GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

Course Curriculum

EMBEDDED VISUAL BASIC PRACTICE
(Code: 3332003)

Diploma Programme in which this course is offered	Semester in which offered
Mechatronics Engineering	3rd Semester

1. RATIONALE

Visual Basic is widely used for developing user interface for the Automatic system. The exposure to this subject will enable the diploma pass out student to develop the Embedded Visual Basic Practice programming skill to control the actuator by interfacing hardware with programming. Once student are able to master this they will be able to easily identify the problem and its solution in small automatic system operated by parallel port.

2. COMPETENCY (Programme Outcome according to NBA Terminology):

The course content should be taught and with the aim to develop different types of skills so that students are able to acquire following competency

- **Control the actuator by interfacing of hardware with the Visual Basic Programming.**

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	
0	0	4	4	0	0	40	60	**100**

Legends: L - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** - Practical; **C** - Credit; **ESE** - End Semester Examination; **PA** - Progressive Assessment

4. COURSE DETAILS

Unit	**Major Learning Outcomes** (Course Outcomes in Cognitive Domain according to NBA terminology)	**Topics and Sub-topics**
Unit – I Control Properties	1a. Explain the properties of different controls.	1.1 Common controls: Text Box, Check Box, Option Button, Combo Box, List Box, Shape, Label, Timer
Unit – II Operator and variable	2a. Use variables, operator according to given task	2.1 Data types: Non-Numerical Data types,Declaring the variable. 2.2 Types of Operator: Exponential, Multiplication, Division, Integer division, String concatenation
Unit – III Conditional operators and math function	3a. Use conditional operator and Math function according to the given task.	3.1 Conditional operator: Equal to, Not Equal to, Less than, Greater than, Less than or equal to, Greater than or equal to 3.2 Types of Math function: Rnd, Sqr, Sin, Cos, Tan, Round etc 3.3 Types of logical operator: AND, OR, X-OR, NOT
Unit – IV Statements and Loop	4a. Select the best loop or statement for a given task.	4.4 If Else Statement (Binary Choice), Do while Loop, For Loop, Select Case Statement
Unit – V Parallel Port	5a. Use LPT Port for data control.	5.1 LPT Port: Pin Configuration, Discrete control of Pin, Sending data to LPT Port, Receiving data from LPT Port.
Unit – VI Hardware Control	6a. Develop the program to Control D.C. motor. 6b. Develop the program to Control Stepper Motor.	6.1 D.C. Motor: On-Off Control, PWM Control 6.2 Stepper Motor: Step Control, Direction Control, Speed Control

5. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (Practice)

Legends:R = Remember; U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may slightly vary from above table.

6. SUGGESTED LIST OF EXERCISES/PRACTICALS

The practical/exercises should be properly designed and implemented with an attempt to develop different types of practical skills **(Course Outcomes in psychomotor and affective domain)** so that students are able to acquire the competencies (Programme Outcomes). Following is the list of practical exercises for guidance.

Note: Here only Course Outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of **Programme Outcomes/Course Outcomes in affective domain** as given in a common list at the beginning of curriculum document for this programme. Faculty should refer to that common list and should ensure that students also acquire those Programme Outcomes/Course Outcomes related to affective domain.

S. No.	Practical Exercises (Course Outcomes in Psychomotor Domain according to NBA Terminology)	Approx. Hrs. Required
1	Develop a program which give output "Welcome to V.B." in the form of message box.	2
2	Develop a program to change the Command button colour by clicking on it	2
3	Develop a program to increment the value of textbox by clicking the command button.	2
4	Develop a program to copy the content of the textbox to the caption of label by clicking the command button.	2
5	Develop a program to display the selected item into the message box.	4
6	Develop a program to show the Scroll bar current value into the Text Box.	4
7	Develop a program to generate 10ms delay.	4
8	Develop a program to compare the value of two textbox and give the output if both values are match.	2
9	Develop a program to find highest value form the given value.	4
10	Develop a program for stop-watch.	2
11	Develop a program to change the shape according to changing the textbox value.	2
12	Develop a program to change the string of textbox by changing the scrollbar position.	2
13	Develop a program to add the value of two textbox and display it in another textbox	2
14	Develop a program to find total odd number from 1 to 100. (For or Do while Loop).	4
15	Develop a program to display message according to the option button click.	4
16	Develop a Program to select the item from drop down menu and display it on message box	2
17	Develop a program to display message according to the check box click.	2
18	Develop a program to Start and stop the D.C. Motor	2
19	Develop a Program to change the direction of D.C. Motor	2
20	Develop a program to rotate a stepper motor one step on one click.	2
21	Develop a program to rotate a stepper motor with pre define steps.	2
22	Develop a program to Control the Speed of D.C. Motor (PWM)	2
	Total	**56**

7. SUGGESTED LIST OF STUDENT ACTIVITIES

Following is the list of proposed student activities such as:

- Develop a program which displays the value into textbox as well as in seven segment display also.
- Develop a program to Control 24VAC Motor.
- Develop Temperature monitoring System.
- Develop the entry counter system.

8. SPECIAL INSTRUCTIONAL STRATEGIES (If Any)

i. Teach the control used in program first and then start programming.
ii. Prepare laboratory manual having all practical listed in practice list.
iii. Give Assignment and solve difficulties of student in class.

Assessment Guidelines

(For Progressive Assessment (PA) of lab activity)

Guide line for Approximate Distribution of Marks for different Units in Progressive Assessment (PA)		
Unit	**Unit Title**	**Total Marks**
I	Control Properties	10
II	Operator and variable	10
III	Conditional operators and math function	12
IV	Statements and Loop	10
V	Basic of Parallel Port	06
VI	Hardware Control	12
Total		**60**

Guideline for Distribution of Marks for different Components in Progressive Assessment (PA)		
S. No	**Content**	**% of Marks**
1	Lab Record.	20%
2	Quality of Software developed	20%
3	Understanding of using hardware and software.	10%
4	Viva voice.	20%
5	Planning, team working, communication etc.	15%
6	Timely Submission, Punctuality and Attendance.	15%
Total		**100%**

9. SUGGESTED LEARNING RESOURCES

A) List of Books

S. No.	Title of Books	Author	Publication
1	Visual Basic 6 Black Book	Moltzner, Steven	Coriolis Group
2	Visual Basic 6 (The Complete reference)	Jerke, Noel	McGraw-Hill
3	Parallel Port Complete: Programming, Interfacing, & Using the PC's Parallel Printer Port	Axelson, Jan	Lakeview Research

B) List of Major Equipment/Materials with Broad Specification

- Computer including Visual Basic (Registered Copy) and Parallel Port.
- D.C. Motor Hardware Circuit.
- Stepper Motor Hardware Circuit.
- Digital Multi Meter (DMM)
- Cathode Ray Oscilloscope (CRO)
- DC Power supplies

C) List of Software/Learning Websites

- Magazines like Electronics for you.
- www.vbtutor.net

10. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics

- **Prof. P. A. Solanki**, Senior Lecturer, Mechatronics Department, B. S. Patel Polytechnic, Kherva, Mehsana.
- **Prof. K. P. Patel**, Head of Department, Mechatronics Department, B. S. Patel Polytechnic, Kherva, Mehsana.

Coordinator and Faculty Members from NITTTR Bhopal

- **Dr. Vandana Somkuwar,** Associate Professor Department of Mechanical Engineering.
- **Dr. (Mrs) C. S. Rajeshwari,** Professor, Department of Electrical & Electronics Engineering