DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

NEW COURSES INTRODUCED-2021-2022

2021-2022-ODD

S.NO	COURSE CODE	COURSE OFFERED
1	SAIC4003	**UNIVERSAL HUMAN VALUES**
2	SCSA1319	**DESIGN THINKING AND INNOVATIONS**
3	SCSA2405	**Programming for IoT Boards Lab**

SAIC4003	UNIVERSAL HUMAN VALUES	L	T	P	Credits	Total Marks
		2	1	0	3	100

COURSE OBJECTIVES

- To develop a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence
- To understand (or developing clarity) the harmony in the human being, family, society and nature/existence
- To strengthen self-reflection
- To develop commitment and courage to act

MODULE 1 COURSE INTRODUCTION - NEED, BASIC GUIDELINES, CONTENT AND PROCESS FOR VALUE EDUCATION

1. Purpose and motivation for the course, recapitulation from Universal Human Values-I
2. Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations
4. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority
5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
6. Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

Practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking.

MODULE 2 UNDERSTANDING HARMONY IN THE HUMAN BEING - HARMONY IN MYSELF!

7. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
8. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility
9. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
10. Understanding the characteristics and activities of 'I' and harmony in 'I'
11. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail
12. Programs to ensure Sanyam and Health.

Practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease.

MODULE 3 UNDERSTANDING HARMONY IN THE FAMILY AND SOCIETY- HARMONY IN HUMAN-HUMAN RELATIONSHIP

13. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship
14. Understanding the meaning of Trust; Difference between intention and competence
15. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship
16. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals
17. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

Practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives.

MODULE 4 UNDERSTANDING HARMONY IN THE NATURE AND EXISTENCE - WHOLE EXISTENCE AS COEXISTENCE

18. Understanding the harmony in the Nature
19. Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self regulation in nature
20. Understanding Existence as Co-existence of mutually interacting units in all-pervasive space

21. Holistic perception of harmony at all levels of existence.

Practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

MODULE 5 IMPLICATIONS OF THE ABOVE HOLISTIC UNDERSTANDING OF HARMONY ON PROFESSIONAL ETHICS

22. Natural acceptance of human values
23. Definitiveness of Ethical Human Conduct
24. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
25. Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems.
26. Case studies of typical holistic technologies, management models and production systems
27. Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations
28. Sum up.

Practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.

Total: 28 Lectures And 14 Practice Sessions

COURSE OUTCOMES

On completion of the course, the student are expected

CO1: To become more aware of themselves, and their surroundings (family, society, nature)

CO2: They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind

CO3: To have better critical ability

CO4: To become sensitive to their commitment towards what they have understood (human values, human relationship and human society)

CO5: To apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction

TEXT /REFERENCE BOOKS

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010
2. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
3. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
4. The Story of Stuff (Book).
5. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
6. Small is Beautiful - E. F Schumacher.
7. Slow is Beautiful - Cecile Andrews
8. Economy of Permanence - J C Kumarappa
9. Bharat Mein Angreji Raj – PanditSunderlal
10. Rediscovering India - by Dharampal
11. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
12. India Wins Freedom - Maulana Abdul Kalam Azad
13. Vivekananda - Romain Rolland (English)
14. Gandhi - Romain Rolland (English)

ASSESSMENT:

Assessment by faculty mentor: 10 marks

Self-assessment:: 10 marks

Assessment by peers: 10 marks

Socially relevant project/Group Activities/Assignments: 20 marks

Semester End Examination: 50 marks

SCSA1319	DESIGN THINKING AND INNOVATIONS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To introduce the idea of Human-centered design and design thinking.
- To understand the concept of empathy and its technique.
- To understand observation phase and insight concepts in design thinking.
- To leverage the use of prototype in design thinking
- To design business models using the design thinking innovations.

UNIT 1 HUMAN-CENTERED DESIGN **9 Hrs.**

Introduction to Human-centered Design – Applications of Human-centered Design – Design Process – Mindsets of Human-centered designer – Principles and process of Design Thinking – Planning a Design Thinking Project

UNIT 2 INTERVIEWING & EMPATHY-BUILDING TECHNIQUES **9 Hrs.**

Introduction to Empathy – Practicing Empathy – Empathy vs. Sympathy – Methods for Empathetic design – Tips for Interviews – Empathy Interviews – Understanding and defining the problem

UNIT 3 MAKING SENSE OF OBSERVATIONS & INSIGHTS **9 Hrs.**

Observation Phase – Tips for observing – Insights definition – Problems with Insights – Case study: Insight problems in the history of aviation – Creativity process, principles and techniques – Evaluation of ideas

UNIT 4 DEVELOPING AND TESTING PROTOTYPES **9 Hrs.**

Role of Prototype in design thinking – Types of prototyping – Guidelines for prototyping – Lean Startup Method for Prototype Development – Visualization and presentation techniques – Testing prototypes: Feedbacks and Maximize learning

UNIT 5 DEFINING & TESTING BUSINESS MODELS & BUSINESS CASES **9 Hrs.**

Business Model Definition – Design thinking to design business model – Innovation in Business Model – Pursuing innovation in business – Business model innovations cases – Kano Model – Desirability Testing.

Max.45 Hrs.

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Understand and apply human-centered design process and planning of design thinking project

CO2: Use empathetic design in the interview process

CO3: Identify need for observations and insights problems and come up with creative ideas in design thinking

CO4: Understand, build and test the prototypes

CO5: Use design thinking concepts to build successful business models.

CO6: Implement innovation techniques in business models.

TEXT /REFERENCE BOOKS

1. Mueller-Roterberg, Christian. "Handbook of Design Thinking." Hochschule Ruhr West (2018).
2. Design Kit by IDEO.org. "The field guide to human centered design." (2015), ISBN: 978-0-9914063-1-9.
3. https://www.interaction-design.org/literature/article/design-thinking-getting-started-with-empathy
4. https://www.interaction-design.org/literature/article/stage-4-in-the-design-thinking-process-prototype
5. https://www.interaction-design.org/literature/article/test-your-prototypes-how-to-gather-feedback-and-maximise-learning
6. https://uxplanet.org/what-are-insights-aa1f2d1b3b9c
7. https://labs.sogeti.com/using-design-thinking-to-design-business-models/
8. https://www.northeastern.edu/graduate/blog/implementing-business-model-innovation/

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100 **Exam Duration : 3 Hrs.**

PART A : 10 Questions of 2 marks each-No choice **20 Marks**

PART B : 2 Questions from each unit with internal choice, each carrying 16 marks **80 Marks**

SCSA2405	Programming for IoT Boards Lab	L	T	P	Credits	Total Marks
		0	0	4	2	100

COURSE OBJECTIVES

- To provide knowledge of Arduino board and its applications.
- To familiarize students with Arduino as IDE, programming language & platform.
- To provide knowledge of Arduino boards and basic components.
- To capable of developing various applications using raspberry pi projects.
- To provide the knowledge of developing application in waspmote boards.

LIST OF EXPERIMENTS:

1. Make your Arduino board blink an LED.
2. Create an application to find Motion detection using arduino board.
3. Create an application to measure Temperature and Humidity using arduino board.
4. Demonstrate Ultrasonic distance sensor in arduino board.
5. Create an application to learn to test the output & input of GPIO pins on Raspberry pi.
6. Develop an application to set up a Apache Tomcat web server on a Raspberry Pi.
7. Design an prototype which measures the amount the gas present inside the working environment using gas sensor in Raspberry pi.
8. Build the application to monitor the environment using temperature sensor in Raspberry pi board.
9. Implement smart cities Sensor Board v3.0 using Wasp mote platform for measuring temperature, humidity and pressure. 10.
10. Measure the light intensity and pollution level using Wasp mote platform.

COURSE OUTCOMES:

On completion of the course, student will be able to

CO1: Learn the basics of electronics and sensors.
CO2: Learn how to prototype circuits with a breadboard
CO3: Learn the Arduino programming language and and IDE
CO4: Learn the Raspberry pi pins and Raspbian OS
CO5: Build the prototype in washmote platform.
CO6: Build the projects for real world applications.