A

Course File Report

On

"HUMAN COMPUTER INTERACTION"

Submitted by

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Assistant Professor

DEPARTMRENT OFCOMPUTER SCIENCE AND ENGINEERING

CMR ENGINEERING COLLEGE

(Affiliated to JNTU, HYDERABAD)

Kandlakoya(v),Medchal -501 401

(2022-2023)

CONTENTS OF COURSE FILE:

1. Department vision & mission
2. List of PEOs, POs, PSOs
3. List of Cos (action verbs as per blooms)
4. Syllabus copy and suggested or reference books
5. Session plan/ lesson plan
6. Session execution log
7. Lecture notes
8. Assignment Questions (Samples Booklets)
9. Mid exam question papers (Samples Booklets)
10. Scheme of evaluation
11. Mapping of Cos with Pos and PSOs
12. Attainment of Cos, Pos and PSOs (Excel sheet)
13. University question papers or question bank.
14. Power point presentations (PPTs)
15. Websites or URLs e- Resources

Submitted By

A.PUNITHA

Assistant Professor

1. Department vision & mission:

Vision

To produce globally competent and industry-ready graduates in Computer Science & Engineering by

imparting quality education with the know-how of cutting-edge technology and holistic personality.

Mission

1. To offer high-quality education in Computer Science & Engineering in order to build core competence for the graduates by laying a solid foundation in Applied Mathematics and program framework with a focus on concept building.

2. The department promotes excellence in teaching, research, and collaborative activities to prepare graduates for a professional career or higher studies.

3. Creating an intellectual environment for developing logical skills and problem-solving strategies, thus developing, an able and proficient computer engineer to compete in the current global scenario.

2. Program Educational outcome (PEO):

PEO 1: Excel in professional career and higher education by acquiring knowledge of mathematical computing and engineering principles.
PEO 2: To provide an intellectual environment for analyzing and designing computing systems for technical needs.
PEO 3: Exhibit professionalism to adapt current trends using lifelong learning with legal and ethical responsibilities.
PEO 4: To produce responsible graduates with effective communication skills and multidisciplinary practices to serve society and preserve the environment.

2.1 Program Outcome (PO):

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer 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 engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **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.

11. **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.

12. 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.

2.3 Program Specific Outcomes (PSOs):

PSO1: Professional Skills and Foundations of Software development: Ability to analyze, design and develop applications by adopting the dynamic nature of Software developments.

PSO2: **Applications of Computing and Research Ability:** Ability to use knowledge in cutting edge technologies in identifying research gaps and to render solutions with innovative ideas.

NBA Graduate Attributes

PO1 Engineering knowledge

PO2 Problem analysis

PO3 Design/development of solutions

PO4 Conduct investigations of complex problems

PO5 Modern tool usage

PO6 The engineer and society

PO7 Environment and sustainability

PO8 Ethics

PO9 Individual and team work

PO10 Communication

PO11 Project management and finance

PO12 Life-long learning

3. Course Outcomes

S. No	Course OutCome
CO1	Define HCI and principles to interaction design**.[Remembering]**
CO2	Demonstrate certain tools for blind or PH people.**[Understanding]**
CO3	Identify the social implications of technology.**[Applying]**
CO4	Examine the responsibilities as engineers in the design of technology**[Analyzing]**
CO5	Solve models from cognitive psychology**[Creating]**

4. Syllabus Copy

UNIT – I

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design. The graphical user interface–popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user–Interface popularity, characteristics- Principles of user interface.

UNIT – II

Design process–Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

ScreenDesigning:Designgoals–
Screenplanningandpurpose,organizingscreenelements,ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information

simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT – III

Windows – New and Navigation schemes selection of window, selection of devices based and screen- based controls. Components–text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT – IV

HCI in the software process, The software life cycle Usability engineering Iterative design and prototyping Design Focus: Prototyping in practice Design rationale Design rules Principles to support usability Standards Golden rules and heuristics HCI patterns Evaluation techniques, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing an evaluation method. Universal design, Universal design principles Multi-modal interaction.

UNIT – V

Cognitive models Goal and task hierarchies Design Focus: GOMS saves money Linguistic models The challenge of display-based systems Physical and device models Cognitive architectures Ubiquitous computing and augmented realities Ubiquitous computing applications research Design Focus: Ambient

Wood – augmenting the physical Virtual and augmented reality Design Focus: Shared experience Design Focus: Applications of augmented reality Information and data visualization Design Focus: Getting the size right..

TEXT BOOKS:

1. The essential guide to user interface design, Wilbert O Galitz, Wiley Dream Tech. Units 1, 2,3
2. Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education Units4,5

REFERENCES:

1. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia.
1. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.
1. User Interface Design, Soren Lauesen , Pearson Education.
2. Human –Computer Interaction, D. R. Olsen, Cengage Learning.
3. Human –Computer Interaction, Smith - Atakan, Cengage Learning

5.SESSION LOG LEESON PLAN

S. NO	Topic (JNTU syllabus)	Sub-Topic	NO. OF LECTURES REQUIRED	Suggested Books	Teaching Methods
UNIT - I					
1	Introduction of Importance of User Interface	Definition, importance of good design	**L1**	**T1**	**M1**
2		Benefits of good design. A brief history of Screen design	**L2-L3**	**T1**	**M1**
3	The graphical user interface	Popularity of graphics, the concept of direct manipulation graphical system, Characteristics	**L4-L5**	**T1**	**M1**
4		Web user – Interface popularity, characteristics- Principles of user interface	**L6-L7**	**T1**	**M1**
UNIT - II					

5	Design process	Human interaction with computers, importance of human characteristics human consideration	**L9**	**T1**	**M1**
6		Human interaction speeds, understanding business junctions	**L10**	**T1**	**M2**
7	Screen Designing	Designgoals– Screenplanningandpurpose,organizingscreenelements,ordering of screen data and content	**L11-L12**	**T1**	**M2(PPT)**
8		screen navigation and flow – Visually pleasing composition – amount of information – focus and	**L13-L14**	**T1**	**M1**

		emphasis			
11		presentation information simply and meaningfully – information retrieval on web – statistical graphics	**L15**	**T1**	**M1**
12		Technological consideration in interfacedesign	**L16**	**T1**	**M1**
UNIT-III					
13	Windows	New and Navigation schemes selection of window	**L17**	**T1**	**M2(PPT)**
13		selection of devices based and screen-based controls	**L18-L19**	**T1**	**M2(PPT)**
20		Multimedia, colors, uses problems, choosing colors	**L20-L21**	**T1**	**M1**

UNIT-IV					
21	HCI in the software process	The software life cycle Usability engineering Iterative design and prototyping	**L22-L23**	**T2**	**M1**
22	Design Focus	Prototyping in practice Design rationale Design rules Principles to support usability Standards Golden rules and heuristics HCI patterns	**L24-L28**	**T2**	**M1**
23		Evaluation techniques, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation Choosing an evaluation method.	**L29-L32**	**T2**	**M1**

24		Universal design, Universal design principles Multi-modal interaction	**L33-L36**	**T2**	**M1**
UNIT –V					
27	Cognitive models Goal and task hierarchies Design Focus	GOMS saves money L0inguistic modelsThe challenge of display-based systems Physical and device models	**L37**	**T2**	**M1**
28		Cognitive architectures Ubiquitous computingandaugmentedrealitiesUbiquitouscomputingapplicationsresearch	**L38-L42**	**T2**	**M1**
29		Design Focus: Ambient Wood – augmenting the physical Virtual and augmented reality	**L43-L45**	**T2**	**M1**
30		Design Focus: Shared experience	**L46**	**T2**	**M2(PPT)**
31		Design Focus: Applications of augmented reality Information and data visualization	**L47-L49**	**T2**	**M2(PPT)**
32		Design Focus: Getting the size right.	**L50**	**T2**	**M2(NPTEL)**

M1 : Lecture Method	**M6 : Tutorial**
M2 : Demo Method	**M7 : Assignment**
M3 : Guest Lecture	**M8 : Industry Visit**
M4 : Presentation /PPT	**M9 : Project Based**
M5 : Lab/Practical	**M10 : Charts / OHP**

METHODS OF TEACHING

Mrs.A.Punitha **WL=7**

	I(9:10-10:10)	II(10:10-11:00)	III(11:00-11:50)	IV(11:50-12:40)		V(1:20-2:20)	VI(2:20-3:10)	VII(3:10-4:00)
MON	HCI		HCI	HCI				
TUE		HCI	HCI					
WED	HCI	HCI						
THU	PROJECT WORK					PROJECT WORK		
FRI	PROJECT WORK					PROJECT WORK		
SAT	PROJECT WORK					PROJECT WORK		

LUNCH BREAK

6. SESSION EXECUTION LOG

Unit . NO	TOPIC	SCHEDULED DATE	COMPLETED DATE	REMARKS
I	Introduction: Importance of user Interface			COMPLETED
II	Design process			COMPLETED
III	Windows			COMPLETED
IV	HCI in the software process			COMPLETED
V	Cognitive models Goal and task hierarchies Design Focus			COMPLETED

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Mid - I ASSIGNMENT QUESTIONS (A.Y 2022-23)

Assignment Questions along with sample Assignments Scripts

1. Define user interface? Explain about the importance of user interface with Good design?(CO1)
2. a) Briefly explain about a Graphical user interface and its Characteristics? (CO1)
b) Analyze in detail about Screen Design?(CO1)
3. Elaborate human interaction speed ?(CO2)
4. a) Develop Conceptual model and its Guidelines?(CO2)
b)Explain different types of Statistical graphs and graphical system?(CO2)
5. List out different types of windows and Components of Windows?(CO3)

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Mid - II ASSIGNMENT QUESTIONS (A.Y 2022-23)

1. Define Multimedia and Application Components of multimedia?(CO3)

2. A)Discuss and elaborate the issues to be considered in choosing colors for web Pages?(CO3)

   B)Draw Waterfall model of Software life Cycle?(CO4)

3.Define Prototype Model? Discuss About the Advantages and Disadvantages of Prototype Model?(CO4)

4.Describe the History of GOMS with examples in detail?(CO5)

5. A)Explain Keystroke Level Model (KLM)?(CO5)

   B)Elaborate about Ambient wood in detail?(CO5)

9. Mid exam Question Papers along with sample Answers Scripts

CMR Engineering College

Kandlakoya(V), Medchal Road, Hyderabad
Department of Computer Science & Engineering

IV B.Tech II-SEM MID-II Examinations

Answer any two of the following Questions. 2*5M=10M

1. a) Define user interface? Explain about the importance of user interface with Good design?(CO1) 2.5 Marks

   b) Analyze in detail about Screen Design?(CO1) 2.5 Marks

2. Elaborate human interaction speed ?(CO2) 5 Marks
3. a) Develop Conceptual model and its Guidelines?(CO2) 2.5 Marks
   b)Explain different types of Statistical graphs and graphical system?(CO2) 2.5 Marks

4. List out different types of windows and Components of Windows?(CO3) 5 Marks

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KANDALKOYA (V), MEDCHAL ROAD, HYDERABAD-501 401

DEPARTMENT OF INFORMATION TECHNOLOGY

IV B.Tech II-SEM MID-II Examinations

Subject: Human Computer Interaction A.Y.2022-2023

Answer any two of the following **2x5=10M**

1.A)Describe the Applications of Multimedia?(CO3)

B)Briefly Explain about the Components of multimedia?(CO3)

2. A)Discuss and elaborate the issues to be considered in choosing colors for web Pages? (CO3)

B)Draw Waterfall model of Software life Cycle?(CO4)

3.Define Prototype Model?Discuss About the Advantages and Dis advantages of Prototype Model?(CO4)

4.A)Describe the History of GOMS?(CO5)

B)Explain Keystroke Level Model (KLM)?(CO5)

10. Scheme of Evaluation MID-I

Sl. No.		THEORY	MARKS	TOTAL
1	a)	Definition	2.5	5
	b)	Screen design	2.5	
2		Human interaction speed	5	5
3	a)	Conceptual model and its Guidelines	2.5	5
	b)	different types of Statistical graphs	2.5	
4	a	List out different types of windows and Components of Windows?	2.5	5
	b	Illustrate about Window Presentation Styles	2.5	
TOTAL MARKS				10 MARKS

MID-II

Sl. No.		THEORY	MARKS	TOTAL
1	a)	Applications of Multimedia	2.5	5
	b)	Components of multimedia	2.5	
2	a)	web Pages	2.5	5
	b)	Waterfall model	2.5	
3		Prototype Model	2.5	5
		Advantages &Disadvantages	2.5	
4	a)	History of GOMS	2.5	5
	b)	Keystroke Level Model	2.5	
TOTAL MARKS				10 MARKS

11. Mapping of COs with POs and PSO's

COURSE OUTCOME PO&PSO Matrix	Relationship of Course Outcomes (CO) to Program Outcomes (PO)													
	PO 1	**PO 2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO 1**	**PSO 2**
CO1	3	-	3	-	1	-	-	-	-	3	-	-	-	2
CO2	-	-	-	-	3	-	-	-	2	2	-	-	-	-
CO3	-	-	-	-	2	-	-	-	-	-	-	-	-	2
CO4	2	-	3	1	-	-	-	-	1	-	-	-	-	2
CO5	-	2	3	-	-	1	-	-	-	-	-	-	-	-
AVERAGE	2.5	2	3	1	2	1	-	-	1.5	2.5	-	-	-	3

12.COs,POs,PSOs Justification

CO.NO	PO/PSO	CL	Justification
CO1	PO1	3	Strongly mapped as students gain the knowledge on HCI and specialization of principles to interaction design
	PO3	3	Strongly mapped for design/development of solutions for complex design Systems
	PO5	1	Slightly mapped to apply appropriate techniques and modern engineering with an understanding of limitations
	PO10	3	Strongly mapped to communicate effectively on design documentation and presentations
	PSO2	2	Moderately mapped To gain

			practical experience in real world Software
CO2	PO5	3	Strongly mapped to create ,select and apply appropriate techniques
	PO9	2	Moderately mapped on individual and team work with good communication
	PO10	2	Moderately mapped to communicate effectively on complex engineering activities
CO3	PO5	2	Moderately mapped to apply techniques to develop the implications of technology
	PSO2	2	Moderately mapped to using industry standard tools for succeeding in IT industry
CO4	PO1	2	Moderately mapped to apply the knowledge of science and engineering fundamentals
	PO3	3	Strongly mapped to design solutions for complex engineering problems and design system components
	PO4	1	Slightly mapped to use research-based knowledge and research methods
	PO9	1	Slightly mapped on individual work or team work in multidisciplinary settings
	PSO2	2	Moderately mapped to gain practical experience in shipping

			real world software ,using industry standard tools and collaboration techniques will equip to secure and succeed in IT industry
CO5	PO2	2	Moderately mapped to analyze complex engineering problems reaching substantiated conclusions using first principles of engineering sciences
	PO3	3	Strongly mapped on design of solutions and solve models from cognitive psychology
	PO6	1	Slightly mapped to consequent responsibilities relevant to professional engineering practice

12. Attainment of CO's, PO's and PSO's (Excel Sheet)21-22 result

ASSESSMENT OF PO'S & PSO'S THROUGH THE COURSE			
PO	**CO**	**Value**	**Final PO Value**
PO1	CO1	3.00	3.00
	CO 4	3.00	
PO2	CO5	3.00	3.00
PO 3	CO1	3.00	3.00
	CO4	3.00	
	CO5	3.00	
PO4	CO 4	3.00	3.00
PO5	CO1	3.00	3.00
	CO2	3.00	
	CO3	3.00	
PO6	CO 5	3.00	3.00
PO 9	CO2	3.00	3.00
PO10	CO1	3.00	3.00
	CO2	3.00	
PSO2	CO1	3.00	3.00
	CO3	3.00	
	CO4	3.00	
	CO5	3.00	

13. University Question Papers/ Question Bank

Code No: **RT42053A** **R13** **Set No. 1**

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2019

HUMAN COMPUTER INTERACTION

(Common to Computer Science and Engineering and Information Technology)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B
*****

PART–A *(22 Marks)*

1.	a)	What are the potential controversies for legal issues of design processes?	[3]
	b)	Why direct manipulation of all screen objects and actions may not be feasible?	[4]
	c)	Compare and contrast between *QWERTY* and *Dvorak* keyboard layouts.	[4]
	d)	Justify that "modest variations in response time are tolerable and have little effect on system performance".	[4]
	e)	What is paper prototyping and how is it used? What are the advantages and disadvantages of it?	[3]
	f)	How the advanced filtering and searching interfaces improve the search content and response time.	[4]

PART–B *(3x16 = 48 Marks)*

2.	a)	What is Heuristic Evaluation? Why is it used? Outline the steps involved for expert review.	[8]
	b)	Discuss the guidelines for Ethnographic observation.	[8]
3.	a)	Explain the importance of response time display rate in menu designing.	[8]
	b)	Compare and contrast between the Linear menus and Tree structured menus with examples.	[8]

4. a) Discuss the challenges and issues in adopting Speech recognition technology. [8]
   b) Explain the various display technologies applicable for small and large displays. [8]

5. a) Discuss the factors that influence the acceptable response time. [8]
   b) Explain the importance and impact of using colors in the design of error and warning messages. [8]

6. a) Explain the advantages of online documentation and also discuss the important features that can help accessing the online documentation in a better way. [8]
   b) Discuss the designer concerns and user-desired qualities for shaping the content of documentation. [8]

7. a) What do you mean by Multimedia document? Discuss various challenges involved in searching a multimedia document. [8]
   b) Discuss the process of data type by task taxonomy for information visualization. [8]

Question Bank

UNIT-1

1. What is User Interface?
2. Discuss the chronological history of graphical user interface
3. Discuss in detail the importance of the user interface design
4. Explain about GUI Interface designs
5. Discuss about the popularity of graphics
6. Explain the concept of Direct manipulation
7. What are the various difficulties with poor design?
8. Discuss psychological and physical user responses to poor design.

UNIT-II

1. Any 5 important Human characteristics in Design
2. Explain Explain any 4 interface design goals
3. Define good screen design. What are the problems with poor design given the factors
4. What is a screen? What is the purpose of a screen?
5. a) What are the important human characteristics that have an influence on design?
   b) Write about the qualities of screen elements.

UNIT-III

1. Explain in detail any Three contents of menu.
2. What are the various functions of menu
3. Discuss different types of menus
4. a) Explain the process of determining basic business functions.
   b) What are the problems with search facility? Discuss.
5. Explain about Words, Sentences
6. a) Write the guidelines for presenting error messages on web.

b) What are the components of a web navigation system? Explain.

7. Discuss about different types of Messages
8. a) List out the factors for using icons and explain.

   b) What are the functions of menus? Explain them in brief.

UNIT-IV

1. Discuss HCI in the software process
2. Explain about goals of evaluation?
3. Which evaluation techniques in software process design.
4. Discus about universal design principles
5. Explain about multi model interaction

UNIT-V

1. Explain about GOSM.
2. Explain about cognitive models Goal and task hierarchies?
3. What are the problems and extension of Goal and hierarchies?
4. Explain briefly on linguistic models?
5. What are the challenges of display based systems?
6. (a) What is ubiquitous computing?

   (b) Augmented realities in ubiquitous computing applications?

14. Power Point Presentations (PPTs)

Interaction between humans(users) and computers is nothing but HCI

- HCI is achieved by interface(interface is nothing but bridge of two objects).
- Human factors are

  1.Vision

  2.Hearing

  3.Touch

  4.Movement
- Computer system is made up of various elements

each of this elements affects the interaction.

- Humans interact with computers through user interface
- It includes s/w which is displayed on Computer monitor.
- H/w such as mouse,keyboard and other peripheral devices.

Good Interface designs

It has eight golden rules

1.Strive for Consistancy(utilize menus,icons,colours etc..,)

2.Enable frequent users to use shortcuts(ctrl+c,ctrl+v,ctrl+x)

3.Offer informative feedback(sending message through gmail)

4.Design dialogue to yield closure(installing s/w ,it should be display status)

5.Prevent errors(wrong password,wrong userid)

6.permit easy reversal of action(undo,redo)

7.Support internal locus of control(close application,exit)

8.Reduce short term memory load

Importance of Good Design

1.We don't care?

2.We don't possess common sense?

3.We don't have the time?

4.We still don't know what really makes good design?

- A well designed interface and screen is terribly important to the users.
- Pure design may even chase some people away from a system permanently.
- It can also lead to aggravation,frustration and increased stress.
- Example bad designs

  -closed door with complete wood

  -suggestion:glass door

Importance of Good Design

1.We don't care?

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- A well designed interface and screen is terribly important to the users.
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The benifits of Good Design

- Poor clarity forced screen users to spend one extra second per screen.

  -Twenty extra seconds in screen usage time adds an additional 14 person years.
- The benifts of a well good designed screen are:

➢ screen users of the modified screens completed transactions in 25 percent less time and with 25 percent fewer errors than those who used the original screens.

➢ Reduced decision-making time.

➢ screen users were about 20 percent more productive with the less crowded version.

➢ one graphical window redesigned to be more effective would save a company about $20,000 during its first year of use.

The Benefits of Good Design

- Good design reduces software complexity which makes the software easier to understand and modify. This facilitates rapid development during a project and provides the foundation for future maintenance and continued system evolution.
- It enables reuse.Good design makes it easier to reuse code.
- It improves software quality .Good design expopses defects and makes it easier to test the software.
- Complexity is the root cause of other problems such as security.A program that is difficult to understand is more likely to be vulnerable to exploits than one that is simpler.

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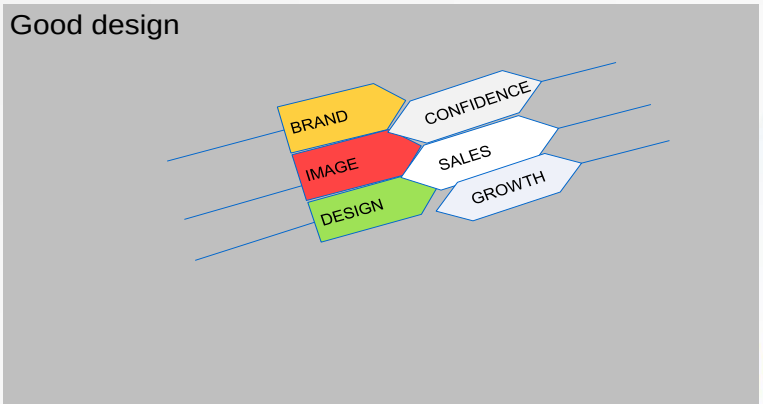

Screen Design

- An orderly,clean,clutter-appearance.
- An obvious indication of what is being shown and what should be done with it.
- expected information located where it should be.
- A clear indication of ,including options,headings,captions,data.
- A simple way of finding out what is in a system and how it get it out.
- A clear indication of when an action can make a permanent change in the data or system.

15. Websites/URLs/ e- Resources.

https://nptel.ac.in/courses/106103115

https://www.digimat.in/nptel/courses/video/106106177/L01.html

https://www.researchgate.net/journal/Human-Computer-Interaction-1532-7051

https://www.journals.elsevier.com/international-journal-of-human-computer-studies

https://www.inderscience.com/info/inarticle.php?artid=90044