## INDUSTRIAL MATHEMATICS 2018-19

An add-on course 'Industrial Mathematics' was organized for the second year undergraduate students of various departments in the academic year 2018-2019. The board of studies was composed of Ms Amala Mary George, Ms Geethu Simon, Ms Reshma Joshy and Ms Jiji Paul A. The course duration was 30 hours. All the 45 students who joined the course completed the program and achieved a certificate.

Ph. (Off.) : 04802701159
Principal (Per.) : 04802708877
(Res) : 04802701876
(Fax) : 04802708877


# SACRED HEART COLLEGE, CHALAKUDY 

Railway Station Road, Thrissur Dt., Kerala - 680 307, India
(Affiliated to University of Calicut \& Re-acredited with A+ Grade by NAAC, CGPA 3.55
E-mait ; shcollegecky@gmail.com Website : wwowsacredheartcollege.ac.in

Date :

To,
Ms, Reshma Joshy,
Guest Faculty,
Department of Mathematics,
S H College, Chalakudy
Thrissur

Dear Sir / Madam
Sub: Appointment of member of Beard of Studies

We are bappy to inform you that you are appointed as a member of the Board year 2018-19.
the Add-On Course 'Industrial Mathematics' in this college for the academic year 2018-19.

Thaaking you.



# DEPARTMENT OF MATHEMATICS <br> SACRED HEART COLLEGE, CHALAKUDY <br> Add-on Course on <br> <br> INDUSTRIAL MATHEMATICS 

 <br> <br> INDUSTRIAL MATHEMATICS}
(Total 30 Hrs )
Module 1 Arithmetic with Whole Numbers, Fractions and Decimals (2 hours)
Arithmetic computations, following the order of operations using; whole numbers, fractions, decimals, and scientific notation

Module 2 Measurement Tools (4 hours)
Computations with units and convert units within Metric Systems, Measurements with measurement tools commonly used in the trades.

Module 3 Practical Plane Geometry and Solid Figures (8 hours)
Computations using formulas, and rearrange formulas into alternate forms, perimeters, areas, surface areas, and volumes of plane and solid figures.

Module 4 Ratio, Proportions, Percent and Trigonometry (8 hours)
problems involving percent, ratio, and proportion, algebraic equations including linear and quadratic, and solve systems of equations, problems involving right and oblique triangles by using trigonometric ratios.

Module 5 Statistics (8 hours)
Analyzing graphically and measures of central tendency to solve problems involving data sets, Translate numbers between decimal, binary, and hexadecimal representations.

## REFERENCES

1. Saunders and Carman, Mathematics for the Trades, 8th edition. Publishers: Pearson

# DEPARTMENT OF MATHEMATICS <br> SACRED HEART COLLEGE, CHALAKUDY <br> Add-on Course on <br> <br> MATHEMATICS FOR COMPETITIVE EXAMINATION 

 <br> <br> MATHEMATICS FOR COMPETITIVE EXAMINATION}

## Module 1 Data Interpretation (4 hours)

The data given in a Table, Graph, Bar Diagram, Pie Chart, Venn diagram.
Module 2 Sequence and Series (6 hours)
Identifying Patterns of Sequences, Geometric Series, Arithmetic Series, Harmonic Series.
Module 3 Arithmetic Skills (8 hours)
BODMAS Rule, Fractions, Divisibility rule, LCM \& GCD (HCF). Date, Time and Arrangement Problems: Calendar Problems, Clock Problems, Blood Relationship.

Module 4 Quantitative aptitude (8 hours)
Averages, Ratio and Proportion, Problems on ages, Problems on time, distance and speed.
Module 5 Computational Skills for Management (4 hours)
Percentages, Profit and Loss, Simple and Compound Interest.

## REFERENCES

1. Quantitative Aptitude for Competitive Examination by R S Agrawal, S. Chand publications.
2. Quantitative Aptitude and Reasoning by R V Praveen, PHI publishers.
3. Quantitative Aptitude for Competitive Examination by Abhijit Guha, Tata Mc Graw Hill publications.

# DEPARTMENT OF MATHEMATICS 

SACRED HEART COLLEGE, CHALAKUDY
Add-on Course on

## MATHEMATICS FOR SOCIAL SCIENCES

(Total 30 Hrs )

## Module 1 Functions ( 6 hours)

Definition of a function, Function Notation and Evaluating Functions, Domain and Range of Functions, Composition of Functions, Inverse Functions, Special Functions (Constant, Polynomial, Rational, Absolute Value), The Remainder and Factor Theorem and Solution of Cubic Equations, Application of Functions (Depreciation, Demand and Supply Curves, Production Levels), Sketching Graphs of Functions (Constant, Linear, Quadratic, Square Root, Absolute Value), Transforming Graphs (Horizontal and Vertical Shifts, Reflection in the Xaxis).

Module 2 Solutions of Inequalities, Complex Numbers, Exponential \& Logarithmic Functions (5 hours)

Systems of Linear Inequalities, Solving Quadratic Inequalities, Graphs of Systems of Inequalities, Applications of Inequalities (Profits, Sales Allocation, Investment), The Definition of Imaginary Numbers, The Definition of Complex Numbers, Addition, Multiplication and Division of Complex Numbers, Graphs of Exponential and Logarithmic Function, The Natural Exponential and Natural Logarithmic Function, Basic Properties of Logarithm, Solving Exponential and Logarithmic Functions, Applications.

## Module 3 Matrix Algebra (4 hours)

Definition of a Matrix, Matrix Addition, Multiplication and Transposition, The Determinant of a $2 \times 2$ and $3 \times 3$ Matrix, The inverse $2 \times 2$ Matrix, Solving $2 \times 2$ Systems of Linear Equations Using Matrix Inversion, Solving 3x3 Systems of Linear Equations Using Cramer's Rule.

## Module 4 Sequences and Series, Limits and Continuity (9 hours)

Definition of a Sequence, Types of Sequences (Arithmetic and Geometric), Sigma Notation, Arithmetic and Geometric Series, Sums of Arithmetic and Geometric Series including sums to infinity, Concepts of a Limit, Limits of Sequences, Limits of Polynomial and Rational Functions, One-Sided Limits, Limits to Infinity, Distinguish between Continuous and Discontinuous Functions, Finding Points of Discontinuity of Rational Functions

## Module 5 Differentiation of Single Variable Functions \& Applications of Differentiation (6

 hours)The Concept of a Derivative, Differentiation from First Principles, Rules of Differentiation (Power, Chain, Product, Quotient Rules), Differentiation of Exponential and Logarithmic Functions, Determination of Gradients, Increasing and Decreasing Functions, Relative Extrema (Maxima and Minima) using the First and Second Derivative Tests, Concavity and Points and Inflection, Vertical and Horizontal Asymptotes

## REFERENCES

1. Haeussler, Paul and Wood, Introductory Mathematics for Business, Economics, and the Life and Social Sciences (12 th Edition), Pearson Education, Inc., New Jersey, 2008.

# SACRED HEART COLLEGE, CHALAKUDY INDUSTRIAL MATHEMATICS 

Time: One Hour
Maximum Marks: 20

1. Write in numerical form : "Twenty-one billion, ten million, thirty-one thousand,one".
a) 210001031001
b) 21010031001
c) 21001031001
d) 210010310001
2. Round 247563 to the nearest hundred thousand
a) 200000
b) 250000
c) 300000
d) 248000
3. Five bolts are needed to mount a tyre. How many bolts are needed to mount all four tyres on 60 cars?
a) 300
b) 240
c) 1200
d) None of these
4. The value of $6+2 \times 3 \div(7-4)+5 \times 2$ is
a) 26
b) 14
c) 18
d) None of these
5. A carpenter must mount an electric panel on an uneven surface. She must raise one corner of the panel $1 \frac{1}{8} \mathrm{in}$. off the surface. If $\frac{3}{16} \mathrm{in}$. washers are used as spacers, how many washers are needed to mount the panel?
a) 7
b) 6
c) 8
d) None of these
6. $3 \frac{1}{5}+1.08=$
a) 4.28
b) cannot add these numbers
c) 1.68
d) none of these
7. A computer printer sells for Rs 13200.00 after a $12 \%$ discount. What was its original or list price?
a) Rs 15000
b) Rs 11616
c) Rs 14784
d) none of these
8. Consider the balance checking account as shown in the given figure.

| Date | Balance | Withdrawals | Deposits |
| :---: | :---: | :---: | :---: |
| Oct. 1 | $\$ 367.21$ |  |  |
| Oct. 3 |  | $\mathbf{5 1 6 7 . 0 5}$ |  |
| Oct. 4 |  | 104.97 |  |
| Oct. 8 |  |  | $\$ 357.41$ |
| Oct. 16 |  | 97.50 |  |
| Oct. 18 |  | 9.43 |  |
| Oct. 20 |  | 259.47 |  |
| Oct. 22 |  | 100.84 |  |
| Oct. 27 |  | 21.88 |  |
| Oct. 30 |  |  |  |
| Nov. 2 |  |  |  |
| Nov. 4 | $?$ |  |  |

Then the closing balance as of November 4 is
a) $\$ 426.18$
b) $\$ 308.24$
c) $\$ 367.21$
d) none of these
9. A 9 in . pulley on a drill press rotates at 960 rpm . It is belted to a 5 in . pulley on an electric motor. Find the speed of the motor shaft.
a) 533
b) 1728
c) 534
d) none of these
10. $30 \%$ of 120 is
a) 36
b) 84
c) 156
d) none of these
11. If a train runs at 40 kmph it reaches its destination late by 11 minutes. But if it runs at 50 kmph it is late by 5 minutes only. Find the distance covered by the train.
a) 25 km
b) 30 km
c) 20 km
d) 27 km
12. One litre is equal to
a) 1000 cm
b) 100 cm
c) $1000 \mathrm{~cm}^{3}$
d) none of these
13. The scientific notation of the number 15000 is
a) $15 \times 10^{3}$
b) $1.5 \times 10^{4}$
c) $0.15 \times 10^{5}$
d) all of these
14. Board 1 must be joined to board 2 at a right angle as in the figure.


If $\angle x$ measures $42^{\circ}$, what must $\angle y$ measure?
a) $58^{\circ}$
b) $48^{\circ}$
c) $138^{\circ}$
d) none of these
15. The area of the given figure is

a) 238
b) 294
c) 266
d) none of these
16. If eight bolts are to be equally spaced around a circular steel plate at a radius of 9 in., what must be the spacing between the centers of the bolts along the curve?
a) 7.07 in .
b) 8.01 in .
c) 7.53 in .
d) none of these
17. Find the volume of the solid given in the figure

a) 1218 in. ${ }^{3}$
b) $1000 \mathrm{in} .^{3}$
c) 1120 in. ${ }^{3}$
d) none of these
18. Consider the triangle given in the figure. Find A.

a) 9
b) 36
c) 15
d) 12
19. Consider the pair of equations $x=1+y$ and $2 y+x=7$. The solution is
a) $x=1, y=0$
b) $x=3, y=2$
c) $x=2, y=1$
d) $x=2, y=3$
20. The following broken-line graph shows the monthly sales of tires in a company.


How many tires were sold during the first three months of the year combined?
a) 1930
b) 1950
c) 1900
d) 700

## DEPARTMENT OF MATHEMATICS

SACRED HEART COLLEGE FOR WOMEN, CHALAKUDY
Students Attendance List of Add-On Course 'Industrial Mathematics' 2018-19
Date of Commencement: 17/07/2018

| SI. No. | Name | Class | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 | Day 6 | Day 7 | Day 8 | Day 9 | Day 10 | Day 11 | Day 12 | Day 13 | Day 14 | Day 15 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | NIMITHA SATHEESAN | II Bcom CA | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ |
| 2 | SALMA SAREESA S I | II Bcom CA | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 3 | SARIGHA P R | II Bcom CA | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 4 | SUDHARMA J | II Bcom CA |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ |  | $\square$ |
| 5 | VINEESHA VICTOR | II Bcom CA | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 6 | VISMAYA N | II Bcom CA |  |  | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 7 | VISMAYA VENUGOPAL | II Bcom CA | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 8 | AJEENA KURYAN | II Bcom CA | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  |  | $\square$ | $\square$ |
| 9 | AJEESHA M R | II Bcom CA |  | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 10 | ALEENA SHAJU | II Bcom CA | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 11 | AMRUTHA K BABU | II Bcom CA | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  |  | $\square$ | $\square$ | $\square$ | $\square$ |
| 12 | HARITHA K G | II Bcom Finance | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ |
| 13 | JESSNA JOSE | II Bcom Finance | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 14 | KRIPAMOL JOSE | II Bcom Finance | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ |
| 15 | KRISHNAPRIYA SURENDRAN | II Bcom Finance | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  |  | $\square$ | $\square$ |
| 16 | LATISA SHAJAN | II Bcom Finance |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 17 | LEEANN ELIZABETH JEEN | II Bcom Finance | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  |  | $\square$ | $\square$ | $\square$ | $\square$ |
| 18 | NISHA JOY | II Bcom Finance | $\square$ |  | $\square$ | $\square$ |  | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ |
| 19 | ASWANI N S | II Bcom CA | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 20 | ASWANI P V | II Bcom CA | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 21 | ATHIRA K S | II Bcom CA | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ |  | $\square$ | $\square$ |
| 22 | BLESSY FRANCIS | II Bcom CA | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 23 | DAISY DAVIS | II Bcom CA | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 24 | DEVIKA KRISHNAN | II Bcom CA | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 25 | DEVIKA VINU | II Bcom CA | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ |
| 26 | DINCY DAVIS | II Bcom CA | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 27 | DISNI DAVIS | II Bcom CA | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ |
| 28 | GAYATHRI K V | II Bcom CA | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ |
| 29 | GREESHMA K K | II Bcom CA | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 30 | JINU THOMAS | II Bcom CA | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |


| 31 | ANGEL THOMAS Bcom Finance |  | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 32 | ANITTA DANIEL | II Bcom Finance | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ |
| 33 | ARYA DEVI BHASI | II Bcom Finance | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 34 | BLESSY BABU | II Bcom Finance | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 35 | AMRUTHA PAUL | II BSc Mathematics | $\square$ |  | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ |
| 36 | CHRISTEENA DEVASSYKUTTY | II BSc Mathematics |  | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 37 | DEVIKA SAJI | II BSc Mathematics | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 38 | JANET JOYSON | II BSc Mathematics | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ |  |
| 39 | KRISHNANJANA M G | II BSc Mathematics | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ |
| 40 | NAZIYA N KHAN | II BSc Mathematics | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ |  |
| 41 | SAJANA SADANANDAN | II BSc Mathematics | $\square$ | $\square$ | $\square$ |  | $\square$ |  | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 42 | SMIJI JACOB | II BSc Mathematics | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ |  | $\square$ |  | $\square$ |
| 43 | SREELAKSHMI | II BSc Mathematics | $\square$ |  | $\square$ |  | $\square$ |  | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 44 | VINCY JOY | II BSc Mathematics |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 45 | DARSANA JOHN | II BSc Mathematics | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ | $\square$ | $\square$ |  | $\square$ | $\square$ |  | $\square$ | $\square$ |

## Department of

## Mathematics

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## THIS CERTIFICATE IS GIVEN TO

## DARSANA JOHN, II BSc Mathematics, Sacred Heart College, Chalakudy

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during the academic year 2018-19

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during the academic year 2018-19

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## DEVIKA SAJI, II BSc Mathematics,

 Sacred Heart College, Chalakudyfor successfully completing
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## Mathematics

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## THIS CERTIFICATE IS GIVEN TO

## CHRISTEENA DEVASSYKUTTY, II BSc Mathematics, Sacred Heart College, Chalakudy

for successfully completing
all the requirements of the add-on course on
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during the academic year 2018-19.

## Department of <br> Mathematics

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## Certificate of Completion

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## AMRUTHA PAUL, II BS Mathematics,

 Sacred Heart College, Chalakudyfor successfully completing
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## BLESSY BABU, II Bcom Finance,

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## Mathematics

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ARYA DEVI BHASI, II Bcom Finance, Sacred Heart College, Chalakudy
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## Mathematics

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## THIS CERTIFICATE IS GIVEN TO

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