FACULTY OF COMPUTER APPLICATIONS
Bachelor of Computer Applications

- **Sem.** : 6
- **Subject Code** : 05BC1606
- **Subject** : Mobile Game Development
- **Course Objectives** :
    1. To be familiarized with the basics of C# Programming Language
    2. To learn how to implement OPP concepts in C#
    3. To integrate concepts of C# to develop games in Unity
    4. To understand Unity game engine
    5. To develop Unity Game and deploy it in Mobile phone

- **Prerequisites** :OOP concepts and Vector Mathematics

Unit No	Topics Covered	No of lectures required
1	**Basics of C#:** • History of C# • C# Environment • How to install C# • Features of C# • Variables and datatypes of C# • Keywords of C# • C# program structure • Operators • Type-Conversion • Looping and Control Statement (if-else, switch, for, while, do-while, break, continue) • Constants and comments in C#	**09**
2	**Methods & Class:** • Arrays • Defining Methods • Calling Methods • Call by Value • Call by Reference • Class and Object	**12**

	• Class Members • this & static • constructors and destructors • method overloading and overriding • Access Modifiers • Strings • Enums	
3	**Inheritance & Exception Handling:** • Inheritance • C# Base • Abstract class • Interface • Exception Handling	**08**
4	**Unity Basics:** • Unity Architecture • Basics of Vector Mathematics • Overview of Unity Environment • Creating Project • Understanding Inspector View • Understanding Game View • Understanding Scene View • Console • Understanding Game Objects and its Transformations (Applying Use of Vector Mathematics) • Understanding Difference between 2D and 3D Projects	**11**

5	**Unity Canvas (UI) and Mini Game:**
	• Basics of Scripting
	• Understanding Usage of Core Classes and its application
	  ○ Vector3
	  ○ Transform
	  ○ MonoBehaviour
	  ○ Mathf
	  ○ Time
	• Basics of Unity UI. -> Canvas, Panels, Images, etc
	• Scene Management and Game Flow
	• Preparing a Mini Game
		10

FACULTY OF COMPUTER APPLICATIONS
Bachelor of Computer Applications

Course Outcomes: (After completion of this course student should be able to)

1. Illustrate an understanding of the language and concepts of game development technology and techniques
2. Design and develop game scripts using C# and the Unity API
3. Demonstrate knowledge of the various interface components that compromise the Integrated Development Environment (IDE) of Unity.
4. Apply mathematical and game programming knowledge and skills to solve development tasks.
5. Understand and apply Object-Oriented Programming techniques in C#.

Course Outcomes – Program Outcomes Mapping Table :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H		L			H	M	L
CO2	L	L	H			M	L	H
CO3	L	M	H			M	L	H
CO4	L	M	H			M	L	H
CO5	L	L	M	L	L	M	L	H

Text Book:

1. **Unity from Proficiency to Mastery (C# Programming): Master C# with Unity (Volume 2), Patrick Felicia, Latest Edition**
2. **Sams Teach Yourself Unity Game Development in 24 Hours, Mike Geig, Sams Publishing, Latest Edition**

Reference Books:

1. **Mastering Unity 2017 Game Development with C#, Alan Thorn, Packt Publishing Limited, Latest Edition**
2. **Learning C# by Developing Games with Unity 2020, Harrison Ferrone, Latest Edition**
3. **Learn C# in 7 days, Gaurav Aroraa, Latest Edition**

FACULTY OF COMPUTER APPLICATIONS
Bachelor of Computer Applications

Web References:

1. **https://learn.unity.com/tutorials**
2. **https://www.tutorialspoint.com/csharp/index.htm**

App References:

1. **Learn Game Development with Unity & C#**
2. **Learn C# tutorial**

Syllabus Coverage from text book:

Unit #	Text Book	Chapter Numbers
1	1	1
2	1	2
3	1	3
4	2	1
5	2	2

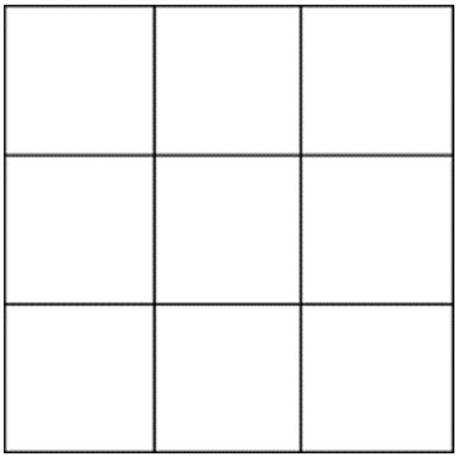
Marwadi University

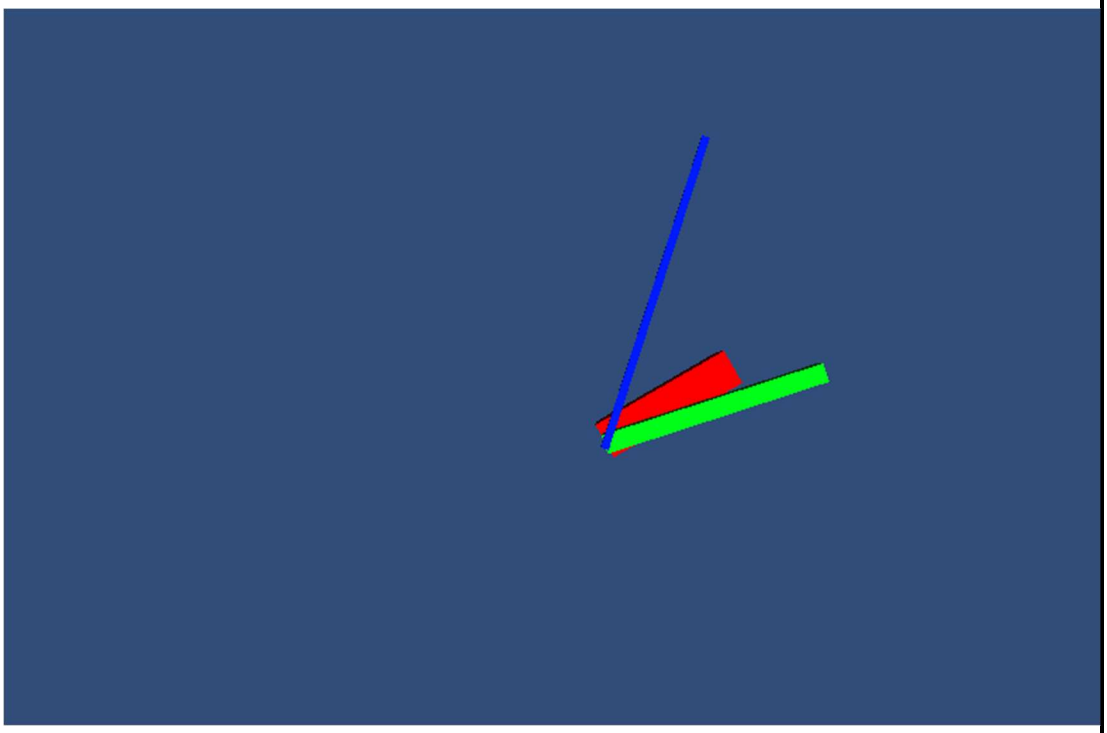
FACULTY OF COMPUTER APPLICATIONS
Bachelor of Computer Applications
PRACTICALS

	Sr. No	List of Practicals
Unit - 1	**1.**	Write a program to print "Hello world"
	2.	Write a simple C# Program to INPUT two variables and print Addition, Subtraction, Multiplication and Division of both numbers.
	3.	Write a program to input 2 number and an arithmetic operator. Display the result accordingly.
	4.	Write a program to input Principal Amount, Rate and Year and display Simple Interest.
	5.	Write a program to input Principal Amount, Rate and Year and display Compound Interest
	6.	Write a program to input radius of a circle, and print area of that circle.
	7.	Write a program to input a number and print whether it is Even or Odd Number.
	8.	Write a program to input age of person and display message as follows - If age < 12 print You are Kid - If age between 12 to 17 print You are teenager - If age between 18 to 60 print you are Adult If age > 60 print You are Senior Citizen
	9.	Write a program to find factorial of a given number.
	10.	Write a program to find Fibonacci series up to a number inputted by user.
	11	Write a program to check weather a number inputted by user is prime or not
	12	Write a program to find all prime numbers between two values inputted by the user
	13	Write a program to Calculate sum of the number inputted by the user for e.g. if user has inputted 1234 then it's sum is 10
	14	Write a program to find minimum of three numbers using conditional operator
	15	Write a program to check weather a number is palindrome or not e.g. input: 121, output: It is palindrome input:124, output: It is not palindrome
	16	Write a program to check weather a string is palindrome or not e.g. input:nayan output: it is palindrome e.g. input: virat output: it is not palindrome
	17	Write a program to check weather a number is ArmStrong or not

		e.g. Input:153 output: It is Armstrong e.g. Input:100 output: It is not Armstrong
	18	Write a program to display maximum number from 5 numbers inputted by user by using the concept of arrays
	19	Write a program to display minimum number from 5 numbers inputted by user by using the concept of arrays
Unit - 2	**20**	Create a class "Rectangle" that would contain length and width as an instance variable, define constructors [constructor overloading (default, parameterized)]to initialize variables of objects. Define methods to find area and to display variables' value of objects which are created.
Unit - 3	**21**	Create a class "Vehicle" with instance variable vehicle_type. Inherit the class in aclass called "Car" with instance model_type, company name etc. display theinformation of the vehicle by defining the show() in both super and sub class
	22	Create a class "Account" containing accountNo, and balance as an instance variable.Derive the Account class into two classes named "Savings" and "Current". The"Savings" class should contain instance variable named interestRate, and the "Current" class should contain instance variable called overdraftLimit. Define appropriatemethods for all the classes to enable functionalities to check balance, deposit, andwithdraw amount in Savings and Current account. (Use the concept of Abstract class)
	23	Write aprogram to implement an interface called Exam with a method Pass (intmark) that returns a boolean. Write another interface called Classify with a methodDivision (int average) which returns a String. Write a class called Result whichimplements both Exam and Classify. The Pass method should return true if the mark isgreater than or equal to 50 else false. The Division method must return "First" when theparameter average is 60 or more, "Second" when average is50 or more but below 60, "No division" when average is less than 50
	24	Describe abstract class called Shape which has three subclasses say Triangle,Rectangle, and Circle. Define one method area () in the abstract class and overridethis area () in these three subclasses to calculate for specific object i.e., area () of Triangle subclass should calculate area oftriangle etc. Same for Rectangle and Circle
	25	Write a program demonstrating the use of Enums in C#
	26	Write a program to demonstrate the use of try and catch in C#
	27	Write a program to demonstrate the use of try, catch and finally in C#

FACULTY OF COMPUTER APPLICATIONS
Bachelor of Computer Applications

	28	Write a program to demonstrate how nested try, catch can be achieved in C#
Unit – 4 & Unit - 5	**29**	Create motion of 2 spheres same as in the game DUET https://play.google.com/store/apps/details?id=com.kumobius.android.duet
	30	Write a script to generate 9 cubes on a plane such that it creates a square of cubes as shown below 
	31	Write a script that moves a cube from one way point to another. Note - These waypoints may change during play mode. These way points are pre generated. (These are empty Game Objects)
	32	Generate Cubes on one above another and move the camera up same as in the game STACK https://play.google.com/store/apps/details?id=com.ketchapp.stack
	33	Create a motion same as dribbling a basketball (Use sphere for basketball)
	34	Create 3 scenes in Unity. a. Home Screen b. Game Play Screen c. Game Over Screen Home Screen will have a Start Button. Game Over Screen will have Home and Restart Button. When the player clicks on the start button -> Switch to Gameplay Screen. When the player taps Space button 5 times -> Switch to Gameover Screen When the player clicks on Home Button -> Switch to Home Screen. When the player clicks on Restart Button -> Switch to Gameplay screen again.

	35	Write a Script to Generate 100 Stairs (In Random Shape) as in the game Infinite Stairs https://play.google.com/store/apps/details?id=com.nflystudio.InfiniteStaircase
	36	Create a spaceship like motion as in the game Galaga(8-Bit Game). - Moves using Arrow Key Input. - Shoots a bullet on Space Button Hit.
	37	Create an Analog Clock using 3 cubes. (One Cube Showing Seconds hand, Others showing minute and Hour respectively) Refer following  Note -> Motion should be the same like a clock. Blue - shows seconds , Red Shows hour, Green shows minutes
	38	Generate Sphere in a Circulate arrangement. Circle Radius Increases after each circle is completed. Each Sphere is generated at a gap of 0.05 seconds. Number of spheres creating a circle increases with each circle getting completed. Note -> The Spheres should be Equidistant from each other

FACULTY OF COMPUTER APPLICATIONS
Bachelor of Computer Applications