Re-Accredited B++ 2.86 CGPA by NAAC
VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
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-:પરિપત્ર:-

યુનિવર્સિટીના વિજ્ઞાન વિદ્યાશાખા હેઠળના તમામ શૈક્ષણિક વિભાગોના વડાશ્રીઓ અને યુનિવર્સિટી સંલગ્ન વિજ્ઞાન વિદ્યાશાખા હેઠળની તમામ કોલેજોનાં આચાર્યશ્રીઓને જણાવવાનું કે, NEP-2020 અંતર્ગત શૈક્ષણિક વર્ષ ૨૦૨૬–૨૭ થી અમલમાં આવનાર B.Sc. Electronics Sem.-7 & 8 Honours (with OJT / without OJT) અને Honours with Research નો અભ્યાસક્રમ ઈલેકટ્રોનિકસ વિષયની નિયુકત એડહોક અભ્યાસ સમિતિના કન્વીનરશ્રીએ અભ્યાસ સમિતિવતી અને વિજ્ઞાન વિદ્યાશાખાના અધ્યક્ષશ્રીએ વિદ્યાશાખાવતી મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલની તા.૨૪/૧૨/૨૦૨૪ ની સભાનાં ઠરાવ ક્રમાંકઃ૩૫૩ અન્વયે માન.કુલપતિશ્રીને આપેલ સત્તા અંતર્ગત માનનીય કુલપતિશ્રી દ્વારા મંજૂર કરેલ છે, જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

(બિડાણઃઉપર મુજબ)

ક્રમાંકઃઓથો./પરિપત્ર/૧૩૮૮૯/૨૦૨૬
તા.૨૨/૦૬/૨૦૨૬

કુલસચિવ

પ્રતિ,
(૧) યુનિવર્સિટીના વિજ્ઞાન વિદ્યાશાખા હેઠળના તમામ શૈક્ષણિક વિભાગોના વડાશ્રીઓ.
(૨) યુનિવર્સિટી સંલગ્ન વિજ્ઞાન વિદ્યાશાખા હેઠળની તમામ કોલેજોનાં આચાર્યશ્રીઓ.
... આપશ્રીના વિભાગ/કોલેજના સંબંધિત શિક્ષકો/વિદ્યાર્થીઓને જાણ કરી અમલ કરવા સારૂ.
(૩) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા.
(૪) પરીક્ષા નિયામકશ્રી,પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.
.....તરફ જાણ તેમજ અમલ સારૂ.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT **PROGRAM TITLE(**without OJT/RP)	
Name of Program	Bachelor of Science (Electronics)
Program Abbreviation	B.Sc. (Electronics) Honours
Duration	Four Years (Honours Degree) without OJT/RP
Eligibility Criteria	Higher Secondary/ Equivalent degree
Pre-requisite	Basic Knowledge of Science and Electronics/Physics
Medium of Instruction	English
Objective of Program	B.Sc. Electronics program aims to provide students with a strong foundation in Electronics concepts, principles, and methods while developing analytical, logical, and problem solving skills. The program prepares students for higher education .research, and diverse professional careers by fostering critical thinking, computational competence, effective communication, ethical values, and a commitment to lifelong learning. It also enables students to apply Electronics knowledge to address real world problems in science, technology, industry and society.
Program Outcome (PO)	PO1 :Develop a strong foundation in scientific principles, theories and concepts across disciplines, fostering interdisciplinary learning, advance knowledge and problem-solving abilities. PO2 :Apply critical thinking and analytical reasoning to evaluate scientific data, hypothesis and real-world problems, leading to evidence –based conclusions. PO3 : Develop investigative skills through experimentation, data analysis and scientific inquiry to contribute to research and innovation. PO4 :Provide students with learning experiences that develop broad knowledge and understanding of key concepts of electronic science and equip students with advanced scientific/technological capabilities for analyzing and tackling the issues and problems in the field of electronics.

	PO5 : Develop ability in students to apply knowledge and skills they have acquired to the solution of specific theoretical and applied problems in electronics. PO6 : Develop abilities in students to design and develop innovative solutions for benefits of society, by diligence, leadership, team work and lifelong learning. PO7 : Provide students with skills that enable them to get employment in industries or pursue higher studies or research assignments or turn as entrepreneurs.
Program Specific Outcomes (PSO)	PSO1 : Develop and strengthen the fundamental core concepts that are required to solve complex problems PSO2 : Develop the skills that needs independent logical and analytical thinking, teamwork and leadership PSO3 : Nurture the students to investigate and development of a workable solution for a real world problem PSO4 : Develop students for self-learning and practicing challenging problem solution PSO5 : Train students to apply practical skills for designing. PSO6 : Train students to expand their knowledge of fields related to their current areas of professional specialization.
Mapping between PO's and PSO's	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
PO1	√√√	√√	√	√	√√	√√√
PO2	√√	√√√	√√	√√√	√√√	√√
PO3	√	√√	√√√	√	√	√√
PO4	√√√	√√	√√	√√	√√√	√
PO5	√√	√√√	√√√	√√	√√√	√√√
PO6	√	√√	√√	√√√	√	√
PO7	√√√	√√√	√√	√√	√√	√√

[✓ ✓ ✓Strong correlation, ✓ ✓Moderate correlation, ✓Slight correlation]

Structure of Program (Semester-7) without OJT/RP

Course Category	Course Code	Course Title	Marksheet Title in English	Level of Course	Teaching Hours/ Week		Exam Duration		Credit		Internal Marks		External Marks		Total Makrs	
					TH	PR	TH	PR	TH	PR	TH	PR	TH	PR	TH	PR
MAJOR	EL-MJ-701-TH	Operational Amplifier Application	Operational Amplifier Application	**400-499**	2	4	1	4	2	2	25	25	25	25	50	50
	EL-MJ-701-PR	Operational Amplifier Application	Operational Amplifier Application	**400-499**												
	EL-MJ-702-TH	Programming with MatLab	Programming with MatLab	**400-499**	2	4	1	4	2	2	25	25	25	25	50	50
	EL-MJ-702-PR	Programming with MatLab	Programming with MatLab	**400-499**												
	EL-MJ-703-TH	Instrumentation Measurement	Instrumentation Measurement	**400-499**	2	4	1	4	2	2	25	25	25	25	50	50
	EL-MJ-703-PR	Instrumentation Measurement	Instrumentation Measurement	**400-499**												
	EL-MJ-704-TH	Introduction to Signal Generator and Wave Analyser	Introduction to Signal Generator and Wave Analyser	**400-499**	4	0	2	0	4	0	50	00	50	00	100	00
MINOR																
MDC																
AEC																
SEC																
VAC/ VAC-IKS																

Structure of Program (Semester-8) (without OJT/RP)

Course Category	Course Code	Course Title	Marksheet Title in English	Level of Course	Teaching Hours/ Week		Exam Duration		Credit		Internal Marks		External Marks		Total Makrs	
					TH	PR	TH	PR	TH	PR	TH	PR	TH	PR	TH	PR
MAJOR	EL-MJ-801-TH	Microcontroller Interfacing	Microcontroller Interfacing	**400-499**	2	4	1	4	2	2	25	25	25	25	50	50
	EL-MJ-801-PR	Microcontroller Interfacing	Microcontroller Interfacing	**400-499**												
	EL-MJ-802-TH	Programming Language for Microcontroller	Programming Language for Microcontroller	**400-499**	2	4	1	4	2	2	25	25	25	25	50	50
	EL-MJ-802-PR	Programming Language for Microcontroller	Programming Language for Microcontroller	**400-499**												
	EL-MJ-803-TH	Industrial Transducers & Sensors	Industrial Transducers & Sensors	**400-499**	2	4	1	4	2	2	25	25	25	25	50	50
	EL-MJ-803-PR	Industrial Transducers & Sensors	Industrial Transducers & Sensors	**400-499**												
	EL-MJ-804-TH	Basics of Data Acquisition and Processing	Basics of Data Acquisition and Processing	**400-499**	4	0	2	0	4	0	50	00	50	00	100	00
MINOR																
MDC																
AEC																
SEC																
VAC/ VAC-IKS																
OTHER, IF ANY, SPECIFY																

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS (without OJT/RP)

Program Name	**Bachelor of Science (Electronics)**					
Semester	**7**					
NCrF Credit Level	**6.0**					
Course Type	**Major**					
Course Subtype	**Nil**					
Subject Type	**Discipline Specific**					
Course Code	**EL-MJ-701-TH**					
Course Level	**400-499**					
Course Title	**Operational Amplifier Application**					
Credit	**Theory:**	**02**	**Practical:**	**02**	**Total:**	**04**
Effective From	**Academic Year : 2026-27**					

Course Outcomes

The course will enable students to understand:

CO1 -The Students will learn the basic terms of op Amp.

CO2 -The students may understand the basic design concept of the use of Op Amp single and dual power supply

CO3 -The Student may Premier general linear applications of Op Amp this concept may help them to think about special Application about Op Amp

CO4 -The Student Will relays Practical Application or Operational

CO5 –They may also learn about the use of feedback circuit Op Amp

CO6 –A student may aware with basic idea of interfacing of Op Amp.

Mapping between Cos and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	√	√		√		√
CO2	√		√		√	
CO3	√	√				
CO4	√					
CO5	√		√			√
CO6	√			√	√	

Course Content

Unit 1: Practical operational amplifier

Input offset voltage, offset voltage compensating network design, input bias current, input offset current, Total output offset voltage, Thermal drift, error voltage, Noise, CMRR, examples of designing and analysis.

Unit 2: Linear applications of op-amp.

Peaking amplifier, summing, scaling and averaging amplifiers, instrumentation amplifier and its applications, voltage to current converter and its applications, current to voltage converter, Integrator, differentiator, examples of designing and analysis.

Reference Books

1) R A Gayakwad, Op-Amps and Linear Integrated Circuits, 2012, PHI, New Delhi
2) P R Gray and R G Meyer, Analysis and Design of Integrated Circuits, 6th Ed John Wiley &Sons

	3) R F Coughlin and A F F Driscoll, Operational Amplifiers and Linear Integrated Circuits, 2000, PHI, New Delhi
Teaching Methodology	Classwork, Discussions, Seminars and Assignment.
Evaluation Method	Internal Assessment : 25 Marks External Assessment : 25 Marks

[Subject code for Practical-2603000507019002]

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS (without OJT/RP)

Program Name	**Bachelor of Science (Electronics)**					
Semester	**7**					
NCrF Credit Level	**6.0**					
Course Type	**Major**					
Course Subtype	**Nil**					
Subject Type	**Discipline Specific**					
Course Code	**EL-MJ-701-PR**					
Course Level	**400-499**					
Course Title	**Operational Amplifier Application**					
Credit	**Theory:**	**02**	**Practical:**	**02**	**Total:**	**04**
Effective From	**Academic Year : 2026-27**					

Course Outcomes

The course will enable students to understand:

CO1 -At the end of the course, the students will be able to measure all the basic parameters of OP AMP.

CO2 -The students may be able to perform all the practicals based on op amp applications.

CO3 -The Student may be able to design the circuit of all applications using Op Amp.

CO4 -The Student will be able to understand internal applications of Op amp.

CO5 – They may also learn about amplification parameter of Op Amp

CO6 –A student may become aware about the basic idea of interfacing of Op Amp.

Mapping between Cos and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	√		√	√	√	√
CO2		√			√	√
CO3	√			√		
CO4		√	√			√
CO5	√	√		√		√
CO6			√		√	√

Course Content

Practical-1: Study of CMMR for an Op. Amp.
Practical-2: Study of application of Op. Amp. as summing amplifier.
Practical-3: Study of Instrumentation amplifier.
Practical-4: Study of application of Op. Amp. as Integrator.
Practical-5: Study of application of Op. Amp. as differentiator.
Practical-6: Study of Operational Amplifier parameters.

Reference Books

1) R A Gayakwad, Op-Amps and Linear Integrated Circuits, 2012, PHI, New Delhi
2) P R Gray and R G Meyer, Analysis and Design of Integrated Circuits, 6th Ed John Wiley &Sons
3) R F Coughlin and A F F Driscoll, Operational Amplifiers and Linear Integrated Circuits, 2000, PHI, New Delhi

Teaching Methodology	Labwork, Discussions
Evaluation Method	Internal Assessment : 25 Marks External Assessment : 25 Marks

[Subject code for Theory-2603000507029001]

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS (without OJT/RP)

Program Name	**Bachelor of Science (Electronics)**					
Semester	**7**					
NCrF Credit Level	**6.0**					
Course Type	**Major**					
Course Subtype	**Nil**					
Subject Type	**Discipline Specific**					
Course Code	**EL-MJ-702-TH**					
Course Level	**400-499**					
Course Title	**Programming with MatLab**					
Credit	**Theory:**	**02**	**Practical:**	**02**	**Total:**	**04**
Effective From	**Academic Year : 2026-27**					

Course Outcomes

The course will enable students to understand:

CO1 -Students will learn features of MATLAB as a programming tool. They are fully familiar to all the features of MATLAB software and easily handle the software.

CO2 -New teaching model which include theory & practical running simultaneously is introduced to our students. This method is very effective and helped to develop programming skills and technique to solve mathematical problems.

CO3 -Students learned graphic features of MATLAB and they are able to use this feature effectively in the various applications.

CO4 -Students are able to use MATLAB as a simulation tool.

CO5 – Major outcome is students are able to work as a 'MATLAB programmer' in the industry because of the hands on practical sessions. This job oriented course will helps students to get the jobs in future.

Mapping between Cos and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	√	√		√		√
CO2	√		√		√	
CO3		√		√		
CO4		√			√	
CO5	√		√			√

Course Content

Unit 1: Introduction to MATLAB

Introduction to MATLAB, overview, starting MATLAB Session, understanding the MATLAB desktop and its environment, quitting the MATLAB session.

Elementary MATLAB Constructs, MATLAB Variables, Arithmetic Operations, Logical and Relational Operations, Mathematical Functions, Graphical Functions, I/O Operations.

Unit 2: MATLAB Programming

Elementary Matrix Manipulations MATLAB Programming, MATLAB Procedures, MATLAB Functions, MATLAB Language

	Constructs, Function Handles, Solution of Differential Equations
Reference Books	1. Y Kirani Singh & B B Chaudhuri, MATLAB Programming, 5th Ed, PHI, New Delhi 2. Rudra Pratap , Getting Started with MATLAB 7, 3rd Ed, Oxford University Press (IndianEdition). 3. Steven T. Karris,Signals and Systems with MATLAB ® Computing and Simulink ®Modeling,4th edition, 2008, Orchard Publications 4. B. Hunt, R. Lipsman, J. Rosenberg, K. Coombes, J. Osborn, G. Stuck A Guide to MATLBfor Beginners and Experienced users, Cambridge University Press, 2001. 5. Andrew Knight, CHAPMAN & HALL/CRC Andrew Knight , BASICS OF MATLAB® andBeyond
Teaching Methodology	Classwork, Discussions, Seminars and Assignment.
Evaluation Method	Internal Assessment : 25 Marks External Assessment : 25 Marks

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS (without OJT/RP)

Program Name	**Bachelor of Science (Electronics)**					
Semester	**7**					
NCrF Credit Level	**6.0**					
Course Type	**Major**					
Course Subtype	**Nil**					
Subject Type	**Discipline Specific**					
Course Code	**EL-MJ-702-PR**					
Course Level	**400-499**					
Course Title	**Programming with MatLab**					
Credit	**Theory:**	**02**	**Practical:**	**02**	**Total:**	**04**
Effective From	**Academic Year : 2026-27**					
Course Outcomes	The course will enable students to understand: **CO-1:** At the end of the semester students will gain an in depth knowledge of MATLAB **CO-2:** At the end of the semester students will be able to write any program in MATLAB					

Mapping between Cos and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	√			√	√	
CO2		√	√			√

Course Content

Practical-1: To create arrays and vectors and perform arithmetic and trigonometric operations on them.
Practical-2: To make simple 2-D plot in MATLAB.
Practical-3: To create script files and execute them in MATLAB
Practical-4: To learn difference between a script file and a function file and execute a function file.
Practical-5: Array and matrix simple computation and manipulation.
Practical-6: To define and use anonymous functions in command-line computation.
Practical-7: To learn and do simple symbolic algebra in MATLAB.

Reference Books

1. Y Kirani Singh & B B Chaudhuri, MATLAB Programming, 5th Ed, PHI, New Delhi
2. Rudra Pratap , Getting Started with MATLAB 7, 3rd Ed, Oxford University Press (Indian Edition).
3. Steven T. Karris,Signals and Systems with MATLAB ® Computing and Simulink ® Modeling,4th edition, 2008, Orchard Publications
4. B. Hunt, R. Lipsman, J. Rosenberg, K. Coombes, J. Osborn, G. Stuck A Guide to MATLB for Beginners and Experienced users, Cambridge University Press, 2001.
5. Andrew Knight, CHAPMAN & HALL/CRC Andrew Knight , BASICS OF MATLAB® and Beyond

[Subject code for Theory-2603000507039001]

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
SYLLABUS (without OJT/RP)

Program Name	**Bachelor of Science (Electronics)**					
Semester	**7**					
NCrF Credit Level	**6.0**					
Course Type	**Major**					
Course Subtype	**Nil**					
Subject Type	**Discipline Specific**					
Course Code	**EL-MJ-703-TH**					
Course Level	**400-499**					
Course Title	**Instrumentation Measurement**					
Credit	**Theory:**	**02**	**Practical:**	**02**	**Total:**	**04**
Effective From	**Academic Year : 2026-27**					

Course Outcomes

The course will enable students to understand:

CO1: Explain the static and dynamic characteristics of measurement systems, including speed of response, time lag, impedance, stiffness, and mathematical models of measurement instruments.

CO2: Analyze the performance of zero-order, first-order, and second-order measurement systems using transfer functions, and evaluate their step, ramp, and frequency responses.

CO3: Describe the operating principles, construction, and applications of pressure measurement devices such as Bourdon tubes, diaphragms, bellows, strain gauges, potentiometers, capacitance transducers, and LVDTs.

CO4: Compare and select appropriate flow measurement techniques, including electromagnetic flow meters, ultrasonic flow meters, and laser anemometers, for different engineering applications.

CO5: Apply the principles of electrical measurements and AC bridges to measure electrical quantities, and analyze the operation of galvanometers, PMMC instruments, ammeters, voltmeters, and bridge circuits for inductance and capacitance measurements.

Mapping between Cos and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	√	√		√		√
CO2			√		√	
CO3		√				√
CO4				√		√
CO5	√		√		√	

Course Content

Unit 1 : Analysis of measurement System

Dynamic characteristics, speed of response, time lag, input impedance and stiffness, generalized mathematical model of measurement systems, operational transfer function, sinusoidal transfer function, zero, first, and second order measurement systems, step, ramp, and frequency response of first order system, step response of second order system

Unit 2: Pressure, Flow and Electrical Measurements

	Pressure measurement, elastic elements, Bourdon tubes, Diaphragm and Bellow gauges, electrical methods, strain gauge, potentiometer etc. variable capacitance types, LVDT *Flow measurement:* Introduction, classification of flow methods, electrical methods, M flow meter, Ultrasonic flow meter, laser anemometer *Electrical Measurements:* Construction and working of Galvanometer, PMMC, D'Arsonval meter, Conversion into ammeter and voltmeter, Range selection. C bridges, General equation of A C Bridge, Comparison, Measurement of inductance and capacitance, Desauty, Schearing, Maxwell and Wein's bridge, Own's Bridge and Anderson's Bridge.
Reference Books	1. W D Cooper, Electronics Instrumentation and Measurement Techniques, 4th Ed, PHI, New Delhi. 2. B E Jones, Instrumentation, Measurements, and Magnitudes, 3rd Ed, TMH, New Delhi. 3. D S Sonde, Monographs with Solid Sate Electronic Instrumentation Vol-I to IV,4th Ed, THM, New Delhi. 4. E O Dobelin, Measurement Systems, 3rd Ed, McGraw Hill
Teaching Methodology	Classwork, Discussions, Seminars and Assignment.
Evaluation Method	Internal Assessment : 25 Marks External Assessment : 25 Marks

[Subject code for Practical-2603000507039002]

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS (without OJT/RP)

Program Name	**Bachelor of Science (Electronics)**					
Semester	**7**					
NCrF Credit Level	**6.0**					
Course Type	**Major**					
Course Subtype	**Nil**					
Subject Type	**Discipline Specific**					
Course Code	**EL-MJ-703-PR**					
Course Level	**400-499**					
Course Title	**Instrumentation Measurement**					
Credit	**Theory:**	**02**	**Practical:**	**02**	**Total:**	**04**
Effective From	**Academic Year : 2026-27**					

Course Outcomes

The course will enable students to understand:

CO1: Demonstrate the working principles, characteristics, and applications of capacitive sensors, strain gauges, and LVDTs for measurement of physical parameters.

CO2: Perform experimental investigations using transducers and sensors, and analyze their sensitivity, accuracy, and measurement performance.

CO3: Construct and balance AC bridge circuits such as Schering, Maxwell, Wien, Owen's, and De Sauty bridges for measurement of electrical parameters.

CO4: Determine unknown capacitance, inductance, frequency, and dielectric properties using appropriate bridge measurement techniques.

CO5: Interpret experimental data, evaluate measurement errors, and prepare technical reports based on laboratory observations and results.

Mapping between Cos and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	√	√				√
CO2			√			
CO3	√			√		√
CO4			√		√	
CO5	√			√		√

Course Content

Practical-1: Study of capacitive sensor.
Practical-2: Study of strain gauge.
Practical-3: Study of LVDT.
Practical-4: Study of Schearing bridge.
Practical-5: Study of Maxwell bridge.
Practical-6: Study of Wein's bridge.
Practical-7: Study of Owen's Bridge.
Practical-8: Study of Desauty Bridge.

Reference Books	1. W D Cooper, Electronics Instrumentation and Measurement Techniques, 4th Ed, PHI, New Delhi. 2. B E Jones, Instrumentation, Measurements, and Magnitudes, 3rd Ed, TMH, New Delhi. 3. D S Sonde, Monographs with Solid Sate Electronic Instrumentation Vol-I to IV,4th Ed, THM, New Delhi. 4. E O Dobelin, Measurement Systems, 3rd Ed, McGraw Hill
Teaching Methodology	Labwork, Discussions
Evaluation Method	Internal Assessment : 25 Marks External Assessment : 25 Marks

[Subject code-2603000507059001]

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS (without OJT/RP)

Program Name	**Bachelor of Science (Electronics)**					
Semester	**7**					
NCrF Credit Level	**6.0**					
Course Type	**Major**					
Course Subtype	**Nil**					
Subject Type	**Discipline Specific**					
Course Code	**EL-MJ-704-TH**					
Course Level	**400-499**					
Course Title	**Introduction to Signal Generator and Wave Analyser**					
Credit	**Theory:**	**04**	**Practical:**	**00**	**Total:**	**04**
Effective From	**Academic Year : 2026-27**					

Course Outcomes

The course will enable students to understand:

CO1: Explain static characteristics of instruments and different types of measurement errors.

CO2: Apply statistical methods for error analysis and error correction.

CO3: Describe the operation and applications of various signal generators.

CO4: Analyze signals using wave analyzers and spectrum analyzers.

CO5: Apply troubleshooting and maintenance techniques to locate and rectify faults in electronic systems.

Mapping between Cos and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	√			√		√
CO2			√		√	
CO3		√				√
CO4				√		
CO5			√			√
CO6	√			√	√	

Course Content

Unit - 1 : Introduction to Errors

Static characteristics (Accuracy and precision, Resolution, Threshold, Linearity, hysteresis, sensitivity, etc), Errors and its types, absolute and relative, Gross, systematic and random errors, Methods of correction, Statistical analysis, Gaussian error distribution curve, probable error.

Unit – 2 : Signal generators

Pulse and square wave generator, function generator, Random Noise generator, TV sweep generator, Marker generator, sweep mark generator,

Unit - 3 : Wave Analyser

	Concept of wave analyser, types, harmonics distortion analyser, spectrum analyser, basic spectrum analyser using SWEPT receiver design, RF spectrum analyser. **Unit – 4 : Trouble shooting techniques** Maintenance, need, common faults, corrective and preventive maintenance, methods of fault location, sequential and non-sequential checks, random check, half split, beginning to end technique
Reference Books	1. W D Cooper, Electronics Instrumentation and Measurement Techniques, 4th Ed, PHI, New Delhi. 2. B E Jones, Instrumentation, Measurements, and Magnitudes, 6th Ed, THM, New Delhi. 3. D S Sonde, Monographs with Solid Sate Electronic Instrumentation Vol-I to IV, 4th Ed, TMH New Delhi. 4. E O Dobelin, Measurement Systems, 3rd Ed, McGraw Hill
Teaching Methodology	Classwork, Discussions, Seminars and Assignment.
Evaluation Method	Internal Assessment : 50 Marks External Assessment :50 Marks

[Subject code for Theory-2703000508019001**]**

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS (without OJT/RP)

Program Name	**Bachelor of Science (Electronics)**					
Semester	**8**					
NCrF Credit Level	**6.0**					
Course Type	**Major**					
Course Subtype	**Nil**					
Subject Type	**Discipline Specific**					
Course Code	**EL-MJ-801-TH**					
Course Level	**400-499**					
Course Title	**Microcontroller Interfacing**					
Credit	**Theory:**	**02**	**Practical:**	**02**	**Total:**	**04**
Effective From	**Academic Year : 2026-27**					

Course Outcomes

The course will enable students to understand:

CO1: Understand branching, looping, and program control instructions of the 8051 micro-controller.

CO2: Develop basic 8051 programs for bit manipulation, I/O operations, and time delays.

CO3: Apply interfacing and I/O programming techniques using the 8051.

CO4: Implement timer, counter, and serial communication programs.

CO5: Configure and use interrupts in the 8051 micro-controller.

Mapping between Cos and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	√	√		√		√
CO2			√		√	
CO3		√				
CO4			√		√	
CO5	√		√			√

Course Content

Unit – 1 : Instruction for Bit Manipulation and Branch in Microcontroller

Loop and jump instructions – Call instructions – Time delay routines – Program control – Assembler directives – Sample programs. I/O operations and related instructions – Bit addresses for I/O and RAM – I/O programming – I/O bit manipulation programming

Unit - 2: Interface and Interrupt of Microcontroller

Programming 8051 Timers – Counter programming – Basics of Serial programming – 8051 connection to RS 232 – 8051 Serial Port Programming – 8051 interrupt – Programming Timer Interrupt – Programming external hardware interrupts – Programming the serial communication interrupt – Interrupt priority in 8051.

Reference Books

1. W D Cooper, Electronics Instrumentation and Measurement Techniques, 4th Ed, PHI, New Delhi.

	2. B E Jones, Instrumentation, Measurements, and Magnitudes, 6th Ed, THM, New Delhi. 3. D S Sonde, Monographs with Solid Sate Electronic Instrumentation Vol-I to IV, 4th Ed, TMH New Delhi. 4. E O Dobelin, Measurement Systems, 3rd Ed, McGraw Hill
Teaching Methodology	Classwork, Discussions, Seminars and Assignment.
Evaluation Method	Internal Assessment : 25 Marks External Assessment : 25 Marks

[**Subject code for Practical**-2703000508019002]

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS (without OJT/RP)

Program Name	**Bachelor of Science (Electronics)**					
Semester	**8**					
NCrF Credit Level	**6.0**					
Course Type	**Major**					
Course Subtype	**Nil**					
Subject Type	**Discipline Specific**					
Course Code	**EL-MJ-801-PR**					
Course Level	**400-499**					
Course Title	**Microcontroller Interfacing**					
Credit	**Theory:**	**02**	**Practical:**	**02**	**Total:**	**04**
Effective From	**Academic Year : 2026-27**					
Course Outcomes	The course will enable students to understand: **CO1:** Develop delay routines and timing programs using a micro-controller. **CO2:** Interface and operate 7-segment LED displays for numerical output. **CO3:** Perform analog-to-digital conversion and analyze the converted data. **CO4:** Interface input devices such as keys/switches with a micro-controller. **CO5:** Design and implement LCD display interfacing for data display applications.					

Mapping between Cos and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	√				√	
CO2		√		√		√
CO3	√					√
CO4		√				√
CO5	√			√		

Course Content

Practical-1: Writing a delay without using delay function and with delay function
Practical-2: Study of 7-segment LED (direct driven and decoded)
Practical-3: Study of A/D conversion.
Practical-4: Study of Interfacing Keys
Practical-5: Study of A/D conversion
Practical-6: Study of the LCD Display Interfacing

Reference Books

1. 8051 Microcontroller by Kenneth J.Ayala, 4th Ed, PHI
2. Microprocessor and Microcontroller by R.Theagarajan, 6th Ed, Sci Tech Publication, Chennai
3. 8051 Microcontroller and Embedded Systems using Assembly and C by Mazidi, Mazidiand D.MacKinlay, 2006 Pearson Education Low Price Edition.
4. The 8051 Micorcontroller and Embedded Systems using Assembly and C, by Kenneth J.Ayala and Dhananjay V Gadre

	5. Programming customizing the 8051 Microcontroller by Myke Predko, 5th Ed, Tata McGraw Hill
Teaching Methodology	Labwork, Discussions
Evaluation Method	Internal Assessment : 25 Marks External Assessment : 25 Marks

[Subject code for Theory-2703000508029001]

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS (without OJT/RP)

Program Name	**Bachelor of Science (Electronics)**					
Semester	**8**					
NCrF Credit Level	**6.0**					
Course Type	**Major**					
Course Subtype	**Nil**					
Subject Type	**Discipline Specific**					
Course Code	**EL-MJ-802-TH**					
Course Level	**400-499**					
Course Title	**Programming Language for Microcontroller**					
Credit	**Theory:**	**02**	**Practical:**	**02**	**Total:**	**04**
Effective From	**Academic Year : 2026-27**					
Course Outcomes	The course will enable students to understand: **CO1:** Understand the fundamentals of C programming, including variables, constants, data types, and operators. **CO2:** Apply decision-making and looping constructs to develop C programs. **CO3:** Develop modular programs using user-defined functions. **CO4:** Demonstrate parameter passing techniques using call by value and call by reference. **CO5:** Utilize pointers and recursion to solve programming problems efficiently.					

Mapping between Cos and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1		√				√
CO2	√				√	
CO3		√		√		
CO4	√					
CO5			√	√		√

Course Content

Unit - 1: Loop and Control structures

Variables and constants in C, Rules for construction of variables and constants, C keywords, Data types in C, integers and chars; signed-unsigned, floats-doubles, storage of data types, Operators and its hierarchy, type conversion, Loop and decision Control structures like if, if-else, else-if, While, For, Do-while, Switch case structure

Unit 2: Functions and Pointers

Importance of Functions, Functions and Pointers, passing values between functions, scope of functions and Calling convention, Call by Value and Call by Reference, Recursion function

Reference Books

1. Let us C, Y. Kanetkar, 9th Ed, BPB PublicationRudra Pratap , Getting Started with MATLAB 7, 3rd Ed, Oxford University Press (IndianEdition).
2. Programing in ANSI C by E Balaguruswamy 6th Ed TMH

	3. Programing in C S G Kochan, 5th Ed, Pearson
Teaching Methodology	Classwork, Discussions, Seminars and Assignment.
Evaluation Method	Internal Assessment : 25 Marks External Assessment : 25 Marks

[Subject code for Practical-2703000508029002]

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS (without OJT/RP)

Program Name	**Bachelor of Science (Electronics)**					
Semester	**8**					
NCrF Credit Level	**6.0**					
Course Type	**Major**					
Course Subtype	**Nil**					
Subject Type	**Discipline Specific**					
Course Code	**EL-MJ-802-PR**					
Course Level	**400-499**					
Course Title	**Programming Language for Microcontroller**					
Credit	**Theory:**	**02**	**Practical:**	**02**	**Total:**	**04**
Effective From	**Academic Year : 2026-27**					
Course Outcomes	The course will enable students to understand: **CO1:** Develop C programs using functions, loops, and conditional statements to solve basic computational problems. **CO2:** Apply arrays for data storage, processing, and sorting operations. **CO3:** Design programs to generate patterns and perform numerical computations. **CO4:** Implement string handling operations using C programming constructs. **CO5:** Use structures and arrays of structures to organize, store, and search data efficiently.					

Mapping between Cos and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	√					√
CO2		√	√			
CO3				√	√	
CO4		√	√			
CO5		√				√

Course Content

Practical-1: Write a programme to find factorial of a number and print using a function.
Practical-2: Write a programme to add first n odd/even numbers.
Practical-3: Write a programme to generate pattern.
Practical-4: Write a programme to print sum of any 10 numbers using 1-D array.
Practical-5: Write a programme to sort given array in ascending/descending order.
Practical-6: Write a programme to find a string length.
Practical-7: Write a programme to initialize structure.
Practical-8: Write a programme to search an item from array of structure.

Reference Books

1. Let us C, Y. Kanetkar, 9th Ed, BPB Publication
2. Programing in ANSI C by E Balaguruswamy 6th Ed TMH
3. Programing in C S G Kochan, 5th Ed, Pearson

Teaching Methodology	Labwork, Discussions

Evaluation Method	Internal Assessment : 25 Marks External Assessment : 25 Marks

[Subject code for Theory-2703000508039001]

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS (without OJT/RP)

Program Name	**Bachelor of Science (Electronics)**					
Semester	**8**					
NCrF Credit Level	**6.0**					
Course Type	**Major**					
Course Subtype	**Nil**					
Subject Type	**Discipline Specific**					
Course Code	**EL-MJ-803-TH**					
Course Level	**400-499**					
Course Title	**Industrial Transducers & Sensors**					
Credit	**Theory:**	**02**	**Practical:**	**02**	**Total:**	**04**
Effective From	**Academic Year : 2026-27**					

Course Outcomes

The course will enable students to understand:

CO1: Explain the principles, characteristics, and classification of transducers and sensors.

CO2: Compare active and passive transducers and select suitable transducers for specific applications.

CO3: Analyze the working of resistive, capacitive, inductive, and displacement transducers.

CO4: Describe the operation and applications of semiconductor and photosensitive sensors.

CO5: Explain the principles and applications of piezoelectric, temperature, pressure, and load cell sensors.

Mapping between Cos and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1				√	√	√
CO2		√	√		√	
CO3	√	√				√
CO4				√		
CO5			√			√

Course Content

Unit – 1 : Transducers

Various types of transducers; Active and passive transducer, Principle and working of Mechanical, Electrical transducers and its comparison. Selection methodology for specific application for Transducers, Principle, working and characteristics of Displacement transducers, Resistive transducer, Capacitive, Inductive transducers. Introduction to semiconductor transducer.

Unit- -2 : Sensors

Types of semiconductor sensors, photo sensitive sensors, Principle and working of Photo diode and photo transistor sensors, LDR, photo conductive, photo emissive, Introduction to Piezoelectric element and their properties as sensor, Piezo electric

	coefficient, equivalent circuits and frequency response of PE, temperature sensors electrical and non-electrical, pressure sensors load cell.
Reference Books	1. W D Cooper, Electronics Instrumentation and Measurement Techniques, 4th Ed, PHI, New Delhi. 2. B E Jones, Instrumentation, Measurements, and Magnitudes, 6th Ed, THM, New Delhi. 3. D S Sonde, Monographs with Solid Sate Electronic Instrumentation Vol-I to IV, 4th Ed, TMH New Delhi.
Teaching Methodology	Classwork, Discussions, Seminars and Assignment.
Evaluation Method	Internal Assessment : 25 Marks External Assessment : 25 Marks

[Subject code for Practical-2703000508039002]

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS (without OJT/RP)

Program Name	**Bachelor of Science (Electronics)**					
Semester	**8**					
NCrF Credit Level	**6.0**					
Course Type	**Major**					
Course Subtype	**Nil**					
Subject Type	**Discipline Specific**					
Course Code	**EL-MJ-803-PR**					
Course Level	**400-499**					
Course Title	**Industrial Transducers & Sensors**					
Credit	**Theory:**	**02**	**Practical:**	**02**	**Total:**	**04**
Effective From	**Academic Year : 2026-27**					
Course Outcomes	The course will enable students to understand: **CO1:** Perform experiments to study the characteristics of capacitive, inductive, and displacement transducers. **CO2:** Analyze the performance of photo-sensitive sensors such as photodiodes, phototransistors, and LDRs. **CO3:** Measure and interpret the characteristics of various transducers and sensors. **CO4:** Evaluate the frequency response of piezoelectric (PE) sensors. **CO5:** Analyze experimental results and apply transducers and sensors for measure.					

Mapping between Cos and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	√	√				√
CO2			√	√		
CO3		√	√			
CO4				√	√	
CO5	√				√	√

Course Content

Practical-1: Study the characteristics of Capacitive Transducer.
Practical-2: Study the characteristics of Inductive Transducer.
Practical-3: Study the characteristics of Displacement Transducer.
Practical-4: Study the characteristics of Photo Diode.
Practical-5: Study the characteristics of Photo-transistor.
Practical-6: Study the characteristics of LDR.
Practical-7: Study the Frequency Response of PE

Reference Books

1. W D Cooper, Electronics Instrumentation and Measurement Techniques, 4th Ed, PHI, New Delhi.
2. B E Jones, Instrumentation, Measurements, and Magnitudes, 6th Ed, THM, New Delhi.
3. D S Sonde, Monographs with Solid Sate Electronic Instrumentation Vol-I to IV, 4th Ed, TMH New Delhi.

Teaching Methodology	Labwork, Discussions
Evaluation Method	Internal Assessment : 25 Marks External Assessment : 25 Marks

[Subject code-2703000508059001]

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS (without OJT/RP)

Program Name	**Bachelor of Science (Electronics)**					
Semester	**8**					
NCrF Credit Level	**6.0**					
Course Type	**Major**					
Course Subtype	**Nil**					
Subject Type	**Discipline Specific**					
Course Code	**EL-MJ-804-TH**					
Course Level	**400-499**					
Course Title	**Basics of Data Acquisition and Processing**					
Credit	**Theory:**	**04**	**Practical:**	**00**	**Total:**	**04**
Effective From	**Academic Year : 2026-27**					

Course Outcomes

The course will enable students to understand:

CO1: Explain the principles and methods of data collection for temperature, force, and related measurements.

CO2: Describe the components and operation of data acquisition systems, including signal conditioning and data conversion.

CO3: Analyze and select appropriate transducers for measurement and data processing applications.

CO4: Apply resistive, capacitive, inductive, and temperature transducers for practical measurement systems.

CO5: Explain the operation of CROs, digital storage oscilloscopes, and related data storage and display techniques.

Mapping between Cos and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1				√	√	
CO2	√	√				√
CO3			√		√	
CO4	√	√			√	√
CO5	√		√		√	

Course Content

Unit 1: Introduction to Data Collection

Data related to Temperature, International Practical scale, Electrical, Non-electrical, and radiation methods, Balance, Hydraulic Cell, Pneumatic Cell, Elastic Force Devices, Separation of force Components and Calibration.

Unit 2: Data Acquisition

General data acquisition system, Signal conditioning, data transmission, A-to-D and D-to-A conversion.

Unit – 3 : Data Processing

	Types, classifications and selection of transducers, Resistive transducers, strain gauge, theory, gauge factor, semiconductors strain gauge, application, capacitive transducers, types, variable area, distance and dielectric type, differential arrangement, inductive transducers, principle and working, temperature measurement, electrical methods, thermistor characteristics and application. **Unit 4 : Data Storage and Display** Oscilloscope, CRT, basic CRO circuit, time base generator, free running mode, triggering mode, synchronization, delay line, CRO probes, special purpose CRO, digital storage Oscilloscope,
Reference Books	1. A K Swahny, Electrical and Electronic Measurements and Instrumentation, Dhanpat Rai & Co. 2. W D Cooper, Electronics Instrumentation and Measurement Techniques, 4^{th} Ed, PHI, NewDelhi. 3. B E Jones, Instrumentation, Measurements, and Magnitudes, 6^{th} Ed, THM, New Delhi. 4. D S Sonde, Monographs with Solid Sate Electronic Instrumentation Vol-I to IV, 4^{th} Ed, TMHNew Delhi.
Teaching Methodology	Classwork, Discussions, Seminars and Assignment.
Evaluation Method	Internal Assessment : 50 Marks External Assessment :50 Marks