

# MATHEMATICS

## Certificate Course

**Program Code: UMT**

**2021-2022 onwards**

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**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**

**Re-accredited with "A" Grade by NAAC**

**PASUMALAI, MADURAI – 625 004**



**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**  
**DEPARTMENT OF MATHEMATICS**  
(For those who joined in 2021-2022 and after)

<b>Course Name</b>	<b>VEDIC MATHEMATICS</b>					
<b>Course Code</b>	<b>21CMTC21</b>	<b>L</b>	<b>P</b>	<b>C</b>		
<b>Category</b>	<b>Certificate Course</b>	45	-	2		
<b>Nature of course:</b>	EMPLOYABILITY	✓	SKILL ORIENTED	✓	ENTREPRENEURSHIP	✓
<b>Course Outcomes:</b>						
1. To motivate the students to understand basic concepts in Mathematics.						
2. By studying simple methods in Vedic mathematics.						
3. To enable the students to prepare Competitive Examinations.						
<b>Unit: I</b>						
Arithmetical Computations – Multiplications						
<b>Unit: II</b>						
Division by the Nikhilam method –Division by Paravartya method - Simultaneous Simple Equations.						
<b>Unit: III</b>						
Quadratic Equations – Cubic Equations						
<b>Unit: IV</b>						
Partial fractions – Integration by partial fractions						
<b>Unit: V</b>						
Sum and Difference of Squares – Elementary Squaring and Cubing.						
					<b>Total Lecture Hours</b>	
<b>Books for Study:</b>						
1. VEDIC MATHEMATICS by Jagadguruswami Sri Bharati Krsna Tirthaji Maharaja, Motilal Banarsidass Publishers , Delhi – 110017.						
<b>Books for References:</b>						
1. Mr.T.S. Bhanu Muthy, A modern Introduction to Ancient India Mathematics, New Age International Publishers, Second Edition 2009.						
2. Dr. S.K. Kapoor, Vedic Mathematics. Lotus Press, 2013.						
3. Mr.Dhaval Bathia, Vedic Mathematics made easy, Jaico Publishing House.						

# COMPUTER SCIENCE)

## Certificate Course

Program Code: UCS

2021-2022 onwards

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**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**  
**DEPARTMENT OF COMPUTER SCIENCE**  
 (For those who joined in 2021-2022 and after)

<b>Course Name</b>	<b>Digital Marketing &amp; Analytics</b>				
<b>Course Code</b>	<b>21CCSC21</b>	<b>L</b>	<b>P</b>	<b>C</b>	
<b>Course Category</b>	<b>Certificate Course</b>	<b>45</b>	<b>-</b>	<b>2</b>	
<b>Nature of Course:</b>	<b>EMPLOYABILITY</b>	✓	<b>SKILL ORIENTED</b>	✓	<b>ENTREPRENURSHIP</b>
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>• Learn about the fundamentals of digital marketing</li> <li>• Explore the latest digital trends of digital marketing</li> <li>• Learn website management and optimization</li> <li>• Monitor performance metrics with SEO tools to execute the SEO strategy successfully</li> <li>• Understand multiple ways to promote your business using social media marketing</li> </ul>					
<b>Unit I</b>	<b>Fundamental Concepts of Digital Marketing &amp; Digital Analytics Concepts</b>				<b>9 Hrs</b>
Introduction - Fundamental Concepts of Digital Marketing - Customer Lifecycle - Marketing Technology - The Future of Digital Marketing .Digital Media Types- Web Analytics- Conversion Analytic-Social Media- Social Media Reporting - User Experience Feedback - Real-Time Site Analytic - Owned Social Metrics -Earned Social Media Metrics -Demystifying Web Data					
<b>Unit II</b>	<b>Digital Analysis Brand and Social Media Marketing</b>				<b>9 Hrs</b>
Benefits of Digital Brand Analysis - Brand Analysis in the Digital Age-Brand Share-Brand Audience -Brand and Consumer Alignment -The Future of Digital Brand Analysis. Introduction to Social Media Building a Sustainable Social Media Strategy - Converged Social Media - Content Marketing in a Social Media World - Visual Social Media - Understanding and Sparking Social Sharing - Storytelling as an Essential Part of Your Social Narrative - Influencer Marketing and Online Reputation Management - Social Media Selling - Social Media Measurement					
<b>Unit III</b>	<b>Digital Analytics</b>				<b>9Hrs</b>
Introduction to Digital Analytics - Organizational Maturity - Building Blocks - Managerial Perspectives of Digital Analytics - Key Performance Indicators - Segmentation - The Analysis Process - Marketing Management - Experimentation and Testing - Reports and Dashboards - The Digital Analytics Stack Digital Analytics Foundations . Quiz. Data Analytics Overview -Dealing with Different Types of Data - Data Visualization for Decision making - Data Science, Data Analytics, and Machine Learning - - Data Science Methodology - Data Analytics in Different Sectors - Analytics Framework and Latest Trends					
<b>Unit IV</b>	<b>Business Analytics &amp; Mobile Analytics Tools</b>				<b>9 Hrs</b>
Introduction - Formatting Conditional Formatting and Important Functions - Analyzing Data with Pivot Tables - Dashboarding - Business Analytics with Excel - Data Analysis Using Statistics - Power BI- Mobile Marketing- Current Mobile Market Landscape- Measuring Mobile Marketing Activities- Tools : Social Media Listening- Search Analytics- Audience Analysis- Content Analysis- Engagement Analysis					
<b>Unit V</b>	<b>Future of Digital Data</b>				<b>9 Hrs</b>
Digital Analytics Disciplines Evolve - Bridging the Analytics Talent Gap - Housing Customer Data - Continuing Consolidation of Data Sources Just as New Sources of Data Emerge -Dealing					

with Growing Concerns About Consumer Privacy - Making Social Data Become More Available to Brands - Continuing Measurement Challenges for Chief Marketing Officers (CMOs)- Scratching the Surface of Machine Learning and Artificial Intelligence

**Total Lecture Hours** | 45Hrs

**Book for References:**

1. Digital Marketing Analytics: Making Sense of Consumer Data in a Digital World (Que Biz-Tech) Kindle Edition by Chuck Hemann, Que Publishing; 1st edition ( 2013)
2. Ryan Deiss, Russ Henneberry, “Digital Marketing for Dummies”, A Wiley Brand.
3. Ian Dodson, “The Art of Digital Marketing”, Wiley 3. Calvin Jones and Damian Ryan. “Understanding Digital Marketing”, Koganpage, IV Edition
4. Web Analytics: An Hour a Day Paperback by Avinash Kaushik Wiley Publishing 2007

**Web References**

1. <https://www.marketplace-simulation.com/>
2. <https://www.sigmacomputing.com/>
3. <https://www.intellicus.com/enterprise-bi/>
4. <https://skill-lync.com/computer-science-engineering-courses/pg-data-analytics-data-science>

**COURSE OUTCOMES:**

**K Level**

At the end of the course the students will be able to

<b>CO1:</b>	Understand the strategy behind digital marketing along with its advantage and limitation	K2
<b>CO2:</b>	Gain an understanding of data collection and analysis used by marketing professionals Become proficient in digital marketing channels	K3
<b>CO3:</b>	Learn to improve visibility of your website on search engines and increase traffic with help of SEO	K3
<b>CO4:</b>	Gain an understanding of customer-centric approach to boost conversion	K4
<b>CO5:</b>	Acquire skill in Business analysis for better planning, optimization and forecast of your campaigns	K4

## LESSON PLAN

UNIT	Digital Marketing & Analytics	Hrs	Mode
I	Introduction - Fundamental Concepts of Digital Marketing - Customer Lifecycle - Marketing Technology - The Future of Digital Marketing .Digital Media Types- Web Analytics- Conversion Analytic-Social Media- Social Media Reporting - User Experience Feedback - Real-Time Site Analytic - Owned Social Metrics -Earned Social Media Metrics -Demystifying Web Data	9	<b>Chalk &amp; Talk, ICT Kit</b>
II	Benefits of Digital Brand Analysis - Brand Analysis in the Digital Age-Brand Share-Brand Audience -Brand and Consumer Alignment -The Future of Digital Brand Analysis. Introduction to Social Media Building a Sustainable Social Media Strategy - Converged Social Media - Content Marketing in a Social Media World - Visual Social Media - Understanding and Sparking Social Sharing - Storytelling as an Essential Part of Your Social Narrative - Influencer Marketing and Online Reputation Management - Social Media Selling - Social Media Measurement	9	<b>Chalk &amp; Talk, ICT Kit</b>
III	Introduction to Digital Analytics - Organizational Maturity - Building Blocks - Managerial Perspectives of Digital Analytics - Key Performance Indicators - Segmentation - The Analysis Process - Marketing Management - Experimentation and Testing - Reports and Dashboards - The Digital Analytics Stack Digital Analytics Foundations . Quiz. Data Analytics Overview - Dealing with Different Types of Data - Data Visualization for Decision making - Data Science, Data Analytics, and Machine Learning - - Data Science Methodology - Data Analytics in Different Sectors - Analytics Framework and Latest Trends	9	<b>Chalk &amp; Talk, ICT Kit</b>
IV	Introduction - Formatting Conditional Formatting and Important Functions - Analyzing Data with Pivot Tables - Dashboarding - Business Analytics with Excel - Data Analysis Using Statistics - Power BI- Mobile Marketing- Current Mobile Market Landscape-Measuring Mobile Marketing Activities- Tools : Social Media Listening- Search Analytics- Audience Analysis- Content Analysis-Engagement Analysis	9	<b>Chalk &amp; Talk, ICT Kit</b>
V	Digital Analytics Disciplines Evolve - Bridging the Analytics Talent Gap - Housing Customer Data - Continuing Consolidation of Data Sources Just as New Sources of Data Emerge -Dealing with Growing Concerns About Consumer Privacy - Making Social Data Become More Available to Brands - Continuing Measurement Challenges for Chief Marketing Officers (CMOs)- Scratching the Surface of Machine Learning and Artificial Intelligence	9	<b>Chalk &amp; Talk, ICT Kit</b>

**Course Designed by: Dr.G.Devika & Dr.S.Shaik Parveen**

**B.Sc., INFORMATION TECHNOLOGY**

**Certificate Course**

**Program Code: UIT**

**2021-2022 onwards**

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**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**  
**DEPARTMENT OF INFORMATION TECHNOLOGY**  
 (For those who joined in 2021-2022 and after)

<b>Course Name</b>	<b>THE ROBOTICS</b>					
<b>Course Code</b>	<b>21CITC21</b>	<b>L</b>	<b>P</b>	<b>C</b>		
<b>Category</b>	<b>Certificate Course</b>	45	-	2		
<b>Nature of course:</b>	EMPLOYABILITY	✓	SKILL ORIENTED	✓	ENTREPRENEURSHIP	✓
<b>Course Outcomes:</b>						
<ol style="list-style-type: none"> <li>4. To study the basic concepts of Robotic system, its components and instrumentation and control related to robotics</li> <li>5. It associated with the design, construction, operation, and application of robots, as well as computer systems for their control.</li> <li>6. Robotics is a multidisciplinary field which brings together a number of distinct branches of engineering—including mechanical, electronic, computer, and systems engineering—to support a vast number of industries</li> <li>7. To study about the drives and sensors used in Robots</li> <li>8. It is therefore need of the day for students to learn Robotics for working in industry.</li> </ol>						
<b>Unit: I</b>	<b>Introduction</b>				<b>9 Hrs</b>	
Brief history of Robots - The First Robots – Factory Automation – Machine Tools - Types of Robot–Technology						
<b>Unit: II</b>	<b>Classification and Specification &amp; Anatomy of Robot</b>				<b>9 Hrs</b>	
Robot Classifications and Specifications - Design and control issues. Introduction: Industrial Robots – Fictional Robots & Modern Fictional Robots. Anatomy of Robot: The Human Body – Robot’s Body – Arms and Hands – Moving Around						
<b>Unit: III</b>	<b>Sensors in Robot &amp; Industrial Robotics</b>				<b>9 Hrs</b>	
Touch sensors, tactile sensor, Proximity and range sensors, Robotic vision sensor - Force sensor, Light sensors. History of Industrial robots – typical applications and Robot Configurations: Welding – Car body Assembling – Painting						
<b>Unit: IV</b>	<b>Intelligent Robots &amp; Robots in Space</b>				<b>9 Hrs</b>	
Artificially Intelligent robots – planning – Intelligent Teaching and Learning – advanced Tele operation – Tele presence – Microrobots. Robots on the U.S. Space Station – Robots for Exploring the Mars Surface – Space Robots beyond the Mars mission.						
<b>Unit: V</b>	<b>Agriculture Robots &amp; Robotic Process Automation (RPA)</b>				<b>9 Hrs</b>	
Robots for crop harvesting – harvest crop – harvest automation – robots for weed removal – robot farming. Robotic Process Automation (RPA): RPA Introduction – Example of RPA – difference between Test Automation and RPA – Application of RPA						
					<b>Total Lecture Hours</b>	<b>45 Hrs</b>
<b>Books for Study:</b>						
<b>Books for References:</b>						
<ol style="list-style-type: none"> <li>1. Ellen Thro , “Robotics: The Marriage of Computers and Machines “</li> <li>2. R .K.Mittal and I.J.Nagrath, Robotics and Control, Tata McGraw Hill, New Delhi, 4th Reprin 2005.</li> </ol>						



3. Craig. J. J. "Introduction to Robotics- mechanics and control", Addison- Wesley, 1999.
4. Fu. K. S., Gonzalez. R. C. & Lee C.S.G., "Robotics control, sensing, vision and intelligence, McGraw Hill Book co, 1987

**Course Outcomes (CO):**

<b>CO1</b>	Identifying and understand the basics of Robot and specifications	K1
<b>CO2</b>	Gathering and Study the Robots Manipulators and Sensors	K2
<b>CO3</b>	Determining and get the knowledge of Industrial and Intelligent Robots	K3
<b>CO4</b>	Illustrating the Robots involves in Space and Agriculture	K4
<b>CO5</b>	Reviewing the acquire knowledge in Robotic Process Automation and its applications	K5

**LESSON PLAN**

<b>Unit</b>	<b>The Robotics</b>	<b>Hrs</b>	<b>Mode</b>
<b>I</b>	Brief history of Robots - The First Robots – Factory Automation – Machine Tools - Types of Robot– Technology	9	Lecture / PPT
<b>II</b>	Robot Classifications and Specifications - Design and control issues. Introduction: Industrial Robots – Fictional Robots & Modern Fictional Robots. Anatomy of Robot: The Human Body – Robot’s Body – Arms and Hands – Moving Around	9	Lecture / PPT
<b>III</b>	Touch sensors, tactile sensor, Proximity and range sensors, Robotic vision sensor - Force sensor, Light sensors. History of Industrial robots – typical applications and Robot Configurations: Welding – Car body Assembling – Painting	9	Lecture / PPT
<b>IV</b>	Artificially Intelligent robots – planning – Intelligent Teaching and Learning – advanced Tele operation – Tele presence – Microrobots. Robots on the U.S. Space Station – Robots for Exploring the Mars Surface – Space Robots beyond the Mars mission.	9	Lecture / PPT
<b>V</b>	Robots for crop harvesting – harvest crop – harvest automation – robots for weed removal – robot farming. Robotic Process Automation (RPA): RPA Introduction – Example of RPA – difference between Test Automation and RPA – Application of RPA	9	Lecture / PPT

Course Designed by  
**Mr. J.RAJKUMAR**

# BCA

## Certificate Course

### Program Code: UCA

2021-2022 onwards

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# MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

## DEPARTMENT OF BCA

(For those who joined in 2021-2022 and after)

<b>Course Name</b>	<b>WEB DESIGNING</b>				
<b>Course Code</b>	<b>21CCAC21</b>	<b>L</b>	<b>P</b>	<b>C</b>	
<b>Category</b>	<b>Certificate Course</b>	45	-	2	
<b>Nature of course:</b>	<b>EMPLOYABILITY</b> ✓	<b>SKILL ORIENTED</b>	<b>ENTREPRENEURSHIP</b>	✓	
<b>Course Outcomes:</b>					
<ul style="list-style-type: none"> <li>Develop a complete web application that includes Front-end, Back-end and Data- exchange technologies.</li> <li>Define the principle and basics of Web page design</li> <li>Visualize and introduce the basic concept of HTML5 and CSS3</li> <li>Develop the concept of web publishing through word press.</li> <li>Build strong foundations (ex: OOPS) in entry level engineers thereby making them job ready as per industry requirements.</li> </ul>					
<b>Unit: I</b>	<b>Web Technologies</b>				
<b>Web Technologies:Introduction-</b> Careers In Web Technologies and Job Roles - How the Website Works - Client and Server Scripting Languages- Differences between Web Designer and Web Developer - Types Of Websites- Web Standards - W3c Recommendations					
<b>Unit: II</b>	<b>Introduction to HTML</b>				
HTML Basics - HTML structure - HTML Elements – HTML Attributes - Headings - HTML Paragraph - HTML Styles - HTML Formatting - HTML Lists - HTML Tables - Frames - Hyperlinks - Images - Forms - Comments& Colours - Links - HTML Classes - HTML Layout - HTML Responsive - HTML iframes - HTML Entities and URL Code					
<b>Unit: III</b>	<b>CSS concept</b>				
<b>CSS:</b> Concept of CSS - Creating Style Sheet - CSS Properties - CSS Color - CSS Styling (Background, Text Format, Fonts, Height/Width) – Shadows - Links - Working with Lists and Tables - CSS Id and Class – CSS 2D Transforms – CSS 3D Transforms - Box Model(Introduction, Border properties, Padding Properties, Margin properties) – CSS Animations – Filters - CSS Advanced(Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector) – Buttons - Creating page Layout and Site Designs					
<b>Unit: IV</b>	<b>Word Press</b>				
Introduction-Installation and configuration-Dashboard-Post-Pages-Adding site content-Adding images and other media-Editing existing content-Saving and Publishing					
<b>Unit: V</b>	<b>Content Management System</b>				
Categories-Tags-Media library -Comments-Appearance-Plugins-Users-Tools-Keeping the site updated.					
					<b>Total Lecture Hours</b>
<b>Books for Study:</b>					
1.					
<b>Books for References:</b>					

1.

<b>COURSE OUTCOMES:</b> <b>At the end of the course the students will be able to</b>		<b>K Level</b>
<b>CO1</b>	Explain the history of the internet and related internet concepts that are vital in understanding web development.	K2
<b>CO2</b>	Demonstrate the important HTML tags for designing static pages	K3
<b>CO3</b>	Integrate CSS with HTML to develop web applications.	K3
<b>CO4</b>	Explain the basic concepts of word press	K3
<b>CO5</b>	To demonstrate real time web applications through Content Management System	K3

### LESSON PLAN

<b>UNIT</b>	<b>WEB DESIGNING</b>	<b>Hrs</b>	<b>Mode</b>
<b>I</b>	<b>Web Technologies: Introduction-</b> Careers In Web Technologies and Job Roles - How the Website Works - Client and Server Scripting Languages- Differences between Web Designer and Web Developer - Types of Websites- Web Standards - W3c Recommendations	<b>7 hrs</b>	<b>Chalk &amp; Talk, ICT Kit</b>
<b>II</b>	<b>Introduction HTML</b> - HTML Basics - HTML structure - HTML Elements – HTML Attributes - Headings - HTML Paragraph - HTML Styles - HTML Formatting - HTML Lists - HTML Tables - Frames - Hyperlinks - Images - Forms - Comments& Colours - Links - HTML Classes - HTML Layout - HTML Responsive - HTML iframes - HTML Entities and URL Code	<b>10 hrs</b>	<b>Chalk &amp; Talk, ICT Kit</b>
<b>III</b>	<b>CSS: Concept of CSS</b> - Creating Style Sheet - CSS Properties - CSS Color - CSS Styling (Background, Text Format, Fonts, Height/Width) – Shadows - Links - Working with Lists and Tables - CSS Id and Class – CSS 2D Transforms – CSS 3D Transforms - Box Model(Introduction, Border properties, Padding Properties, Margin properties) – CSS Animations – Filters - CSS Advanced(Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector) – Buttons - Creating page Layout and Site Designs	<b>10 hrs</b>	<b>Chalk &amp; Talk, ICT Kit</b>
<b>IV</b>	<b>Word Press: Introduction-</b> Installation and configuration-Dashboard-Post-Pages-Adding site content-Adding images and other media-Editing existing content-Saving and Publishing	<b>10 hrs</b>	<b>Chalk &amp; Talk, ICT Kit</b>
<b>V</b>	Categories-Tags-Media library -Comments-Appearance-Plugins-Users-Tools-Keeping the site updated.	<b>8 hrs</b>	<b>Chalk &amp; Talk, ICT Kit</b>

Course designed by Mrs.R.Vasuki Assistant Professor

# B.Sc., E&C

## Certificate Course

### Program Code: UEL

2021-2022 onwards

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**PASUMALAI, MADURAI – 625 004**



**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**  
**DEPARTMENT OF ELECTRONICS AND COMMUNICATION**  
 (For those who joined in 2021-2022 and after)

<b>Course Name</b>	<b>COMPUTER HARDWARE AND INTERFACING</b>					
<b>Course Code</b>	<b>21CELC21</b>	<b>L</b>	<b>P</b>	<b>C</b>		
<b>Category</b>	<b>Certificate Course</b>	45	-	2		
<b>Nature of course:</b>	EMPLOYABILITY	✓	SKILL ORIENTED	✓	ENTREPRENEURSHIP	✓
<b>Course Outcomes:</b>						
<ul style="list-style-type: none"> <li>• To introduce issues related to CPU</li> <li>• To introduce the computer peripheral controllers.</li> <li>• To understand the OS Installation</li> <li>• To introduce the features of different Operating systems.</li> <li>• To understand different storage media</li> </ul>						
<b>Unit: I</b>	<b>Introduction to CPU:</b>				<b>9</b>	
CPU essentials – processor modes – modern CPU concepts – Architectural performance features – the Intel’s CPU – Mother board components – chipset,-Super I/O- system timer and Real Time Clock requirements						
<b>Unit: II</b>	<b>Peripheral Controllers:</b>				<b>9</b>	
I/O slots – ISA, PCI and AGP bus slots – Ports – Serial and Parallel ports, USB, FireWire port, MIDI, SCSI, IrDA, Bluetooth – Connectors – System Bus, ISA, EISA, PCI, AGP and PCI bus – Disk controllers						
<b>Unit: III</b>	<b>Operating System Basics &amp; Installation</b>				<b>9</b>	
Operating system and software installation-Configuring cards and devices-Dual operating system installation-Error identification-Trouble shooting-Virus protection & scanning						
<b>Unit: IV</b>	<b>Types of Operating systems:</b>				<b>9</b>	
Windows XP, Windows Vista, Windows 7 and Windows 8 and Red Hat Linux and Multi Boot Operating System						
<b>Unit: V</b>	<b>Storage Devices :</b>				<b>9</b>	
magnetic storage – magnetic recording principles – data and disk organization – floppy drive – hard drive – CD-ROM drive –CDROM electronics – DVD-ROM – DVD media – DVD drive and decoder						
<b>Total Lecture Hours</b>					<b>45</b>	

**Books for Study:**

1. N.Mathivanan, "PC -Based Instrumentation Concepts and Practice", Prentice Hall of India, New Delhi, 2007.
2. B. Govindarajalu, "IBM PC and clones Hardware, Trouble Shooting and Maintanance", Second Edition, Tata McGraw Hill, New Delhi, 2005.
3. D.V. Hall, microprocessors and interfacing: programming and hardware. McGraw Hill, 1999

**Books for References:**

1. Stephen J.Bigelow, "Trouble Shooting, maintaining and Repairing PCs", Tata McGraw-Hill, New Delhi, 2001.
2. B.Govindarajulu, IBM PC and Clones: Hardware, and Maintenance, TMH. 1991
3. S.J Bigelow, troubleshooting, maintaining and repairing Pc"s, TMH, 1999

# CHEMISTRY

## Certificate Course

**Program Code: UCH**

**2021-2022 onwards**

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**PASUMALAI, MADURAI – 625 004**



**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)****DEPARTMENT OF CHEMISTRY****(For those who joined in 2021-2022 and after)**

<b>Course Name</b>	<b>FOOD CHEMISTRY</b>					
<b>Course Code</b>	<b>21CCHC21</b>	<b>L</b>	<b>P</b>	<b>C</b>		
<b>Category</b>	<b>Certificate Course</b>	45	-	2		
<b>Nature of course:</b>	EMPLOYABILITY	✓	SKILL ORIENTED	✓	ENTREPRENEURSHIP	✓
<b>Course Outcomes:</b>						
<b>Unit: I   Food Science</b>						
Food relation to health – Function of Food – Food groups – Nutritional deficiency – Cooking – Preliminary Preparations – Cooking methods – Microwave cooking						
<b>Unit: II   Food Poison</b>						
Food poisons – natural poisons (alkaloids – nephrotoxins) – pesticides. (DDT, BHC, Malathion) – Chemical poisons – First-aid for poison consumed victims.						
<b>Unit: III   Food Adulteration</b>						
Sources of food – types – advantages and disadvantages – Food adulteration – contamination of Wheat, Rice, Alial, Milk, Butter etc. with clay stones, water and toxic chemicals – Common adulterants – Ghee adulterants and their detection – Detection of adulterated Foods by simple analytical techniques.						
<b>Unit: IV   Food Additives</b>						
Food additives – artificial sweetners – Saccharin – Cyclomate and aspartate – Food flavours – esters, aldehydes and heterocyclic compound – Food colours – restricted use – spurious colours – Emulsifying agents – preservatives learning agents – Baking powder- yeast – taste makers.						
<b>Unit: V   Food Technology</b>						
Biotechnology Food – Algae as Food – Spirulina – Organic Foods – Food irradiation – Packaging of Foods- Classification of Package.						
					<b>Total Lecture Hours</b>	
<b>Books for Study:</b>						
2. B. Srilakshmi, Food Science, 3 <sup>rd</sup> Edition, New Age International (P) Ltd., 2002.						
<b>Books for References:</b>						
2. Jayashree Gosh, Fundamental concepts of Applied Chemistry, S.Chand & Co., Publishers, 1998.						
3. Thanamma Jacob, Textbook of Applied Chemistry for Home Science and Allied Sciences, Macmillan, 2000.						

**B.Sc., FOOD AND DAIRY TECHNOLOGY**

**Certificate Course**

**Program Code: UFD**

**2021-2022 onwards**

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**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**  
**DEPARTMENT OF FOOD AND DAIRY TECHNOLOGY**  
(For those who joined in 2021-2022 and after)

<b>Course Name</b>	<b>LOW COST AND MILLET BASED FOOD PRODUCTS - PRACTICAL</b>					
<b>Course Code</b>	<b>21CFDCP1</b>	<b>L</b>	<b>P</b>	<b>C</b>		
<b>Category</b>	<b>Certificate Course</b>	45	-	2		
<b>Nature of course:</b>	EMPLOYABILITY	✓	SKILL ORIENTED	✓	ENTREPRENEURSHIP	✓
<b>Course Outcomes:</b> <b>On successful completion of the course the student will be able to,</b>						
CO1: Gain the importance of low-cost food						
CO2: Apply the ideas to make different food products.						
CO3: Analyze various cooking methods.						
CO4: Know the importance of food product development.						
CO5: Create various new food products.						
<b>Method of preparation of,</b>						
1. Malted weaning products.						
2. Millet based idly preparation.						
3. Millet bar preparation.						
4. Soup mix from little millet.						
5. Extruded products.						
6. Stiff porridge.						
7. Thin porridge.						
8. Sweet and salted ready to eat baked products.						
9. Seed based product						
10. Dried products						
<b>Web Resources</b>						
<a href="https://www.millets.res.in/m_recipes/Millets_Recipes-A_Healthy_choice.pdf">https://www.millets.res.in/m_recipes/Millets_Recipes-A_Healthy_choice.pdf</a>						
<b>Books for References:</b>						
1. Sri Lakshmi, B, <b>Food Science</b> , New Age International Private Limited Publishers, New Delhi; Chennai (1997).						
2. Swaminathan, M., <b>Food Science and Experimental Foods</b> , Ganesh, and Company, Madras (1988).						

# LIBRARY AND INFORMATION SCIENCE

## Certificate Course

### Library Organization and Management

2021-2022 onwards



**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**

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## **VISION**

To would learners into accomplished individuals by providing them with a stimulus for social change through character, confidence and competence.

## **MISSION**

1. Enlightening the learners on the ethical environmental issues.
2. Extending holistic training to shape the learners in to committed and competent citizens.
3. Equipping them with soft skills for facing the competitive world.
4. Enriching their employability through career oriented courses.
5. Ensuring accessibility and opportunity to male education affordable to the underprivileged.

**Certificate Course in Library and Information Sciences  
(C.L.I.Sc.)**

**(English Medium)**

**1. Programme Objectives:**

1. To gain knowledge is fundamental principals of library & information sicenece
2. To carrier opportunity
3. To create awareness among students to make use of library effectively.

**2. Target Group of Learners**

1. To make an opportunity for carriers development
2. Students of their institution and those who are willing to join.

**Duration of the Programme**

**Duration:**

As per University norms (one year)



**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**  
**DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE**  
(For those who joined in 2021-2022 and after)

<b>Course Name</b>	<b>LIBRARY ORGANISATION AND MANAGEMENT (Theory)</b>					
<b>Course Code</b>	<b>21ULICR1</b>	<b>L</b>	<b>P</b>	<b>C</b>		
<b>Category</b>	<b>Certificate Course</b>	45	-	1		
<b>Nature of course:</b>	EMPLOYABILITY	✓	SKILL ORIENTED	✓	ENTREPRENURSHIP	✓
<b>Course Objectives:</b>						
<b>Unit: I</b>					<b>10</b>	
Need & Purpose of Library in Society - various type of libraries						
<b>Unit: II</b>					<b>10</b>	
Library Management – Various sections – Routines & functions						
<b>Unit: III</b>					<b>05</b>	
Implications of five laws of library science						
<b>Unit: IV</b>					<b>10</b>	
Need & purpose of five laws of library science						
<b>Unit: V</b>					<b>10</b>	
ICT in Libraries						
<b>Total Lecture Hours</b>					<b>45 Hrs</b>	
<b>Books for Study:</b>						
<b>Books for References:</b>						
1. M.S. Qureshi, Laws of Library Science, Rajat Publications, New Delhi, India 2018.						
2. Pankaj Kumar Singh, Library Information Services and Systems, 1 <sup>st</sup> ed., Tilak Wasan Discovery Publishing House Pvt. Lts., New Delhi 2014						
3. K.S. Umopathy, Information Sources: An International Selective Guide, Vikas Publishing House Pvt. Lts., New Delhi.						
4. K.G. Rastogi, Reference Services in Library Science – Alfa Publications, New Delhi 2006.						
5. Raghunath Pandey, Libaray Management: New Concepts and Practices, Hnanadas Prakashan (P&D), New Delhi 2017.						
6. Rajaraman, V., Fundamentals of Computers, 4 <sup>th</sup> ed., PHI learning Pvt, Ltd., New Delhi 2008.						
7. Prakash Nayaran Raj, Library Automation in Modern age, Random Publications, New Delhi 2018						



**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**  
**DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE**  
(For those who joined in 2021-2022 and after)

<b>Course Name</b>	<b>Information Processing – Classification and Cataloguing (Practical)</b>			
<b>Course Code</b>	<b>21ULICPR</b>	<b>L</b>	<b>P</b>	<b>C</b>
<b>Category</b>	<b>Certificate Course</b>	-	45	1

1. CC Practice – Classification of Document Using Colon Classification (6<sup>th</sup> Edition).
2. CCC – Practice – Cataloguing of Titles of Documents according to Classified Catalogue Code (5<sup>th</sup> Edition).

**References**

1. Rangantahan S.R, Colon Classification Ed 6, Ess Ess Publication
2. Rangantahan S.R, Classified Catalogue Code With Additional Rules To Dictionary Catalogue, Ed. 5: Ess Ess Publication, 2006



# B.A., ENGLISH

Certificate Course

Program Code: UEN

2021-2022 onwards

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**PASUMALAI, MADURAI – 625 004**



**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**  
**DEPARTMENT OF ENGLISH**  
 (For those who joined in 2021-2022 and after)

<b>Course Name</b>	<b>PROFESSIONAL SKILLS</b>			
<b>Course Code</b>	<b>21CENC21</b>	<b>L</b>	<b>P</b>	<b>C</b>
<b>Category</b>	<b>Certificate Course</b>	<b>45</b>		<b>2</b>
<b>Nature of course:</b>	<b>EMPLOYABILITY</b> ✓	<b>SKILL ORIENTED</b> ✓	<b>ENTREPRENURSHIP</b>	
<b>Course Objectives:</b>				
<ol style="list-style-type: none"> <li>1. To actuate the language skills of students by offering adequate practice in professional contexts.</li> <li>2. To generate cognitive, logical, verbal and analytical skills of the students</li> <li>3. To develop strategic competence of students that will help them in efficient communication</li> <li>4. To sharpen students' critical thinking skills and to make them culturally aware of the target situation</li> <li>5. To help the students understand the significance of non-verbal communication in professional contexts</li> </ol>				
<b>Unit: I</b>	<b>Professional Communication</b>			<b>09hrs</b>
<ol style="list-style-type: none"> <li>1. Communication and its barriers</li> <li>2. Personal SWOT Analysis</li> <li>3. Phone Conversations</li> <li>4. Negotiations, Complaints and Conflicts</li> <li>5. Scheduling Events/ Meetings</li> </ol>				
<b>Unit: II</b>	<b>Business Correspondence at Workplace</b>			<b>09hrs</b>
<ol style="list-style-type: none"> <li>1. Time Management</li> <li>2. Practice on Message Writing/ Passing, Filling of Message Forms</li> <li>3. Sending Memorandum, Emails &amp; Letters.</li> <li>4. Notices, Agenda, Minutes</li> <li>5. Transcoding a given chart, Table or Statistics into a report.</li> </ol>				
<b>Unit: III</b>	<b>Presentation Skills</b>			<b>09hrs</b>
<ol style="list-style-type: none"> <li>1. Presentation techniques &amp; connecting with the Audience</li> <li>2. Delivering Short speeches/ Snap talks</li> <li>3. Using visual aids: content of visual aid &amp; general principles</li> <li>4. Listing information - Linking ideas – Sequencing – Summarizing &amp; concluding</li> </ol>				
<b>Unit: IV</b>	<b>Media Skills</b>			<b>09hrs</b>
<ol style="list-style-type: none"> <li>1. Making official announcements for various occasions</li> <li>2. Preparing brochures and pamphlets, designing advertisements</li> <li>3. Writing blogs and preparing web-content</li> <li>4. Compering for Social Events</li> </ol>				
<b>Unit: V</b>	<b>Non-verbal Skills</b>			<b>09hrs</b>

1. Components of non-verbal communication
2. Methods and execution of non-verbal communication
3. Reading positive non-verbal signs from great personalities
4. Importance of effective non-verbal communication

	<b>Total Lecture Hours</b>	<b>45 Hrs</b>
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**Books for Study:**

Sweeney, Simon. English for Business Communication Teacher's Book. Germany, Cambridge University Press, 2003.

Anderson, Chris. TED Talks: The Official TED Guide to Public Speaking: Tips and Tricks for Giving Unforgettable Speeches and Presentations. United Kingdom, John Murray Press, 2016.

**Books for References:**

Roche, Marc. Business English Communication: Advanced Skills ©. Master English for Business and Professional Purposes. How to Communicate at Work: +700 Online Business English Resources. Business English Originals ©. N.p., Amazon Digital Services LLC - KDP Print US, 2020.

**Web Resources:**

<https://www.coursera.org/specializations/professional-skills-for-the-workplace>

<https://www.edx.org/course/public-speaking->

[2?index=product&queryID=5f205ce889c0442942c49cad065b8862&position=10](https://www.edx.org/course/public-speaking-2?index=product&queryID=5f205ce889c0442942c49cad065b8862&position=10)

[https://www.edx.org/course/effective-business-](https://www.edx.org/course/effective-business-communication?index=product&queryID=5f205ce889c0442942c49cad065b8862&position=8)

[communication?index=product&queryID=5f205ce889c0442942c49cad065b8862&position=8](https://www.edx.org/course/effective-business-communication?index=product&queryID=5f205ce889c0442942c49cad065b8862&position=8)

**Course Outcomes**

**K Level**

After the completion of this course, the students will be able to

<b>CO1:</b>	Expressing language for speaking with confidence in an intelligible and acceptable manner	<b>K2</b>
<b>CO2:</b>	Understand the importance of business correspondences at workplace	<b>K2</b>
<b>CO3:</b>	Apply the techniques and strategies of presentation skills in public speaking	<b>K3</b>
<b>CO4:</b>	Organizing their own ability to improve their own competence in using the language	<b>K4</b>
<b>CO5:</b>	Assessing non-verbal communication in a professional context	<b>K5</b>

Course Designed by:

- (i) **Mrs.L.Mirunalini**, Assistant Professor, & (ii) **Mr.S.Balaji**, Assistant Professor

# BBA

## Certificate Course

### Program Code: UBA

2021-2022 onwards

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**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**  
**DEPARTMENT OF BUSINESS ADMINISTRATION**  
 (For those who joined in 2021-2022 and after)

<b>Course Name</b>	<b>EVENT MANAGEMENT</b>				
<b>Course Code</b>	<b>21CBAC21</b>	<b>L</b>	<b>P</b>	<b>C</b>	
<b>Category</b>	<b>Certificate Course</b>	<b>45</b>	<b>-</b>	<b>2</b>	
<b>Nature of course:</b>	<b>EMPLOYABILITY</b> ✓	<b>SKILL ORIENTED</b> ✓	<b>ENTREPRENURSHIP</b>		
<b>Course Objectives:</b>					
<p>1. An understanding of the roles &amp; responsibilities of Event Management and aware of event management as a profession.</p> <p>2. Gain basic knowledge about event planning and acquire competencies to: Plan a proposal on management of an event.</p> <p>3. Understand and develop Marketing skills for promoting and branding an event successfully.</p> <p>4. To study the safety and security measures involved in organizing an event.</p> <p>5. To prepare the event budget and crisis plan to control the event.</p>					
<b>Unit: I</b>	<b>Concept of Event Management</b>				<b>09hrs</b>
Historical perspective -Introduction to Event Management - Basic understanding of event management sector-types of events, event management industry in India.					
<b>Unit: II</b>	<b>Planning event and event laws</b>				<b>09hrs</b>
Aim of event- Develop a mission – Establish Objectives-Preparing event proposal- planning process-Relevant legislations-legal permissions/licenses.					
<b>Unit: III</b>	<b>Marketing and Branding</b>				<b>09hrs</b>
Nature of event marketing-process-event mix-sponsorship-Introduction to various creative – newspaper-ads/posters/hoardings, Event Branding, celebrity management.					
<b>Unit: IV</b>	<b>Safety and Security –</b>				<b>09hrs</b>
Security- Occupational Safety-Event Risk Management, crowd management, safety Planning-rules and regulation.					
<b>Unit: V</b>	<b>Budget and Crisis Management-</b>				<b>09hrs</b>
Budget-estimated income-Breakeven point-cash flow analysis-Concept of crisis-types of crisis-causes-crisis Management-crisis management plan-contingency plans					

	<b>Total Lecture Hours</b>	<b>45 Hrs</b>
<b>Books for Study:</b>		
<b>Books for References:</b>		
<b>Web Resources:</b>		
<b>Course Outcomes</b>		<b>K Level</b>
After the completion of this course, the students will be able to		
<b>CO1:</b>	Students will become familiar with the key concepts of managing an event understand various aspects of events and types of events	<b>K2</b>
<b>CO2:</b>	Operate the event planning process to obtain a sense of responsibility for the multi-disciplinary nature of event management	<b>K3</b>
<b>CO3:</b>	Examine the marketing skills and challenges faced in managing an event to gain confidence and enjoyment from involvement in the dynamic industry of event management	<b>K4</b>
<b>CO4:</b>	Analyze the key elements of a events and the processes involved in safety and security - venue selection, registration, catering, accommodation, transport, theming, and entertainment	<b>K4</b>
<b>CO5:</b>	Sketch the management essentials such as developing budgets, critical paths, work breakdown structures, risk mitigation and contingency plans	<b>K3</b>

**In practical paper, students will be tested for planning, concept, designing and lay out of an even, specimen format will be given below and practical paper will carry 100 marks.**

**Table of contents**

1. **Define goals and objectives**
2. **Establish a budget**
3. **Build your team**
4. **Pick your venue and date**
5. **Develop event branding**
6. **Plan your program**
7. **Confirm sponsors, exhibitors, and speakers**
8. **Identify and select tech tools**
9. **Create a marketing and promotional plan**
10. **Determine your measurement**

# BBA (SF)

## Certificate Course

Program Code: UBA

2021-2022 onwards

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**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**  
**DEPARTMENT OF BUSINESS ADMINISTRATION (SF)**  
(For those who joined in 2022 and after)

<b>Course Name</b>	<b>DIGITAL BUSINESS MANAGEMENT</b>			
<b>Course Code</b>	<b>21CBACC22</b>	<b>L</b>	<b>P</b>	<b>C</b>
<b>Category</b>	<b>Certificate Course</b>	<b>45</b>	<b>-</b>	<b>2</b>
<b>Nature of course:</b>	<b>EMPLOYABILITY</b>	<b>SKILL ORIENTED</b>	<b>ENTREPRENEURSHIP</b>	
<b>COURSE OBJECTIVES:</b>				
1. To provide a good conceptual understanding of digital business. 2. To know the components of Digital Business. 3. To gain the knowledge in E-Commerce. 4. To understand the functions of Electronic market. 5. To develop the skills required to manage the Digital Business.				
<b>Unit: I</b>	<b>Introduction to Digital Business</b>			<b>9hrs</b>
Meaning – Evolution of Digital Business, Differences between E-Business and E-Commerce, Challenges and Opportunities in Digital Business. Recent scenario of Digital Business in India.				
<b>Unit: II</b>	<b>Digital business Infrastructure</b>			<b>9 hrs</b>
Meaning – components of Digital Business. Digital business strategy- meaning, characteristics, key components of digital Strategy.				
<b>Unit: III</b>	<b>E-Commerce</b>			<b>9 hrs</b>
Meaning – Types - B2B, B2C and C2C, Benefits and Limitations of E-commerce - Business applications of E commerce.				
<b>Unit: IV</b>	<b>Electronic market</b>			<b>9hrs</b>
Meaning – definition - Functions of Digital market - Factors of Digital market. Digital market vs Traditional market. Electronic payment system – Modes – Bank Transfer, E-Wallets, Mobile Payments, Debit Card and Credit Card.				
<b>Unit: V</b>	<b>Managing Digital Business</b>			<b>9hrs</b>
Managing Knowledge in Digital Business, Management skills required for Digital business. Security system in Digital Business – Encryption, Digital Signature and Security certificates. Security Threats to Digital Business.				
<b>Total Lecture Hours</b>				<b>45 hrs</b>
<b>Text Book: A textbook on E-commerce - Publisher: Neha Publishers &amp; Distributors</b>				
<b>Reference:</b>				
1. E-commerce from vision to fulfillment-Elias M. Awad PHI-Restricted (2002) 2. Digital Business and E-Commerce Management,–Dave Chaffey, August 2014 3. Introduction to E-business-Management and Strategy-Colin Combe, ELSVIER, 2006 4. Digital Business Concepts and Strategy –Eloise Coupey, 2nd Edition –Pearson				
<b>Web Resources</b>				
<a href="https://onlinecourses.nptel.ac.in/noc19_mg54/preview">https://onlinecourses.nptel.ac.in/noc19_mg54/preview</a> <a href="https://www.mooc-list.com/course/digital-business-act-digital-world-coursera">https://www.mooc-list.com/course/digital-business-act-digital-world-coursera</a> <a href="https://www.mooc-list.com/course/digital-business-grow-digital-world-coursera">https://www.mooc-list.com/course/digital-business-grow-digital-world-coursera</a>				



## LESSON PLAN

<b>UNIT</b>	<b>SUBJECT NAME</b>	<b>Hrs</b>	<b>Mode</b>
<b>I</b>	<b>Introduction to Digital Business</b> Meaning – Evolution of Digital Business, Differences between E-Business and E-Commerce, Challenges and Opportunities in Digital Business. Recent scenario of Digital Business in India.	<b>9 hrs</b>	<b>Lecture Method</b>
<b>II</b>	<b>Digital business Infrastructure</b> Meaning – components of Digital Business. Digital business strategy- meaning, characteristics, key components of digital Strategy.	<b>9 hrs</b>	<b>Lecture Method</b>
<b>III</b>	<b>E-Commerce</b> Meaning – Types - B2B, B2C and C2C, Benefits and Limitations of E-commerce - Business applications of E commerce.	<b>9 hrs</b>	<b>Lecture Method</b>
<b>IV</b>	<b>Electronic market</b> Meaning – definition - Functions of Digital market - Factors of Digital market. Digital market vs Traditional market. Electronic payment system – Modes – Bank Transfer, E-Wallets, Mobile Payments, Debit Card and Credit Card.	<b>9 hrs</b>	<b>Lecture Method, video session</b>
<b>V</b>	<b>Managing Digital Business</b> Managing Knowledge in Digital Business, Management skills required for Digital business. Security system in Digital Business – Encryption, Digital Signature and Security certificates. Security Threats to Digital Business.	<b>9 hrs</b>	<b>Lecture Method &amp; group activity</b>

# BSW

## Certificate Course

### Program Code: USW

2021-2022 onwards

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**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**  
**DEPARTMENT OF SOCIAL WORK**  
(For those who joined in 2020-2021 and after)

<b>Course Name</b>	<b>PERSONALITY ENHANCING SKILLS</b>			
<b>Course Code</b>	<b>21CSWC21</b>	<b>L</b>	<b>P</b>	<b>C</b>
<b>Category</b>	<b>Certificate Course</b>	<b>45</b>		<b>2</b>
<b>Nature of course:</b>	<b>EMPLOYABILITY</b>	<b>SKILL ORIENTED</b>	<b>ENTREPRENURSHIP</b>	
<b>COURSE OBJECTIVES:</b>				
CO1: To know the basic concepts of Personality. CO2: To understand the concepts and types of Leadership. CO3: To improve the Decision making & Problem solving Skill. CO4: To develop effective Time Management & Stress Management CO5: To apply all the required skills in an individual's life.				
<b>Unit: I</b>	<b>Personality Development</b>			<b>9</b>
Personality: Concept, Meaning, Types of Personality. Personality Development – Concept, Meaning, Salient Features of Personality Development, Factors Determining Personality Development. Importance of Personality Development. Benefits of personality development.				
<b>Unit: II</b>	<b>Leadership Skill</b>			<b>8</b>
Leadership: Concept, Types and Styles of Leadership quality (Autocratic, Democratic, Laissez Fair, Transformational and Transactional) Skills required for Good leader (Communication, Importance of Leadership, ways to build Leadership quality.				
<b>Unit: III</b>	<b>Decision making &amp; Problem solving Skill</b>			<b>8</b>
Decision making- Concept, Meaning, steps (or )Process and importance of Decision Making. Ways to improve Decision making skill. Problem solving Skill- Definition of Problem, Concept, Meaning, Strategies to overcome the Problem – Concept of Problem solving skill and Importance of Problem solving skill				
<b>Unit: IV</b>	<b>Time Management &amp; Stress Management</b>			<b>10</b>
Time Management - Concept, Meaning, steps (or )Process and importance of Time Management. Ways to improve Time Management skill. Stress Management - Definition of Stress, Types, Strategies to overcome stress. Emotions -Concept and types, Strategies to overcome Emotions.				
<b>Unit: V</b>	<b>Communication</b>			<b>10</b>
<b>Communication</b> – Concept, Types of Communication: Verbal - Interpersonal , Intra Personal communication; Non Verbal - Body Language: Gestures, Posture , Eye Contact , Facial Expressions, Positions of Sitting, Walking, Standing, Handshakes , Optimal Distance – Concept and Importance of Etiquettes and Mannerism.				
			<b>Total Lecture Hours</b>	<b>45</b>
<b>Books for Study:</b> 1. The personality developments book-by Sourav Das. 2. Communication Skills for Professionals and Students-Dr. Amitabh Dwivedi				
<b>Books for Reference:</b> 1. Hurlock E.B. (2006), Personality Development, New Delhi, Tata McGraw Hill Publications, Ltd.				
<b>Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc.)</b> <a href="https://www.mooc-list.com/course/theories-personality-saylororg">https://www.mooc-list.com/course/theories-personality-saylororg</a>				

# B.COM., CA

## Certificate Course

### Program Code: UCC

2021-2022 onwards

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**MANNAR THIRUMALAI NAICKER COLLEGE(AUTONOMOUS)**

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**PASUMALAI, MADURAI – 625 004**



**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**  
**DEPARTMENT OF COMMERCE WITH CA**  
(For those who joined in 2021-2022 and after)

<b>Course Name</b>	<b>Goods and Services Tax (GST)</b>			
<b>Course Code</b>	21CCCC21	<b>L</b>	<b>P</b>	<b>C</b>
<b>Category</b>	Certificate Course	45	-	2
<b>Nature of course:</b>	<b>EMPLOYABILITY</b> ✓	<b>SKILL ORIENTED</b> ✓	ENTREPRENURSHIP	
<b>Course Objectives:</b> 1. To actuate the language skills of students by offering adequate practice in professional contexts. 2. To generate cognitive, logical, verbal and analytical skills of the students 3. To develop strategic competence of students that will help them in efficient communication 4. To sharpen students' critical thinking skills and to make them culturally aware of the target situation 5. To help the students understand the significance of non-verbal communication in professional contexts				
<b>Unit: I</b>	<b>Introduction to GST</b>			<b>09hrs</b>
Definition-Meaning –Structure of GST- Highlights of GST- Administration –Classes of Officers – Powers of officers- Levy of an Exception from Tax- Tax Rate Structure.				
<b>Unit: II</b>	<b>Levy and Collection</b>			<b>09hrs</b>
Levy and Collection of Central & State Goods and Service Tax- Composition Levy-Taxable Person – Power to grant exemption from tax – Time, Value and Place of Supply.				
<b>Unit: III</b>	<b>Input Tax Credit and Registration Procedures</b>			<b>09hrs</b>
Eligibility and Conditions for taking Input Tax Credit - Recovery of input tax Credit and interest thereon – Registration –Registration forms and process.				
<b>Unit: IV</b>	<b>Tax Invoice, Credit and Debit Notes</b>			<b>09hrs</b>
Tax Invoice –Returns- Furnishing details of outward supplies –Furnishing details of inward supplies - Returns First Return – Annual Return –Final Return – Notice to return defaulters- Levy of late fee – Tax Return Preparers.				
<b>Unit: V</b>	<b>Payment of Tax</b>			<b>09hrs</b>
Interest, Penalty and other amounts- Interest on delayed payment of Tax – Tax Deduction at Source – Transfer of input tax credit – Refund of Tax - Accounts and records.				
				<b>Total Lecture Hours</b>
				<b>45 Hrs</b>
<b>Books for Study:</b>				
Gupta S.S and Datey. V.S “Guide to New Model GST LAW”, Taxman Publication Pvt, New Delhi.				
<b>Books for References:</b>				
1. Goods and Service Tax (GST) , Dr.H.C.Mehrotra, Prof. V.P.Agarwal: SahityaBhawan publications: Agra, Taxmann: GST and Customs Law , Dr. Vinod K. Singhania, Taxmann Publications Pvt.Ltd.				
<b>Web Resources:</b>				
1. <a href="https://quickbooks.intuit.com/in/resources/gst-center/gst-basics/">https://quickbooks.intuit.com/in/resources/gst-center/gst-basics/</a>				

2. <https://www.indiafilings.com/learn/gst-registration-procedure/>
3. <https://cleartax.in/s/assessment-gst>
4. <https://www.taxmann.com/post/blog/practice-questions-based-on-valuation-under-the-customs-act-1962/?amp>
5. <https://tax2win.in/guide/gst-council>

Course Outcomes		K Level
After the completion of this course, the students will be able to		
CO1:	To provide students with a basic knowledge of Principles and Provisions of GST.	
CO2:	Impart knowledge of Levy, Input Tax Credit, Registration and Tax Invoice.	
CO3:	Familiarize students to Returns, Payment of Tax and Accounts and Records.	
CO4:	Develops Employability Skill.	
CO5:		

Course Designed by:

- (i) Mrs.L.Mirunalini, Assistant Professor, Department of English (SFW)
- (ii) Mr.S.Balaji, Assistant Professor, Department of English (SFW)

### LESSON PLAN

UNIT	Goods and Services Tax (GST)	Hrs.	Mode
I	<b>Introduction to GST</b>	9	L / Chalk & Talk
II	<b>Levy and Collection</b>	9	L/Chalk & Talk
III	<b>Input Tax Credit and Registration Procedures</b>	10	L / PPT
IV	<b>Tax Invoice, Credit and Debit Notes</b>	8	L / PPT
V	<b>Payment of Tax</b>	9	Chalk/PPT

Course Designed by:

**Mr.A.Sarweswaram, Assistant Professor, Dr.N.Illambirai, Assistant Professor  
&Mr.C.KarthickKumar, Assistant Professor**

# B.COM., (SF)

## Certificate Course

### Program Code: UCO

2021-2022 onwards

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**MANNAR THIRUMALAI NAICKER COLLEGE(AUTONOMOUS)**

**Re-accredited with "A" Grade by NAAC**

**PASUMALAI, MADURAI – 625 004**



**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**  
**DEPARTMENT OF COMMERCE (SF)**  
(For those who joined in 2021-2022 and after)

<b>Course Name</b>	<b>TOURISM MARKETING</b>			
<b>Course Code</b>	<b>21CCOC21</b>	<b>L</b>	<b>P</b>	<b>C</b>
<b>Category</b>	<b>CERTIFICATE COURSE</b>	<b>45</b>	<b>-</b>	<b>2</b>
<b>Nature of Course:</b>	<b>EMPLOYABILITY</b>	<b>SKILL ORIENTED</b>	<b>ENTREPRENEURSHIP</b>	
<b>COURSE OBJECTIVES:</b>				
To introduce the basic knowledge of tourism. To impart the knowledge about the concepts and characteristics of tourism marketing. To make understand the various functions of tourism marketing. To apply the principles of tourism as to planning, organizing and motivation to travel. To provide practical knowledge on tourism marketing.				
<b>Unit: I</b>	<b>Introduction of Tourism:</b>			<b>9 Hrs</b>
Introduction-Tourist-Typology of Tourism-Tourist Organization in India –India Tourism Development Corporation (ITDC)-Market potentials of tourism Industry				
<b>Unit: II</b>	<b>Tourism Marketing:</b>			<b>9Hrs</b>
Introduction –Tourism Marketing – Objectives of Marketing Tourism-Importance of Tourism				
<b>Unit: III</b>	<b>Tourism Product planning and Development:</b>			<b>9Hrs</b>
Introduction-Product: the Concept –Salient features of Tourism Product- Tourism Product Planning and Development				
<b>Unit: IV</b>	<b>Marketing Four ‘A’ of Tourism:</b>			<b>9Hrs</b>
Introduction-Marketing Tourist Attraction - Marketing Tourist Accommodation - Marketing Accessibility- Marketing Tourist Amenities				
<b>Unit: V</b>	<b>Tourism Sector in India:</b>			<b>9 Hrs</b>
Introduction-Domestic Tourism in India (Public & Private) –International Tourism Practices in India.				
<b>Total Lecture Hours</b>				<b>45</b>
<b>Book for Study:</b>				
1.Tourism Marketing-S.M.Jha 2. An Introduction to the business of Tourism -Venu vasudevan ,B.Vijaya Kumar,B.R.Saroop Roy 3.Basics of Tourism Management – Suddhendu Narayan Misra, Sapan Kumar Sadual				
<b>Book for Reference:</b>				
1. Bhatia.A.K, Tourism Development Principles and Practices, Sterling Publishers, New Delhi, 1982. 2. Chris Cooper (et.al), Tourism - Principles and Practice, Pitman Publishing, London, 1993. 3.An Introduction to the business of Tourism -Venu vasudevan ,B.Vijaya Kumar,B.R.Saroop Roy 4..Basics of Tourism Management – Suddhendu Narayan Misra, Sapan Kumar Sadual				
<b>Web Resource:</b>				



<https://youtube/K1P85nJNWCs>

**Course Outcome:**

<b>CO1:</b>	To identify the students to gain basic knowledge of tourism	Up tok1
<b>CO2:</b>	To analyse the tourism marketing regard with objectives and importance.	Up tok3
<b>CO3:</b>	To analyze the tourism product planning and development.	Up to k4
<b>CO4:</b>	To apply the 4 A's in tourism Marketing	Up to k3
<b>CO5:</b>	To understand the Tourism Sectors in India both Public and Private	Up to k2

**LESSON PLAN**

<b>UNIT</b>	<b>SUBJECT NAME</b>	<b>Hrs</b>	<b>Pedagogy</b>
<b>I</b>	<b>Introduction of Tourism:</b> Introduction-Tourist-Typology of Tourism-Tourist organization in India –India Tourism Development Corporation (ITDC)-Market Potentials of Tourism Industry	<b>9Hrs</b>	<b>Black Board &amp; PPT</b>
<b>II</b>	<b>Tourism Marketing:</b> Introduction –Tourism Marketing – Objectives of Tourism Marketing -Importance of Tourism	<b>9Hrs</b>	<b>Black Board &amp; PPT</b>
<b>III</b>	<b>Tourism Product planning and Development:</b> Introduction-Product: the Concept –Salient features of Tourism Product- Tourism product planning and Development	<b>9Hrs</b>	<b>Black Board &amp; PPT</b>
<b>IV</b>	<b>Four 'A' in Tourism Marketing:</b> Introduction-Marketing Tourist Attraction - Marketing Tourist Accommodation - Marketing Accessibility- Marketing Tourist Amenities	<b>9Hrs</b>	<b>Black Board &amp; PPT</b>
<b>V</b>	<b>Tourism Sector in India:</b> Introduction-Domestic Tourism in India (Public & Private) – International Tourism in India.	<b>9Hrs</b>	<b>Black Board &amp; PPT</b>
	<b>Total Hours</b>	<b>45 Hours</b>	

**Course designed by:**

**Mrs. P. ISWARYALAKSHMI**, Assistant Professor of Commerce (SFW),

# B.A., TAMIL

## Certificate Course

### Program Code: UTA

2021-2022 onwards

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**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**

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**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)****DEPARTMENT OF TAMIL****(For those who joined in 2021-2022 and after)**

Course Name	பண்ணிசை			
Course Code	21CTAC21	L	P	C
Category	Certificate Course	45	-	2
Nature of course:	EMPLOYABILITY	<b>SKILLORIENTED</b>	✓	ENTREPRENURSHIP
<b>Course Objectives</b>				
1. பண்ணிசை பற்றித் தெரிந்து கொள்ள முடிகின்றது. 2. தேவாரப் பண்களுக்கு இணையான இராகங்களை அறியமுடிகிறது. 3. தாளங்களைக் கற்றுக்கொள்ள முடிகின்றது. 4. மாணவர்கள் பண்முறையில் பாடல்களைப் பாட வழிவகுக்கிறது. 5. இறைநெறியில் மாணவர்களை நெறிப்படுத்துகிறது.				
<b>UNIT I</b>	(பண்ணிசை அறிமுகம்)			9
பன்னிரு திருமுறை அறிமுகம் - பன்னிரு திருமுறைகளை ஓதும் விதம் - பன்னிரு திருமுறைகளை ஓதுவதன் மூலம் கிடைக்கும் பலன்கள் - திருமுறைகளைப் பாடத்துவங்கும் முறை - திருமுறைகளைப் பாடிய பின் நிறைவு செய்யும் முறை.				
<b>UNIT II</b>	(பண்முறை)			9
பண்முறை - தேவாரப் பண்கள் - பகற்பண் - இரவுப்பண் - பொதுப்பண் - பண்களுக்கு இணையான செவ்வியல் இராகங்கள்.				
<b>UNIT III</b>	(தாளங்கள்)			9
தாளங்கள் - ஆதி - ரூபகம் - சாப்பு - தாள சாதிகள் - திருப்புக்ழ - அபிராமி அந்தாதி - சந்த நயங்கள் - தாளத்தொடு பதிகம் பாடுதல்.				
<b>UNIT IV</b>	(திருஞானசம்பந்தர் (திருக்கடைக்காப்பு -			9
1) முதல் திருமுறை - குறிஞ்சி - வாசி தீரவே - திருவீழிமிழலை 2) இரண்டாம் திருமுறை - காந்தாரம் - மந்திரமாவது - திருஆலவாய் 3) இரண்டாம் திருமுறை - பியந்தைக்காந்தாரம் - வேயுறுதோளிபங்கள் - திருமுறைக்காடு 4) மூன்றாம் திருமுறை - கொல்லி - மானின்னேர் விழி - திருஆலவாய் 5) மூன்றாம் திருமுறை - புறநீர்மை - மங்கையர்க்கரசி - திருஆலவாய்				
<b>UNIT V</b>	(திருநாவுக்கரசர் (தேவாரம் -			9
1) நான்காம் திருமுறை சாதாரி -- தலையே நீ வணங்காய் - பொது				

- 2) நான்காம் திருமுறை – காந்தார பஞ்சமம் சொற்றுணை வேதியன் – பொது
- 3) நான்காம் திருமுறை – காந்தாரம் – மாதர்பிறைக் கண்ணியாணை – ஐயாறு
- 4) ஐந்தாம் திருமுறை – திருக்குறுந்தொகை – அன்னம் பாலிக்கும் – தில்லை
- 5) ஆறாம் திருமுறை – திருத்தாண்டகம் – வடிவேறு திரிகுலம் – திருப்புவணம்

**Total Lecture Hours** | 45

**Books for Study:**

1. பக்தவச்சலம்.ஆ - பன்னிரு திருமுறை மூலம் முழுவதும்  
தமிழ்வேதம் வெளியீடு  
குடியாத்தாம், பதிப்பு –2017

**Books for References:**

1. சித்தலிங்கம், பி.டி. - சைவ சமயத் தோற்றமும் வளர்ச்சியும்  
கஸ்தூரிபாய் காந்தி கண்யா குருகுலம்,  
குருகுலம் வெளியீட்டுப் பகுதி,  
வேதாரண்யம் – 614 810. மறுபதிப்பு – 1984.
2. புலவர் நடராசன், ரா.பி. - தேவாரம், திருவாசகம்  
உமா பதிப்பகம்,  
171, பு/எண், பவளக்காரத் தெரு,  
மண்ணடி, சென்னை – 1.  
மூன்றாம் பதிப்பு – 2012.
3. திருமுருக கிருபானந்தவாரியார் - குகழீ வாரியார் பதிப்பகம்  
107, சிங்கண்ணத்தெரு,  
சிந்தாதிரிப்பேட்டை, சென்னை-2.  
முதல் பதிப்பு – 1998..

**Web Resources:**

1. தேவாரப் பண்கள் - <http://www.tamilvu.org/ta/courses-diploma-d061-d0613-html-d0613112-45060>
2. பண் வரலாறு - <https://bit.ly/33RejBs>
3. பண் வகைகள் - <https://bit.ly/3tH5uVT>
4. திருப்புகழ் முழுவதும் - <https://bit.ly/3Agu7Km>

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)****DEPARTMENT OF TAMIL****(For those who joined in 2021-2022 and after)**

Course Name	பண்ணிசை					
Course Code	21CTAC21	L	P	C		
Category	Certificate Course (பிற்பருவம்)			-	-	-
Nature of course:	EMPLOYABILITY	SKILLORIENTED	✓	ENTREPRENURSHIP		
<b>Course Objectives</b>						
1. பண்ணிசை பற்றித் தெரிந்து கொள்ள முடிகின்றது. 2. தேவாரப் பண்களுக்கு இணையான இராகங்களை அறியமுடிகிறது. 3. தாளங்களைக் கற்றுக்கொள்ள முடிகின்றது. 4. மாணவர்கள் பண்முறையில் பாடல்களைப் பாட வழிவகுக்கிறது. 5. இறைநெறியில் மாணவர்களை நெறிப்படுத்துகிறது						
<b>UNIT I</b>	(சந்தரர் (திருப்பாட்டு -				9	
1) ஏழாம் திருமுறை - இந்தளம் - பித்தா பிறைசூடி - திருவெண்ணெய்நல்லூர் 2) ஏழாம் திருமுறை - பழம்பஞ்சுரம் - மற்றுபற்றெனக்கு - திருப்பாண்டிக்கொடுமுடி 3) ஏழாம் திருமுறை - கொல்லிகௌவாணம் - தில்லைவாழ் அந்தணர் - திருவாரூர் 4) ஏழாம் திருமுறை - நட்டராகம் - செண்டாடும் விடையாய் - திருக்காளத்தி 5) ஏழாம் திருமுறை - செந்துருத்தி - மீளா அடிமை - திருவாரூர்						
<b>UNIT II</b>	(மாணிக்கவாசகர் (திருவாசகம் -				9	
1) எட்டாந்திருமுறை - திருவெம்பாவை )1- 20 பாடல்கள்( 2) எட்டாந்திருமுறை - திருப்பொற்சுண்ணம் )1-10 பாடல்கள்( 3) எட்டாந்திருமுறை - திருச்சாழல் )1- 10 பாடல்கள்( 4) எட்டாந்திருமுறை - அன்னைப்பத்து )1-10 பாடல்கள்( 5) எட்டாந்திருமுறை - திருப்பள்ளியெழுச்சி )1-10 பாடல்கள்( ஒளிவளர் விளக்கே - தன்பரம் பொருளே - நீறணி பவள - தனதன்நல் தோழா - கோலமே மேலை - மன்னுக தில்லை - பாலுக்குப் பாலகன் - தாதையைத் தாளர - குழலொளி யாழொலி - ஆரார் வந்தார்						
<b>UNIT III</b>	( திருவிசைப்பா,திருப்பல்லாண்டு)				9	
சந்ததம்பந்த - திருப்பரங்குன்றம், விறல்மாறனைந்து - திருச்செந்தூர், ஆறுமுகம்ஆறுமுகம் - பழநி, காமியத் தழுந்தி - சுவாமிமலை, முத்துத் தெறிக்க - திருத்தணிகை, அகரமுமாகி -						

பழமுதிர்ச்சோலை, அதிரும்பகழல் - குன்றுதோராடல், அதலசேடனாராட - குன்றுதோராடல், நீலங்கொள் - குன்றுதோராடல், முத்தைதரு - குன்றுதோராடல்

**UNIT V** (அபிராமி அந்தாதி) 9

உதிக்கின்ற செங்கதிர் - பூத்தவளே புவனம் - மங்கலை செங்கலசம் - மணியே மணியின் - சொல்லும் பொருளும் - அன்றெ தடுத்து - புண்ணியம் செய்தனமே - நாயகி நான்முகி - தனம்தரும் கல்விதரும் - கூட்டியவா என்னை.

**Total Lecture Hours** 45

**Books for Study:**

1. பக்தவச்சலம்.ஆ - பன்னிரு திருமுறை மூலம் முழுவதும் தமிழ்வேதம் வெளியீடு குடியாத்தாம், பதிப்பு -2017

**Books for References:**

1. சித்தலிங்கம், பி.டி. - சைவ சமயத் தோற்றமும் வளர்ச்சியும் கஸ்தூரிபாய் காந்தி கண்யா குருகுலம், குருகுலம் வெளியீட்டுப் பகுதி, வேதாரண்யம் - 614 810. மறுபதிப்பு - 1984.
2. புலவர் நடராசன், ரா.பி. - தேவாரம், திருவாசகம் உமா பதிப்பகம், 171, பு/எண், பவளக்காரத் தெரு, மண்ணடி, சென்னை - 1. மூன்றாம் பதிப்பு - 2012.
3. திருமுருக கிருபானந்தவாரியார் - குகழி வாரியார் பதிப்பகம் 107, சிங்கனத்தெரு, சிந்தாதிரிப்பேட்டை, சென்னை-2. முதல் பதிப்பு - 1998..

**Web Resources:**

- தேவாரப் பண்கள் - <http://www.tamilvu.org/ta/courses-diploma-d061-d0613-html-d0613112-45060>
- பண் வரலாறு - <https://bit.ly/33RejBs>
- பண் வகைகள் - <https://bit.ly/3tH5uVT>
- திருப்புகழ் முழுவதும் - <https://bit.ly/3Agu7Km>

## Certificate Course



**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**  
**DEPARTMENT OF COMMERCE – CORPORATE SECRETARYSHIP**  
(For those who joined in 2023-2024 and after)

**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**

**DEPARTMENT OF COMMERCE - CORPORATE SECRETARYSHIP**

**Class : B.Com (CP)**

**Semester :**

**Subject Code: 21CCPC22**

**Part III : Value Added Course**

**Hours : 45**

**Credits : 01**

### **PRINCIPLES OF LIFE INSURANCE**

Course Outcomes: On successful completion of the course, the students will be able to

**CO1:** Know the basic Principles of Life Insurance.

**CO2:** Analyze the benefits of individuals and the society.

**CO3:** Enable the Structure of Indian Insurance Industry,

**CO4:** Understand the Economic Principles of insurance,

**CO5:** Study the Structure of Indian Insurance Industry.

**UNIT-1:** Introduction: Definition - Objectives of insurance - Functions of insurance - Types of Life insurance policies.

**UNIT-2:** Benefits of insurance: Benefits of insurance to individuals, to Business and to society.

**UNIT-3:** Economic Values of Insurance: Sharing - Premium - Bonus Discount-Claim-

Maturity Period- Surrender Value- Assignment - Renewal - Expiry- Nomination- Lapse of Policy.

**UNIT-4:** Basic Principles of Insurance: Utmost good Faith - Insurable Interest - Material facts

- Indemnity - Proximate cause.

**UNIT-5: Structure of Indian Insurance Industry: Insurance Regulatory and Development**

Authority (IRDA) Condition, Duties, Powers and Functions.

**Books for Study:**

1. P.Periasamy, **Principles and Practice of Insurance**, Himalaya Publishing House.
2. SIA, **Principles of Insurance**, SIA Publishers & Distributors Pvt Ltd, 2019 edition (2019).
3. Dr Rakesh Agarwal, **Principles of Insurance**, Sashi Publications; 2019 edition (2017).

**Books for References: book:**

1. M.Manoharan, **Insurance Principles and Practice**, Palani Paramounts Publications.
2. Neeti Gupta, Abha Chopra, **Principles of Insurance**, 2018 edition, Kalyani Publishers (2018).





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

## **CERTIFICATE COURSE**

**Subject code: 21CMBC21**

**Hours:45**

**Course title:Biofertilizer Production**

**Credit:1**

### **Course outcomes**

On successful completion of the course, the learners should be able to

**CO1:** To describe about the importance of biofertilizers and biopesticides.

**CO2:**To identify bacterial, algal and fungal biofertilizer.

**CO3:**To assess the quality control of biofertilizers.

**CO4:** To distinguish symbiotic and non- symbiotic nitrogen fixers.

**C05:** To determine quality control of biofertilizers.

### **UNIT – I -Bacterial biofertilizer**

Biofertilizer: Isolation, Characterization,Mass inoculam production - *Rhizobium*, *Azotobacter*, *Azopirillum* and *Frankiia*.

### **UNIT –II-Algal and Fungal biofertilizer**

Algal biofertilizer Mass inoculam production - Blue green algae- *Azolla* – Importance;  
Fungal biofertilizers Mass inoculam production - Mycorrhizae – ecto and endomycorrhiza.

### **UNIT-III-Phosphate solubilizing microorganisms**

Phosphate solubilizing microbes Mass inoculam production – phosphobacteria;  
Phosphate solubilization mechanism.

### **UNIT - IV-Biopesticides production**

Biopesticides Mass inoculam production – *Bacillus thuringiensis* and *Trichoderma viride*; Biosafety.

### **UNIT - V- Quality control and applications**

Carrier based inoculants - Quality control of biofertilizers - Methods of biofertilizer applications, Agronomic importance.

### **Reference books:**

1. Subba Rao N.S. 1995, Soil microorganisms and plant growth, Oxford and IBH publishing Co. Pvt. Ltd,NewDelhi.
2. Mahendra K. Rai. 2005, Hand book of Microbial biofertilizers, The Haworth Press, Inc. New York.
3. Kannaiyan S. 2003, Bioetchnology of Biofertilizers, CHIPS, Texas.