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VEER NARMAD SOUTH GUJARAT UNIVERSITY

University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.

વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી

યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.

Tel : +91 - 261 - 2227141 to 2227146, Toll Free : 1800 2333 011, Digital Helpline No.- 0261 2388888

E-mail : info@vnsgu.ac.in, Website : www.vnsgu.ac.in


-: પરિપત્ર :-

યુનિવર્સિટી સંલગ્ન કોમ્પ્યુટર સાયન્સ વિદ્યાશાખા હેઠળની તમામ બીસીએ કોલેજોના આચાર્યશ્રીઓને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૬-૨૭ થી અમલમાં આવનાર BCA(Artificial Intelligence and Data Analytics) Sem.-2 (SEC) Basic IoT Applications Smart Device Projects નો પેટાસમિતિ દ્વારા તૈયાર કરવામાં આવેલ અભ્યાસક્રમ કોમ્પ્યુટર સાયન્સ વિષયની અભ્યાસ સમિતિના ચેરમેનશ્રીએ અભ્યાસ સમિતિવતી અને કોમ્પ્યુટર સાયન્સ ફેકલ્ટીના ઈ.ચા.ડીનશ્રીએ ફેકલ્ટીવતી મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલની તા.૨૪/૧૨/૨૦૨૪-ની સભાનાં ઠરાવ ક્રમાંક:૩૫૩ અન્વયે માનનીય કુલપતિશ્રીને આપેલ સત્તા અંતર્ગત એકેડેમિક કાઉન્સિલવતી માન.કુલપતિશ્રીએ મંજૂર કરેલ છે. જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

બિડાણ: ઉપર મુજબ

ક્રમાંક:ઓથો./પરિપત્ર/૧૨૩૭૫/૨૦૨૬

તા.૦૮/૦૬/૨૦૨૬


કુલસચિવ લા

પ્રતિ,

(૧) યુનિવર્સિટી સંલગ્ન તમામ બીસીએ કોલેજોના આચાર્યશ્રીઓ.

.....આપશ્રીની કોલેજ/વિભાગના સંબંધિત શિક્ષકો/વિદ્યાર્થીને જાણ કરી અમલ કરવા સારું.

(૨) ઈ.ચા.ડીનશ્રી, કોમ્પ્યુટર સાયન્સ વિદ્યાશાખા.

(૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

.....તરફ જાણ તેમજ અમલ સારું.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
F.Y.B.C.A.(ARTIFICIAL INTELLIGENCE AND DATA ANALYTICS)
(SEM – 2)

AI-206-03: Basic IoT Applications and Smart Device Projects
(w.e.f. Academic Year June, 2026-2027)

COURSE NAME	Basic IoT Applications and Smart Device Projects								
Semester	II								
NCrF Credit Level	Level-4.5								
Course Type	Skill Enhancement Course								
Course Subtype	Employability								
Subject Type	Skill Enhancement course								
Course Code	AI-206-03								
Course Level	100-199								
Course Title	Basic IoT Applications and Smart Device Projects (SEC-02)								
Credit	2 Credits								
Effective From	Academic Year : 2026-2027								
Course Objective:	<ol style="list-style-type: none"> 1. Reinforce basic Arduino and circuit knowledge 2. Enable students to build simple automation systems 3. Introduce sensor-based real-life applications 4. Develop hands-on skills through mini projects 5. Encourage creativity and problem-solving using IoT devices 								
Course Outcomes	<p>CO1: Recall and apply basic Arduino and circuit concepts</p> <p>CO2: Develop simple automation systems using sensors</p> <p>CO3: Interface multiple input/output devices</p> <p>CO4: Build small IoT-based applications</p> <p>CO5: Demonstrate problem-solving using hardware setups</p>								
Mapping between Cos and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
	CO1								
	CO2								
	CO3								
	CO4								
	CO5								
Course Content	<p>Unit-1:</p> <p>1.1 Basics OF Arduino</p> <p> 1.1.1 Arduino fundamentals</p> <p> 1.1.2 LED, resistor, push button</p> <p> 1.1.3 Breadboard connections</p>								

- 1.2 Working with Multiple Outputs
 - 1.2.1 Connecting multiple LEDs
 - 1.2.2 Sequential lighting patterns
 - 1.2.3 Traffic light simulation
- 1.3 Working with Multiple Inputs
 - 1.3.1 Multiple push buttons
 - 1.3.2 Input combinations
 - 1.3.3 Basic logical operations (AND, OR – conceptual)

Unit–2: Sensor-Based Automation

- 2.1 Light-Based Automation
 - 2.1.1 Working of LDR
 - 2.1.2 Automatic light control
- 2.2 Temperature-Based Systems
 - 2.2.1 Temperature sensor basics
 - 2.2.2 Threshold-based control
- 2.3 Motion-Based Systems
 - 2.3.1 PIR sensor introduction
 - 2.3.2 Motion detection
- 2.4 Automation Concepts
 - 2.4.1 Condition-based programming
 - 2.4.2 Real-life automation examples

Unit–3: Output Devices and Alerts

- 3.1 Buzzer and Alerts
 - 3.1.1 Introduction to buzzer
 - 3.1.2 Sound-based alerts
- 3.2 Displaying Output
 - 3.2.1 Serial Monitor usage
 - 3.2.2 Displaying sensor values
- 3.3 Combined Systems
 - 3.3.1 Sensor + LED system
 - 3.3.2 Sensor + buzzer system
 - 3.3.3 Multi-output integration

Unit–4: Mini IoT Applications and Projects

- 4.1 Smart Lighting System
 - 4.1.1 Automatic street light using LDR
- 4.2 Basic Security System
 - 4.2.1 Motion detection alarm using PIR
- 4.3 Temperature Alert System
 - 4.3.1 Threshold-based alert system
- 4.4 Student Mini Project
 - 4.4.1 Design and implementation
 - 4.4.2 Demonstration and explanation

[Students are expected to work on following suggested Practicals during Lab- hours :
1. Multiple LED blinking, 2. Traffic light system, 3. Two-button control system, 4. LDR-based automatic light, 5. Temperature threshold system, 6. PIR motion detection, 7. Buzzer alert system, 8. Sensor + LED integration, 9. Sensor + buzzer system, 10. Mini project (student-defined)]

	[Suggested components for lab : (One set per 10 students): (i) Arduino Uno – 1, (ii) Breadboard – 1, (iii) USB Cable – 1 (iv) LEDs –10nos. (v) Resistors – Assorted (vi) Jumper wires – Set (vii) Push buttons –3nos. (viii) LDR sensor – 1nos. (ix) Temperature sensor – 1nos., (x) PIR sensor – 2 nos. (xi) Buzzer – 2 nos.]
Reference Books	<ol style="list-style-type: none"> 1. Getting Started with Arduino (3rd Edition), 978-9352139819, Massimo Banzi, Maker Media 2. Arduino Cookbook, 978-1449313876, Michael Margolis, O'Reilly Media 3. Programming Arduino: Getting Started with Sketches, 978-0071784229, Simon Monk, McGraw-Hill Education 4. Exploring Arduino: Tools and Techniques for Engineering Wizardry, 978-1119405373, Jeremy Blum, Wiley 5. Internet of Things: A Hands-On Approach, 978-0996025515, Arshdeep Bahga and Vijay Madisetti, Universities Press 6. Learning Internet of Things, 978-1788399119, Peter Waher, Packt Publishing 7. Beginning Arduino, 978-1430232401, Michael McRoberts, Apress 8. Make: Electronics (2nd Edition), 978-1680450260, Charles Platt, Maker Media 9. Practical Electronics for Inventors (4th Edition), 978-1259587549, Paul Scherz and Simon Monk, McGraw-Hill Education 10. Hands-On Internet of Things with MQTT, 978-1789341780, Agus Kurniawan, Packt Publishing
Teaching Methodology	Class Work, Discussion, Lab work, Self-Study, Seminars and/or Assignments
Evaluation Method	<p>50% Internal assessment.</p> <ul style="list-style-type: none"> - Attendance, Class and home Assignment, Practical Unit tests. - Practical exam, viva-voce, E-Journal <p>50% External assessment.</p> <ul style="list-style-type: none"> - Practical Exam, viva-voce, E-Journal