

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
WORK INTEGRATED LEARNING PROGRAMME
Digital Content (Flipped Learning Model)

Part A: Content Organization

Course Title	Usability Engineering
Course No(s)	SS ZG547
Credit Units	5 (~ Total Hours/week of Student's Effort in Learning)
Credit Model	5 (1+2+2) ~ @ 5Hours/week: Lecture (1.5) + Lab/Assignments(1.5) + Self-study(2)
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Course Objectives

CO1	Understand the psychology underlying user-interface and usability design guidelines keeping in mind human behavioural and perceptual capabilities and limitations that affect interface design.
CO2	Understand the basic principles of Goal-directed user interface design and standard patterns and key modelling concepts involved in Visual interface design for software interfaces.
CO3	Understand development methodologies and lifecycle models for building user interfaces and prototyping in user interface design and how to test them.

Text Books/References

T1	<i>About Face: The Essentials of Interaction Design by Alan Cooper, Robert Reimann, David Cronin. Christopher Nooessel, 4th Edition, WILEY</i>
R1	<i>Don't Make Me Think, Revisited: A Common Sense Approach to Web and Mobile Usability (3rd Edition) Paperback by Steve Krug (Author), 3rd Edition</i>
R2	<i>The Design of Everyday Things (Revised and Expanded Edition) by Don Norman</i>

** Course-code specific to collaborating organization

Glossary of Terms

Module	M	Module is a standalone quantum of designed content. A typical course is delivered using a string of modules (typically 10 – 15). M2 means module 2.
Lecture Session	LS	A Module consists of several Lecture Sessions (LS) in sequence; Each LS covers a particular topic in its entirety; All Lecture Sessions are video recorded content and are available online for anytime-anywhere viewing by Students; LS1.2 denotes Lecture Session number 2 in Module 1
Video Segment	VS	Each Lecture Session (LS) may further be divided into several small (~10-20min) Video Segments (VS) illustrating one sub-topic or concept; LS 1.2 VS 3 (or LS1.2.3) indicates Video Segment number 3 of Lecture Session 2 of Module 1; There may be

		short-quizzes in between Video Segments to assess Students' understanding of the topic
Contact session	CS	Contact sessions refer to physical class-room sessions meant for elaboration of difficult-to-understand concepts, discussions on case-problems, case-studies, and Q&A session with students etc., to be taken up by the course instructor during the contact hours. A Contact Session is built by stringing a bunch of contact session topics. CS3.2 = Contact session sub-module 2 associated with Module 3 CS3.0 = Contact session associated with all sub-modules of Module 3
Case Problem	CP	Case problems/topics (experienced by practising Usability Professionals/Product Designers) to be discussed in the class
Self-Study	SS	Specific content assigned for self-study by the Student
Homework	HW	Specific problems/assignments/lab exercises assigned by Instructor as homework to Students

Course Overview & Terminology

This course--consisting of lectures, case-studies and demonstrations--aims to introduce the science, art and engineering behind the design of user-friendly interfaces for all kinds of digital products—from mobile phones and smart-watches to microwave ovens and automobiles. Though it is the software that implements the User Interface, the skills expected of Usability Engineer (like Graphic Designers or Product Designers) are quite distinct from that of traditional software engineer. This course is highly recommended for all professionals engaged in the conceptual design and development of products and services targeted for use by ordinary citizens. Contents of this course include:

- Introduction of Usability Engineering as a professional discipline
- Iterative Design Process: Research-Ethnography-Rapid Prototyping
- Designing for the Web, Mobile, Consumer and Industrial Devices/Equipment
- Universal Interfaces, Internalization, Localization and designing

As different Text books/Authors/Organizations adopt different words to refer to the same underlying concept (albeit minor differences in semantics), without loss of generality we shall adopt the following words synonymously during the course

Word / Acronym Adopted in this Course	Other Related Words / Acronyms in use by Organizations / Authors	Remarks
Design	Product Design, Industrial Design, Usability Design	Design for Usability
UI (User Interface)	GUI, HUI, HCI, MMI (Man Machine Interface)	User Interface with x
HDI (Human-Device Interface)	HCI	Device – more generic and contemporary word
IxD (Interaction Design)	Interaction Design	Interaction between User and Product
UX (User Experience)	Generic umbrella term beyond usage of single product/service	
Personas	Archetypes, Models	Modelling of different Users

Usability Design (UD)	Iterative Design Cycle: Ethnographic Research – Prototyping -- Refinement	As the word 'Engineering' encompasses 'Design' in its life-cycle, the two words at times are used synonymously
Usability Engineering (UE)	Involves full life-cycle from Design to Development to Testing	
User	Actual end-user (citizen, customer, consumer) who uses the product/service	A Human who uses the product

Course Organization

Introductory Video/Document: << *Introduction of Instructors, overview of the course, structure and organization of topics, guidance for navigating the content, and expectations from students*>>

<Module #>.<Lecture Sequence #>.<Video Segment #>

Lecture Sessions: Each of the Lecture Sessions (LSx.y) are delivered via series of several pre-recorded **Video Segments (VS)** of **15 – 20mins** duration followed by:

Contact Sessions: Each of the Contact Session (CSx.y) of 1.5-2Hr each for Illustrating the concepts discussed in the videos with exercises, tutorials and discussion on case-problems (wherever appropriate); contact sessions (CS) may cover more than one Lecture Session (LS). The schedule of Contact Sessions will be prepared and distributed by the Instructor before commencement of the course (Refer Part-B of this Handout.)

Module Structure

* The duration of Video Segment (VS) may last an average of 10 – 15 minutes each.

No	Title of the Module	Ref.# (Chap)	No. of VS*	Total Mins.
M1	Usability Engineering: Introduction, Motivation and Definitions	T2(C2), R1(C1)	5	90
M2	Designing for Usability: Industrial Design, Form vs Function, Interaction Design	T1(C1), IM	5	90
M3	Usability Design Principles: Psychology of Human-Device Interaction, Design Heuristics, Gestalt Principles of Design	T2(C5), R1, IM	5	90
M4	Goal-Directed Design: Modelling of Users, Personas, Scenarios	T1(C1-C5), R3, IM	5	90
M5	Usability Design: Role of Metaphors, Idioms and Affordances	T1(C12-13), R1(C4)	5	90
M6	Visual Interface Design: Web/Mobile Interfaces, Design of eCommerce sites, Role of Sensory Interfaces in User Experience	T1(C14, C20-25)	5	90
M7	Usability Engineering: “Empathy to Ethnography to Engineering”—A Lifecycle view, Rapid Prototyping & Refinement	T2(C4), R4, IM	5	90
M8	Interface Standards, Designing for Accessibility and Internationalization	T1(C14,C26), T2(C10), R5	5	90
M9	Usability Testing and Assessments	T2(C6,C7)	5	90

	M10	Technology in Interaction Design: Augmented Intelligence (AI), Natural Language Processing (NLP), and Chatbots/Personal Assistants (examples from Apple, Amazon, Google and Microsoft)	IM, Product Literature / Blogs	5	90	
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#T1,T2 (Text Books); **IM**: Instructor-provided Material (PPTs or PDF documents); **ORG**: Material/documents sourced from students' organization

While effort is made to ensure the topics covered in this course are in alignment with referenced text-books, due to changing technologies and emerging practices in this field, it is strongly advised that students refer to their own sources on the net or their own organizations for comprehensive understanding of the concepts.

Content Structure

Type	Title	Description
M1: Usability Engineering--Introduction, Motivation and Definitions		
LS1.1	Introduction to Usability—a Science, Art or Engineering?	1.1 Introduction to Usability This session introduces the notion of Usability as a science of designing effective human interfaces with machines; Distinguish Usability vs User Experience (UX) vs Interaction Design (IXD); Why Usability matters in today's technology-driven world; Examples of products with good and bad Usability
CS1.0		CS1.0 Discuss how Usability is different from Functional Requirements; Identify products in our daily lives with bad (or "unusable") interfaces; Why Product/Visual Designers are much sought after in the industry; Skills expected of a Designer; Highlight the role of 'Design' in the success of Apple products; Let students articulate the attributes of an exciting UX or Product they used or Service they experienced recently; Debate whether Usability is a scientific discipline or the outcome of select creative artists
M2: Designing for Usability		
LS2.1	Designing 'Usable' Products, Services and Customer Experiences	2.1 Elements of Design for Usability This session highlights the elements of a good Design; Trade-offs in the architects' metaphor "Form follows Function"; Design of Graphical Interfaces and Digital Products or Information Appliances; Stakeholders in the Design process; Introduction of the emerging concept of 'Design Thinking' of Organizations and Systems
LS2.2	The Design Process	2.2 Design as an Iterative Process Illustrates the evolutionary aspect of Product development process to include 'Design' in its early stages; Design as an iterative process with user feedback and refinement; Empathy and Ethnographic-research; Goal-Directed Design Process; Managing

		conflicting interests of Stakeholders; Adoption of Agile methods in Usability Engineering
CS2.0		CS 2.0: Discuss (with examples) how Software Engineering is different from Usability Engineering; Why is the User the most important Stakeholder? Why should Designers should involve early on in the process even before Requirements capture; How empathy and ethnography play a key role in arriving at effective User Interaction Model
M3: Usability Design Principles		
LS3.1	Usability Heuristics	RL3.1 Design Problems and Perception biases Design problem and design rules. What is Perception? Visual Perception, Perception biases.
LS3.2	Gestalt Principles of Design	LS3.2 Gestalt Principles Application of Gestalt psychology to the Design of Visual Elements; How Gestalt principles drive aesthetics as well as rapid cognition in graphic communications; Illustration of application of Gestalt principles with examples. Additional principles commonly used in design - Progressive disclosure, Fitt's law and Hick's Law.
CS3.0		CS3.0: Discuss (with examples) how Visual Communication Design (in the form of web pages, graphic displays and information brochures, etc.) helps rapid and effective communication in Human-Device Interface (as in mobile apps, error messaging, automotive displays, technical/business presentations); Heuristics are rules-of-thumb (which worked well for several decades much before the advent of computer devices) based on psychology of human perception, therefore, let students discuss and discover new heuristics that they may find relevant for their devices (mobiles, tablets or public display boards, machines, appliances, etc.); share examples of best web-sites, gaming devices, and analyse the application of any of these ten Usability Heuristics or Gestalt Principles.
M4: Goal-Directed Design--Modelling Users in Context		
LS4.1	Goal-Directed Design	LS4.1 Goals vs Tasks and Activities This module highlights focus on the end 'Goal' or objective of an interface/device vis-à-vis elaboration of tasks and activities which are intermediate steps; How identifying Goal (the real Human motivation) gives the Designer the freedom to explore ideas for effective Interaction; Illustrate the Goal-Directed Design process from Research to Refinement.
LS4.2	Modelling of Users using Personas and Goals	RL4.2 User Modelling: Personas, Goals This session highlights the importance of Mental Models in the Design process: Differences between User model, Represented Model (Design) and Implementation Model (Development); "Ideal Final Result (IFR)" – a thought-experiment approach to visualize Goals; How to identify different Personas of Users based on their

		behaviour, demographics, age, etc.; Constructing scenarios (contexts) of usage
CS 4.0		CS4.0: Discuss (with examples) how Goals are different from Product Features and therefore Tasks and Activities; Let students stretch their imagination to discover the ultimate Goal (IFR tool can be used) of any product/device/service they are trying to design (smart watch, mobile app, kitchen appliance or eGov service); Discuss why design of a mobile phone, automobile, Tablet or ATM for senior citizens should be different from that of college students (the need for Modelling of Users as Personas); Importance of ethnographic studies (and field observations of actual users sampling the product) in refining the design prototype (use IDEO shopping-cart example referred in M7)
M5: Usability Design--Role of Metaphors, Idioms and Affordances		
LS5.1	Basic Visual Principles	LS5.1 Basic Visual Principles Explores the basic Visual design principles and how to be considerate when designing keeping in mind these principles
LS5.2	Role of Metaphors, Idioms and Affordances	LS5.2 Metaphors, Idioms, and Affordances Metaphors make the unfamiliar familiar, this session highlights: Different visual, physical or cognitive metaphors for adoption in UI design; Idiomatic interfaces in GUI design; Limitations of Metaphors; Idiomatic interfaces; The concept of Affordance and how Manual Affordances guide intuitive IxD
CS5.0		CS5.0: This is an important session which highlights key differences between good and great UIs; Let Students explore their products, gadgets and appliances in their workplaces and homes and also their past experiences in interacting online with Government services to surface various good and bad Metaphors, Idioms and the appreciation of Affordances.
M6: Visual Interface Design for the Web & Mobile		
LS6.1	Web & Mobile Interfaces	LS6.1 Design of Web & Mobile Interfaces This session introduces visual communication design principles as applied to websites or mobile apps; The choice of appropriate colours for GUI elements based on science and local culture; Depth and breadth of Hierarchy of Menus; Visual balance and symmetry; Adoption of Icons; Reducing visual noise and clutter on screen
LS6.2	Design of eCommerce Sites	LS6.2 Design of eCommerce Site With digital economy in its boom period and as plethora of online eCommerce sites compete to seek customers' attention (eyeballs), it is often their design (mobile apps or website) make all the difference to their success in the marketplace; This session walks through examples of good and bad online shopping sites by highlighting the relevant visual design principles

LS6.3	Sensory Interfaces in User IxD	LS6.3 Role of Sensory Interfaces in IxD Beyond keyboard, mouse and touch, display and audio, the evolution of digital products with multiple sensors such as location, motion and haptic interfaces (touch), etc., are making dramatic transformation to User Experience and application design; This session highlights recent advances in sensory interfaces supported by various mobile devices and their operating systems; Application of multi-sensory interfaces in the design of Virtual Reality (VR) and Augmented Reality (AR) environments
CS6.0		CS6.0: As much of today's IxD activities revolves around visual communication, designing of screens for either web or mobile should become an internalized skills for Usability professionals; Let Students get a solid grounding on this by illustrating various existing applications and mobile devices and the role played by Usability Engineers coupled with advances in multi-sensory Interface Technologies; Also, highlight the differences between designing for the web and mobile screens (OS-specific apps) and technology/tools for easy porting across devices with different form factors (Desktop, Mobile, Tablet, and Smartwatch)
M7: Usability Engineering—A Lifecycle view, Rapid Prototyping & Refinement		
LS7.1	Life-cycle view of Usability Engineering	LS7.1 Usability Engineering --A Life-cycle view Usability Engineering unlike the water-fall model of Software Engineering is not a linear flow of activities from the beginning to the end of the development life-cycle – It's an iterative process with continuous refinement through ethnographic studies and stakeholder engagement; This session introduces the actual engineering process of realizing Usable Designs starting from Design to Development to Testing
LS7.2	Design as an Iterative Process	LS7.2 Design—an Iterative Process Empathy for Users and their ethnographic study marks the beginning of the Design process with Rapid Prototyping and field trials with Users in an iterative cycle of Design-Test-Refine; This session walks through the typical Iterative Design Process employed by Usability Engineers
CS7.0		CS7.0: Discuss with Students how they develop traditional software products and what 'Design' (in the sense of Usability vis-à-vis Technical Design they are familiar with) means to them and how they plan to include Usability in their Development model; Draw parallels between Agile Methods for Requirements Definition and Usability Engineering and debate if Agile approach can be the right choice for Usability Engineering; Let students discuss adopting this process for the design of an ATM for rural population in India.
M8: Interface Standards and Designing for Accessibility		
LS8.1	Interface Standards	LS8.1 User Interface Standards

		UI Standards ensure consistency of behaviour across applications and devices; This session explores the relevance of standards and their ‘impediment’ to progress; Highlight the defacto standards set by Apple, Microsoft and Google
LS8.2	Internationalization & Localization	LS8.3 Internationalization User Interfaces The choice of icons, colours and fonts is primarily dictated by local customs, culture and language; This session drives the importance of universal conventions for reducing users’ cognitive overhead when products are targeted for international market as well as tailored to local customs, culture and political sensitivities; Adoption of Unicode character-set for multiple global languages
LS8.3	Designing for Accessibility	LS8.2 Designing for Accessibility (for <i>Devyangs</i>) This session considers issues related to Accessibility for Differently-abled persons (<i>Devyangs</i>) by defining relevant Personas and Working sets; Laws governing Accessibility in different countries; Walkthrough the W3C standard for Web Accessibility (WCAG 2.0); Survey of existing national and international standards for mobile and Web Accessibility
CS8.0		CS8.0: Debate the choice of Microsoft’s Windows vs Apple’s iOS vs Google’s Android OS as de facto standard for UI; Discuss evolution of mobile interfaces from feature phones to today’s smart phones; Identify products and services in workplaces that demand Accessibility
M9: Usability Testing and Assessments		
LS9.1	Usability Testing and Assessment	LS9.1 Usability Testing and Assessments Unlike functionality testing in software products, testing of Usability is not to be confined to the pre-release phase, and Usability test planning and test-case design is integrated into the iterative Design process (~ TDD in Agile Testing); This session examines various test strategies (manual, naïve-user, in-field, automated) that are applicable for Usability testing; Beyond quantitative testing, also highlighted various qualitative assessment of Usability by mute observation, field surveys and questionnaire
CS9.0		CS 9.0: Discuss how modelling of users (Personas) helps in Usability test planning, alpha-testing vs beta-testing; Deciding when to release a product in the market; Handling post-release User complaints (cite cases of global product recall and their repercussions on company’s brand value, etc.)
M10: Technology in Interaction Design		
LS10.1	Technology in Interaction Design	LS10.1 Application of Technology in IxD Low-cost sensors and emergence of Internet-of-Things (IoT) are contributing to generation of enormous amounts of data for analysis and communication; This session explores various new technologies of Speech Processing, Image Recognition, Artificial

		Intelligence and Haptic Interfaces, etc. that are taking HCI to new heights (Chatbots, Personal Assistants, VR/AR devices, etc.)
CS10.0		CS10.0: Let Students identify new technologies that are defining HDI in mobiles, desktops, home automation products, automobiles, entertainment electronics, etc.; In the advent of increasing complexity of digital products, discuss how the strategy of “Simplicity” and “Minimalism” is positioning Apple as the Design Company—a role model for Usability Engineers

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Part B: Course Handout

Academic Term	Second Semester 2017-2018
Course Title	Usability Engineering
Course No	SS ZG547
Lead Instructor	
Instructor(s)	

Learning Outcomes

LO1	Identify the user interface design rules that are based on human psychology of perception, learning, reasoning, remembrance and human cognition.
LO2	Apply Goal directed design principles to create human-centred software interfaces.
LO3	Acquire the knowledge of various research techniques to recognize user needs and model them with the help of personas.
LO4	Associate the standard patterns and principles to develop good design and test them.
LO5	Demonstrate how to design a good user interface with a mock-up tool.

Course Introduction & Motivation

In the current digital economy where end-users are inundated with variety of gadgets, appliances, multi-function always-on portable devices such as mobile phones, tablets and smart-watches etc., Usability—the design of product with focus on ease-of-use—assumes paramount importance over functionality. Thus, Usability has become a dominant criteria for success in today’s crowded marketplace. However, there is severe shortage of Usability Designers as these skills unlike Technical skills are not embraced by the generic IT professionals. Also the “Digital India” initiative by the Government of India towards making all transactions in consumer and business space go digital is adding impetus for design of user-friendly devices and mobile applications to cater to all segments of diverse Indian population with multitude of languages, cultures and different-abilities.

This course--consisting of lectures, case-studies and demonstrations--aims to introduce the science, art and engineering behind the design of user-friendly interfaces for all kinds of digital products—from mobile phones and smart-watches to microwave ovens and automobiles. Though it is the software that implements the User Interface, the skills expected of Usability Engineer (like Graphic Designers or Product Designers) are quite distinct from that of

traditional software engineer. This course is highly recommended for all professionals engaged in the conceptual design and development of products and services targeted for use by ordinary citizens. Contents of this course include:

- Introduction of Usability Engineering as a professional discipline
- Iterative Design Process: Research-Ethnography-Rapid Prototyping
- Designing for the Web, Mobile, Consumer and Industrial Devices/Equipment
- Universal Interfaces, Internalization, Localization and designing

for *Devyangs*

Teaching Methodology (*Flipped Learning Model*)

The pedagogy for this course is centred around flipped learning model in which the traditional class-room instruction is replaced with recorded lectures to be watched at home as per the student's convenience and the erstwhile home-working or tutorials become the focus of classroom contact sessions. In this model, in addition to walking-through the topic-centric exercises and filling the gaps in student's comprehension, the contact sessions are also enriched with discussion on organization-specific practices and case-problems experienced by typical practising professionals in the industry.

A catalogue of such case-problems (typical Design Challenges) with continuous update based on inputs from collaborating organizations is maintained by the lead instructor. In addition, **problem-sets** are made available by the instructor as take-home exercises for student's practice.

As part of evaluation, 2-4 week long **take-home assignments or work on building prototypes** of interest to individual student organizations are provided and at the end of which students are expected to prepare a report a detailed report or demonstrate the prototype or make a presentation to the class.

Course Delivery

- There are 12 Contact Sessions (of 1.5 - 2 hours each)--6 before mid-semester and 6 post-mid-semester over a period of 22 weeks with alternate weeks for home-watching of Recorded Lecture Sessions (LS)
- The 6th & 12th Contact Sessions are planned for review of topics pre-mid-semester and pre-end-semester examinations
- The students are expected to watch the prescribed recorded Lecture Sessions (LS) before attending the above Contact Sessions

Instruction Delivery (*via Recorded Lecture Sessions*)

- Students are expected to watch the pre-recorded digital content (below Lecture Sessions) at their own pace before attending scheduled Contact Sessions (CS)
- Minimum of one Contact Session (topics listed under CSx.y) is to be planned for each core module (M1...M10)

#	Title of the Module	LS Nos. (Recorded)
M1	Usability Engineering: Introduction, Motivation and Definitions	LS1.1
M2	Designing for Usability: Industrial Design, Form vs Function, Interaction Design	LS2.1, LS 2.2

M3	Usability Design Principles: Design Heuristics, Gestalt Principles of Design	LS3.1, LS3.2
M4	Goal-Directed Design: Modelling of Users, Personas, Scenarios	LS4.1, LS4.2
M5	Usability Design: Role of Metaphors, Idioms and Affordances	LS5.1, LS5.2
M6	Visual Interface Design: Web/Mobile Interfaces, Design of eCommerce sites	LS6.1, LS6.2, LS6.3
M7	Usability Engineering: A Lifecycle view, Rapid Prototyping & Refinement	LS7.1, LS7.2
M8	Interface Standards: Designing for Accessibility and Internationalization	LS8.1, LS8.2, LS8.3
M9	Usability Testing: and Assessments	LS9.1
M10	Technology in Interaction Design: Augmented Intelligence (AI), Natural Language Processing (NLP), and Chatbots/Personal Assistants	LS10.1

Contact Session Plan

- o Each Module (M#) covers an independent topic and module may encompass more than one Recorded Lecture Session (LS).
- o **Contact Sessions (1.5 - 2hrs each week)** are scheduled **alternate weeks** after the student watches all Recorded Lecture Sessions (LS) of the specified Modules (listed below) during the previous week
- o In the flipped learning model, Contact Sessions are meant for in-classroom discussions on cases, tutorials/exercises to be done by students or responding to student's questions/clarification--- may encompass more than one Module/LS
- o Contact Session topics listed in course structure (numbered CSx.y) may cover several LS; and as per the pace of instructor/students' learning, the instructor may take up more than one CS topic during each of the below sessions

Date / Week#	Contact Session(CS)	Topics# for CS (by Instructor)	Pre-CS Preparation (by Students)
	1	CS1.0	T1(C1), M1
	2	CS2.0	M2
	3	CS3.0	M3
	4	CS4.0	M4
	5	CS5.0	M5
	6	<Review before MID-SEM >	Mid-Sem Syllabus [M1→M5]
		MID-SEM	Mid-Sem Syllabus [M1→M5]

	7	CS6.0	M6
	8	CS7.0	M7, R4
	9	CS8.0	M8, R5
	10	CS9.0	M9
	11	CS10.0	M10
	12	<Review before END-SEM>	Entire Syllabus [M1→M10]
		END-SEM	Entire Syllabus [M1→M10]

#: In addition to the listed topics under CSx.y, refer the attached list of topics for experiential learning, they can be given as assignments to students or taken up for discussion in contact sessions

Experiential Learning Components (ELC) for Work-Integrated Learning

The ELCs can be used by the Instructor for discussion in the Contact Sessions or used by Students as examples of self-study or given as Assignments/Design Projects by Instructors.

They could be in any of the following form:

- Assignment Topics for Research/Self-Study and Presentation
- Case-problems for Design
- Making of Design Prototypes

A set of typical case-problems/products for study/design are presented here for students to apply their knowledge on “Design for Usability.” Relevant materials are provided to students via shared folders.

[Instructors can enrich this list by adding more cases/projects from their own experience or as specified by the students' organization]

#	ELC: Discussion/Assignment Topic/Case-study/Project
1	Walkthrough websites of Good & Bad GUI
2	Analyze the factors that contributed to the success of Nokia 3310 Feature phone which is staging a comeback in 2017
3	Design Aadhar-enabled PoS machine for enabling all digital transactions in rural India
4	Discuss why Apple is considered more as a Design Company than a Technology Leader
.	...

Assignment Instructions (Representative, to be tailored to the actual Assignment/Project):

Topic: Chose any ONE product/service/software/facility/etc. that you got frustrated with (w.r.f to Usability experience)

- a) Describe the 'painful' experience
- b) Analyze/Identify the Principle(s) (Usability Heuristic) overlooked/ignored in its design
- c) Suggest a modified design

Suggested Reading Materials (attached): NNG Usability Heuristics; Normal Design Principles; Making Considerate Software

(Note this is only suggested, students are free to browse any paper/book/internet source on the topic for guidance on Usability).

Tools for Prototyping/Wire-frame Modelling: The following are the open-source/freeware tools or Demo versions students can download and use for designing their mock-up GUI (screen prototypes of web/mobile interfaces)

1. The 7 Best Prototyping Tools for UI and UX Designers in 2016
<https://blog.prototypr.io/the-7-best-prototyping-tools-for-ui-and-ux-designers-in-2016-701263ae65e8>
2. Wire-frame mockup tool: <https://balsamiq.com>

Assignments

- Each student is given an individual assignment on any of the topics discussed in the class; Assignment Topics are based on practical problems experienced or part of work-items or tools used by collaborating organizations
- Assignments are take-home and deadline-driven (typically of 2-4 weeks duration) announced post Mid-semester examination
- Students to spend at least 16 hours of work in study, research, building prototypes, discussion and preparation of the model/report and presentation.
- As part of deliverables for evaluation, the student is expected to demonstrate or prepare a report and make a short-presentation in the class

Evaluation Scheme:

Legend: EC = Evaluation Component; AN = After Noon Session; FN = Fore Noon Session

No	Name	Type	Duration	Weight	Day, Date, Session, Time
EC-1	Quiz-I	Online	-	5%	February 1 to 10, 2018
	Quiz-II	Online		5%	March 1 to 10, 2018
	Assignment-I	Online		15%	March 20 to 30, 2018
EC-2	Mid-Semester Test	Closed Book	2 hours	30%	04/03/2018 (AN) 2 PM – 4 PM
EC-3	Comprehensive Exam	Open Book	3 hours	45%	22/04/2018 (AN) 2 PM – 5 PM

Syllabus for Mid-Semester Test (Closed Book): Topics in Sessions up until Mid-Sem exam

Syllabus for Comprehensive Exam (Open Book): All topics

BITS-Pilani eLearn Site: All the recorded Lecture Sessions (LS) are accessible via BITS-Pilani eLearn.site (<http://elearn.bits-pilani.ac.in/user/>) for all registered students; All materials and communication regarding the course (announcements, assignment submission, online quizzes, and Instructor materials, Session Presentations, etc.) are provided on eLearn site only.

Communication Policy: Students are expected to use Q/A and Discussion Forums in the above eLearn site for all student-instructor communication; No personal emails or mobile calls to instructors will be entertained; Issues related to site access and other administrative issues to be directed to the specified WILP contacts on BITS-Pilani website

Closed Book: No reference material of any kind will be permitted inside the exam hall.

Open Book: Use of any printed Text/Ref Books and hand-written material (notebooks) will be permitted inside the exam hall. Loose sheets, Photocopies and Laser printouts of any material will not be permitted. Computers of any kind will not be allowed inside the exam hall. Use of calculators will be allowed in all exams. No exchange of any material will be allowed.

Self-Study: It shall be the responsibility of the individual student to be regular in maintaining the self-study schedule (watching of Recorded Lectures before the scheduled contact sessions) as given in the course handout.

Instructor-in-Charge