of list slicing concept to display elements of list.* • *Write program to elaborate different list methods.* • *Write program to apply list comprehension.* • *Write program to illustrate two-dimensional list.* • *Write program to create tuple, add elements in tuple, remove elements from tuple and display tuple items.* • *Write program to create dictionary, add elements in dictionary, remove elements from dictionary and display dictionary items.* • *Write program to create set, add elements in set, remove elements from set and display set items.* • *Write program to perform set operations.* • *Write program to make use of string manipulation methods and also perform different string operations.*
• Define object oriented paradigm with python • Demonstrate class and object with data hiding concept • Describe the use of self-keyword in programs. • Compare and contrast different types of inheritance. • Elaborate polymorphism concept	**Unit 4: Object Oriented Programming with Python [10 Hrs]** 4.1 Class and Object 4.2 __init__ method 4.3 self keyword 4.4 Inheritance 4.5 Polymorphism and Data Hiding **Practical Works** • *Write program to elaborate object oriented concept with simple examples.* • *Write program to make use of __init__ method to initialize objects.* • *Write program to apply different types of inheritance.*

	• *Write program to elaborate polymorphism and data hiding concept.*
• Clarify the concept of functions. • Create function with arguments, without arguments, returning values. • Describe exception and how to handle them in programs. • Explain the use of file in program. • Demonstrate the file operations with examples.	**Unit 5: Function, Exception and File Handling [10 Hours)]** 5.1 Introduction to Functions 5.2 Defining and Calling Function 5.3 Passing Arguments to Functions 5.4 Value-Returning Functions 5.5 Introduction to File Input and Output 5.6 Using Loops to Process Files 5.7 Exception Handling **Practical Works** • *Write program to divide work in functions.* • *Write different variety of functions: function with arguments, value returning function, function without arguments.* • *Write program to store output in file.* • *Write program to read input from file.* • *Write program to handle different types of exception.*
• Discuss the use of database and GUI programming. • Demonstrate CRUD operation in database. • Design simple GUI with frames and widgets. • Perform simple calculations using GUI. • Draw different geometrical shapes using canvas	**Unit 6: Database and GUI Programming [12 Hours]** 6.1 Opening and Closing Database Connection with SQLite 6.2 Creating and Deleting Tables 6.3 Adding Data to a Table 6.4 CRUD Operations 6.5 Using the tkinter Module 6.6 Working with Widgets - Displaying Text with Label, Button, Info Dialog Boxes, Getting Input with the Entry, Using Labels as Output Fields, Radio and Check Buttons 6.7 Organizing Widgets with Frames 6.8 Drawing Shapes with Canvas Widget **Practical Works** • *Write program to establish connection with database and create or delete database and table.*

	• *Write program to store data in database and manipulate the data.* • *Write program to perform CRUD operation in database.* • *Write program to create simple GUI with widgets: label, text entry, radio buttons, check buttons* • *Write program to organize the different widgets with frame to create attractive designs.* • *Write program to draw different geometrical shapes using canvas widget.*

Note: The figures in square brackets indicate approximate teaching hours allotted to respective units.

4. **General Instructional Techniques**
Lecture preferably with the use of multi-media projector, demonstration, practical classes, discussion, and brain storming in all units as far as practicable.

5. **Specific Instructional Techniques**
Demonstration is an essential instructional technique for all units in this course during teaching-learning process. Specifically, demonstration with practical works will be specific instructional technique in this course. The details of suggested instructional techniques are presented below:

Units	Activities
Unit 1 to 6	• Code writing activity is performed to elaborate each units concepts • Monitoring of students' work by reaching each student and providing feedback for improvement • Presentation by students followed by peers' comments and teacher's feedback • Demonstration by the teacher on practical works mentioned in each unit • Lab work individually or in pairs is assigned by the teacher to understand each unit • Assignment should be assigned to prepare lab report/project report for individual student

6. **Evaluation**

Evaluation of students' performance is divided into parts: Internal assessment (theory and practical and internal External examinations (theory and practical). The distribution of points is given below:

Internal Assessment Theory	Internal Assessment Practical	Semester Examination (Theoretical exam)	External Practical Exam/Viva	Total Points
25 Points	15 Points	40 Points	20 Points	100 Points

Note: *Students must pass separately in internal assessment, external practical exam and semester examination.*

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6.1 Internal Assessment (25 Points) of Theoretical Part

Internal assessment will be conducted by subject teacher based on following criteria:

Attendance and learning Activities	5 points
First assignment (Written assignment)	5 points
Second assignment (Project work with presentation)	10 points
Third assignment/written examination	5 point
Total	25 points

6.2 Internal Assessment (15 Points) of the Practical Part

Internal practical assessment will be conducted by subject teacher based on following criteria:

Attendance and learning Activities	5 points
Practical work/project work/lab work	10 points
Total	15 points

6.3 Semester Examination (40 Points)

Examination Division, Dean office will conduct final examination at the end of semester.

Objective question (Multiple choice questions 10 x 1 point)	10 Points
Short answer questions (6 questions x 5 marks with Two 'OR' Questions)	30 Points
Total	40 points

6.4 Practical Exam/Viva (20 Points)

Internal assessment (Record Book-4 points, Project work Presentation- 2, Internal Practical Test-2 Points)	Semester final examination	Total
8 Points	12 points	20 Points

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7. Recommended Books and References materials (including relevant published articles in national and international journals)

7.1 Prescribed Textbook

Tony Gaddis, T. (2021). *Starting out with Python (5th Ed.).* Pearson

7.2 Recommended Books

Hetland, M.L. & Nelli, F. (2024). *Beginning Python from Novice to Professional (4th Ed.)*, Apress

Murugesh, T.S., Vasudevan, S.K. & Pulari, S.R. (2024). *Python: A Practical Learning Approach (1st Ed.)*, CRC Press

Zuckarelli, J.L. (2024). *Learn coding with Python and JavaScript A practical introduction for beginners (1st Ed.)*, Springer

Barry, P. (2023). *Head First Python: A Learner's Guide to the Fundamentals of Python Programming (3rd Ed.)*, O'Reilly Media

Liu, M. (2021). *Make Python Talk Build Apps with Voice Control and Speech Recognition (1st Ed.),* No Starch Press

ICT. Ed. 478: Teaching Method in ICT Education

Course No.: ICT. Ed. 478	Nature of course: Theoretical
Level: Bachelor	Credit Hour: 3
Semester: Seven	Teaching Hour: 48

1. Course Description

Teaching methods in Information and Communications Technology (ICT) include the various instructional approaches and strategies applied to deliver ICT-related knowledge and skills to students efficiently. The methods used could include hands-on computer lab sessions, interactive multimedia presentations, online learning modules, collaborative projects, and problem-based learning activities that actively involve students in the practical implementation of ICT ideas. The course aims to give students a comprehensive understanding of ICT tools, software, programming, and digital literacy, and endow them with the necessary understanding and abilities for the digital era.

1. General Objectives

The general objectives of this course are as follows:

- To explore innovative teaching methods to enhance instructional effectiveness and engage students in a technology-rich environment.
- To create comprehensive lesson plans to optimize student learning experiences.
- To design and apply strategies for utilizing ICT tools effectively in the classroom.
- To utilize ICT tools for student assessment, online assessments, and digital portfolio management, providing constructive feedback.
- To explore emerging technologies in education to stay updated with advancements and best practices in teaching methods.

2. Course Outlines:

Specific Objectives	Contents
• Explain pedagogy and andragogy concepts for effective teaching strategies across age groups. • Describe flipped classroom models • Explain online and face-to-face instruction to create flexible, cohesive blended learning experiences. • Explore gamification elements to enhance motivation and engagement. • Explore real-world problems, collaboration, and critical thinking concept. • Describe inquiry-based learning	**Unit I: Innovative teaching methods (6 Hours)** 1.1 Concept of Pedagogy and Andragogy 1.2 Flipped Classroom 1.3 Blended Learning 1.4 Gamification 1.5 Project-Based Learning (PBL) 1.6 Inquiry-Based Learning

• Create learning objectives to guide session planning and measure student progress effectively. • Create lesson plans that align with objectives, ensuring structured and engaging content delivery. • Incorporate ICT tools seamlessly into lesson plans to enhance learning and student interaction. • Develop strategies for effective time management and pacing to maintain lesson flow and student engagement. • Design lessons with interactive elements to actively involve students and promote hands-on learning.	**Unit II: Session Planning and Design (10 Hours)** 2.1 Determine Learning Objectives 2.2 Designing Effective Lesson Plans 2.3 Integrating ICT Tools into Lesson Plans 2.4 Time Management and Pacing 2.5 Designing Interactive Lessons
• Design strategies for effective ICT tool use in the classroom. • Plan management for a technology-enhanced classroom environment. • Create a plan for facilitating collaborative learning among students. • Use gamification, quizzes, and polls to enhance student engagement. • Engage students using social media for interactive learning.	**Unit III: Classroom Teaching Strategies (12)** 3.1 Strategies for effective use of ICT tools 3.2 Design Technology-enhanced classroom 3.3 Design collaborative learning 3.4 Student engagement using gamification, interactive quizzes and polls 3.5 Post-class engagement using social media
• Assess student performance using ICT tools effectively. • Implement online assessments and manage e-portfolios efficiently. • Provide feedback to students through digital channels. • Use data-driven insights for educational decision-making.	**Unit IV: Evaluation and Feedback (8)** 4.1 Assessing Student Performance with ICT 4.2 Online Assessments and E-Portfolios 4.3 Providing Feedback through Digital Means 4.4 Data-Driven Decision Making in Education
• Explore emerging technologies for future educational applications. • Prepare strategies for future classroom technology integration. • Analyze case studies of innovative ICT classroom practices. • Develop a comprehensive semester plan incorporating ICT method.	**Unit V: Future Direction ICT teaching methods (12)** 5.1 Emerging Technologies in Education 5.2 Preparing for the Future Classroom 5.3 Case Studies of Innovative ICT Practices in classroom 5.4 Project about complete plan of one semester

4. Instructional Techniques

The instructional techniques for this course are divided into two groups. First group consists of general instructional techniques applicable to most of the units. The second group consists of specific instructional techniques applicable to particular units.

4.1 General Techniques

Reading materials will be provided to students in each unit. Lecture, Discussion, use of multi-media projector, brain storming are used in all units.

4.2 Specific Instructional Techniques

Demonstration is an essential instructional technique for all units in this course during teaching learning process. Specifically, demonstration with practical works will be specific instructional technique in this course.

5. Evaluation :

Internal Assessment	Semester Examination	Total Marks
40 Marks	60 Marks	100 Marks

Note: Students must pass separately in internal assessment and semester examination.

5.1 Internal Evaluation (40 Marks):

Internal evaluation will be conducted by subject teacher based on following criteria:

• Class Attendance	5 Marks
• Learning activities and class performance	5 Marks
• First assignment (written assignment)	10 Marks
• Second assignment (Case Study/project work with presentation)	10 Marks
• Terminal Examination	10 Marks
Total	40 Marks

5.2 Semester Examination (60 Marks)

Examination Division, Dean office will conduct final examination at the end of semester.

Objective question (Multiple choice 10 questions x 1 mark)	10 Marks
Subjective short answer questions (6 ques with Two OR ques x 5 marks)	30 Marks
Long answer questions (2 ques with One OR ques x 10 marks)	20 Mark
Total	60 Marks

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6. Recommended Books and Reference Materials

6.1. Recommended Books:

Huang, R., Spector, J.M., & Yang, J. (2019). *Educational Technology*. Springer Berlin, Heidelberg.

Wang , Y. (Ed.) (2011). *Education and Educational Technology*. Springer-Verlag Berlin Heidelberg

Agarwal, J.C. (2008): *Essentials of Educational Technology: Innovations In Teaching Learning.* New Delhi: Vikas Publishing House Pvt. Ltd.

6.2. References materials:

Kolb, L. (2017). Learning first, technology second: The educator's guide to designing authentic lessons (First edition). Portland, Oregon: International Society for Technology in Education.

Radha Mohan. (2007). Innovative science teaching. New Delhi: Prentice-Hall of India Private Limited.

Mangal, S. K., & Mangal, U. (2012). Essentials of educational technology. New Delhi: PHI Learning Pvt. Ltd.

ICT. Ed. 479: Educational Project

Course No. : ICT. Ed. 479 | Nature of Course: Practical
Level: Bachelor | Credit Hours: 3
Semester: Seven | **Teaching Hours: 80**

1. **Course Description**

This course requires students to complete a major information systems project. Students are to demonstrate a capacity to work in the computing field at a professional level. Students are expected to manage their resources to initiate, plan, estimate, and carry out educational information systems project following appropriate standards. It develops students' skills regarding analysis, design, and development of meaningful real-world applications. This course introduces planning and completing project work related to computer software under the supervision of an instructor or a supervisor.

2. **General Objectives**

On completion of this course, the students will be able to:

- Develop the ability of a student to tackle, a selected problem to a reasonable depth of understanding
- Develop the ability of a student to organize and produce a professional software/website
- Develop the ability of a student to produce technical documentation to a high standard
- Develop the ability of a student to produce an analytical report which communicates the work carried out in the project and evaluates the final product and the student's contribution

3. **Description of the Project Work**

The work carried out must be a practical, problem-solving project. It should be a realistic project in the sense that the product should be useful practically as far as possible.

3.1 Group Formation

Students can perform project individually or in a group (maximum of 4 students).

3.2 Procedure

The students should exercise the following three phases for this course.

- Proposal Submission
- Mid-Term Defense
- Final Project Submission and Defense

a. Proposal Submission:

- Students (s) prepare proposal documents in the prescribed format and submit to the Department of ICTE in the College.
- The HOD/Program Coordinator or a panel coordinated by him/her evaluates the proposal with or without a presentation from the student(s).
- If the proposal is accepted; a Supervisor is assigned by HOD/Coordinator

depending upon the nature of the project

b. Mid Term Defense:
   - The project team has to face a Mid Term Defense after first 40% to 60% of the project duration so that the supervisor and internal evaluator are assured of the progress of the project.

c. Final Defense:

   Project team submits a complete project report in the prescribed format to the department
   - The department then schedules the day for final defense
   - External Supervisor will be decided and will be called for the final defense
   - The project team needs to give presentation, followed by viva question answer session.

3.3 Prescribed Format of the Proposal

- Introduction
- Problem Statement
- Objective
- Scope and Limitation
- Methodology
  a. Requirement Identification
     - Study of existing system
     - Requirement collection
  b. Feasibility Study
     - Technical
     - Operational
     - Economical
  c. Tools
     - Analysis and Design Tools
     - Implementation tools (Front End, Back End)
- High level design of Proposed System (by system flow chart, use cases or other appropriate diagrams
- Gantt Chart to show the project planning.
- Expected Outcome

3.4 Prescribed Format of the Project Report

The sequence in which the project report material should be arranged is as follows:

- Cover page and Title
- Candidate's Declaration
- Supervisor's Certificate/ Recommendation
- Internal, External Examiners' Approval
- Acknowledgements

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- Executive Summary
- List of Figures
- List of Tables
- Abbreviations
- Table of Contents
- Main Body
- References / Bibliography
- Appendix

3.5 Number of Copies to be submitted to the Department

Three hard copies of the report are to be submitted to the Department after corrections done as suggested by the guide/Department at any time when report submission is called by the guide/Department. The total number of reports to be prepared are three:

- One copy to the college
- One copy for the University
- One copy to the candidate

Before taking the final printout, the approval of the concerned guide is mandatory, and Suggested corrections, if any, must be incorporated. The reports submitted to the department/guide(s) must be hard bounded with black cover with golden color alphabets.

3.6 Standard to be followed

The report must be printed on one side only. Please use a high-resolution printer, preferably a laser printer with at least 300 dpi.

A. *Page Layout*
   Your paper must use a page size corresponding to A4 which is 210mm *(8.27")* wide and 297mm (11.69") long.
   The margins must be set as follows:
   - Top = 1 inch
   - Bottom = 1 inch
   - Left = 1.25 inch
   - Right = 1 inch

B. *Page Style*
   - All paragraphs must be indented. All paragraphs must be justified aligned with 1.5 spacing

C. *Text Font of Entire Document*
   - The entire document should be in Times New Roman.
   - The font size has to be 12pt throughout

D. *Section Headings*

- No more than 3 levels of headings should be used.
- Font size for the headings will be 16pt, 14pt, 12pt bold

E. *Figures and Tables*
- Position figures and tables at the tops and bottoms pages. Tables and figures may be full-page width or may be partial page.
- Width with wrap on either side.
- Figure captions should be centered below the figures. Table captions should be centered above.
- Caption font size: Times New Roman 10pt bold
- Table Numbering: ChapterNo.TableCount (eg. Table 1.1, Table 1.2, Table 3.1, Table 3.5)
- Figure Numbering: ChapterNo.FigureCount (eg. Figure 2.1, Figure 2.4, Figure 5.1)

F. *References*
- For reference students must follow APA (latest version) format.

4. Evaluation:

Proposal	Mid-Term Defense	Final Defense	Total Marks
10 Points	30 Points	60 Points	100 Points

4.1 Evaluators:
- Project Supervisor (Mentor of the project) -40%
- Internal (HOD/Program Coordinator or decided by Coordinator) -20%
- External Supervisor -40%

4.2 Duration (for 1 group)
- Presentation 20 minutes
- Viva 15 minutes
- Demonstration 15 minutes
- Report checking 10 minutes

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