

Program Name	: Computer Engineering Program Group
Program Code	: CO/CM/IF/CW
Semester	: Fourth
Course Title	: GUI Application Development using VB.Net
Course Code	: 22034

1. RATIONALE

VB.NET is the programming language based on Object Oriented Concepts which is prominently used to develop GUI based Applications. Graphical User Interface (GUI) based application includes various user friendly controls to accept or display data. This course will give the students an in-depth understanding of the concepts used in VB .NET and necessary skills to use programming techniques to develop .NET based applications and deploy the same.

2. COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- **Develop GUI based application using VB.net.**

3. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following *industry oriented* COs associated with the above mentioned competency:

- a. Use Visual Studio IDE to design application.
- b. Develop GUI Application using Form Controls and its events.
- c. Apply Object Oriented concepts in GUI Application.
- d. Use Data access controls to store data in Database and retrieve it.
- e. Use Data Binding in GUI Application.

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme			Credit (L+T+P)	Examination Scheme													
L	T	P		Theory						Practical							
				Paper Hrs.	ESE		PA		Total		ESE		PA		Total		
					Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	
2	-	4	6	--	--	--	--	--	--	--	50#	20	50~	20	100	40	

'#':No practical Examination, (~^2): For the *practical only courses*, the PA has two components under practical marks i.e. the assessment of practicals (seen in section 6) has a weightage of 60% (i.e.30 marks) and micro-project assessment (seen in section 12) has a weightage of 40% (i.e.20 marks). This is designed to facilitate attainment of COs holistically, as there is no theory ESE.

Legends: L-Lecture; T – Tutorial/Teacher Guided Theory Practice; P - Practical; C – Credit, ESE - End Semester Examination; PA - Progressive Assessment, '#': No Theory Examination

5. COURSE MAP (with sample COs, PrOs, UOs, ADOs and topics)



This course map illustrates an overview of the flow and linkages of the topics at various levels of outcomes (details in subsequent sections) to be attained by the student by the end of the course. in all domains of learning in terms of the industry/employer identified competency depicted at the centre of this map.

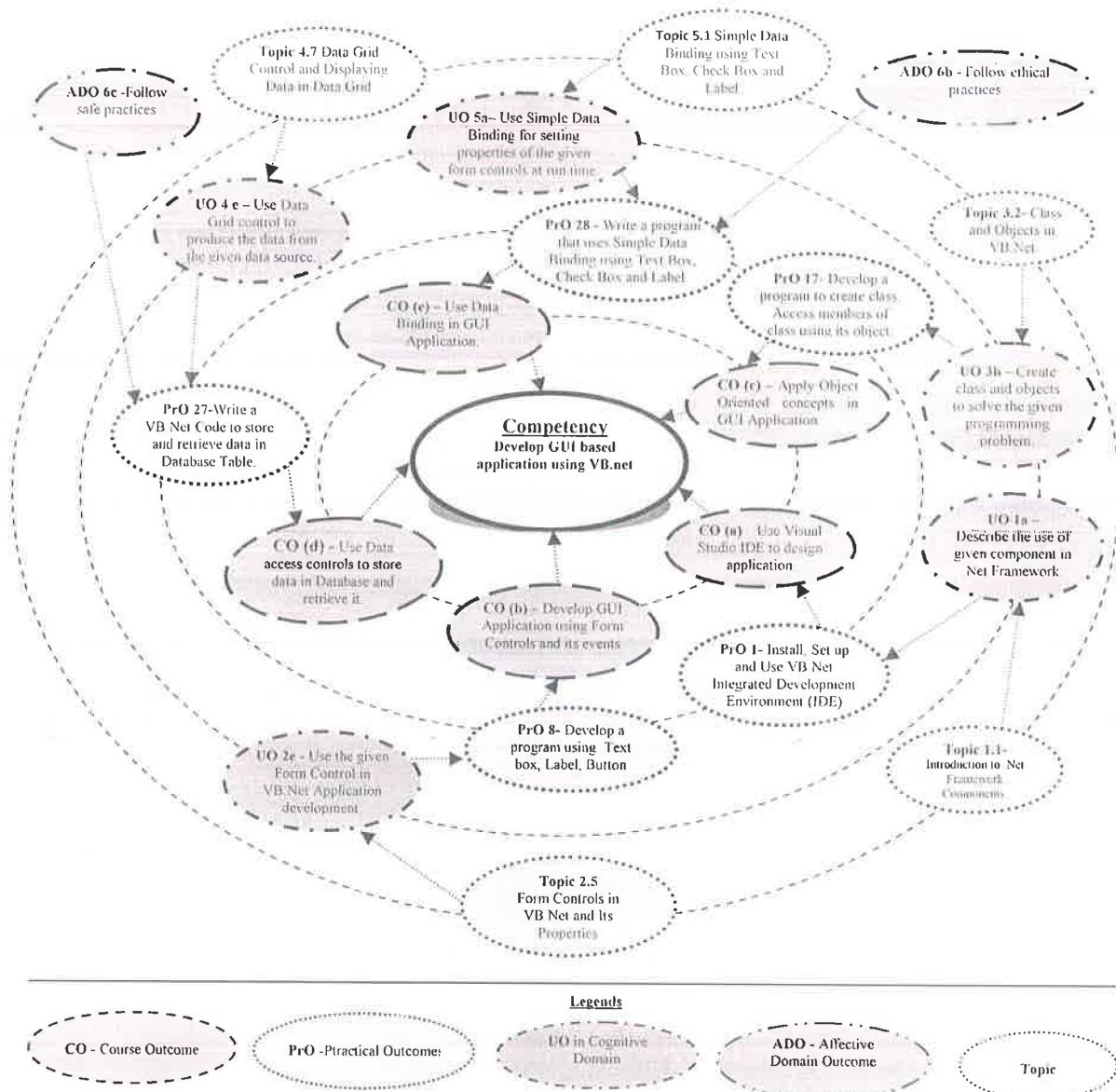


Figure 1 - Course Map

6. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
1.	Install, Set up and Use VB.Net IDE (Integrated Development Environment).	I	
2.	Use Existing Namespaces and Create user defined Namespace in VB.Net.	I	



S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
3.	(a) Write a simple program to display a welcome message using <i>msgbox()</i> . (b) Develop programs to solve Arithmetic expressions.	II	02*
4.	Develop programs to demonstrate use of <i>IF, IF-else</i> Control structures in VB.net.	II	02*
5.	Develop programs to demonstrate use of <i>Case</i> Control structures in VB.net.	II	02*
6.	Develop programs to demonstrate use of <i>While, DO Loops</i> in VB.net.	II	02*
7.	Develop programs to demonstrate use of <i>For, For-each</i> Loops in VB.net.	II	02*
8.	Develop a program using Text box, Label, Button	II	02*
9.	Develop a program using Radio button, check box,	II	02*
10.	Develop a program using List box, Combo box.	II	02*
11.	Write a program using Picture Box, Panel.	II	02*
12.	Write a program using Tab Control, and Timer.	II	02*
13.	Write a program to perform validation using regular expression and error provider.	II	02*
14.	Write a program to perform validation using regular expression and error provider.	II	02*
15.	Write a program to demonstrate use of Sub-procedures and Parameterized Sub-Procedures.	III	02
16.	Write a program to demonstrate use of Simple function and parameterized Functions.	III	02*
17.	Develop a program to create class. Access members of class using its object.	III	02*
18.	Create constructor to initialize object of class. Use Destructor to de-allocate memory using <i>finalize</i> method.	III	02*
19.	Develop a program to inherit members of super class in sub class using simple inheritance.	III	02*
20.	Develop a program to demonstrate Overloading a method	III	02*
21.	Develop a program to demonstrate Overriding in inheritance	III	02*
22.	Develop a program to demonstrate Shadowing in inheritance		02
23.	Construct a program to handle runtime errors by using Exception handling.	III	02*
24.	Write a program to fetch data from table and display in Data Grid.	IV	02*
25.	Write a program to perform following operation using Data Adapter: Fill and Update data in Database.	IV	02*
26.	Write a program to perform following operation using Data Adapter: Fetch data from multiple tables in Dataset.	IV	02
27.	Write a VB.Net Code to store and retrieve data in Database Table.	IV	02*
28.	Write a program that uses Simple Data Binding using Text Box, Check Box and Label.	V	02
29.	Write a program that uses Complex Data Binding using Combo	V	02



S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
	Box.		
30.	Write a program that uses Complex Data Binding using List Box.	V	02
31.	Write a program to Navigate across existing data in table.	V	02
32.	Create Executable file of VB.Net Application and Deploy it to other computer.	V	02*
	Total		64

Note

- i. A suggestive list of PrOs is given in the above table. More such PrOs can be added to attain the COs and competency. A judicious mix of minimum 24 or more practical need to be performed, out of which, the practicals marked as '*' are compulsory, so that the student reaches the 'Application Level' of Bloom's Taxonomy' as generally required by the industry.
- ii. The 'Process' and 'Product' related skills associated with each PrO are to be assessed according to a suggested sample given below:

S.No.	Performance Indicators	Weightage in %
1	Use of relevant VB.Net tool to design given GUI application.	20
2	Write appropriate code to generate desired output in GUI Application.	30
3	Debug, test and execute the programs/modules.	30
4	Able to answer oral questions.	10
5	Submission of report in time.	10
	Total	100

The above PrOs also comprise of the following social skills/attitudes which are Affective Domain Outcomes (ADOs) that are best developed through the laboratory/field based experiences:

- a. Follow safety practices.
- b. Practice good housekeeping.
- c. Demonstrate working as a leader/a team member.
- d. Follow ethical practices.

The ADOs are not specific to any one PrO, but are embedded in many PrOs. Hence, the acquisition of the ADOs takes place gradually in the student when s/he undertakes a series of practical experiences over a period of time. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

- 'Valuing Level' in 1st year
- 'Organising Level' in 2nd year and
- 'Characterising Level' in 3rd year.

7. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will usher in uniformity in conduct of experiments, as well as aid to procure equipment by authorities concerned.

S. No.	Equipment Name with Broad Specifications	PrO S. No.



S. No.	Equipment Name with Broad Specifications	PrO S. No.
1	Personal computer, (preferably i3-i5 processor based), RAM minimum 2 GB, Hard disk 10 GB minimum available space.	For all Experiments
2	Operating system: Windows 7/8/10	
3	Microsoft Visual Studio 2012 or later.	

8. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency. More UOs could be added.

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit – I Overview of GUI Programming	1a. Describe use of the given component in .Net Framework. 1b. Describe use of use the given element in VB.Net IDE. 1c. Apply the given System Namespace in VB.net Application. 1d. Create Event Handler to respond to the given event.	1.1 Introduction to .Net Framework Components. i. Common Language Runtime (CLR) ii. Microsoft Intermediate Language (MSIL) iii. Just-In-Time Compiler 1.2 Exploring VB.Net IDE 1.3 System Namespaces in VB.Net 1.4 Events and Event handling
Unit– II Decision control and Loop control	2a. Select relevant data type for the given problem with justification. 2b. Write expression using operators for the given VB.Net Application. 2c. Use relevant control structure to apply the given criteria for decision making and branching. 2d. Implement relevant type of loop to solve the given iterative problem. 2e. Use the given Form Control in VB.Net Application development.	2.1 Data Types in VB.Net 2.2 Operators in VB. Net ii. Arithmetic Operators iii. Logical Operators iv. Bit Shift Operators v. Relational Operators vi. Assignment Operators 2.3 Control Structures ii. IF Statement iii. IF – ELSE Statement iv. Select Case Statement 2.4 Loops in VB.Net i. For Loop ii. While Loop iii. Do Loop iv. For Each Loop 2.5 Form Controls in VB.Net and Its Properties - Button, Text box, Label, Radio button, Check Box, List Box, Combo Box, Picture Box, Panel, Tab Control, Timer.
Unit– III Object Oriented	3a. Write Sub-procedure/function to solve the given problem. 3b. Create class and objects to solve	3.1 Sub Procedures and Functions 3.2 Class and Objects in VB.Net 3.3 Constructors and Destructors in



Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Programming in VB.Net	the given programming problem. 3c. Create constructor to initialize the given object. 3d. Apply Inheritance to inherit members of the super class in the given problem. 3e. Use Overloading/Overriding/Shadowing in the given situation. 3f. Develop exception handling mechanism to handle the given exception.	VB.Net 3.4 Inheritance in VB.Net, Simple Inheritance using <i>Override</i> Keyword 3.5 Overloading, Overriding and Shadowing 3.6 Exception Handling
Unit-IV Data access in VB.NET	4a. Use the relevant component of ADO.Net architecture based on the given situation. 4b. Select relevant data provider to solve the given problem. 4c. Use the given data provider to the given Access database. 4d. Produce data using Data Adapter Control for communication between the given dataset and the data source. 4e. Use Data Grid control to produce the data from the given data source.	4.1 Architecture of ADO.Net. 4.2 Accessing Data with Server Explorer. 4.3 Data Providers. 4.4 Connections, Data Reader, Data Adapters and Datasets. 4.5 Creating new Data Connection. 4.6 Creating Dataset. 4.7 Data Grid Control and Displaying Data in Data Grid. 4.8 Data Access using Data Adapter.
Unit –V Data Binding and Deployment	5a. Use Simple Data binding for setting properties of the given form control at run time. 5b. Use Complex Data binding for setting properties of the given form control at run time. 5c. Implement VB.Net Application to navigate data in the given database. 5d. Deploy the given VB.Net Application.	5.1 Simple Data Binding using Text Box, Check Box and Label. 5.2 Complex Data Binding using Combo box and List box. 5.3 Navigating Database. 5.4 Deploying VB.Net Application.

Note: To attain the COs and competency, above listed UOs need to be undertaken to achieve the 'Application Level' of Bloom's 'Cognitive Domain Taxonomy'.

9. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER

–Not Applicable–

10. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:



- a. Prepare journals based on practical performed in laboratory.
- b. Library/E-Book survey regarding 'VB.Net' used in software industries.
- c. Undertake a survey of different GUI applications and compare with the following points.
 - i. Available Applications.
 - ii. Application Profile.

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- a. Massive open online courses (**MOOCs**) may be used to teach various topics/sub topics.
- b. '**L**' in item No. 4 does not mean only the traditional lecture method, but different types of teaching methods and media that are to be employed to develop the outcomes.
- c. About **15-20% of the topics/sub-topics** which is relatively simpler or descriptive in nature is to be given to the students for **self-directed learning** and assess the development of the COs through classroom presentations (see implementation guideline for details).
- d. With respect to item No.10, teachers need to ensure to create opportunities and provisions for **co-curricular activities**.
- e. Guide student(s) in undertaking micro-projects.
- f. Demonstrate students thoroughly before they start doing the practice.
- g. Observe continuously and monitor the performance of students in Lab.

12. SUGGESTED MICRO-PROJECTS

Only one micro-project is planned to be undertaken by a student that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project are group-based. However, in the fifth and sixth semesters, it should be preferably be **individually** undertaken to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry. In special situations where groups have to be formed for micro-projects, the number of students in the group should **not exceed three**.

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each student will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The total duration of the micro-project should not be less than **16 (sixteen) student engagement hours** during the course. The student ought to submit micro-project by the end of the semester to develop the industry oriented COs.

A suggestive list of micro-projects are given here. Similar micro-projects could be added by the concerned faculty:

- a. **Hotel Management applications**– Prepare
 - Hotel room booking system having variety of rooms,
 - Hotel billing system for various services used by the guest.
- b. **Store Management Application** - Prepare a menu driven application for inventory management in Store.
- c. **Students' Record System** -Prepare a menu driven application to Maintain Academic record of students from multiple streams.
- d. **Traffic signals control Design**- Design an application for traffic signal control using Timer Control.

13. SUGGESTED LEARNING RESOURCES



S. No.	Title of Book	Author	Publication
1	Visual Basic .NET The Complete Reference	Jeffrey R. Shapiro	McGraw-Hill, California, USA ISBN0-07-213381-3
2	Visual Basic .NET Programming Black Book	Holzner Steven	Dreamtech Press, 2015, New Delhi, ISBN-13:978-81-7722-609-6.
3	Beginning Visual Basic 2012	Bryan Newsome	Wrox Press, USA, Edition: 2012; ISBN: 9781118311813,
4	GUI Application Development using VB.Net	Dr. Rajendra Kawale	Devraj Publication,

14. SUGGESTED SOFTWARE/LEARNING WEBSITES

- a. <http://www.vbtutor.net/index.php/visual-basic-2012-tutorial>
- b. <http://howtostartprogramming.com/vb-net>
- c. <https://www.tutorialspoint.com/vb.net>
- d. <http://vb.net-informations.com>
- e. <http://www.java2s.com/Tutorial/VB/CatalogVB.htm>
- f. <http://www.functionx.com/vbnet>
- g. <http://www.dfit.dfinalsolution.com/dotnet%20tutorial%20for%20beginners.pdf>

