Semester III

Microsoft Excel and Visual Basic for Applications			
Course Code	21CV382	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:2:0:0	SEE Marks	50
Total Hours of Pedagogy	15	Total Marks	100
Credits	1	Exam Hours	01 hr

Course objectives:

- To learn basic operations using excel
- To solve problems using functions in excel
- To design structural elements using excel and VB as a tool

Teaching-Learning Process (General Instructions)
These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. The online courses available should be shared with students
2. YouTube videos
3. Power point presentations
4. Assignments to solve all the problems using excel and VB.

Module-1

Introduction to Microsoft Excel, Workbooks, Worksheets, User Interface – navigating the interface, entering data, implicit data types, setting cell data types, Basic operations – copy/cut, paste, paste special, row and cell references, using cell names, Simple built-in formulae, Copying and pasting formulae

Built-in formulae – Trigonometric, Logarithmic, Exponential, Statistical, Matrix operations such as transpose, multiplication, inverse etc.

Plotting charts of different types, bar and pie charts, scatter plots, legend, Using Log and Semilog scales, Customizing chart axes, Using multiple axes, Preparing contour plots, Annotating charts.

Teaching-Learning Process	Chalk and talk, PowerPoint Presentation, YouTube videos

Module-2

Introduction to Visual Basic for Applications, User Interface – VBA Editor, VBA toolbar, Developing simple functions in VBA – area of a circle, minimum cover to reinforcement in a beam as per IS 456, Calling user defined functions, Organizing code into modules.

Debugging VBA code using built-in debugger – breakpoints, watch variables, trace lines of code with run to cursor, step into, step over and step out.

Developing subroutines, calling subroutines, Differences between functions and subroutines, Scope of subroutines – Public and Private, Calling a subroutine

Teaching-Learning Process	Chalk and talk, PowerPoint Presentation, YouTube videos

Module-3

VBA data types, Working with data types, Enforcing defining types with Option Explicit, Defining, initializing and using arrays within functions/subroutines.

Commenting code, Long statements spanning multiple lines, Program flow control – Branching and looping, using conditional statements, Calling Worksheet functions in VBA.

Develop functions for simple civil engineering applications – Stability of gravity dams, analysis of

rectangular footings subjected to axial compression and bending about both axes, etc.	
Teaching-Learning Process	Chalk and talk, PowerPoint Presentation, YouTube videos
Module-4	
Table lookup – Lookup, Vlookup, Hlookup, Match, Index, VBA Object model, creating and using user defined objects. Building forms, triggering subroutines by pressing a button on a form Interacting with other applications with support for VBA, such as, SAP2000/ETABS or any other software used by civil engineers.	
Teaching-Learning Process	Chalk and talk, PowerPoint Presentation, YouTube videos
Module-5	
Using Python to manipulate Microsoft Excel files, creating, editing and saving Microsoft Excel files from Python, Interacting with Microsoft Excel using Python xl wings package, Calling Python from VBA. Developing functions and subroutine for a comprehensive civil engineering application – RC design, Steel design, or other similar problems from other fields of Civil Engineering.	
Teaching-Learning Process	Chalk and talk, PowerPoint Presentation, YouTube videos

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

1. Solve Trigonometric, Logarithmic, Exponential, Statistical problems and perform Matrix operations
2. Solve civil engineering problems using VB as a tool
3. Design structural elements by integrating excel and VB

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50)in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

Continuous internal Examination (CIE)

Three Tests (preferably in MCQ pattern with 20 questions) each of 20 Marks (duration 01 hour)

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

Two assignments each of 10 Marks

1. First assignment at the end of 4th week of the semester
2. Second assignment at the end of 9th week of the semester

Quiz/Group discussion/Seminar, any two of three suitably planned to attain the COs and POs for 20 Marks (duration 01 hours)

1. The sum of total marks of three tests, two assignments, and quiz /seminar/ group discussion will be out of 100 marks and shall be scaled down to 50 marks
2. Semester End Examinations (SEE)
3. SEE paper shall be set for 50 questions, each of 01 mark. The pattern of the question paper is MCQ (multiple choice questions). The time allotted for SEE is 01 hour. The student has to secure minimum of 35% of the maximum marks meant for SEE.

Suggested Learning Resources:
Books

1. Bourg, D.M., Excel Scientific and Engineering Cookbook, O'Reilly Media Inc., 2006.
2. Bilio, E.J., Excel for Scientists and Engineers – Numerical Methods, Wiley-Interscience, 2007.
3. Documentation for xlwingshttps://docs.xlwings.org/en/stable/

Web links and Video Lectures (e-Resources):

- https://freepdf-books.com/excel/
- https://jobscaptain.com/ms-excel-book-pdf/

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Assignments to understand the operations in Excel and VB may be given to students

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