K.S.R.M COLLEGE OF ENGINEERING

UGC-Autonomous
Kadapa,AP
www.ksrmce.ac.in

Dated: 20-09-2021

Lr./KSRMCE/Principal Office /2021-22/

Principal Office Orders

As per the decisions of the Academic Council meeting held on 09-09-2021 the undersigned members are been appointed as the Board of studies for MATHEMATICS Engineering for a period of 2 years.

S.No.	Name	Designation
1.	Prof. B. Rama Bhupal Reddy	Prof in Mathematics,KSRMCE
2.	Prof. G. Sankar Sekhar Raju	Principal,JNTUACE,Pulivendula
3	Prof. A. Mallikarjuna Reddy	Prof in Mathematics,YVU,Kadapa
4	Prof.V.Sugunamma	HOD,Dept.of mathematics,SVU,Tirupathi
5	Dr. D. Krishna Mohan Raju	Alumni
6	Sri. Y. Satheesh Kumar	Asst.Prof in Mathematics,KSRMCE
7	Dr.G.Radha	Asst.Prof in Mathematics,KSRMCE
8	Sri G.Sreedhar	Asst.Prof in Mathematics,KSRMCE
9	B.Veera Shankar	Asst.Prof in Mathematics,KSRMCE
10	Dr.V.Ramachandra Reddy	Asst.Prof in Mathematics,KSRMCE
11	Dr. Y. Bhavani Kumar	Industry Expert

The orders will come in to force for with immediate effect.

V.S.S. Murty

Principal

PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
KADAPA-516005, (A.P.)

Cc to:

The Management for information
The HoD of H&S for necessary actions
The Members for Information
The Website Committee for upload

BOARD OF STUDIES MEETING – 2021-22

K.S.R.M COLLEGE OF ENGINEERING

AUTONOMOUS

Minutes of the Meeting

Date	**22-09-2021**	**Day**	**Wednesday**
Time	**11:30 am – 1.00 pm**	**Venue**	**Virtual meeting: http://meet.google.com/uur-anad-wci**
Dept./SS	**Humanities and Sciences (Mathematics)**	**Convener**	**Dr. B. Rama Bhupal Reddy**

MembersPresent:10				**Members Absent: 00**		
S. No	**Name**	**Designation**	**Signature**	**S. No**	**Name**	**Designation**
1.	Prof. B. Rama Bhupal Reddy	Prof., Mathematics, KSRMCE	B Ramu			
2.	Prof .G. Sankara Sekhar Raju	Principal, JNTUP				
3.	Prof . A. Mallikarjuna Reddy	Prof., of Mathematics, Dept. of Mathematics, SK University				
4.	Prof. V. Sugunamma	HOD, Dept. of Mathematics, Sri Venkateswara University Tirupathi				
5.	Dr. Y. Bhavani Kumar	Industry person				
5.	Dr. D. Krishna Mohan Raju	Alumni				
6.	Dr. G. Radha	Associate Prof., KSRMCE	G. Radha			
7.	Sri. Y. Satheesh Kumar Reddy	Assistant Prof., KSRMCE				
8.	Sri. G. Sreedhar	Assistant Prof., KSRMCE	G. Sreedhar			
9.	Sri. B. Veera Sankar	Assistant Prof., KSRMCE	B. V.			
10.	Dr. V. Ramachandra Reddy	Assistant Prof., KSRMCE	Ramach			

Prof. B.Rama Bhupal Reddy, welcomed all the members to the meeting and presented the agenda of the meeting.

Theresolutionsare:

	Todo item	Discussion	Resolution	Coordinator/in-charge
1	To finalize the curriculum and syllabus for I Sem& II SemAI & ML Branchunder R20 Regulations.	The Board of Chairman has presented the syllabus designed by the faculty after taking the feedback from all stakeholders and comparing with premier institute syllabus	The committeediscussed and approved the syllabus of Linear Algebra & Calculus &Mathematics for Intelligent System	Prof. B.Rama Bhupal Reddy
2..	To finalize syllabus for III & IV Sem B.Techunder R20 regulations.	The Board of Chairman has presented the syllabus designed by the faculty after taking the feedback from all stakeholders and comparing with premier institute syllabus.	The committee has approved the syllabus with few suggestions for III & IV semesters subjects Special Functions & Complex Analysis , Probability Statistics & Numerical methods, Probability Theory & Statistical methods.	Prof. B.Rama Bhupal Reddy
3.	To finalize the syllabus for M.Tech under R18 Regulations.	The Board of Chairman has presented the syllabus designed by the faculty after taking the feedback from all stakeholders and comparing with premier institute syllabus.	The committee has approved the syllabus of Advanced Mathematics	Prof. B.Rama Bhupal Reddy

Prof. B.Rama Bhupal Reddyhave proposed the Vote of thanks and concluded the meeting.

B. Ramu

Convener

HOD H&S

Dr. I. SREEVANI M.Sc.,Ph.D.
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA 516 005

Course Title	PROBABILITY, STATISTICS AND NUMERICAL METHODS				B. Tech. IV Sem ME		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
2021402	BS	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	--	3	40	60	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs		

Course Objectives:

The objective of this course is to familiarize the student's knowledge in basic concepts and few techniques in probability and statistics in relation to the engineering applications. Also, to impart with numerical methods of solving the non-linear equations and interpolation.

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

CO1	Apply discrete and continuous probability distributions.
CO2	Infer the statistical inferential methods based on large sampling tests.
CO3	Infer the statistical inferential methods based on small sampling tests.
CO4	Determine the roots of polynomial and transcendental equations by different methods.
CO5	Estimate an unknown quantity by using related known values.

UNIT-I: Probability

Explaining basic concepts of Random variables (Without Problems) - Probability distributions: Binomial - Poisson approximation to the binomial distribution and normal distribution-their properties.

Learning Outcomes:

At the end of this unit, the student will be able to

- apply Binomial and Poisson distributions for real data to compute probabilities and theoretical frequencies
- interpret the properties of normal distribution and its applications.

UNIT-II: Testing of Hypothesis

Formulation of null hypothesis, critical regions, level of significance. Large sample tests. Tests based on normal distribution –z -test for means and proportions.

Learning Outcomes:

At the end of this unit, the student will be able to

- explain the concept of hypothesis and confidence intervals.
- apply the concept of hypothesis for testing of large samples.

UNIT-III: Small Sample Tests

t-test for one sample, two samples problem and paired t-test. F-test - Chi-square test (testing of goodness of fit and independence).

Learning Outcomes:

At the end of this unit, the student will be able to

- apply the concept of testing hypothesis for small samples to draw the valid inferences
- estimate the goodness of fit

UNIT-IV:

Solution of algebraic and transcendental equations: Bisection method – False - position method – Newton - Raphson method.

Solution of System of equations: Jacobi's iteration method – Gauss- Seidel iteration method.

Learning Outcomes:

After completion of this unit, the student will be able to

- find approximate roots of an equation by using different numerical methods
- find solution of system of equations by using different numerical methods

UNIT-V: Interpolation

Finite differences - Forward differences - Backward differences - Newton's forward and backward difference formulae for interpolation - Lagrange's formula for unequal intervals- Inverse interpolation.

Learning Outcomes:

After completion of this unit, the student will be able to

- explain various operators and find the relation among operators
- apply Newton's forward and backward formulae for equal intervals
- apply Lagrange's formula to find inverse interpolation

Textbooks:

1. Higher Engineering Mathematics, B. S. Grewal, 44/e, Khanna Publishers, 2017.
2. Probability & Statistics for Engineers & Scientists, Walpole, Myers, Myers, Ye, Seventh Edition, Pearson Education Asia.
3. Applied Numerical Analysis, Curtis F.Gerald, Patrick O.Wheatley, Seventh Edition, Pearson Education.
4. Numerical Methods, P. Kandasamy, K. Thilagavathy, K. Gunavathi, S. Chand & Company, 2/e, Reprint 2012.

References:

1. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Publications, 9th edition-2013.
2. A text book of Engineering Mathematics, N.P. Bali and Manish Goyal,Laxmi Publications, Reprint, 2010.
3. Numerical Methods, S Arumugam, A.Thangapandi Issac, A Somasundaram SCITECH Publishers, Second edition Reprint 2013.
4. Probability and Statistics for Engineers, Johnson, Fifth edition, Prentice Hall of India.

Dr. I. SREEVANI M.Sc.,Ph.D
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005

Course Title	Special Functions and Complex Analysis				B. Tech. III Sem ECE		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
2021301	BS	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	-	--	3	40	60	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs		

Course Objectives:

The objective of this course is to familiarize the student's knowledge on Bessel functions, Legendre's polynomials. The concepts of complex variables to equip the students to solve application problems.

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

CO 1	**Discuss** Bessel functions and Legendre's polynomials.
CO 2	**Determine** the differentiation of complex functions used in engineering problems and construction of analytic functions.
CO 3	**Analyze** images from z-plane to w-plane.
CO 4	**Determine** complex integration along the path.
CO 5	**Apply** Residue theorem to evaluate real definite integrals.

UNIT I

Bessel functions –Introduction – Recurrence formulae for $J_n(x)$ – Generating function for $J_n(x)$ – Jacobi series – Orthogonality of Bessel functions – Legendre's equation – Rodrigue's formula, Legendre Polynomials – Generating function for $P_n(x)$ - Recurrence formulae for $P_n(x)$ – Orthogonality of Legendre polynomials.

Learning Outcomes:

- After completion of this unit, the student will be able to solve Bessel and Legendre's equations in terms of polynomials.

UNIT II

Functions of a complex variable – Limit – Continuity -Differentiability – Analytic function – Properties – Cauchy – Riemann equations in cartesian and polar coordinates – Harmonic and Conjugate harmonic functions. Construction of analytic function using Milne's - Thomson method.

Learning Outcomes:

After completion of this unit, the student will be able to

- define continuity and differentiability of complex functions.
- apply Cauchy-Riemann equations to complex functions in order to determine the given complex function is analytic.

UNIT III

Conformal Mapping: Some standard transforms – translation, rotation, magnification, inversion and reflection. Bilinear transformation – invariant points. Special conformal transformations: $w = e^z$, z^2, sinz and cosz.

Learning Outcomes:

- After completion of this unit, the student will be able to analyze images from z-plane to w-plane.

UNIT IV

Complex integration: Line integral - Evaluation along a path – Cauchy's theorem – Cauchy's integral formula – Generalized integral formula. Singular point – Isolated singular point – Simple pole, Pole of order *m* – Essential singularity.

Learning Outcomes:

- After completion of this unit, the student will be able to make use of integration concepts for complex functions.

UNIT V

Residues: Evaluation of residues. Cauchy's residue theorem – Evaluation of the real definite integrals of the type (i) Integration around the unit circle $\int_0^{2\pi} f(cos\theta, sin\theta)d\theta$ and (ii) integration around a small semi circle $\int_{-\infty}^{\infty} f(x)dx$

Learning Outcomes:

After completion of this unit, the student will be able to

- make use of the Cauchy's residue theorem to evaluate certain integrals.
- analyze real definite integrals in definite regions.

Text Books:

1. Higher Engineering Mathematics, Dr. B.S Grewal, Khanna Publishers-44 edition, 2017.
2. Advanced Engineering Mathematics, Erwin Kreyszig, Willey Publications, 10th edition Reprint 2021.
3. Advanced Engineering Mathematics, Neil Opeter V
4. Advanced Engineering Mathematics, Greenberg Michael D, Cengage Publishers.

Reference Books:

1. Higher Engineering Mathematics, B.V.Ramana, Mc.Graw Hill Education (India) Private Limited.
2. Advanced Engineering Mathematics by N. Bali, M Goyal & C.Watkins Firewall Media 17th edition Reprint 2015.
3. Engineering Mathematics, Volume – III, E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.
4. Calculus an introduction to applied Mathematics, Greenspan Harvey P Benney David J Turner James E

Dr. I. SREEVANI M.Sc.,Ph.D.
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005

Course Title	PROBABILITY THEORY AND STATISTICAL METHODS				B. Tech. IV Sem CSE		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
2021405	BS	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	--	--	3	40	60	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs			

Course Objectives:

- To help the students in getting a thorough understanding of the fundamentals of probability.
- To help the students in getting a thorough understanding and usage of statistical techniques like testing of hypothesis and statistical quality control.

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

CO 1	Understand the concepts of Probability and random variables.
CO 2	Interpret the properties of probability distributions and their applications.
CO 3	Analyze the problems of engineering and industry using the techniques of testing of hypothesis for large samples.
CO 4	Analyze the problems of engineering and industry using the techniques of testing of hypothesis for small samples.
CO 5	Apply statistical quality control and draw appropriate inferences for engineering problems.

UNIT I: Random variables

Discrete random variables – Continuous random variables –Probability distribution function – Discrete and continuous probability distribution – Mathematical Expectation, Variance and standard deviation of probability distribution.

Learning Outcomes:

At the end of this unit, the student will be able to

- explain the notion of random variables, distribution functions and expected value.

UNIT II

Discrete distributions: Binomial and Poisson distributions with related properties.

Continuous distributions: Uniform and Normal distributions with related properties.

Learning Outcomes:

At the end of this unit, the student will be able to

- apply Binomial and Poisson distributions for real data to compute probabilities and theoretical frequencies
- interpret the properties of normal distribution and its applications.

UNIT III: Testing of Hypothesis

Formulation of null hypothesis, critical regions, level of significance. Large sample tests. Tests based on normal distribution – z -test for means and proportions.

Learning Outcomes:

At the end of this unit, the student will be able to

- explain the concept of hypothesis and confidence intervals.
- apply the concept of hypothesis for testing of large samples.

UNIT IV: Small samples

t-test for one sample, two samples problems and paired t-test. F-test – Chi-square test (testing of goodness of fit and independence).

Learning Outcomes:
At the end of this unit, the student will be able to

- apply the concept of testing hypothesis for small samples to draw the valid inferences
- estimate the goodness of fit

UNIT V: Statistical Quality Control

Concept of quality of a manufactured product – defect and defectives – Causes of variation – Random and assignable causes – The principle of Shewhart control chart – Charts for attributes and variable quality characteristics – Construction and operation of X-bar chart and R-chart, p-chart and c-chart.

Learning Outcomes:
At the end of this unit, the student will be able to

- apply the concept of statistical quality control to draw different charts and draw the inferences from them.

Text Books:

1. Higher Engineering Mathematics, Dr. B.S.Grewal, Khanna Publishers-44 edition.
2. Probability and Statistics for Engineers and Scientists, Walpole and Myers, Seventh edition, Pearson Education Asia, 2002
3. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Publications, 9th edition- 2013.
4. An Introduction to Probability theory and its applications, William Feller

Reference Books:

1. Probability and Statistics by E. Rukmangadachari & E. Keshava Reddy, Pearson Publishers.
2. Statistical Methods by S.P.Gupta, S Chand Publications, 44th revised edition 2014.
3. Probability and Statistics for Engineers, Johnson, Fifth edition, Prentice Hall of India.
4. Probability & Statistics, Mendenhall Beaver, Beaver

Dr. I. SREEVANI M.Sc.,Ph.D.
Head of Humanities & Sciences
K.S.R.M College of Engineering
KADAPA - 516 005

Course Title	PROBABILITY, STATISTICS AND NUMERICAL METHODS				B. Tech. III Sem CE		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
2021302	BS	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	--	3	40	60	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs		

Course Objectives:

The objective of this course is to familiarize the student's knowledge in basic concepts and few techniques in probability and statistics in relation to the engineering applications. Also, to impart with numerical methods of solving the non-linear equations and interpolation.

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

CO1	Apply discrete and continuous probability distributions.
CO2	Infer the statistical inferential methods based on large sampling tests.
CO3	Infer the statistical inferential methods based on small sampling tests.
CO4	Determine the roots of polynomial and transcendental equations by different methods.
CO5	Estimate an unknown quantity by using related known values.

UNIT-I: Probability

Explaining basic concepts of Random variables (Without Problems) - Probability distributions: Binomial - Poisson approximation to the binomial distribution and normal distribution-their properties.

Learning Outcomes:

At the end of this unit, the student will be able to

- apply Binomial and Poisson distributions for real data to compute probabilities and theoretical frequencies
- interpret the properties of normal distribution and its applications.

UNIT-II: Testing of Hypothesis

Formulation of null hypothesis, critical regions, level of significance. Large sample tests. Tests based on normal distribution –z -test for means and proportions.

Learning Outcomes:

At the end of this unit, the student will be able to

- explain the concept of hypothesis and confidence intervals.
- apply the concept of hypothesis for testing of large samples.

UNIT-III: Small Sample Tests

t-test for one sample, two samples problem and paired t-test. F-test - Chi-square test (testing of goodness of fit and independence).

Learning Outcomes:

At the end of this unit, the student will be able to

- apply the concept of testing hypothesis for small samples to draw the valid inferences
- estimate the goodness of fit

UNIT-IV:

Solution of algebraic and transcendental equations: Bisection method – False - position method – Newton - Raphson method.

Solution of System of equations: Jacobi's iteration method – Gauss- Seidel iteration method.

Learning Outcomes:

After completion of this unit, the student will be able to

- find approximate roots of an equation by using different numerical methods
- find solution of system of equations by using different numerical methods

UNIT-V: Interpolation

Finite differences - Forward differences - Backward differences - Newton's forward and backward difference formulae for interpolation - Lagrange's formula for unequal intervals- Inverse interpolation.

Learning Outcomes:

After completion of this unit, the student will be able to

- explain various operators and find the relation among operators
- apply Newton's forward and backward formulae for equal intervals
- apply Lagrange's formula to find inverse interpolation

Textbooks:

1. Higher Engineering Mathematics, B. S. Grewal, 44/e, Khanna Publishers, 2017.
2. Probability & Statistics for Engineers & Scientists, Walpole, Myers, Myers, Ye, Seventh Edition, Pearson Education Asia.
3. Applied Numerical Analysis, Curtis F.Gerald, Patrick O.Wheatley, Seventh Edition, Pearson Education.
4. Numerical Methods, P. Kandasamy, K. Thilagavathy, K. Gunavathi, S. Chand & Company, 2/e, Reprint 2012.

References:

1. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Publications, 9th edition-2013.
2. A text book of Engineering Mathematics, N.P. Bali and Manish Goyal,Laxmi Publications, Reprint, 2010.
3. Numerical Methods, S Arumugam, A.Thangapandi Issac, A Somasundaram SCITECH Publishers, Second edition Reprint 2013.
4. Probability and Statistics for Engineers, Johnson, Fifth edition, Prentice Hall of India.

Dr. I. SREEVANI M.Sc.,Ph.D.
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005

Course Title	Special Functions and Complex Analysis				B. Tech. IV Sem EEE		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
2021401	BS	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	-	--	3	40	60	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs		

Course Objectives:

The objective of this course is to familiarize the student's knowledge on Bessel functions, Legendre's polynomials. The concepts of complex variables to equip the students to solve application problems.

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

CO 1	**Discuss** Bessel functions and Legendre's polynomials.
CO 2	**Determine** the differentiation of complex functions used in engineering problems and construction of analytic functions.
CO 3	**Analyze** images from z-plane to w-plane.
CO 4	**Determine** complex integration along the path.
CO 5	**Apply** Residue theorem to evaluate real definite integrals.

UNIT I

Bessel functions –Introduction – Recurrence formulae for $J_n(x)$ – Generating function for $J_n(x)$ – Jacobi series – Orthogonality of Bessel functions – Legendre's equation – Rodrigue's formula, Legendre Polynomials – Generating function for $P_n(x)$ - Recurrence formulae for $P_n(x)$ – Orthogonality of Legendre polynomials.

Learning Outcomes:

- After completion of this unit, the student will be able to solve Bessel and Legendre's equations in terms of polynomials.

UNIT II

Functions of a complex variable – Limit – Continuity -Differentiability – Analytic function – Properties – Cauchy – Riemann equations in cartesian and polar coordinates – Harmonic and Conjugate harmonic functions. Construction of analytic function using Milne's - Thomson method.

Learning Outcomes:

After completion of this unit, the student will be able to

- define continuity and differentiability of complex functions.
- apply Cauchy-Riemann equations to complex functions in order to determine the given complex function is analytic.

UNIT III

Conformal Mapping: Some standard transforms – translation, rotation, magnification, inversion and reflection. Bilinear transformation – invariant points. Special conformal transformations: $w = e^z$, z^2, sinz and cosz.

Learning Outcomes:

- After completion of this unit, the student will be able to analyze images from z-plane to w-plane.

UNIT IV

Complex integration: Line integral - Evaluation along a path – Cauchy's theorem – Cauchy's integral formula – Generalized integral formula. Singular point – Isolated singular point – Simple pole, Pole of order m – Essential singularity.

Learning Outcomes:

- After completion of this unit, the student will be able to make use of integration concepts for complex functions.

UNIT V

Residues: Evaluation of residues. Cauchy's residue theorem – Evaluation of the real definite integrals of the type (i) Integration around the unit circle $\int_0^{2\pi} f(cos\theta, sin\theta)d\theta$ and (ii) integration around a small semi circle $\int_{-\infty}^{\infty} f(x)dx$

Learning Outcomes:

After completion of this unit, the student will be able to

- make use of the Cauchy's residue theorem to evaluate certain integrals.
- analyze real definite integrals in definite regions.

Text Books:

1. Higher Engineering Mathematics, Dr. B.S Grewal, Khanna Publishers-44 edition, 2017.
2. Advanced Engineering Mathematics, Erwin Kreyszig, Willey Publications, 10th edition Reprint 2021.
3. Advanced Engineering Mathematics, Neil Opeter V
4. Advanced Engineering Mathematics, Greenberg Michael D, Cengage Publishers.

Reference Books:

1. Higher Engineering Mathematics, B.V.Ramana, Mc.Graw Hill Education (India) Private Limited.
2. Advanced Engineering Mathematics by N. Bali, M Goyal & C.Watkins Firewall Media 17th edition Reprint 2015.
3. Engineering Mathematics, Volume – III, E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.
4. Calculus an introduction to applied Mathematics, Greenspan Harvey P Benney David J Turner James E

Dr. I. SREEVANI M.Sc.,Ph.D.
Head of Humanities & Sciences
K.S.R.M College of Engineering
KADAPA - 516 005

Course Title	Mathematics for Intelligent System (R20)				B. Tech. II Sem CSE-AI&ML		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
2021204	BS	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		2	0	--	2	40	60	100
Mid Exam Duration: 2Hours					End Exam Duration: 3Hours		

Course Objectives:

- This course will illuminate the students in the concepts of application orientation of Mathematics.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

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

CO 1	Develop the use of matrix techniques that is needed by engineers for practical applications.
CO 2	Utilize sequences and series to real life problems.
CO 3	Apply first order differential equations.
CO 4	Evaluate ordinary differential equations of higher order.
CO 5	Apply curvature concepts in engineering problems.

UNIT I: Gaussian Elimination (08 Hours)

Introduction – Matrix notation and Matrix multiplication - Gaussian elimination – Triangular Factorization methods.

Learning Outcomes:
At the end of this unit, the student will be able to

- apply direct methods to solve system of equations.

UNIT II: Sequences and series (08 Hours)
Convergence of sequences and series – Comparison test – p test – D'Alemberts ratio test – Cauchy's root test (without proofs).

Learning Outcomes:
At the end of this unit, the student will be able to

- find the limit of the sequences in convergence or divergence of the iterative procedures
- apply various tests of convergence in getting the limit values

UNIT – III: First order ordinary differential equations (08 Hours)
Linear, Bernoulli equations. Applications: Orthogonal trajectories, Newton's law of cooling, Law of natural growth and decay.

Learning Outcomes:
At the end of this unit, the student will be able to

- solve first order ordinary differential equations
- apply first order ordinary differential equation to practical problems.

UNIT IV: Ordinary differential equations of higher order (08 Hours)
Linear differential equations of second and higher order with constant coefficients – R.H.S term of the type e^{ax}, sinax, cosax, polynomials in x, e^{ax} V(x), xV(x).

Learning Outcomes:
At the end of this unit, the student will be able to

- analyze and interpret the solutions of the differential equations.

UNIT V: Differential Calculus (08 Hours)
Curvature: Curvature of a curve – Curvature of a circle – Radius of a curvature – Centre of Curvature – Equation to the circle of curvature.

Learning Outcomes:

At the end of this unit, the student will be able to

- evaluate radius of curvature
- find equation of circle of curvature

Text Books:

1. Higher Engineering Mathematics, Dr. B.S. Grewal, Khanna Publishers-44 edition 2017.

2. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Publications, 10th edition-Reprint 2021.
3. Advanced Engineering Mathematics, Neil Opeter V

4. Advanced Calculus, Widder V David

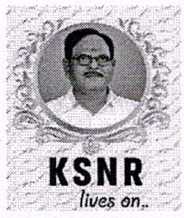
Reference Books:

1. Higher Engineering Mathematics, B.V. Ramana, Mc. Graw Hill Education (India) Pvt. Ltd, New Delhi, 11th Edition, Reprint 2010.
2. Linear Algebra: A Modern Introduction, D Poole, 2nd Edition, Brooks/Cole, 2005.
3. A Text Book of Engineering Mathematics, N.P. Bali and Manish Goyal, Lakshmi Publications, Reprint 2008
4. Calculus an introduction to Applied Mathematics, Greenspan Harvey P Benney David J Turner James E

Dr. I. SREEVANI M.Sc.,Ph.D.
Head of Humanities & Sciences
K.S.R.M College of Engineering
KADAPA - 516 005

K.S.R.M. COLLEGE OF ENGINEERING

(AUTONOMOUS)
Pulivendula Road, Kadapa-516 005
Andhra Pradesh, India
Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu.
An ISO 14001:2004 & 9001: 2015 Certified Institution



Artificial Intelligence & Machine Learning

Curriculum

B.Tech. I Sem (R20UG)

S.No.	Course Code	Course Name	Category	Hours per Week			IM	EM	Credits
				L	T	P	40	60	
1	2021101	Linear Algebra & Calculus	BSC	3	0	0	40	60	3
2	2023103	Environmental Chemistry	BSC	3	0	0	40	60	3
3	2039103	Problem Solving with Algorithmic thinking	ESC	2	0	0	40	60	2
4	2024104	Professional Communication	HS	2	0	0	40	60	2
5	2039105	Python Programming	ESC	3	0	0	40	60	3
6	2013106	Introduction to Digital Manufacturing	ESC	2	0	0	40	60	2
7	20AG107	Agriculture for Engineers & Field Activity Lab	BSC	-	0	3	40	60	1.5
8	2039108	Problem Solving using C Lab	ESC	-	0	3	40	60	1.5
9	2039109	Python Programming Lab	ESC	-	0	3	40	60	1.5
10	20MC110	Indian Traditional Knowledge	MC	3	0	0	40	--	---
		Total					**400**	**540**	**19.5**

Dr. I. SREEVANI M.Sc.,Ph.D
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005

AI & ML

B.Tech. II Sem (R20UG)									
S.No.	Course Code	Course Name	Category	Hours per Week			IM	EM	Credits
				L	T	P	40	60	
1	2023201	Biology for Engineers	BSC	2	0	0	40	60	2
2	20AP202	Applied Physics	BSC	2	0	0	40	60	2
3	2039202	Introduction to machine learning	ESC	1	0	0	40	--	0
4	2039203	Data Structures	ESC	3	0	0	40	60	3
5	2021204	Mathematics for Intelligent Systems	BSC	2	0	0	40	60	2
6	2039205	Object Oriented Programming through Java	ESC	3	0	0	40	60	3
7	2014206	Principles of Measurements & Sensors	ESC	3	0	0	40	60	3
8	2039207	Data Structures Lab	ESC	0	0	3	40	60	1.5
9	2024209	Communication Skills lab	HS	0	0	3	40	60	1.5
10	2039208	Java Programming Lab	ESC	0	0	3	40	60	1.5
11	20MC211	Community work / NSS	MC	2	0	0	40	--	0
		Total					**440**	**540**	**19.5**

Dr. I. SREEVANI M.Sc.,Ph.D.
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005

CE

B.Tech. - III Semester

Course Code	Category	Course Title	Hours / Week			IM	EM	CR
			L	T	P			
2021302	BSC	Probability,Statistics&NumericalMethods	3	0	0	40	60	3
2001302	ESC	Geology and Building materials	3	0	1	40	60	3.5
2001303	PCC	Advanced Strength of materials	3	1	0	40	60	4
2001304	PCC	Fluid Mechanics	3	0	0	40	60	3
2001305	PCC	Geomatics	3	0	0	40	60	3
2001306	PCC(LAB)	Fluid Mechanics Laboratory	0	0	3	40	60	1.5
2001307	PCC(LAB)	Geomatics Lab	0	0	3	40	60	1.5
20013S1	SOC	CivilEngineeringWorkshop(Skilloriented)	1	0	2	40	60	2
Total Credits			**16**	**1**	**9**	**320**	**480**	**21.5**

B.Tech. - IV Semester

CourseCode	Category	CourseTitle	Hours/Week			IM	EM	CR
			L	T	P			
2025401	HSS	BusinessEconomicsandAccountingfor Engineers	3	0	0	40	60	3
2001402	PCC	Hydraulics &HydraulicMachinery	3	0	0	40	60	3
2001403	PCC	Soil Mechanics	3	0	0	40	60	3
2001404	PCC	StructuralAnalysis	3	0	0	40	60	3
2001405	PCC	Transportation Engineering	3	0	0	40	60	3
2001406	BSC(LAB)	Building Planning and Drawing (AutoCAD)	0	0	3	40	60	1.5
2001407	PCC(LAB)	Soil Mechanics Laboratory	0	0	3	40	60	1.5
2001408	PCC(LAB)	Transportation Engineering Laboratory	0	0	3	40	60	1.5
20014S2	SOC	Advanced Civil Engineering Workshop (Skilloriented-2)	1	0	2	40	60	2
2024410	HSMC	Universal HumanValues	3	0	0	40	60	3
Total			**19**	**0**	**11**	**400**	**600**	**24.5**

Dr. I. SREEVANI M.Sc.,Ph.D.
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005

III Semester (Theory - 05, Lab - 03)

EEE

S. No.	Subject Code	SUBJECT	SC	L	T	P	IM	EM	CR
1	2002301	Switching Theory & Logic Design	PCC	3	0	0	40	60	3
2	2002302	Electromagnetic Field Theory	PCC	3	0	0	40	60	3
3	2002303	Electrical Circuit Analysis - II	PCC	3	0	0	40	60	3
4	2002304	Electrical Measurements & Measuring Instruments	PCC	3	0	0	40	60	3
5	2002305	DC Machines & Transformers	PCC	3	0	0	40	60	3
6	2002306	Electrical Circuit Analysis - II Lab	PCC	0	0	3	40	60	1.5
7	2002307	Electrical Measurements & Measuring Instruments Lab	PCC	0	0	3	40	60	1.5
8	2002308	DC Machines & Transformers Lab	PCC	0	0	3	40	60	1.5
9	2002309	Skill Oriented Course	SC	1	0	2	40	60	2
10	2025310	Human Values & Professional Ethics	HSMC	2	0	0	40	60	3
Total				18	00	11	400	600	24.5

IV Semester (Theory - 05, Lab - 03)

S. No.	Subject Code	SUBJECT	SC	L	T	P	IM	EM	CR
1	2021401	Special Functions & Complex Analysis	BSC	3	0	0	40	60	3
2	2025402	Fundamentals of Management for Engineers	HSMC	3	0	0	40	60	3
3	2002403	Induction Motors & Synchronous Machines	PCC	3	0	0	40	60	3
4	2002404	Linear Control Systems	PCC	3	0	0	40	60	3
5	2002405	Power Systems - I	PCC	3	0	0	40	60	3
6	2002406	Induction Motors & Synchronous Machines Lab	PCC	0	0	3	40	60	1.5
7	2002407	Control Systems Lab	PCC	0	0	3	40	60	1.5
8	2005408	Python Programming Lab	ESC	0	0	3	40	60	1.5

Dr. I. SREEVANI M.Sc.,Ph.D
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005

B. Tech. - III semester ME

Course Code	Category	Course title	Hours / Week			IM	EM	CR
			L	T	P			
2003301	ESC	Fundamentals of Statistics and Dynamics.	3	0	0	40	60	3
2003302	ESC	Fluid Mechanics &Hydraulic Machinery	3	0	0	40	60	3
2003303	PCC	Manufacturing processes	3	0	0	40	60	3
2003304	PCC	Engineering Thermodynamics	3	0	0	40	60	3
2003305	ESC	Mechanics of Materials	3	0	0	40	60	3
2003306	ESC	Fluid Mechanics &Hydraulic Machinery Lab	0	0	3	40	60	1.5
2003307	PCC	Manufacturing Technology Lab	0	0	3	40	60	1.5
2003308	ESC	Mechanics of Materials Lab	0	0	3	40	60	1.5
2003309	SC	Skill oriented course (CATIA)	1	0	2	40		2
			16	1	11	360	480	21.5

B. Tech. - IV Semester

Course Code	Category	Course title	Hours/Week			IM	EM	CR
			L	T	P			
2025401	HSS	Business Economics and Accounting for Engineers	3	0	0	40	60	3
2021401	BSC	Probability Statics and Numerical methods	3	0	0	40	60	3
2003403	PCC	Applied Thermodynamics	3	0	0	40	60	3
2003404	PCC	Kinematics of Machines	3	0	0	40	60	3
2025405	PCC	Machine tools	3	0	0	40	60	3
2003406	PCC (LAB)	Applied Thermodynamics lab	0	0	3	40	60	1.5
2003407	PCC (LAB)	Manufacturing Technology Lab-II	0	0	3	40	60	1.5
2003408	PCC (LAB)	Computer Aided Machine Drawing.	0	0	3	40	60	1.5
2003409	SOC	Skill Oriented Course – II CNC Programming and simulation.	1	0	2	40	60	2
2025410	HSMC	Universal Human Values	3	0	0	40	60	3
Total			**19**	**0**	**11**	**400**	**600**	**24.5**

Dr. I. SREEVANI M.Sc.,Ph.D.
Head of Humanities & Sciences
K.S.R.M College of Engineering
KADAPA - 516 005

Proposed Course Structure (R20) – II Year **Dept: ECE**

Semester-III									
S.No	**Code**	**Course Name**	**Category**	**L**	**T**	**P**	**IM**	**EM**	**Credits**
1.	2021301	Special Functions and Complex Analysis	BSC	3	0	0	40	60	3
2.	2004301	Signals and Systems	PC	3	0	0	40	60	3
3.	2004302	Digital System Design	PC	3	0	0	40	60	3
4.	2004303	Analog Circuits	PC	3	0	0	40	60	3
5.	2004304	Network theory	PC	3	0	0	40	60	3
6.	2004305	Simulation Lab	PC	0	0	3	40	60	1.5
7.	2004306	Digital System Design Lab	PC	0	0	3	40	60	1.5
8.	2004307	Analog Circuits Lab	PC	0	0	3	40	60	1.5
9.	20SC308	Python Programming (Skilled Course - I)	SC	1	0	2	40	60	2
10.	2024310	Universal Human Values	HS	3	0	0	40	60	3
Total									**24.5**

Semester-IV									
S.No	**Code**	**Course Name**	**Category**	**L**	**T**	**P**	**IM**	**EM**	**Credits**
1.	2025401	Business Economics and Accounting for Engineers	BSC	3	0	0	40	60	3
2.	2021403	Probability Theory & Stochastic Processes	PC	3	0	0	40	60	3
3.	2004403	Microprocessors and Microcontrollers	PC	3	0	0	40	60	3
4.	2004404	EM Waves and Transmission Lines	PC	3	0	0	40	60	3
5.	2004405	Linear and Digital IC Applications	PC	3	0	0	40	60	3
6.	2004406	Linear and Digital IC Applications Lab	PC	0	0	3	40	60	1.5
7.	2004407	Microprocessors and Microcontrollers Lab	PC	0	0	3	40	60	1.5
8.	2004408	LabView Programming Lab	PC	0	0	3	40	60	1.5
9.	20SC409	PCB Design (Skilled Course –II)	SC	1	0	2	40	60	2
Total									**21.5**
		Community Service Project(Mandatory) for 6 weeks duration during summer vacation							

Dr. T. SREEVANI M.Sc.,Ph.D
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005

Department of Computer Science & Engineering

R20 Course Structure

IV Semester(Theory-05, Lab-03)

S.No.	Subject Code	SUBJECT	SC	L	T	P	IM	EM	CR
1	2004401	Microprocessors & Microcontrollers	ESC	3	0	0	40	60	3
2	2005402	Computer Organization	PCC	3	0	0	40	60	3
3	2005403	Principles of Operating Systems	PCC	3	0	0	40	60	3
4	2005404	Digital Logic Circuits & Design	PCC	3	0	0	40	60	3
5	2021405	Probability Theory & StatisticalMethods	BSC	3	0	0	40	60	3
6	2004406	Microprocessors & Microcontrollers Lab	ESC	0	0	3	40	60	1.5
7	2005407	Principles of Operating Systems Lab	PCC	0	0	3	40	60	1.5
8	2005408	Digital Logic Design Lab	PCC	0	0	3	40	60	1.5
9	2005409	Skill Oriented Course Advanced Python Programming	SC	0	0	4	40	60	2.0
10	20MC410	Universal Human Values	MC	3	0	0	40	60	3.0
Total				18	00	13	400	600	24.5

Dr. I. SREEVANI M.Sc.,Ph.D.
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005