School name: Indus University
Faculty name: Ms. Jalpa Poriya

Subject code: MCA-406(A)
Course name: Mobile Cross Platform Development
Pre-requisites: C#, .NET Framework, knowledge of mobile operating systems
Credit points: 04
Offered: MCA
Trimester number: 4th

Course Coordinator
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Consultation times: 2:30 PM to 3:30 PM

Course Lecturer
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Consultation times: 2:30 PM to 3:30 PM

Students will be contacted throughout the Session via Mail with important information relating to this Course.

Course Objectives
1. To teach the fundamentals and strategies behind cross-platform mobile application development.
2. Instead of learning languages like Objective-C, focus on building apps from day one for Android, iOS, WebOS - without the complexities of these platforms.

Course Outcomes (CO)
1. Build native mobile apps for Android, iOS and Windows using C#. Understand the fundamentals of Xamarin Forms and its architecture.
2. Build user-interfaces with XAML and code.
3. Implement multi-page apps with navigation, tabs, and master/detail pages. Store and retrieve data from a variety of sources.
4. Implement Model-View-ViewModel (MVVM) architectural pattern.

Course Outline

UNIT I

[12 Hours]

Introduction to Xamarin:

How Does Xamarin Forms Fit In Anatomy of an App, Deeper into Text, Scrolling the Stack, Dealing with Sizes, Button Clicks, XAML vs. Code, XAML Basics, XAML Compilation, XAML Previewer, XAML Namespaces, Bindable Properties, Attached Properties, Resource Dictionaries

UNIT II

[12 Hours]

Code and XAML in Harmony**,** Platform-Specific API Calls, XAML Markup Extensions, TheBindable Infrastructure, Styles, Bitmaps, Absolute Layout, The Interactive Interface

UNIT III

[12 Hours]

Data Binding, Mastering the Grid, MVVM, Collection Views, Async and File I/O, Transforms, Animation, Triggers and Behaviors, iOS, Windows, Device Class, Plugins, Introduction to Effects, Creating an Effect, Passing Parameters to an Effect

UNIT IV

[12 Hours]

Page Navigation, Page Varieties, Custom Layouts, Custom renderers, Renderer Base Classes and Native Controls, Customizing an Entry, Behaviors, Introduction to Behaviors, Attached Behaviors, Xamarin, Forms Behaviors, Reusable Behaviors.

Method of delivery
Lectures – Board Work
PowerPoint presentation
Quiz organization

Study time
Lectures: 4 hours / week
Self-learning: 4 hours / week

CO-PO Mapping (PO: Program Outcomes)

Program Outcomes:

Computer Applications Graduates will be able to:

PO1   **Computer knowledge:** Apply the knowledge of mathematics, science, computer fundamentals and specialization to the solution of complex problems.

PO2   **Problem analysis:** Identify, formulate, review research literature, and analyze complex computer science problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and computer sciences.

PO3   **Design/development of solutions:** Design solutions for complex computer science problems and design system components or processes that meet the specified needs with appropriate consideration for cultural, social environment.

PO4   **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5   **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern IT tools including prediction and modelling to complex activities with an understanding of the limitations.

PO6   **The digital youth and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional skill-set.

PO7   **Environment and sustainability:** Understand the impact of the professional computer science solutions in social and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8   **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the computer science practice.

PO9   **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10   **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11   **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12   **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1					1	1	2	2		4	
CO2	1		2	3	2	1		2	2		1	
CO3	1	4		2	3					2		3
CO4	1	4								3	3	2

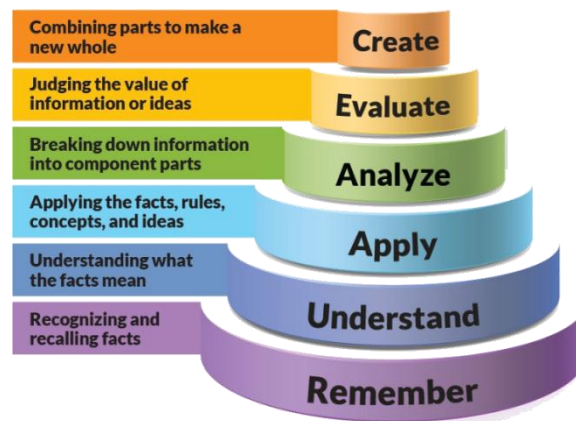# Blooms Taxonomy and Knowledge retention

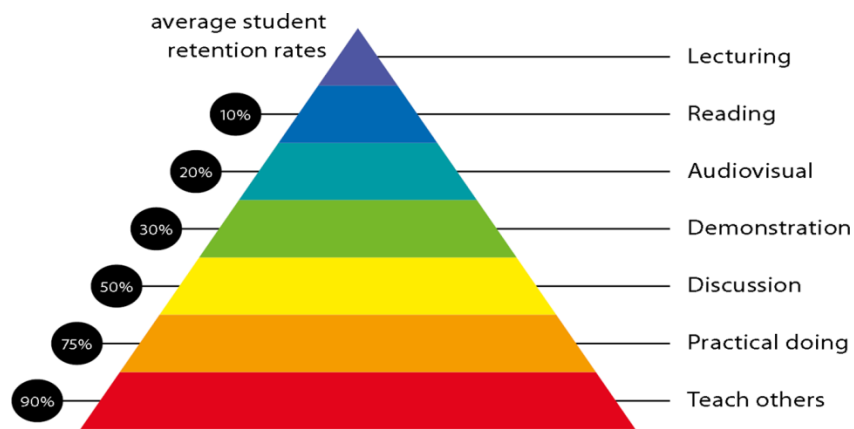**Figure 1: Blooms Taxonomy**

Figure 2: Knowledge retention

Graduate Qualities and Capabilities covered

(Qualities graduates harness crediting this Course)

General Graduate Qualities	Specific Faculty of Computer Graduate Capabilities
Informed Have a sound knowledge of an area of study or profession and understand its current issues, locally and internationally. Know how to apply this knowledge. Understand how an area of study has developed and how it relates to other areas.	**1 Professional knowledge, grounding & awareness**
Independent learners Engage with new ideas and ways of thinking and critically analyze issues. Seek to extend knowledge through ongoing research, enquiry and reflection. Find and evaluate information, using a variety of sources and technologies. Acknowledge the work and ideas of others.	**2 Information literacy, gathering & processing**
Problem solvers Take on challenges and opportunities. Apply	**4 Problem solving skills**

creative, logical and critical thinking skills to respond effectively. Make and implement decisions. Be flexible, thorough, innovative and aim for high standards.	
Effective communicators	**5 Written communication**
Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings. Recognize how culture can shape communication.	**6 Oral communication**
	7 Teamwork
Responsible	**10 Sustainability, societal & environmental impact**
Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.	

Practical work:

Not applicable

Lecture/tutorial times

Lecture	**Tuesday**	**8:30 – 09:20 am**	**Room**
Lecture	**Wednesday**	**01:05 – 01:55 pm**	**Room**
Lecture	**Thursday**	**10:10 – 11:00 am**	**Room**
Lecture	**Friday**	**8:30 – 09:20 am**	**Room**

Attendance Requirements

The University Code of Practice Students states that it is the responsibility of students to attend all lectures, tutorials, seminars and practical work as stipulated in the Course outline. Attendance of practical work exercises is compulsory.

Details of referencing system to be used in written work

Please see "Need to add a link"

Text books
1. *"Creating Mobile Apps with Xamarin"* Publisher : Microsoft Press

Additional Materials
1. *"Beginning of Xamarin"*

2. *"Mastering Xamarin.Forms"*

3. *"Xamarin Studio for Android Programming: A C# Cookbook"*

4. *"Xamarin Essentials"*

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

Example:		
Quiz 1 *(closed book)*	20% (week 3)	Objective (1-3)
Debate on technical topic	10% (week 10)	Objective (5)
Expert Group Presentations	10% (week 12)	Objective (1-4)
Final exam	60%	Objectives (1-5)

NOTE: A failure to complete the laboratory work will result in a Technical Fail (TF) being recorded as your grade. Marks are not normally scaled or modified in this Course.

SUPPLEMENTARY ASSESSMENT (Courses with Academic Empowerment ONLY)

Students who receive an overall mark of 50% will be considered for supplementary assessment in the trimester concerned. The offer of supplementary assessment is not automatic and will be considered on a case by case basis. Precise form of supplementary assessment will be determined at the time the offer of a supplementary assessment is made. Students must make themselves available during the supplementary examination period to take up any offer of supplementary assessment.

Late Work

Late assignments will not be accepted without supporting documentation. Late submission of the reports will result in a deduction of 5% of the maximum mark per calendar day

Format

All assignments must be presented in a neat, legible format with all information sources correctly referenced. **Assignment material handed in throughout the year that is not neat and legible will not be marked and will be returned to the student.**

Retention of Written Work

Written assessment work will be retained by the Course coordinator/lecturer for two weeks after marking to be collected by the students.

University and Faculty Policies

Students should make themselves aware of the University and/or Faculty Policies regarding plagiarism, special consideration, supplementary examinations and other educational issues and student matters.

Plagiarism - Students should refer to the Indus University policy on Plagiarism available in the University Calendar. Plagiarism is not acceptable and may result in the imposition of severe penalties. Plagiarism is the use of another person's work, or idea, as if it is his or her own - if you have any doubts at all on what constitutes plagiarism, please consult your Course coordinator or lecturer. Plagiarism will be penalized severely and has led to expulsion from the University. Further information on plagiarism can be found in the Faculty Policy document.

Do not copy the work of other students.
Do not share your work with other students (except where required for a group activity or assessment)

Course schedule (subject to change)

Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
Week 1	Unit 1		PPT – Board work
Week 2	Unit 1		PPT – Board work
Week 3	Unit 1		PPT – Board work
Week 4	Unit 1		PPT – Board work
Week 5	Unit 2		PPT – Board work
Week 6	Unit 2		PPT – Board work
Week 7	Unit 2		PPT – Board work
Week 8	Unit 2		PPT – Board work
Week 9	Unit 3		PPT – Board work
Week 10	Unit 3		PPT – Board work
Week 11	Unit 3		PPT – Board work
Week 12	Unit 4		PPT – Board work
Week 13	Unit 4		PPT – Board work
Week 14	Unit 4		PPT – Board work
Week 15	Unit 4		PPT – Board work