

Artificial Intelligence - Sandeep Kamble 2023-2024



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(USCS501)

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(USCS5032)

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(USIT304)

(Core Subject)

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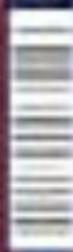
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# Introduction Embedded Systems - Sandeep Kamble 2023-2024



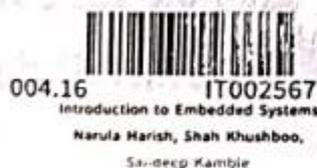
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(Code - USIT402)

(Core Subject)

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from the academic year 2023-2024

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# Introduction to Embedded Systems (Code : USIT402)

Harish G. Narula, Khushboo Shah, Sandeep Kamble

(Semester IV – S.Y. B.Sc. (Information Technology) (Mumbai University))

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First Edition : January 2024

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ISBN : 978-93-5563-674-4

**Published By**

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Book Code : MIE23A

## SYLLABUS

<b>B. Sc. (Information Technology)</b>		<b>Semester - IV</b>	
<b>Course Name : Introduction to Embedded Systems</b>		<b>Course Code : USIT402</b>	
<b>Periods per week (1 Period is 50 minutes)</b>		5	
<b>Credits</b>		2	
<b>Evaluation System</b>	<b>Theory Examination</b>	<b>Hours</b>	<b>Marks</b>
		$2\frac{1}{2}$	75
		<b>Internal</b>	25

Unit	Details	Lectures
I	<p><b>PIC Microcontroller</b> : Architecture, memory organization, addressing modes, instruction set, PIC programming in Assembly &amp; C -I/O port, Data Conversion, RAM &amp; ROM Allocation, Timer programming.</p> <p><b>Advanced ARM Controllers</b> : Introduction to ARM and its Features, Architecture, memory organization, addressing modes, The ARM Programmer's model, Registers, Pipeline, Interrupts, Coprocessors, Interrupt Structure. <b>(Refer Chapters 1 and 2)</b></p>	12
II	<p><b>Communication Protocol and Implementation</b> : Introduction to Communication Protocol, I<sup>2</sup>C - Interfacing with micro controller using bit-banking method, I<sup>2</sup>C devices - RTC, Memory, ADC-DAC, Port Expander, SPI (Serial Peripheral Interface), Bluetooth, Wi-Fi and RFID. Understanding Serial, Communication, Bluetooth Communication, SPI Interface ZigBee, Wi-Fi, I<sup>2</sup>C, Infrared, RFID, GSM, GPS, PDH/SDH/Ethernet. <b>(Refer Chapter 3)</b></p>	12
III	<p><b>Getting Started with Arduino</b> : Introduction, Arduino Variants, Install the Drivers, Arduino IDE.</p> <p><b>Basic Functions</b> : Overview, Structure, Digital I/O Functions, Analog I/O Functions, Advanced I/O Functions, Timer Functions, Communication Functions, Interrupt Functions, Math Functions, Programming Language Reference. <b>(Refer Chapter 4)</b></p>	12
IV	<p><b>Using Sensors with the Arduino</b> : Light Sensitive Sensors, Temperature Sensors, Temperature and Humidity Sensor, Line-Tracking Sensor, Ultrasonic Sensors, Digital Infrared Motion Sensor, Joystick Module, Gas Sensor, Hall Sensor, Color Sensor, Digital Tilt Sensor, Triple Axis Acceleration Sensor, Analog Sound Sensor, Voice Recognition Module, Digital Vibration Sensor, Flame Sensor, Capacitive Touch Sensor.</p> <p><b>Electromechanical Control using the Arduino</b> : DC Motor, Stepper Motor, Servo Motor. <b>(Refer Chapter 5)</b></p>	12

Unit	Details	Lectures
V	<b>Wireless Control using the Arduino : Infrared Transmitter and Receiver, Wireless Radio Frequency, Bluetooth, GSM/GPRS, Wi-Fi</b> <b>Case Studies :</b> <ul style="list-style-type: none"> <li>• Air Quality Monitor Using Arduino</li> <li>• A Fire-Fighting Robot Using Arduino</li> <li>• Intelligent Lock System Using Arduino</li> </ul> <p style="text-align: right;">(Refer Chapter 6)</p>	12

## Practical Syllabus

B. Sc. (Information Technology)		Semester - IV	
Course Name : Introduction to Embedded Systems		Course Code : USIT4P2	
Periods per week (1 Period is 50 minutes)	Lectures per week	3	
		Hours	Marks
Evaluation System	Practical Examination	$2\frac{1}{2}$	50

### List of Practical

1.	<b>Introduction to Arduino</b> Introduction to Arduino circuits and breadboarding. Blinking of LEDs.
2.	Program using Light Sensitive Sensors.
3.	Program using temperature sensors.
4.	Programs using humidity sensors.
5.	Programs using Line tracking sensors.
6.	Programs using Ultrasonic Sensors.
7.	Programs using digital infrared motion sensors.
8.	Programs using gas sensors.
9.	Programs using servo motors.
10.	Programs making Joystick with Arduino.



**PIC Microcontrol**  
 addressing modes,  
 Assembly & C -I/  
 Allocation, Timer p

- 1.1 Intro
- 1.2 Compa
- 1.3 Harva
- 1.3.1 Harva
- Micro
- 1.4 PIC1
- 1.5 Arch
- (Blo
- 1.5.1 Prog
- 1.5.2 31 M
- 1.5.3 Dat
- 1.5.4 Ari
- 1.5.5 CP
- 1.5.5(A) W
- 1.5.5(B) S
- 1.5.5(C) P
- 1.5.5(D) S
- 1.5.5(E) M
- 1.5.6
- 1.5.7
- 1.5.8
- 1.5.8(A)
- 1.6

## Unit I

## Chapter 1 : PIC Microcontroller 1-1 to 1-37

**PIC Microcontroller** : Architecture, memory organization, addressing modes, instruction set , PIC programming in Assembly & C -I/O port, Data Conversion, RAM & ROM Allocation, Timer programming.

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**Basic Functions** : Overview, Structure, Digital I/O Functions, Analog I/O Functions, Advanced I/O Functions, Timer Functions, Communication Functions, Interrupt Functions, Math Functions, Programming Language Reference

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**Electromechanical Control using the Arduino** : DC Motor, Stepper Motor, Servo Motor.

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**Wireless Control using the Arduino :** Infrared Transmitter and Receiver, Wireless Radio Frequency, Bluetooth, GSM/GPRS, Wi-Fi

**Case Studies :**

- Air Quality Monitor Using Arduino
- A Fire-Fighting Robot Using Arduino
- Intelligent Lock System Using Arduino

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6.1.1	Infrared Transmitter.....	
6.1.2	Infrared Receiver.....	
6.2	Wireless Radio Frequency.....	
6.3	Bluetooth.....	
6.4	GSM.....	
6.5	GPRS.....	
6.6	Wi-Fi.....	
6.7	Case Studies.....	
6.7.1	Air Quality Monitor Using Arduino.....	
6.7.2	A Fire-Fighting Robot Using Arduino.....	
6.7.3	Intelligent Lock System Using Arduino.....	
V	<b>Lab Manual.....</b>	<b>L-1 to L-17</b>

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2023-2024



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# Customer Relationship Management

(USCS6051)

(Generic Elective \*\*)

T.Y.B.Sc. (Computer Science) Semester VI

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*Choice Based Credit System with effect from Academic Year 2023-2024*

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(Semester VI – T.Y. B.Sc. (Computer Science) (Mumbai University))

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**First Edition** : December 2023

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**ISBN** : 978-93-5563-741-3

**Published By**

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**Printed @**

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Near Pari Company,  
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**Subject Code** : USCS6051

**Book Code** : MCE43A

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**Sandeep Kamble**

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**Ankit Bandal**

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# SYLLABUS

Mumbai University

(B.Sc. Computer Science) Semester – VI

## Customer Relationship Management (USCS 6051)

### Course Objectives :

1. To provide students with a comprehensive understanding of CRM concepts, theories, and models.
2. To equip students with the knowledge and skills to manage the customer journey, including customer acquisition and retention.
3. To explore the factors that contribute to customer-perceived value and the role of CRM in enhancing the customer experience.
4. To familiarize students with strategic and operational CRM approaches, including customer portfolio management and marketing automation.
5. To introduce students to the analytical aspects of CRM, including data management, analytics for strategy and tactics, and the implementation of CRM systems.

Unit	Details	Lectures
I	<p><b>Understanding Customer Relationships</b></p> <p><b>Introduction to CRM :</b> Three forms of CRM, The changing face of CRM, Misunderstandings about CRM, Defining CRM, CRM constituencies, Commercial contexts of CRM, Models of CRM, Understanding relationships, Relationship Quality, Customer life-time value, Customer satisfaction, loyalty and business performance, Relationship management theories, Benefits of CRM</p> <p><b>Managing the customer journey :</b> Customer acquisition, Portfolio purchasing, Prospecting, Key performance indicators of customer acquisition programs, Operational CRM tools that help customer acquisition, Customer retention, Economics and Strategies of customer retention, Key performance indicators of customer retention programs.</p>	15

Unit	Details	Lectures
	<p><b>Managing customer-experienced value</b> : Understanding value, modeling customer-perceived value, its sources, Customization, Value through the marketing mix, Customer Experience concepts, Service marketing, Total quality management, relationship management, CRM's influence on CX, How CRM software applications influence customer experience  <b>(Refer Chapters 1, 2, 3)</b></p>	
II	<p><b>Strategic and Operational CRM</b></p> <p><b>Customer portfolio management</b> : Portfolio, customer, Basic disciplines for CPM, CPM in the business-to-business context, customer portfolio management tools, strategically significant customers, The seven core customer management strategies</p> <p><b>Marketing automation</b> : Introduction to marketing automation, Benefits, Software applications for marketing, Sales force automation</p> <p><b>Service automation</b> : Introduction, customer service, Modeling service quality, Customer service standards, service automation, Benefits, Software applications for service  <b>(Refer Chapters 4, 5, 6)</b></p>	15
III	<p><b>Analytical CRM</b></p> <p><b>Developing and managing customer-related databases</b> : Corporate customer-related data, Structured and unstructured data, Developing a customer-related database, Data integration, Data warehousing, Data marts, Analytics for CRM strategy and tactics, Big data analytics, Analytics for structured data, ways to generate analytical insight, Data-mining procedures, Artificial intelligence (AI), machine learning (ML) and deep learning (DL)</p> <p><b>Implementing CRM</b> : Introduction, develop the CRM strategy, build CRM project foundations, needs specification and partner selection, project implementation, performance evaluation</p> <p><b>Case studies and success stories related to CRM</b>  <b>(Refer Chapters 7, 8)</b></p>	15

## Unit – I

### Chapter 1 : Introduction to CRM

1-1 to 1-32

**Introduction to CRM :** Three forms of CRM, The changing face of CRM, Misunderstandings about CRM, Defining CRM, CRM constituencies, Commercial contexts of CRM, Models of CRM, Understanding relationships, Relationship Quality, Customer life-time value, Customer satisfaction, loyalty and business performance, Relationship management theories, Benefits of CRM

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(USCS6051)

(Generic Elective \*\*)

T.Y.B.Sc. (Computer Science) Semester VI

**Sandeep Kamble     Ankit Bandal**

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Sandeep Kamble, Ankit Bandal

(Semester VI – T.Y. B.Sc. (Computer Science) (Mumbai University))

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**First Edition** : December 2023

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ISBN : 978-93-5563-741-3

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**Subject Code** : USCS6051

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	<p><b>Managing customer-experienced value</b> : Understanding value, modeling customer-perceived value, its sources, Customization, Value through the marketing mix, Customer Experience concepts, Service marketing, Total quality management, relationship management, CRM's influence on CX, How CRM software applications influence customer experience  <b>(Refer Chapters 1, 2, 3)</b></p>	
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## Unit – I

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