SARDAR PATEL UNIVERSITY
Syllabus Structure B.Sc. Semester: VII
With Effect from: June – 2026
Bachelor of Science (Honors)
B.Sc. Electronics and Communication Semester VII
(Major subject)

Course Code	**US07MAELC01**	**Title of the Course**	**Signal & System**
Total Credits of the Course	**04**	**Hours per Week**	**04**
Programme Outcome (PO) - For B.Sc. Electronics and Communication Programme	1. Bachelor of Science degree program provides theoretical and practical knowledge of different Science subjects in consonance with National Education Policy 2020. 2. This programme provides a flexibility to students to acquire certificate course, diploma course, degree programme, honours degree with or without research having multi entry and multi exit facilities. 3. Bachelor of Science programme at Sardar Patel University is designed keeping the overall back ground preparation in mind for the student to either opt for a Master programme or jobs or to become an entrepreneur. 4. At the entry level of the programme, i.e., semester one, various subjects offered as major subject, minor subject, interdisciplinary subject as per choice of the students. 5. In addition to that, some skill enhancement courses, ability enhancement courses and value-added courses are also offered for overall development of the students. 6. After end of the even semesters, the students may take exit after fulfilling the minimum requirements. 7. The students have the enough opportunity to complete four-year graduation programme with any major subject as per their choice. 8. The students, after completion of the program from Sardar Patel University, can opt for the master's degree programme in the subject they have had at the final semester, or in a related discipline.		
Programme Specific Outcome (PSO) – B.Sc. (Electronics and Communication) Programme	1. To improve the scientific awareness among the students. 2. To make students to understand the role and contribution of Electronics and Communication in the development of science and technology. 3. To improve scientific attitude and to give emphasis on the development of experimental skills, data analysis, calculations, and also on the limitations of the experimental method and data as well as results obtained. 4. To help students in understanding the concepts of Electronics and Communication.		

	5. To emphasize the strength of equations, formulae, graphs, mathematical tools to solve the problems. 6. To understand the conceptual development of the subject and thereby develop the interest in the subject. 7. To create interest in the subject and improve technological aspect through mini projects, projects, models, demonstrations, etc. 8. To create interest in the subject to continue to work in the field of science particularly in Electronics and Communication. 9. To Understand the impact of electronics in modern era.
Course Objectives:	1. In this course, students will be learning about the electronics instrument which were used in our day to-day life. 2. To understand the basics of semiconductor components like resistor, capacitor and inductor their applications will be introduced.

Course Content

Unit	Description	Weightage* (%)
1.	Signals, Systems & Signal Processing, Classification of signals, the concept of frequency in continuous time and discrete time signals, sampling theorem.	**25%**
2.	Discrete-time signals, sequences, Discrete time systems, Block diagram representation, Classification, Convolution representation of LTI systems, Analysis of Discrete time systems described by difference equations (except particular solution).	**25%**
3	Z Transform, Properties of Z transform, Rational Z Transform, Inverse Z transform, Transfer function representation, Analysis of LTI systems in Z domain, Transient & steady state response, Causality & Stability	**25%**
4	Frequency Analysis of continuous time signals, Frequency analysis of discrete time signals, Fourier series and Power density spectrum of discrete time periodic signal. Fourier transform and Energy density spectrum of discrete time aperiodic signals. Relationships of the Fourier transform to the Z transform Frequency domain classification and concept of bandwidth.	**25%**

Teaching-Learning Methodology	Direct Teaching through Chalk-Walk and Talk ICT enabled teaching Question-Answer Class discussion led by teacher/students Case Studies Literature review Problem solving activities Debate Collaborative and Co-operative Learning Think Pair Share

	Jigsaw Inquiry Based Learning Panel Discussion Project Based Learning Flipped Classroom Blended Learning designs Concept Mapping

Evaluation Pattern

Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per NEP. 2020)	50%
2.	University Examination	50%

Course Outcomes: On the successful completion of the course, the students should be able to apply their knowledge to solve problems, analyze complex issues, design solutions, conduct investigations, and understand the societal and ethical implications of their work.

Suggested References:

Sr. No.	References
1.	Introduction to Signals and Systems: Edward W. Kamen, Macmillan Pub. Co., New York.
2.	Signals & Systems: continuous and discrete: Rodger E. Zimer, Maxwell Macmillan International (1990), Second edition.
3.	Digital Signal Processing : Principles, Algorithms, and Applications: John G Proakis & Dimitris G Manolakis, Prentice Hall India, 3rd edition

On-line resources to be used if available as reference material

On-line Resources:

https://www.electronics-tutorials.ws/
https://www.electronicshub.org/tutorials/
www.allaboutcircuits.com

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Syllabus Structure B.Sc. Semester: VII
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Bachelor of Science (Honors)
B.Sc. Electronics and Communication Semester VII
(Major subject)

Course Code	**US07MAELC02**	**Title of the Course**	**8 Bit Microcontroller and Applications**
Total Credits of the Course	**04**	**Hours per Week**	**04**
Programme Outcome (PO) - For B.Sc. Electronics and Communication Programme	1. Bachelor of Science degree program provides theoretical and practical knowledge of different Science subjects in consonance with National Education Policy 2020. 2. This programme provides a flexibility to students to acquire certificate course, diploma course, degree programme, honours degree with or without research having multi entry and multi exit facilities. 3. Bachelor of Science programme at Sardar Patel University is designed keeping the overall back ground preparation in mind for the student to either opt for a Master programme or jobs or to become an entrepreneur. 4. At the entry level of the programme, i.e., semester one, various subjects offered as major subject, minor subject, interdisciplinary subject as per choice of the students. 5. In addition to that, some skill enhancement courses, ability enhancement courses and value-added courses are also offered for overall development of the students. 6. After end of the even semesters, the students may take exit after fulfilling the minimum requirements. 7. The students have the enough opportunity to complete four-year graduation programme with any major subject as per their choice. 8. The students, after completion of the program from Sardar Patel University, can opt for the master's degree programme in the subject they have had at the final semester, or in a related discipline.		
Programme Specific Outcome (PSO) – B.Sc. (Electronics and Communication) Programme	1. To improve the scientific awareness among the students. 2. To make students to understand the role and contribution of Electronics and Communication in the development of science and technology. 3. To improve scientific attitude and to give emphasis on the development of experimental skills, data analysis, calculations, and also on the limitations of the experimental method and data as well as results obtained. 4. To help students in understanding the concepts of Electronics and Communication.		

	5. To emphasize the strength of equations, formulae, graphs, mathematical tools to solve the problems. 6. To understand the conceptual development of the subject and thereby develop the interest in the subject. 7. To create interest in the subject and improve technological aspect through mini projects, projects, models, demonstrations, etc. 8. To create interest in the subject to continue to work in the field of science particularly in Electronics and Communication. 1. Upon successful completion of this subject the student will be able to understand the transport phenomena in Semiconducting Materials and various Electronic Devices
Course Objectives:	1. In this course, students will be learning about the electronics instrument which were used in our day to-day life. 2. To understand the basics of semiconductor components like resistor, capacitor and inductor their applications will be introduced.

Course Content

Unit	Description	Weightage* (%)
1.	8051 Microcontroller: Microprocessor Vs Microcontroller, Embedded Systems, Embedded Microcontrollers, 8051 Architecture- Registers, Pin diagram, I/O ports functions, Internal Memory organization. Interfacing Concept: Design of Address decoder circuit and control signal generation. External Memory (ROM & RAM) interfacing.	**25%**
2.	8051 Instruction Set: Addressing Modes, Data Transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Bit manipulation instructions. Simple Assembly language program examples to use these instructions.	**25%**
3	8051 Timers and Counters :Operation and Assembly language programming to generate a pulse using Mode-1 and a square wave using Mode-2 on a port pin. 8051 Serial Communication- Basics of Serial Data Communication. 8051 Interrupts, 8051 Assembly language programming to generate an external interrupt	**25%**
4	Interfacing 8051 to LED's, Switches, LCD, ADC-0804, DC Motor and Stepper motor with Assembly language programming.	**25%**

Teaching-Learning Methodology	Direct Teaching through Chalk-Walk and Talk ICT enabled teaching Question-Answer Class discussion led by teacher/students Case Studies Literature review Problem solving activities

	Debate Collaborative and Co-operative Learning Think Pair Share Inquiry Based Learning Panel Discussion Project Based Learning Flipped Classroom Blended Learning designs Concept Mapping

Evaluation Pattern

Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per NEP. 2020)	50%
2.	University Examination	50%

Course Outcomes: On the successful completion of the course, the students should be able to apply their knowledge to interface simple switches, simple LEDs, ADC 0804, LCD and Stepper Motor to 8051 using 8051 I/O ports.

Suggested References:

Sr. No.	References
1.	"The 8051 Microcontroller and Embedded Systems – using assembly and C ", Muhammad Ali Mazidi and Janice Gillespie Mazidi and Rollin D. McKinlay; PHI, 2006 / Pearson, 2006.
2.	"The 8051 Microcontroller", Kenneth J. Ayala, 3rd Edition, Thomson/Cengage Learning.

On-line resources to be used if available as reference material

On-line Resources:
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https://www.electronicshub.org/tutorials/
www.allaboutcircuits.com

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B.Sc. Electronics and Communication Semester VII
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Course Code	**US07MAELC03**	**Title of the Course**	**Electronics and Communication Practical**
Total Credits of the Course	**04**	**Hours per Week**	**08**

Course Content		
Sr. No.	**List of Experiments**	**Weightage* (%)**
	Section A	
1.	Practical based on US07MAELC01 (MATLAB Based).	**50%**
	Section B	
1.	Practical based on US07MAELC02 (8-bit Microcontroller & Applications).	**50%**

Syllabus Structure B.Sc. Semester: VII
With Effect from: June – 2026
Bachelor of Science
B.Sc. Electronics and Communication Semester VII
(Minor subject)

Course Code	**US07MIELC01**	**Title of the Course**	**Analog Interface Electronics**
Total Credits of the Course	**02**	**Hours per Week**	**02**
Programme Outcome (PO) - For B.Sc. Electronics and Communication Programme	1. Bachelor of Science degree program provides theoretical and practical knowledge of different Science subjects in consonance with National Education Policy 2020. 2. This programme provides a flexibility to students to acquire certificate course, diploma course, degree programme, honours degree with or without research having multi entry and multi exit facilities. 3. Bachelor of Science programme at Sardar Patel University is designed keeping the overall back ground preparation in mind for the student to either opt for a Master programme or jobs or to become an entrepreneur. 4. At the entry level of the programme, i.e., semester one, various subjects offered as major subject, minor subject, interdisciplinary subject as per choice of the students. 5. In addition to that, some skill enhancement courses, ability enhancement courses and value-added courses are also offered for overall development of the students. 6. After end of the even semesters, the students may take exit after fulfilling the minimum requirements. 7. The students have the enough opportunity to complete four-year graduation programme with any major subject as per their choice. 8. The students, after completion of the program from Sardar Patel University, can opt for the master's degree programme in the subject they have had at the final semester, or in a related discipline.		
Programme Specific Outcome (PSO) – B.Sc. (Electronics and Communication) Programme	1. To improve the scientific awareness among the students. 2. To make students to understand the role and contribution of Electronics and Communication in the development of science and technology. 3. To improve scientific attitude and to give emphasis on the development of experimental skills, data analysis, calculations, and also on the limitations of the experimental method and data as well as results obtained. 4. To help students in understanding the concepts of Electronics and Communication. 5. To emphasize the strength of equations, formulae, graphs, mathematical tools to		

	solve the problems. 6. To understand the conceptual development of the subject and thereby develop the interest in the subject. 7. To create interest in the subject and improve technological aspect through mini projects, projects, models, demonstrations, etc. 8. To create interest in the subject to continue to work in the field of science particularly in Electronics and Communication. 9. To Understand the impact of electronics in modern era.
Course Objectives:	1. In this course, students will be learning about the electronics instrument which were used in our day to-day life. 2. To understand the basics of semiconductor components like resistor, capacitor and inductor their applications will be introduced.

Course Content

Unit	Description	Weightage* (%)
1.	PN Junction diode characteristics & its application, zener diode, LED, LDR, tunnel diode, Varactor diode, Schottkey diode, BJT, JFETs, MOSFETs.	**50%**
2.	Differential amplifier and its DC & AC analysis, block diagram of OPAMP, its parameters, frequency response, current mirror and current loading biasing, concept of ideal op-amp, specification of standard op-amp like IC 741, LM 324, µA 741.	**50%**

Teaching-Learning Methodology	Direct Teaching through Chalk-Walk and Talk ICT enabled teaching Question-Answer Class discussion led by teacher/students Case Studies Literature review Problem solving activities Debate Collaborative and Co-operative Learning Think Pair Share Jigsaw Inquiry Based Learning Panel Discussion Project Based Learning Flipped Classroom Blended Learning designs Concept Mapping

Evaluation Pattern

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1.	Internal Written / Practical Examination Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per NEP. 2020)	50%
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Course Outcomes: On the successful completion of the course, the students should be able to apply their knowledge to solve problems, analyze complex issues, design solutions, conduct investigations, and understand the societal and ethical implications of their work.

Suggested References:

Sr. No.	References
1.	Electronics Principle: A.P. Malvino
2.	Op Amps and Linear Integrated Circuits: Ramakant Gayakwad, PHI 3rd Edition 1993.

On-line resources to be used if available as reference material

On-line Resources:

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Course Code	**US07MIELC02**	**Title of the Course**	**Electronics and Communication Practical**
Total Credits of the Course	**02**	**Hours per Week**	**04**

Course Content		
Sr. No.	**List of Experiments**	**Weightage* (%)**
1.	Practical Based on US07MIELC01	**100%**

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