DRS. KIRAN & PALLAVI PATEL GLOBAL UNIVERSITY
Established Under Gujarat Private Universities (Amendment) Act, 2021 (Gujarat Act No. 15 of 2021)
KPGU Vadodara

FACULTY OF ENGINEERING & TECHNOLOGY

KRISHNA SCHOOL OF EMERGING TECHNOLOGY

&

APPLIED RESEARCH

(KSET)

FINAL DRAFT
OF
DETAILED SCHEME
&
SYLLABUS OF SEMESTER 3 / YEAR 2

B. TECH. COMPUTER SCIENCE & ENGINEERING

DURATION: 4 YEARS (8 SEMESTERS)

MONTH: JULY **YEAR: 2022**

Year : 2 Semester : 3																		
Sr No.	**Name of Subject**	**Teaching Scheme**				**Evaluation Scheme**											**Credits**	
						Theory					**Practical**					**Total Marks**		
		Theory Hours/week	**Tutorial Hours/week**	**Practical Hours/week**	**Total**	**Ex**	**Internal**				**Internal**				**External**		**Theory**	**Practical**
							Continuous Evaluation				**Term Work**				**Viva/Practical Exam**			
						ESS	**Attendance**	**Assignment**	**Mid Sem-I**	**Mid Sem-II**	**Attendance**	**Lab work**	**Report Writing**	**Performance**				
1	Data Structures	**3**	**0**	**0**	**3**	**70**	**5**	**5**	**10**	**10**	**-**	**-**	**-**	**-**	**-**	**100**	**3**	**0**
2	Data Structures Laboratory	**0**	**0**	**4**	**4**	**-**	**-**	**-**	**-**	**-**	**5**	**5**	**5**	**5**	**30**	**50**	**0**	**2**
3	Database Management Systems	**3**	**0**	**0**	**3**	**70**	**5**	**5**	**10**	**10**	**-**	**-**	**-**	**-**	**-**	**100**	**3**	**0**

4	Database Management Systems Laboratory	**0**	**0**	**4**	**4**	**-**	**-**	**-**	**-**	**-**	**5**	**5**	**5**	**5**	**30**	**50**	**0**	**2**
5	Digital Electronics	**3**	**0**	**0**	**3**	**70**	**5**	**5**	**10**	**10**	**-**	**-**	**-**	**-**	**-**	**100**	**3**	**0**
6	Digital Electronics Laboratory	**0**	**0**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**5**	**5**	**5**	**5**	**30**	**50**	**0**	**1**
7	Maths-III	**3**	**0**	**0**	**3**	**70**	**5**	**5**	**10**	**10**	**-**	**-**	**-**	**-**	**-**	**100**	**3**	**0**
8	Maths-III Laboratory	**0**	**0**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**5**	**5**	**5**	**5**	**30**	**50**	**0**	**1**
9	Language Elective-2	**3**	**0**	**0**	**3**	**70**	**5**	**5**	**10**	**10**	**-**	**-**	**-**	**-**	**-**	**100**	**3**	**0**

Program Education Objectives (PEOs):

PEO1	To build a strong foundation for problem solving ability, critical thinking and mathematical principles in the domain of computer Science and emerging Technologies.
PEO2	To adapt innovative teaching methodology to elevate research and technical skills with advancements in computing tools and technologies and provide sustainable solutions to the social, economical and industrial problems.
PEO3	To produce competent computer professionals with various skills to formulate, analyze and design diverse problems and address challenges by developing software solutions.
PEO4	To exhibit lifelong learning skills, professional skills, leadership qualities, entrepreneurship and ethical values for global enrichment.
PEO5	Integrate computer science with AI, IoT, healthcare, finance, robotics, and smart technologies to create innovative solutions for real-world challenges.

Program Specific Outcomes (PSOs):

PSO1	Applying core mathematical concepts of computer Science and Engineering to solve complex problems by dividing it into smaller problems.
PSO2	To develop the research skill and ability to analyze the feasible solution in context with software development and management using modern tools and technologies.

Program Outcomes (POs):

PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**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.
PO3	**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.
PO4	**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.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, andmodern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**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.
PO7	**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.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**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.
PO11	**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.
PO12	**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

<table>
<tr><td>Course Title</td><td colspan="2">Digital Electronics</td><td>Course No
(Will be assigned)</td><td colspan="8"></td></tr>
<tr><td>Specialization</td><td colspan="2"></td><td rowspan="3">Structure</td><td colspan="8"></td></tr>
<tr><td>Course/Branch</td><td colspan="2">CSE</td><td colspan="2">L</td><td colspan="2">T</td><td colspan="2">P</td><td colspan="2">C</td></tr>
<tr><td>Offered for</td><td colspan="2">3rdSem</td><td colspan="2">3</td><td colspan="2">0</td><td colspan="2">0</td><td colspan="2">3</td></tr>
<tr><td>Faculty</td><td colspan="2">E & T</td><td>Status</td><td>BSC</td><td>HSC</td><td>ESC</td><td>PCC</td><td>Prof. Elective</td><td>Open Elective</td><td colspan="2">Minor(Hons)</td></tr>
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HoD Director Dean

Date of approval by Board of Study		Date of approval by Academic Council	

Sr No	Name of Course	Teaching Scheme				Evaluation Scheme										Credits	
						Theory					Practical				Total Marks		
						Ex	Internal				Internal			External		Theory	Practical
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		Theory Hours/week	Tutorial Hours/week	Practical Hours/week	Total	ESS	Attendance	Assignment	I-Mid Sem	II-Mid Sem	Attendance	Lab work	Writing Report	Performance				
1	Digital Electronics	3	0	0	3	70	5	5	10	10	-	-	-	-	-	100	3	-

HoD Director Dean

Course Outcomes:	
CO1	Solve the given problem using fundamentals of Number systems and Boolean algebra.
CO2	Understand simplification of Boolean function and its conversion in different forms.
CO3	Understand, analyze and design various Combinational circuits.
CO4	Compare different flip-flop characteristics and FF Design, understand and analyze various sequential circuits.
CO5	Demonstrate the process of Analog to Digital conversion and Digital to Analog conversion, understand various memory organization and TTL logic.

Content of the Course

Module	**Contents/Topics to be covered**	**Hours**
Module 1	**Number Systems and Logic Gates** Digital computer and digital systems fundamentals AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, examples of IC gates, number systems-binary, signed binary, octal hexadecimal number, binary arithmetic, complements arithmetic, error detecting and correcting codes	**06**
Module 2	**Boolean Function Simplification** 2,3,4,5 variable K-map representation and simplification of logic functions using K-map, SOP and POS minimization of logical functions. Don't care conditions, VEM kmap, NAND or NOR implementation	**05**
Module 3	**Combinational Logic** Multiplexer, De-Multiplexer/Decoders, Adders, Subtractors, BCD arithmetic, carry look ahead adder, serial adder, parity checker/generator, code converters, priority encoders, decoders/drivers for display devices, Q-M method of function realization	**06**

Module 4	**Sequential Logic:** Introduction, RS,JK,D,T Flip-Flops, Triggering of Flip-Flops, Flip-Flop Excitation Tables, Analysis of Clocked Sequential Circuits, State Reduction and Assignment Design Procedure, Design of Counters, Design with State Equations	**06**
Module 5	**Registers, Counters and the Memory unit** Shift registers, applications of shift registers, serial to parallel converter, parallel to serial converter Ripple Counters, Synchronous Counters, Timing Sequences, Memory Unit, Johnson counter	**08**
Module 6	**A/D and D/A conversion** :A/D and D/A Converters Digital to analog converters: weighted resistor/converter, R-2R Ladder D/A converter, specifications for D/A converters, parallel comparator A/D converter, successive approximation A/D converter, counting A/D converter, dual slope A/D converter, A/D converter using voltage to frequency and voltage to time conversion, specifications of A/D converters	**05**
Module 7	**Memory and PLDs : ALU,** Digital logic families, TTL, Schottky TTL and CMOS logic, interfacing CMOS and TTL, Tri-state logic.read only memory (ROM), read and write memory(RAM), content addressable memory (CAM), charge de coupled device memory (CCD), commonly used memory chips, ROM as a PLD, Programmable logic array, Programmable array logic, complex Programmable logic devices (CPLDS), Field Programmable Gate Array (FPGA).	**05**

Textbooks	
1	"Digital logic and Computer design", M. M. Mano, Pearson Education India, 2016.
2	“Fundamentals of Digital Circuits", A. Kumar, Prentice Hall India, 2016
3	“Digital Principles and Applications” Malvino & Leach, McGraw-Hill Education
References	
1	"Modern Digital Electronics", R. P. Jain, McGraw Hill Education, 2009.
Web content Link/E-material links	
1	https://nptel.ac.in/courses/108105113

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HoD Director Dean

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List of Experiment

Name of Laboratory: Digital Electronics Laboratory

List of practical/Experiments

Sr No	**Objective**	**Performance**	**Study**	**Self-Study**
1	Getting familiar with various digital integrated circuits of different logic families. Study of data sheet of these logic Families	-	Yes	-
2	To study the implementation of AND, OR and NOT gates using NAND and NOR gate.	Yes		-
3	To Simplify and Implement given Boolean function using logic gates.	Yes	Yes	-
4	To study and verify Code Conversion circuits Binary to Gray code Gray to Binary code BCD to XS-3 code	Yes	Yes	-

5	To study Half adder, Full adder,2bit parallel adder and Half Subtractor circuit and verify its truth table.	Yes	Yes	-
6	To study different Flip Flops and verify its truth table	Yes	Yes	-
7	To study 4 to 1 line Multiplexer and1 to 4 line Demultiplexer and verify its truth table.	Yes	Yes	-
8	To study 8 to 3 line Encoder and 3to 8 line Decoder and verify its truth table.	Yes	Yes	-
9	To study 4 bit Ripple Up/Down Counter.	Yes	Yes	-
10	To study Serial In-Parallel Out 4bits Shift Register.	Yes	Yes	-
11	Study and configuration of A to D and D to A converter.	Yes	Yes	-