

**JAMAL MOHAMED COLLEGE (Autonomous), Tiruchirappalli-620 020**

**COP Programme –Course Structure under CBCS**

**Department** : Mathematics

**Name of the course** : E-MATHEMATICAL TOOLS

[UGC Approval No. F.No. 4 – 442/2010 (COP). Dt. 22.03.2010]

(For the candidate admitted from the academic year 2017-2018 onwards)

10.02.2017

<b>COURSE CODE</b>	<b>COURSE</b>	<b>COURSE TITLE</b>	<b>HOURS/ WEEK</b>	<b>CREDIT</b>	<b>CIA MARKS</b>	<b>SE MARKS</b>	<b>TOTAL MARKS</b>
<b>CERTIFICATE COURSE</b>							
17MACT1P	CORE I	MS Word and LATEX	10	10	25	75	100
17MACT2P	CORE II	SPSS – Basic Modules	10	10	25	75	100
17MACT3P	CORE III	MATLAB - Basic Concepts	10	10	25	75	100
<b>TOTAL</b>			<b>30</b>	<b>30</b>	<b>75</b>	<b>225</b>	<b>300</b>
<b>DIPLOMA PROGRAMME</b>							
17MADM1P	CORE I	MS PowerPoint and LATEX with Beamer Package	10	10	25	75	100
17MADM2P	CORE II	Hypothesis Testing using SPSS	10	10	25	75	100
17MADM3P	CORE III	Numerical Methods using MATLAB	10	10	25	75	100
<b>TOTAL</b>			<b>30</b>	<b>30</b>	<b>75</b>	<b>225</b>	<b>300</b>
<b>GRAND TOTAL</b>			<b>60</b>	<b>60</b>	<b>150</b>	<b>450</b>	<b>600</b>
<b>ADVANCED DIPLOMA PROGRAMME</b>							
17MAAD1P	CORE I	Project Preparation using LATEX	10	10	25	75	100
17MAAD2P	CORE II	Forecasting using SPSS	10	10	25	75	100
17MAAD3P	CORE III	MATLAB: Graphics 2D and 3D	10	10	25	75	100
<b>TOTAL</b>			<b>30</b>	<b>30</b>	<b>75</b>	<b>225</b>	<b>300</b>
<b>GRAND TOTAL</b>			<b>90</b>	<b>90</b>	<b>225</b>	<b>675</b>	<b>900</b>

**E – MATHEMATICAL TOOLS  
CERTIFICATE COURSE  
CORE– I: MS WORD AND LATEX**

**Course Code : 17MACT1P**  
**Hours/Week: 10**  
**Credit : 10**

**Max Marks : 100**  
**Internal Marks : 25**  
**External Marks : 75**

**Objectives:**

To develop the computer skills and understand the MS Word and LATEX.

**List of Practical for MS Word.**

1. Insert Pictures in your word document.
2. Prepare News Paper format.
3. Prepare a list of Editing and Formatting Functions of MS-Word.
4. Write a covering Letter to apply for a Job in a Company in MS-Word.
5. Prepare your Curriculum Vitae in MS-Word.
6. Prepare the Mail Merge in MS-Word with a suitable example.
7. Prepare the Mailing Labels in MS-Word with a suitable example.
8. Prepare the Mailing Envelopes in MS-Word with a suitable example.
9. Prepare a Mark Sheet of a student using Tables in MS-Word.
10. Insert Different shapes in your word document.

**List of Practical for LATEX**

1. To create two paragraphs with a heading using LATEX.
2. To prepare a page with four paragraphs. First containing single and double quoted words. Second contains an italic word, third contains some sashes and accents and fourth contains some symbols.
3. To prepare a conduct certificate given by the Principal of Jamal Mohamed College.
4. To typeset a given Poetry.
5. To prepare labeled items containing bullets, dashes, stars and dots.
6. To prepare some Statistical table.
7. To typeset some vague mathematical formula like formula for correlation coefficient.
8. To typeset the system of equations and the corresponding matrix form.
9. To typeset formula for binomial expansion and Christoffel's symbols.
10. To create a floating picture using LATEX.

**Prepared by:**

**Mr. S. Mohamed Yusuff Ansari**

**Mr. D. Dhamodharan**

**CORE– II: SPSS – Basic Modules**

**Course Code: 17MACT2P**  
**Hours/Week: 10**  
**Credit: 10**

**Max Marks : 100**  
**Internal Marks: 25**  
**External Marks: 75**

**Objectives:**

To develop the typesetting knowledge in Statistical formulae in SPSS.

**List of Practical:**

1. Mean, Standard deviation, Variance.
2. Bar diagram, Line diagram, Pie chart and Histogram.
3. Co-efficient of correlation.
4. Regression equation of X on Y.
5. Regression equation of Y on X.
6. Application of t-test for one sample problem.
7. Application of t-test for two sample problems.
8. Application of t-test for testing the significance of Correlation Coefficient.
9. One-tailed and Two-tailed tests.
10. Application of analysis of variance.

**Prepared by:**

Dr. R. Jahir Hussain

**CORE– III: MATLAB - Basic Concepts**

**Course Code: 17MACT3P**  
**Hours/Week: 10**  
**Credit: 10**

**Max Marks : 100**  
**Internal Marks: 25**  
**External Marks: 75**

**Objectives:**

To develop the computer skills and to get the experience in LATEX.

**List of Practical**

1. Basic operations on matrices
2. Reshaping, appending and deleting rows or column
3. Determinant as inverse of a matrix
4. Different types of matrices
5. Square root of exponential power of a matrix
  - a. Solving higher degree equation
6. Solving system of equation of degree one
7. Solving system of equation of higher degree
8. Eigen values , Eigen vectors of a matrix
9. LU,QR, Choleskey factorization of a matrix
10. Gauss elimination method to solve system of equation
11. Straight line functions
12. Curve fitting with polynomial function
13. Interpolation
14. Data analysis of statistics
15. Line Integral
16. Double integral rectangle domain
17. Double integral non rectangle domain
18. Solving first order linear ODE
19. Solving non-linear differential equation
20. Solving Algebraic equation

**Prepared by:**

Dr. A. Mohamed Ismayil

**E – Mathematical Tools****DIPLOMA COURSE****CORE– I: MS PowerPoint and LATEX with Beamer Package****Course Code: 17MADM1P****Hours/Week: 10****Credit: 10****Max Marks : 100****Internal Marks : 25****External Marks : 75****Objectives:**

To develop the knowledge in designing Presentations.

**List of Practical for MS Powerpoint**

1. Entering and Formatting text in presentations.
2. Working with Text Boxes: Formatting Shapes and Themes.
3. Picture, Shapes and Smart Art: Formatting and Using Smart Art.
4. Photo Albums and Views: Create a Photo Album.
5. Tables and Spreadsheets: Adding and Using Tables.
6. Charts and Chart Tools: Adding and Formatting Charts.
7. Reach for the Starts: Slide Masters and Transitions.
8. Animating Multimedia: Adding and Formatting Videos.
9. Show Time: Delivering Presentations.
10. Prepare to Share: Proof and Protect Presentations.

**List of Practical for LATEX with Beamer Package**

1. Create Frame content with
  - \*Head line and foot line
  - \*Left and right sidebars
  - \*Navigative bars
  - \*Logo
  - \*Frame title
  - \*Background
  - \*Content
  - \*Alignments and Spacings
2. Prepare Presentation themes
  - \*Inner themes
  - \*Outer themes
  - \*Font themes
3. Creating Frames with color
4. a. Creating Frames with columns
  - b. Creating Frames with Environments
    - \*lists
    - \*Mathematics Blocks (Theorem, definition, lemma...)
    - \*Blocks
      - A Block, A Alert box, sections, sub sections.

5. Creating Frames with dynamic effect
  6. Creating Frames with Overlays
    - \*Pause
    - \*Overlays specifications
  7. Creating Frames with graphics
  8. Creating Ornamental aspects
  9. Creating Producing handouts
- Creating Hyberlink with table, blocks, bibliograpy

**Prepared by:**

**Mr. S. Mohamed Yusuff Ansari**

**Mr. D. Dhamodharan**

**CORE– II: Hypothesis Testing using SPSS****Course Code: 17MADM2P****Hours/Week: 10****Credit: 10****Max Marks : 100****Internal Marks: 25****External Marks: 75****Objectives:**

To develop the knowledge to solve statistical problems using SPSS.

**List of Practicals**

1. Twenty students have taken their common entrance test after their graduation. The selection committee wants to see the relationship between the scores of CET and the percentage achieved in graduation through correlation analysis.

Frame a hypothesis and show the type of relationship (positive or negative relationship) between the variables.

CET scores	70	60	65	68	70	75	87	89	90	96	97	65	80	86	77
% in UG degree	71	82	73	64	75	69	75	88	90	90	88	82	73	74	65

2. Twenty employees of different age group have taken their Exams for getting promotions in their designation in the office. The appraisal committee wants to see the relationship between the scores of Exam and the age through correlation analysis.

Frame a hypothesis and show the type of relationship (positive or negative relationship) between the variables using correlation.

The appraisal committee also wants to calculate the Unit increase in the Exam score when there is increase in age by applying regression. It also wants to predict the exam score of an employee with the age of 21.

Age of Employees	24	34	27	26	30	34	45	43	48	51	46	30	38	42	32
Exam scores	70	60	65	68	70	75	87	89	90	96	97	65	80	86	77

3. Pawan wants to see the relationship between monthly household income (X) and retail purchase (Y) by 20 respondents through Spearman's rank order correlation.

X	1	5	0.50	10	3	3	7	8	10	0.40	0.30	0.20	0.10	0.15	0.80	5	6	7	8	1
Y	10	25	10	100	35	30	100	100	150	8	6	3	2	2	10	30	30	20	60	10

**Note : X ( Rupees in lakhs) and Y( Rupees in thousands)**

4. A Survey was taken among 15 students; the data collected was “preparatory hours of the student”, “Exam percentage of the student”. The Researcher was to see the direction of correlation between the preparatory hours and Exam percentage through correlation analysis. He also wants to calculate the how much Exam percentage will increases when the preparatory time is increased by 1 hour. Apply regression to calculate the Unit increase.

Preparatory hours of the student	4	3	7	6	3	4	5	4	8	5	6	3	8	4	3
Exam percentage	70	60	65	68	70	75	87	89	90	96	97	65	80	86	77

**Prepared by:**

Dr. R. Jahir Hussain



**CORE– III: Numerical Methods using MATLAB**

**Course Code: 17MADM3P**  
**Hours/Week: 10**  
**Credit: 10**

**Max Marks : 100**  
**Internal Marks : 25**  
**External Marks: 75**

**Objectives:**

To develop the practical skills to solve Mathematical problems using MATLAB.

**List of Practicals**

1. Solving equations using Bisection method
2. Solving equations using False position method
3. Solving equations using Newton's method
4. Solving equations using Secant method
5. Solving system of equations by Cramer's rule
6. Solving system of equations by Gaussian Elimination method
7. Solving system of equations by Gauss -Jordan method
8. Solving system of equations by Jacobi-Iterative method
9. Lagrange interpolation method
10. Newton's interpolation method
11. Linear fit
12. Non-linear fit
13. Trapezoidal rule to solve the definite integral
14. Simpson rule
15. Euler method to solve the ODE
16. Modified Euler method
17. Taylor's method
18. R-K Second order
19. R-K Fourth order
20. Fixed point method

**Prepared by:**

Dr. A. Mohamed Ismayil

**E – Mathematical Tools**  
**ADVANCED DIPLOMA COURSE**  
**CORE– I: Project Preparation using LATEX**

**Course Code: 17MAAD1P**  
**Hours/Week: 10**  
**Credit: 10**

**Max Marks : 100**  
**Internal Marks : 25**  
**External Marks: 75**

**Objectives:**

To develop the knowledge to solve Statistical problems.

**List of Practicals**

1. To use packages (preamble part) in LATEX.
2. To prepare a multi table for some planets and its distances.
3. To use setcounts, fonts and font style in LATEX
4. To prepare Page alignments, Page Style in LATEX.
5. To typeset for theorem, lemma, prepositions and corollary using LATEX.
6. To prepare a nested box and type some text with the box and outside the inner box.
7. To Use of ref. to pointing a sec. no., lemma no. and page no.
8. To Use the foot note and endnote in LATEX.
9. To prepare chapters, sections, subsections, subsubsections in book.
10. To prepare bibliography and bibliography database in article.
11. To prepare tableofcontent, listoffigure, listoftables in thesis.
12. To prepare title, author, abstract, keyword in article.
13. To prepare preface, acknowlegement, declare certificates in thesis.
14. To prepare front page of thesis and book
15. To prepare a book format with two chapters and index.

**Prepared by:**

**Mr. S. Mohamed Yusuff Ansari**

**Mr. D. Dhamodharan**

**CORE– II: Forecasting using SPSS**

**Course Code: 17MAAD2P**  
**Hours/Week: 10**  
**Credit: 10**

**Max Marks : 100**  
**Internal Marks : 25**  
**External Marks : 75**

**Objectives:**

To develop the knowledge to solve Statistical problems using SPSS.

**Hypothesis : Parametric**

1. The life time of tube for a random sample of 20 provides following figures:

item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Life (in years)	5	5.5	6	5.4	2	3.4	6.5	7	5.4	5.9	6	5.8	5.7	9	6	7	8.7	5.9	5	4.9

Null hypothesis: Average Life of tube is 5 years.

Analyze the above problem through T test.

2. The height of males and the height of females were compared

Does height create a significant difference between the male and female?

Analyze the problem using independent sample t test.

Label : Male : 1, Female :2

Gender	1	1	2	1	2	1	2	1	2	1	1	2	1	2	1	1	2	2	1	2
Height in cms	140	146	156	149	154	156	151	148	158	150	151	159	153	148	155	146	150	152	149	156

3. A researcher wants to compare the pretest scores and posttest scores of 30 students who has undergone training in an institution.

Does the training have any impact in the scores of the students?. Analyze the problem using paired sample T test

pretest	53	54	57	68	66	74	63	71	74	75	59	71	69	55	52	61	76	81	61	69
posttest	88	96	98	103	108	122	112	120	123	124	97	115	111	85	79	94	93	96	87	77

4. Gupta wants to compare the scores of CBSE students from four metro cities of India i.e

Delhi, Kolkata, Mumbai, Chennai. He Obtained 10 participant scores based on random sampling from each of the four metro cities, Collecting 40 responses. He made the following hypothesis

**NULL HYPOTHESIS :** There is no significant difference in scores between different metro cities of India.

**ALTERNATE HYPOTHESIS:** There is significant difference in scores between different metro cities of India.

Note: This is an independent design, since the respondents are from different cities. Use One -way between groups ANOVA.

Label For City : 1 - Delhi , 2 - Kolkata, 3-Mumbai, 4 - Chennai

	Scores of the Student									
1	400	450	499	480	495	300	350	356	269	298
2	389	398	399	498	457	400	300	298	369	348
3	488	469	425	450	399	385	299	298	389	390
4	450	400	428	398	359	360	310	295	322	365

5. Sekar Kapoor wants to know the sales in four different metro cities of India in Diwali season. He assumes the sales contrast of 2:1:-1:-2 for Delhi: Kolkata: Mumbai: Chennai, respectively. He collects sales data from 10 respondents each from the four metro cities. Frame the required hypothesis, do the analysis using the One-way between groups ANOVA with planned Comparisons and show the result. Calculate F ratio along with Post Hoc analysis.

City	Sales in Rs (Lacs)									
1	500	498	478	499	450	428	500	498	486	469
2	500	428	389	378	498	469	428	412	410	421
3	421	410	389	359	369	359	349	349	359	400
4	289	269	259	299	389	349	350	301	297	279

6. Deepak wants to know the sales in four different cities of India in Christmas Season. He assumes the sales contrast of 5: 3: 4: -4 for Delhi: Bangalore: Mumbai: Hyderabad, respectively. He collects sales data from 10 respondents each from the four cities, collecting a total of 40 sales data.

City	Sales in (Rs Crores)
Delhi	50,48,47,49,40,42,50,98,86,69
Bangalore	40,38,43,38,39,87,69,48,41,40
Mumbai	41,10,89,39,36,39,49,29,59,40
Hyderabad	28,29,59,99,39,34,30,31,29,39

Frame the required hypothesis, Analyses through One-way between groups ANOVA with planned comparisons, Calculate F ratio along with Post Hoc analysis.

### **Hypothesis - Non - Parametric**

7. Neha gupta wants to research that whether sales (dependent) of the respondents depend on their place (independent) and education (independent). She assigns 10 respondents from each metro city.

Labels

Place: 1 (Delhi), 2 (Kolkata), 3(Chennai)

Education: 1 (Under graduate), 2(Graduate), 3(Post Graduate).

She wants to know which variable shows significant effect on sales Whether the location influences sales?

Whether the education influences the sales?

Whether the influence of education on sales depends on location of respondent?

Use two ways between groups Anova to determine the significant effect between variables.

8. Mohit Rajan wants to research that whether sales (dependent) of the respondents depend on their place (independent) and age (independent). He assigns 10 respondents from each metro city. Each respondent can select from 3 age levels.

Place : Ram Nagar, Jyoti Colony, Vivek

Vihar Ram Nagar - 10 respondents

Jyoti Colony - 9 respondents

Vivek Vihar - 10 respondents

Age : 1 (below 25 years), 2 (25-35 years), 3 (above 35 years).

Place	Age	Sales (Rs. Lacs)
Ram nagar	1	20,40,44,35
	2	30,34,50,40
	3	60,55
Jyoti Colony	1	15,25,30

	2	35,40,45,70
	3	65,80
Vivek Vihar	1	80,75,30,10
	2	100,90,75
	3	150,89,99

Analyze through Two-way between groups ANOVA. Find the variable that has significant effect on sales.

9. Mathu Gupta wants to know whether the serial preference was dependent on location of the respondent. The responses indicate, 75 respondents each have seen serial crorepathi and Big Boss. His responses indicate 66 respondents from Delhi and 84 respondents from Mumbai. The frequency table is shown below.

Serial	Place	Frequency
Crorepathi	Delhi	40
Crorepathi	Mumbai	35
Big Boss	Delhi	26
Big Boss	Mumbai	49

Conduct a chi square test for independence or relatedness (Based on weigh cases)

10. The sales of two retails stores of Delhi(store1) and Mumbai(store2) are compared by ganesh. The sales are in Rs.Lacs. There are 20 respondents, 10 from each store. Apply Mann - Whitney nonparametric t-test of independent groups to prove the hypothesis

**Null hypothesis:** There exists no significant difference in the sales of two retails shop

**Alternative hypothesis:** There exists significant difference in the sales of two retails shop.

Retail store	1	2	1	1	2	2	2	1	2	1
Sales (Rs Lacs)	40	30	60	45	55	25	60	80	100	20

Retail store	2	1	1	2	1	1	2	2	1	2
Sales (Rs Lacs)	10	80	85	90	120	85	60	55	56	25

11. A showroom manager compares the laptop sales for the year in two parts. He wants to compare the sales of first half and second half of the year. He recorded the sales from 20 showrooms and saved their sales in Rs.Lacs. Apply Wilcoxon signed-rank test of non-parametric , paired-test to prove the hypothesis.

**Null hypothesis:** There exists no significant difference in the showroom sales for the first and second half of the year.

**Alternative hypothesis:** There exists significant difference in the showroom sales for the first and second half of the year.

Sale 1 (Rs Lacs)	10	20	25	50	45	30	50	60	100	20
Sale 2 (Rs Lacs)	20	50	60	35	65	90	110	25	20	35

Sale 1 (Rs Lacs)	50	90	60	40	20	45	65	56	38	28
Sale 2 (Rs Lacs)	64	69	95	85	76	68	59	120	60	30

**Prepared by:**  
Dr. R. Jahir Hussain

**SEMESTER – VI****CORE– III: MATLAB: Graphics 2D and 3D****Course Code: 17MAAD3P****Max Marks : 100****Hours/Week: 10****Internal Marks: 25****Credit: 10****External Marks: 75****Objectives:**

To develop the practical skills in Graphics 2D and 3D using MATLAB.

**List of Practical**

1. Plot a Circle
2. Overlay Plot
3. Contour Plot
4. Field Plot
5. Histogram
6. Exponential Growth and Decay
7. Pie diagram
8. Exponential curve
9. Logarithmic curve
10. Plot a Circular helix
11. Circular in 3D view
12. Plot of four filled polygons
13. Plotting surface with surface
14. Plotting surface with surfacec
15. Plotting surface with surfacel
16. 3D pie diagram
17. Discrete data plot with stems
18. Sphere with unit radius
19. Ellipsoid with given radii
20. Cylinder with given Light

**Prepared by:****Dr. A. Mohamed Ismayil**



# Jamal Mohamed College, Trichy-20

## Department of Mathematics

### Ramanujan Centre for Mathematic Excellence

**Course Name** : Certificate Course on Quantitative Aptitude

**Eligibility** : Final Year UG Students

**Teaching Hours** : 2 hours X 20 days

#### Course Content:

- Numbers, HCF & LCM of Numbers
- Decimal Fractions, Simplification
- Square Roots & Cube Roots, Average
- Problems on Numbers, Problems on Age
- Surds & Indices, Profit & Loss
- Percentage, Ratio & Proportion
- Partnership, Chain Rule
- Time & Work, Pipes & Cistern
- Time & Distance, Problems on Trains
- Boats & Streams, Allegation or Mixture
- Simple Interest, Compound Interest
- Logarithms, Area
- Volume & Surface Areas
- Verbal Ability
- Reasoning

#### Text Book:

R.S. Aggarwal, Quantitative Aptitude, S. Chand & Company Ltd. (2007).

#### Books for Reference:

1. R.S. Aggarwal, Arithmetic (Subjective and Objective) For Competitive Examinations, S. Chand and Company Ltd. (2004).
2. R.S. Aggarwal, Objective Arithmetic, S. Chand & Company Ltd. (2004).