

**MANNAR THIRUMALAI NAICKER COLLEGE**

**PASUMALAI, MADURAI- 625 004**

(An Autonomous Institution Affiliated to Madurai Kamaraj University)

(Re-accredited with 'A' Grade by NAAC)



**ADD ON COURSE**

**SYLLABUS AND REGULATIONS**

UNDER  
CHOICE BASED CREDIT SYSTEM (CBCS)  
**(For those who joined during 2018-2019 and after)**



**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**  
**DEPARTMENT OF PHYSICS (SF)**  
**(For those who joined in 2018 - 2019 and after)**

**Programme : PG**  
**Subject Code: 18PPHVA1**

**Hours: 45**  
**Credit: 01**

**NANOTECHNOLOGY**

**Unit 1: The big world of nanomaterials**

History and scope - can small things make a big difference – nanosize properties - classification of nano structured materials - fascinating nanostructures: nanowires, nanorods, nanoshells, nanotubes, nanofluids and nano fantasies- applications of nano materials – challenges and future scope.

**Unit 2: Synthesis of Nanomaterials**

Synthesis routes: Bottom up approaches: physical vapour deposition-chemical vapour deposition- spray conversion process- sol gel process. Top down approaches: Nanolithography: STM based nano lithography, AFM based nano lithography and dip pen lithography.

**Unit 3: Nanoelectronics**

Fundamental of semiconductor devices- metal oxide semiconductor field effect transistor (MOSFET)- solid state quantum effect devices- molecular electronic devices-Nano optoelectronic devices- Micro and Nano-electromechanical systems (MEMS/NEMS).

**Unit 4: Applications of nanotechnology**

Nanosensors-Carbon nanotube (CNT) based sensors- nano wire sensors- food and agriculture industry-cosmetics and consumer goods-structure of engineering-automotive industry-nanomedical applications-textiles-paint-energy-defence and space applications.

**Unit 5: Nanostructured material with high potential**

Quantum dots fabrication and applications - GaN nanowires: Applications of GaN nanowires - nanocrystalline  $\text{TiO}_2$  -  $\text{TiO}_2$  nanopowders-  $\text{TiO}_2$  nanotubes, multilayered films.

**Textbook**

1. B.S. Murthy, P. Shankar, Baldev Raj, B.B. Rath and James Murday, “Textbook of Nanoscience and Nanotechnology”, Universities Press India Pvt. Ltd, 2012.

Unit 1: Chapter 1 (1.1 to 1.5 and 1.7)

Unit 2: Chapter 3 (3.1 to 3.14 and 3.2.5)

Unit 3: Chapter 4 (4.1 and 4.2)

Unit 4: Chapter 4 (4.3 and 4.5 to 4.14)

Unit 5: Chapter 6 (6.1, 6.3, 6.5 and 6.6)

**Reference Books**

1. Rakesh Rathi, “Nanotechnology, Technology Revolution of 21<sup>st</sup> Century” S. Chand and Company Ltd, Ramnagar, New Delhi, 2010.
2. G. Mohan Kumar, “Nanotechnology, Nanomaterials and Nanodevices”, Narosha Publishing House, New Delhi, 2016.



**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**

**DEPARTMENT OF COMPUTER SCIENCE (SF)**

**(For those who joined in 2018-2019 and after)**

**Class : UG**

**Hours : 45**

**Subject Code : 18UCSVA1**

**Credits : 01**

**DATA ANALYSIS USING MS-EXCEL**

**Unit I**

Introduction to Excel: About Excel & Microsoft - Uses of Excel - Excel software - Spreadsheet window pane - Title Bar - Menu Bar - Standard Toolbar - Formatting Toolbar - the Ribbon - File Tab and Backstage View - Formula Bar - Workbook Window - Status Bar - Task Pane - Workbook & sheets

Columns & Rows : Selecting Columns & Rows - Changing Column Width & Row Height - Autofitting Columns & Rows - Hiding/Unhiding Columns & Rows - Inserting & Deleting Columns & Rows - Cell - Address of a cell - Components of a cell - Format - value - formula - Use of paste and paste special

**Unit II**

Functionality Using Ranges: Using Ranges - Selecting Ranges - Entering Information Into a Range - Using AutoFill Creating Formulas. (4 hours) Using Formulas- Formula Functions - Sum - Average, if, Count, max, min, Proper, Upper, Lower, Using AutoSum.

Advance Formulas : Concatenate, Vlookup, Hlookup, Match, Countif, Text, Trim Spreadsheet Charts (4 hours) Creating Charts - Different types of chart, Formatting Chart Objects - Changing the Chart Type - Showing and Hiding the Legend - Showing and Hiding the Data

**Unit III**

Table Data Analysis : Sorting, Filter - Text to Column - Data Validation PivotTables - Creating PivotTables - Manipulating a PivotTable - Using the PivotTable Toolbar - Changing Data Field - Properties - Displaying a PivotChart - Setting PivotTable Options - Adding Subtotals to PivotTables

**Unit IV**

Spreadsheet Tools : Moving between Spreadsheets, Selecting Multiple Spreadsheets - Inserting and Deleting Spreadsheets Renaming Spreadsheets - Splitting the Screen - Freezing Panes - Copying and Pasting Data between Spreadsheets - Hiding - Protecting worksheets

**Unit V:**

Making Macros: Recording Macros - Running Macros - Deleting Macros

**Text Book:** 1. Microsoft Office Excel, Torben Lage Frandsen, www.Bookboon.com



**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**  
**DEPARTMENT OF COMPUTER SCIENCE (SF)**  
**(For those who joined in 2018-2019 and after)**

**Class : UG Hours : 45**  
**Subject Code : 18UCSVA3 Credits : 01**

**DIGITAL MARKETING**

**Unit I**

Digital Marketing Fundamentals – Website Planning and Structure – Facebook Marketing for Business

**Unit II**

Google Adwords :Understanding Adwords Google Ad Types Pricing Models PPC Cost Formula Ad Page Rank Billing and Payments Adwords User Interface Keyword Planning Keywords Control Creating Ad Campaigns Creating Text Ads Creating Ad Groups Bidding Strategy for CPC Practical Examples

**Unit III:**

LinkedIN and Twitter Marketing-: Google Analytics and Webmaster Tool –Search Engine Optimization (SEO) –Affiliate Marketing & Google AdSense – Case Studies and Practical Assignments – Google Certification Program Training

**Unit IV**

Marketing v/s Sales Section -: Marketing Mix and 4 Ps –What is Digital Marketing? Inbound vs Outbound Marketing – Content Marketing – Understanding Traffic – Understanding Leads – Strategic Flow for Marketing Activities.

**Unit V**

PPC Advertising YouTube and Video Marketing E-mail Marketing for Business- Lead Generation & Marketing Automation- eCommerce and Payment Gateway –Remarketing Strategies – Advance Level- Google Plus for Business

**Reference Books:**

1. Ryan Deiss, Russ Henneberry, “Digital Marketing for Dummies”, A Wiley Brand.
2. Ian Dodson, “The Art of Digital Marketing”, Wiley
3. Calvin Jones and Damian Ryan. “Understanding Digital Marketing”, Koganpage, IV Edition.



**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**  
**DEPARTMENT OF COMPUTER SCIENCE (SF)**  
**(For those who joined in 2018-2019 and after)**

**Class : PG**  
**Subject Code : 18PCSV A2**

**Hours : 45**  
**Credits : 01**

**R PROGRAMMING**

**Unit I**

R – Overview – Basic Syntax – Data Types – Variables – Operators – Decision Making – Loops – Function – Strings

**Unit II**

Vectors – Lists – Matrices – Arrays – Factors – Data Frames – Packages – Data Reshaping – CSV Files

**Unit III**

Excel File – Binary Files – XML Files – JSON Files – Web Data – Databases – PIE Charts – Bar Charts – Boxplots

**Unit IV**

Histograms – Line Graphs – Scatterplots – Mean, Median & Mode – Linear Regression – Multiple Regression – Logistic Regression – Normal Distribution – Binomial Distribution

**Unit V**

Poisson Distribution – Analysis of Covariance – Time Series Analysis – NonLinear Least Square – Decision Tree – Random Forest – Survival Analysis – Chi Square Test

**Web Reference:**

1. [http://www.tutorialspoint.com/r/r\\_tutorial.pdf](http://www.tutorialspoint.com/r/r_tutorial.pdf)

**Reference Book:**

1. Garrett Golemund, “Hands-on programming with R”, O’Reilly, 2014.
2. Pace, Larry, “Beginning R – Introduction to Statistical Programming”, Apress



**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**  
**DEPARTMENT OF INFORMATION TECHNOLOGY (SF)**  
**(For those who joined in 2018-2019 and after)**

**Class : UG**

**Hours : 45**

**Subject Code : 18UITVA1**

**Credits : 01**

**DATA ANALYSIS USING MS-EXCEL**

**Unit I**

Introduction to Excel: About Excel & Microsoft - Uses of Excel - Excel software - Spreadsheet window pane - Title Bar - Menu Bar - Standard Toolbar - Formatting Toolbar - the Ribbon - File Tab and Backstage View - Formula Bar - Workbook Window - Status Bar - Task Pane - Workbook & sheets

Columns & Rows : Selecting Columns & Rows - Changing Column Width & Row Height - Autofitting Columns & Rows - Hiding/Unhiding Columns & Rows - Inserting & Deleting Columns & Rows - Cell - Address of a cell - Components of a cell - Format - value - formula - Use of paste and paste special

**Unit II**

Functionality Using Ranges: Using Ranges - Selecting Ranges - Entering Information Into a Range - Using AutoFill Creating Formulas. (4 hours) Using Formulas- Formula Functions - Sum - Average, if, Count, max, min, Proper, Upper, Lower, Using AutoSum.

Advance Formulas : Concatenate, Vlookup, Hlookup, Match, Countif, Text, Trim Spreadsheet Charts (4 hours) Creating Charts - Different types of chart, Formatting Chart Objects - Changing the Chart Type - Showing and Hiding the Legend - Showing and Hiding the Data

**Unit III**

Table Data Analysis : Sorting, Filter - Text to Column - Data Validation PivotTables - Creating PivotTables - Manipulating a PivotTable - Using the PivotTable Toolbar - Changing Data Field - Properties - Displaying a PivotChart - Setting PivotTable Options - Adding Subtotals to PivotTables

**Unit IV**

Spreadsheet Tools : Moving between Spreadsheets, Selecting Multiple Spreadsheets - Inserting and Deleting Spreadsheets Renaming Spreadsheets - Splitting the Screen - Freezing Panes - Copying and Pasting Data between Spreadsheets - Hiding - Protecting worksheets

**Unit V:**

Making Macros: Recording Macros - Running Macros - Deleting Macros

**Text Book:** 1. Microsoft Office Excel, Torben Lage Frandsen, www.Bookboon.co



**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**  
**DEPARTMENT OF INFORMATION TECHNOLOGY (SF)**  
(For those who joined in 2018-2019 and after)

**Class : UG**

**Hours : 45**

**Subject Code : 18UITVA3**

**Credits : 01**

**DIGITAL MARKETING**

**Unit I**

Digital Marketing Fundamentals – Website Planning and Structure – Face book Marketing for Business

**Unit II**

Google Adwords :Understanding Adwords Google Ad Types Pricing Models PPC Cost Formula Ad Page Rank Billing and Payments Adwords User Interface Keyword Planning Keywords Control Creating Ad Campaigns Creating Text Ads Creating Ad Groups Bidding Strategy for CPC Practical Examples

**Unit III:**

LinkedIN and Twitter Marketing-: Google Analytics and Webmaster Tool –Search Engine Optimization (SEO) –Affiliate Marketing & Google AdSense – Case Studies and Practical Assignments – Google Certification Program Training

**Unit IV**

Marketing v/s Sales Section -: Marketing Mix and 4 Ps –What is Digital Marketing? Inbound vs Outbound Marketing – Content Marketing – Understanding Traffic – Understanding Leads – Strategic Flow for Marketing Activities.

**Unit V**

PPC Advertising YouTube and Video Marketing E-mail Marketing for Business- Lead Generation & Marketing Automation- e Commerce and Payment Gateway –Remarketing Strategies – Advance Level- Google Plus for Business

**Reference Books:**

1. Ryan Deiss, Russ Henne berry, “Digital Marketing for Dummies”, A Wiley Brand.
2. Ian Dodson, “The Art of Digital Marketing”, Wiley
3. Calvin Jones and Damian Ryan. “Understanding Digital Marketing”, Koganpage, IV Edition.



**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**  
**DEPARTMENT OF COMMERCE WITH COMPUTER APPLICATION (SF)**  
**(For those who joined in 2018-2019 and after)**

<b>Class</b>	<b>: UG</b>	<b>Hours</b>	<b>: 45</b>
<b>Subject Code</b>	<b>: 18UCAVA1</b>	<b>Credits</b>	<b>: 01</b>

**DATA ANALYSIS USING MS-EXCEL**

**Unit I**

Introduction to Excel: About Excel & Microsoft - Uses of Excel - Excel software - Spreadsheet window pane - Title Bar - Menu Bar - Standard Toolbar - Formatting Toolbar - the Ribbon - File Tab and Backstage View - Formula Bar - Workbook Window - Status Bar - Task Pane - Workbook & sheets

Columns & Rows : Selecting Columns & Rows - Changing Column Width & Row Height - Autofitting Columns & Rows - Hiding/Unhiding Columns & Rows - Inserting & Deleting Columns & Rows - Cell - Address of a cell - Components of a cell - Format - value - formula - Use of paste and paste special

**Unit II**

Functionality Using Ranges: Using Ranges - Selecting Ranges - Entering Information Into a Range - Using AutoFill Creating Formulas. (4 hours) Using Formulas- Formula Functions - Sum - Average, if, Count, max, min, Proper, Upper, Lower, Using AutoSum.

Advance Formulas : Concatenate, Vlookup, Hlookup, Match, Countif, Text, Trim Spreadsheet Charts (4 hours) Creating Charts - Different types of chart, Formatting Chart Objects - Changing the Chart Type - Showing and Hiding the Legend - Showing and Hiding the Data

**Unit III**

Table Data Analysis : Sorting, Filter - Text to Column - Data Validation PivotTables - Creating PivotTables - Manipulating a PivotTable - Using the PivotTable Toolbar - Changing Data Field - Properties - Displaying a PivotChart - Setting PivotTable Options - Adding Subtotals to PivotTables

**Unit IV**

Spreadsheet Tools : Moving between Spreadsheets, Selecting Multiple Spreadsheets - Inserting and Deleting Spreadsheets Renaming Spreadsheets - Splitting the Screen - Freezing Panes - Copying and Pasting Data between Spreadsheets - Hiding - Protecting worksheets

**Unit V:**

Making Macros: Recording Macros - Running Macros - Deleting Macros

**Text Book:** 1. Microsoft Office Excel, Torben Lage Frandsen, www.Bookboon.com



**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**  
**DEPARTMENT OF COMMERCE WITH COMPUTER APPLICATION (SF)**  
**(For those who joined in 2018-2019 and after)**

**Class : UG**

**Hours : 45**

**Subject Code : 18UCAVA3**

**Credits : 01**

**DIGITAL MARKETING**

**Unit I**

Digital Marketing Fundamentals – Website Planning and Structure – Facebook Marketing for Business

**Unit II**

Google Adwords :Understanding Adwords Google Ad Types Pricing Models PPC Cost Formula Ad Page Rank Billing and Payments Adwords User Interface Keyword Planning Keywords Control Creating Ad Campaigns Creating Text Ads Creating Ad Groups Bidding Strategy for CPC Practical Examples

**Unit III:**

LinkedIN and Twitter Marketing-: Google Analytics and Webmaster Tool –Search Engine Optimization (SEO) –Affiliate Marketing & Google AdSense – Case Studies and Practical Assignments – Google Certification Program Training

**Unit IV**

Marketing v/s Sales Section -: Marketing Mix and 4 Ps –What is Digital Marketing? Inbound vs Outbound Marketing – Content Marketing – Understanding Traffic – Understanding Leads – Strategic Flow for Marketing Activities.

**Unit V**

PPC Advertising YouTube and Video Marketing E-mail Marketing for Business- Lead Generation & Marketing Automation- eCommerce and Payment Gateway –Remarketing Strategies – Advance Level- Google Plus for Business

**Reference Books:**

1. Ryan Deiss, Russ Henneberry, “Digital Marketing for Dummies”, A Wiley Brand.
2. Ian Dodson, “The Art of Digital Marketing”, Wiley
3. Calvin Jones and Damian Ryan. “Understanding Digital Marketing”, Koganpage, IV Edition.



**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**  
**DEPARTMENT OF MATHEMATICS WITH CA (SF)**  
**(For those who joined in 2018 - 2019 and after)**

**Class : B.Sc Mathematics (CA)**  
**Subject Code : 18UMCVA1**

**Hours : 45**  
**Credits : 01**

**GRAPH THEORY- INTRODUCTORY CONCEPTS**

**Unit –I**

Graphs- Introduction to Graphs- Definition and examples - Degrees – Subgraphs .

**Unit –II**

Independent sets and coverings - Operations on graphs.

**Unit –III**

Connectedness – Walks, Trails and Paths.

**Unit –IV**

Trees – Introduction -Characterisation of Trees – Centre of a Tree.

**Unit –V**

Colourability – five color theorem – four color theorem

**Text Book:**

Dr.S.Arumugam and S.Ramachandran, **Invitation To Graph Theory**, Scitech Publication, Chennai, 2015. Reprint May 2017.

**Reference Book:**

1. F. Harary, Graph Theory, Addison-Wesley, Reading, Mass, 1972.
2. J.A. Bondy and U.S.R. Murty, Graph Theory with applications, North Holland, New York. 1976.

Unit I - Chapter 2: Sections 2.1 to 2.3

Unit II - Chapter 2: Sections 2.6 , 2.9

Unit III- Chapter 4: Sections 4.1

Unit IV- Chapter 6 : Sections 6.0 to 6.2

Unit V - Chapter 9 : Sections 9.2 , 9.3



**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**  
**DEPARTMENT OF MATHEMATICS WITH CA (SF)**  
**(For those who joined in 2018 - 2019 and after)**

**Class : B.Sc Mathematics (CA)**

**Hours : 45**

**Subject Code : 18UMCVA2**

**Credits : 01**

**A GUIDE TO LATEX**

**Unit –I**

Basics – Introduction - Basics of a LATEX file -Command names and arguments –  
Declarations - Special characters - Word division

**Unit –II**

Document Layout and Organization -Document class- Page style - Parts of the  
Document - Table of contents

**Unit –III**

Displayed Text - Changing font - Centering and indenting - Lists - Generalized  
lists –  
Theorem-like declarations

**Unit –IV**

Mathematical Formulas -- Mathematical environments - Main elements of math  
mode - Mathematical symbols - Additional elements - Fine-tuning mathematics -  
Beyond standard LATEX .

**Unit –V**

Graphics Inclusion and Color -- The graphics packages - Adding color – Slide  
Preparation - Slide production with seminar –slide for paper presentation – Beamer  
package.

**Text Book:**

1. H. Kopka and P.W. Dally, A Guide to LATEX, Third Edition, Addison Wesley, Harlow, 1999.

Unit I - Chapter 1 : Section 1.5

Chapter 2 : Sections 2.1,2.3,2.5,2.8

Unit II - Chapter 3 (Full)

Unit III - Chapter 4 (Full)

Unit IV - Chapter 5 (Full)

Unit V- Chapter 6 & Chapter 15 (Full)



**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**  
**DEPARTMENT OF B.Sc ELECTRONICS AND COMMUNICATION (SF)**  
**(For those who joined in 2018-2019 and after)**

**Class : B.Sc.(E&C)**  
**Subject Code : 18UELVA1**

**Hours : 45**  
**Credits : 01**

## **PCB DESIGNING**

### **Unit-I**

**Introduction to PCB designing concepts :** PCB - Types of PCBs: Single Sided (Single Layer) - Multi-Layer (Double Layer) - PCB Materials –Component introduction and their categories:

**Types of Components:** Active Components: Diode -Transistor - MOSFET - LED - SCR - Integrated Circuits (ICs) Passive Components: Resistor - Capacitor - Inductor -Transformer - Speaker/Buzzer

### **Unit-II**

**PCB Designing Flow Chart& dot board soldering :** Schematic Entry - PCB Layout Designing - Prototype Designing - Design Rule Check (DRC) - PCB Making –Printing Etching - Drilling -Assembly of components Dot Board soldering- Soldering Techniques-How to solder different components and ICs

### **Unit-III**

**Description and rules of PCB Layers :** Electrical Layers -Top Layer - Mid Layer - Bottom Layer -Mechanical Layers o Board Outlines and Cutouts - Drill Details - Documentation Layers - Components Outlines -Reference Designation

**Rules for Track:** Track Length - Track Angle - Rack Joints - Track Size

### **Unit-VI**

**Lab practice and designing concepts Starting the PCB designing using eagle software:** Understanding the schematic Entry - Creating Library & Components - Drawing a Schematic -Flat Design / hierarchical Design -Setting up Environment for PCB -Design a Board- Auto routing

### **Unit-V**

**PCB Designing Practice :** PCB Designing of Basic and Analog Electronic Circuits - PCB Designing of Power Supplies -PCB Designing of Electronics Projects - PCB Designing of Embedded Projects - Soldering LED's- Checking for errors-Trouble shooting errors.

### **Text book**

1. Walter.C Bosshart, Printed circuit Boards, Design and Technology, Publication Mcgraw Hill Education, 16 June 1983.



**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**  
**DEPARTMENT OF B.Sc ELECTRONICS AND COMMUNICATION (SF)**  
**(For those who joined in 2018-2019 and after)**

**Class : B.Sc.(E&C)**  
**Subject Code : 18UELVA2**

**Hours : 45**  
**Credits : 01**

**ELECTRICAL WIRING**

**Unit I:**

**Electrical Wiring:** Wiring diagram of light, fan, and bell and alarm circuit, Staircase and go down wiring- Main switch board for house wiring- various accessories used for tube light circuit

**Unit II:**

**House Wiring:** Concept of standard house wiring procedure and best practices:

Types of wires -Types of switches - Other accessories like lamp holders- ceiling roses – sockets- fuses- Distribution boards- Fuses and fuse materials

**Unit-III**

**Electrical fixtures:** Selection and use of electrical fixtures such as circuit breakers, starters, relays etc. and their power rating as per circuit voltage requirement

**Unit-IV**

**Domestic Appliances:** Construction - working- trouble shooting of electric fans - mixer- grinder -washing machine- Voltage stabilizer- Inverters and UPS.

**Unit V:**

**Wiring Circuits and Earthing:** Necessity of earthingdefinitions of fundamental terms in earthing like earth, earth lead, earth electrode, earth wire- Simple lamp circuit and bedroom lighting circuits - Stair case wiring, series and parallel circuits.

**\*Study material Prepared by Department**



**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**  
**DEPARTMENT OF CHEMISTRY (SF)**  
**(For those who joined in 2018 – 2019 and after)**

**Programme : UG**  
**Subject Code : 18UCHVA1**

**Hours : 45**  
**Credits : 01**

**OILS AND FATS–I**

**Unit – 1**

History – common fatty acids present in oils and fats – classification of oils and fats – omega fatty acids, Trans fats – role of oils and fats in plants, animals and human beings.

**Unit – 2**

Physical properties of oils and fats – oiliness and viscosity – surface tension – density – refractive index – specific heat and heat of fusion – smoke fire and flash point – solubility and miscibility – determination of refractive index, specific gravity, and viscosity – engler's apparatus.

**Unit – 3**

Structure and composition of oils and fats – triglyceride composition of natural fat – hydrolysis – saponification – rancidity and its types – hydrogenation – halogenations – chemical oxidation – epoxidation and polymerization.

**Unit – 4**

Synthesis and metabolism in plants and animals – fat metabolism – biosynthesis of fats – ketosis – Kerb's cycle – carbohydrate metabolism – glycolysis.

**Unit – 5**

Enzymes – classification – co-enzymes – chemistry of butter – classification – composition – manufacture and chumming.

**Text Books**

1. Industrial Chemistry, B.K. Sharma, Goel Publishing House, 17<sup>th</sup> Edition, Meerut, 2013.
2. The chemistry of oils and fats, Frank D Gunstone, Blackwell Publishers, 2004.
3. Bailey's Industrial oil and fat products, Vol.2, Daniel Swern, Wiley Interscience Publications.

**Reference Books**

1. Standard Methods for the Analysis of Oils, Fats and Derivatives 1<sup>st</sup> Supplement to the 7<sup>th</sup> Revised and Enlarged Edition prepared for publication by A. Dieffenbacher, W.D. Pocklington.
2. A. Bahl and B.S. Bahl, Advanced Organic Chemistry, 1<sup>st</sup> Multicolour Edition, S. Chand & Company, New Delhi, 2010.
3. K.S. Tewari, N.K. Vishnoi and S.N. Mehrotra, A Textbook of Organic Chemistry, 2<sup>nd</sup> Edition, Vikas Publishing House (Pvt) Ltd., New Delhi, 2004.



**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**  
**DEPARTMENT OF CHEMISTRY (SF)**  
**(For those who joined in 2018 – 2019 and after)**

**Programme : UG**

**Subject Code : 18UCHVA2**

**Hours : 45**

**Credits : 01**

**OILS AND FATS–II**

**Unit – 1**

Oil seed crops – groundnut, sesame, coconut, castor, cotton seed, mustard, sunflower, linseed, soya bean – black cumin seed – botanical description and their health benefits and drawbacks.

**Unit – 2**

Chemical composition of oils extracted from groundnut, sesame, coconut, and castor.

**Unit – 3**

Production of oils from cotton seed, mustard, sunflower, linseed, soya bean and black cumin seed.

**Unit – 4**

Milk and milk analysis – Milk constituent – Analysis of milk – organoleptic test – estimation of fat by gravimetric method – determination of density and specific gravity of milk using lactometer.

**Unit – 5**

Determination of moisture content of cheese – determination of pH of milk – ash content in milk – detection of preservatives in milk – analysis of ghee.

**Text Books**

1. Industrial Chemistry, B.K. Sharma, Goel Publishing House, 17<sup>th</sup> Edition, Meerut, 2013.
2. The chemistry of oils and fats, Frank D Gunstone, Blackwell Publishers, 2004.
3. Bailey's Industrial oil and fat products, Vol.2, Daniel Swern, Wiley Interscience Publications.
4. Oil seed crops, E.A. Weiss, Longmann Groups Ltd.,

**Reference Books**

1. Standard Methods for the Analysis of Oils, Fats and Derivatives 1<sup>st</sup> Supplement to the 7<sup>th</sup> Revised and Enlarged Edition prepared for publication by A. Dieffenbacher, W.D. Pocklington.
2. A. Bahl and B.S. Bahl, Advanced Organic Chemistry, 1<sup>st</sup> Multicolour Edition, S. Chand & Company, New Delhi, 2010.
3. K.S. Tewari, N.K. Vishnoi and S.N. Mehrotra, A Textbook of Organic Chemistry, 2<sup>nd</sup> Edition, Vikas Publishing House (Pvt) Ltd., New Delhi, 2004.



**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**  
**DEPARTMENT OF FOOD AND DAIRY TECHNOLOGY (SF)**  
(For those who joined in 2018-2019 and after)

**Programme : UG**

**Hours : 45**

**Subject Code: 18UFDVA1**

**Credit : 01**

**VALUE ADDED MILK AND MILK PRODUCTS**

**Practicals:**

1. Introduction and importance of value addition in dairy products.  
Method of preparation of,
2. Value addition in milk: flavoured milk, natural colouring and flavouring agents.
3. Value addition of Khoa and Kheer.
4. Value addition of Paneer and Channa.
5. Value addition of Kulfi, Basanthi and Rasagulla.
6. Value addition of fermented milk products.
7. Value addition of Dahi and Shrikand
8. Value addition in Milk by products.
9. Preparation of pre, pro and symbiotic dairy products.
10. Preparation of whey and casein products.

**Reference:**

1. Aneja.R.P, B.N Mathur, R.C Chandra and A.K. banerjee (2002)., Technology of Indian Milk Products, A Dairy India Year bok, New Delhi.
2. Modern Dairy Technology, Vol. I Advances in Milk Processing by R.K. Robinson



**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**  
**DEPARTMENT OF FOOD AND DAIRY TECHNOLOGY (SF)**  
(For those who joined in 2018-2019 and after)

**Programme : UG**  
**Subject Code: 18UFDVA2**

**Hours: 45**  
**Credit: 01**

**LOW COST FOOD PRODUCT DEVELOPMENT**

**Method of preparation of,**

1. Cereal based products
2. Pulse based products
3. Vegetable products
4. Fruit products
5. Egg products
6. Baked products
7. Dried products
8. Nut based products
9. Seed based products
10. Sugar related products

**Reference:**

1. Srilakshmi, B, **Food Science**, New Age International Private Limited Publishers, New Delhi; Chennai (1997).
2. Swaminathan, M., **Food Science and Experimental Foods**, Ganeshand Company, Madras (1988).



**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**  
**DEPARTMENT OF MICROBIOLOGY (SF)**  
**(For those who joined in 2019 -2020 and after)**

**Programme: UG**

**Course**

**Semester:**

**Subject code: 18UMBVA2**

**Paper: Add on**

**Hours: 45**

**Credit: 01**

**MICROBIOLOGY OF MILK**

**Unit-I**

Sources of microbial contamination of milk and their importance, important groups of spoilage of microorganisms and their manifestation in milk.

**Unit-II**

Microbial growth in milk during storage and transport, Principles of sanitation practices at all stages of production and processing.

**Practicals**

1. Milk sample collection methods for microbiology test
2. E.coli test
3. MBRT-test
4. Isolation of dairy cultures
5. Isolation of Probiotic organisms from Curd/Butter milk.

**Reference books:**

1. Robinson,R.K.(2002) Dairy Microbiology Handbook; The Microbiology of Milk and Milk Products 3<sup>rd</sup> edition. Wiley-Inter science publishers.
2. Manish L.Srivastava Handbook of Microbiology, Daya publishing House