Syllabus

OF

Course Work

for

MASTER OF PHILOSOPHY (M.PhIl)

ELECTRONICS

Choice Based Credit System (CBCS)

DEPARTMENT OF PHYSICS,
VEER NARMAD SOUTH GUJARAT UNIVERSITY,
UDHANA MAGDALLA ROAD,
SURAT -395007. (GUJARAT)

Structure for M.Phil. Syllabus

M.Phil (ELECTRONICS)

Sr. No.	Course Code	Course Title	L	T	P	Cr.
1	EL-601	Research Methodology	4	1	0	4
2	EL-602	Numerical and Computational Techniques	4	1	0	4
3	EL-603	Electronics	4	1	0	4
4	EL-604	Dissertation	-	-	-	08
			12	03	0	20

Effective from June 2017

Faculty of Science **M.Phil. ELECTRONICS**

DEPARTMENT OF PHYSICS,
VEER NARMAD SOUTH GUJARAT UNIVERSITY,
SURAT -395007

Syllabus

Faculty Code: **SCI Subject** (Paper) Code: **EL** Level Code: **03**

Name of Program**: M.Phil.** Subject: **ELECTRONICS**

Course (Paper) Name & No.: EL**- 601 RESEARCH METHODOLOGY**

Course (paper) Unique Code: PAPER**-1 EL-601**

External Examination Time Duration: **03 Hours**

Name of Exam	Semester	Course Group	Credit	Internal Marks	External Marks	Practical/Viva Marks	Total Marks
M.Phil	**1**	**Core**	**04**	**30**	**70**	**----**	**100**

Course Objectives:

õ **Strengthening Foundations of research methodology in the subject of Electronics**

õ**To expose the Students with the theoretical concepts of Research**

M.Phil Syllabus 2017
EL-601
EL-601 Research Methodology

UNIT : 1 Research Methodology : An Introduction, meaning, objectives and purpose of research. Types of research, significance and characteristics of research, criteria of good research, Research Methods and methodology, scientific methods, Distinction to scientific Methods.

UNIT : 2 Research process and problems, Research design, Concepts and type of research design, important of Experimental design and limitation of research. Data collection and its Analysis.

UNIT : 3 Report writing ,Structure of scientific report, Types of report, Significance of the report, characteristics of repot, report heading and body of the report, References/Bibliography.

UNIT : 4 Research evaluation methods, various index (h-index, I-index, etc…) index and abstracting service and their calculations. Plagiarism, its significance and effects. Components of IPR, Patent Laws.

Recommended Books

(1) Research Methods of Science, Michael M. Marda, First Edition, (2011), Cambridge University Press, New York.
(2) Research Methodology, C.C. Kothari and GouravGarg, Third Edition, (2014), New Age International Publication, Delhi.
(3) Probability and Error for Physical Science, S.K. Muthu Orient Lougman, (1982).
(4) Research Methodology, Dr. P.R. Majhi and Dr. P.K. Khatua Himalaya Publication House.

Effective from June 2017

Faculty of Science **M.Phil. ELECTRONICS**

DEPARTMENT OF PHYSICS,
VEER NARMAD SOUTH GUJARAT UNIVERSITY,
SURAT -395007

Syllabus

Faculty Code: **SCI Subject** (Paper) Code: **EL** Level Code: **03**

Name of Program**: M.Phil.** Subject: **ELECTRONICS**

Course (Paper) Name & No.: **EL- 602 Numerical and Computational Techniques**

Course (paper) Unique Code: PAPER**-2 EL-602**

External Examination Time Duration: **03 Hours**

Name of Exam	Semester	Course Group	Credit	Internal Marks	External Marks	Practical/Viva Marks	Total Marks
M.Phil	**1**	**Core**	**04**	**30**	**70**	**----**	**100**

Course Objectives:

õ**To expose the Students with the theoretical concepts of Research**

õ**To expose the Students with various mathematical methods for numerical analysis and use of computational tools**

M.Phil Syllabus 2017
EL-602
EL-602 Numerical & Computational Techniques

UNIT-I: **Curve-Fitting** : Least-square Methods, Spline Methods.
Integration: Simpson's 1/3rd rule, Romberg intefration, Richardson extrapolation techniques.
Ordinary Differential equation: Euler method, 2nd and 4th order Runge-Kutta Methods.

UNIT-II: **Computer Programming** : Review of FORTRAN-77 through problems.
Introduction to FORTRAN-90: additional features different from FORTRAN 77.
Introduction to parallel computing: Essentials of parallel computation; need for high speed computing and parallel computers.
Introduction to FORTRAN-95: features for parallel computing, FORALL. etc.

UNIT: III **Software Package: Mathematica**
Introduction: Notebook Interfaces, Text-Based Interfaces
Numerical calculations: Arithmetic, Exact and Approximate Results, Some Mathematical Functions, Arbitrary-Precision Calculations, Complex Numbers, Getting Used to Mathematica, Mathematical Notation in Notebooks
Algebraic calculations: Symbolic Computation, Values for Symbols, Transforming Algebraic Expressions, Simplifying Algebraic Expressions, Advanced Topic: Putting Expressions into Different Forms, Advanced Topic: Simplifying with Assumptions, Picking Out Pieces of Algebraic Expressions, Controlling the Display of Large Expressions, The Limits of Mathematica, Using Symbols to Tag Objects
Symbolic mathematics: Basic Operations, Differentiation, Integration, Sums and Products, Equations, Relational and Logical Operators, Solving Equations, Inequalities, Differential Equations, Power Series, Limits, Integral Transforms, Recurrence Equations, Packages for Symbolic Mathematics, Advanced Topic: Generic and Non-Generic Cases, Mathematical Notation in Notebooks
Numerical mathematics: Basic Operations, Numerical Sums, Products and Integrals, Numerical Equation Solving, Numerical Differential Equations, Numerical Optimization, Manipulating Numerical Data, Statistics

UNIT: IV **Spreadsheets/Worksheets packages:SIGMAPLOT**

Introduction: SigmaPlot at a Glance, New Features in SigmaPlot, Installing SigmaPlot, SigmaPlot Basics, Viewing Toolbars, Positioning Toolbars, Undoing Mistakes, Anatomy of SigmaPlotGfraphs, SigmaPlot Help

Notebook Manager Basics:

Notebook Manager Overview, Opening and Closing Notebooks in the Notebook, Manager Protecting Notebooks, Setting a Password, Working with Sections in the Notebook Manager, Creating New Items in the Notebook Manager, Opening Files in the Notebook Manager

Worksheet Basics: Using the Worksheet Shortcut Menu, Setting Worksheet Display Options, Moving Around the Worksheet, Entering Data into a SigmaPlot Worksheet, Importing Files from Other Applications, Exporting Worksheet Data, Descriptive Statistics for Worksheets, Displaying Worksheet Data, Formatting Worksheets, Cutting, Copying, Pasting, Moving, and Deleting Data, Entering and Promoting Column and Row Titles, Removing Outliers and Other Data, Using Excel Workbooks in SigmaPlot, Additional Features With Excel, Excel Toolbars, Using Transforms on Data in Excel Workbooks, Printing Worksheets, Configuring Printer Settings

Recommended Books:

(1) S.C. Chapra, R.P. Canale, Numerical methods for Engineers, 5th ed.,(2006), McGraw Hill
(2) K. SankarRao, Numerical Methods for Scientists and Engineers, (2001), PHI
(3) V. Rajaraman, Computer Programming in FORTRAN 77, 3rded, (1994), PHI
(4) V. Rajaraman, Computer Programming in FORTRAN 90 and 95, (1994), PHI
(5) V. Rajaraman and C Siva Ram Murthy, Parallel Computers: Architecture and Programming, (2004), PHI
(6) S. Wolfram, Mathematica book, 5th ed. (2003).
(7) SIGMAPLOT 11.0 users guide, systat software, inc, (2008).

Effective from June 2017

Faculty of Science **M.Phil. ELECTRONICS**

DEPARTMENT OF PHYSICS,
VEER NARMAD SOUTH GUJARAT UNIVERSITY,
SURAT -395007

Syllabus

Faculty Code: **SCI Subject** (Paper) Code: EL Level Code: **03**

Name of Program**: M.Phil.** Subject: **ELECTRONICS**

Course (Paper) Name & No.: **EL-603- ELCTRONICS**

Course (paper) Unique Code: **EL-603**

External Examination Time Duration: **03 Hours**

Name of Exam	Semester	Course Group	Credit	Internal Marks	External Marks	Practical/Viva Marks	Total Marks
M.Phil.	**1**	**Elective**	**04**	**30**	**70**	**----**	**100**

Course Objectives:

õ **Introducing thrust areas of research of the Department**

õ **Fundamental course on prerequisites for higher studies in Electronics**

M.Phil (ELECTRONICS) Syllabus-2017

EL-603 : ELECTRONICS

Unit-1 Gas flow vacuum system, Vacuum Pump (rotary, Diffusion) Gauges (Pirani, ionization etc.), Theories of Nucleation, Growth Processes, Physical and Crystallography structure of films, and epitaxial growth. Basic device technology, and approximate doping profile across p-n junction, Metal-semiconductor contacts, solar cell, LED and semi conductor Laser

Unit-2 Device Technologies, NMOS, CMOS, ECL, BIFET, BICMOS, BIMOS, CCD, I^2LTechnologies,Monolithic Integrated Circuit Fabrication.

Unit-3 Applications of linear Integrated Circuits:
PLL and its applications, Positive and Negative voltage regulators, IC LM series adjustable voltage regulators, LM 380 Power Amplifier, IC 8038 function generator. Binary weighted type DAC, R-2R ladder type DAC Parallel Comparator type ADC, successive approximation type ADC, counter type ADC, Dual slop type ADC.

Unit-4 Study of ATmega-328 and ATmega-2560 microcontroller based embedded system development board, Embedded C-programming for microcontrollers, Interfacing of LEDs, Switches, 7-Segment display, LCD- display, ADCs and DACs, Interfacing of advance transducers, Simulation of programs.

Books:

(1) Vacuum Science and Technology V.V.Rao, T.B.Ghosh and K.I.Chopra Allied Publishers Limited (India).

(2) Vacuum Technology, A. Roth, North-Holland, 1986.

(3) "Hand book of thin film technology" L.I.Maissel and R.I.Glang, McGraw Hill Book Co. New York,1970.

(4) "The Material Science of Thin Films" M. ohring, Academic press, New York 1992.

(5) Hand Book technologies of Films and Coatings, R.F.Bunshah, Novyes publication, 1996.

(6) Microelectronics A.Grable, McGraw Hills Publication(1987).

(7) RamakantGayakwad, Operational amplifier and integrated circuits by PHI learning Publishing Company.

(8) H.Taub and D. Schilling, Digital Integrated Electronics, McGraw-Hill, Publishing Company.

(9) Kenneth J. Ayeala, The 8051 microcontroller, Architecture, programming and application, penram International publishing (I) Pvt. Ltd.

(10) M. A. Mazidi, Microcontroller and Embedded Systems, Pearson India Publishing Company,

(11) Satish Shah, Embedded system design using The 8051 Microcontroller, Bension Education

Effective from June 2017

Faculty of Science **M.Phil. ELECTRONICS**

DEPARTMENT OF PHYSICS,
VEER NARMAD SOUTH GUJARAT UNIVERSITY,
SURAT -395007

Syllabus

Faculty Code: **SCI Subject** (Paper) Code: **EL** Level Code: **03**

Name of Program**: M.Phil.** Subject: **ELECTRONICS**

Course (Paper) Name & No.: EL**- 604**

Course (paper) Unique Code: **Dissertation**

Name of Exam	Semester	Course Group	Credit	Viva Marks	Average of Three (01 Internal + 02 External) referees' Marks	Total Marks
M.Phil.	**2**	**Dissertation**	**08**	**60**	**140**	**200**