Koneru Lakshmaiah Education Foundation
(Category -1, Deemed to be University estd. u/s. 3 of the UGC Act, 1956)
Accredited by **NAAC** as 'A++' Grade University ❖Approved by AICTE ❖ ISO 9001-2015 Certified
Campus: Green Fields, Vaddeswaram - 522 502, Guntur District, Andhra Pradesh, INDIA.
Phone No. 0863 - 2399999, www.klef.ac.in; www.klef.edu.in; www.kluniversity.in
Admin Off: 29-36-38, Museum Road, Governorpet, Vijayawada - 520 002. Ph: +91 - 866 -2577715, Fax: +91-866-2577717.

To
The Dean –Academics
K L Deemed University
Vaddeswaram.

BOS No.08/2019-20

Dear Sir,

Sub: Minutes of the BOS Meeting, Department of Mathematics held on 25-06-2019 in F-008(Conference Hall) from 10.00 A.M.-Reg.,

Greetings to you.

Department of Mathemtics, K.L.E.F. has conducted BOS meeting on 25-06-2019 in F-008(Conference Hall) from 10.00A.M. Here I am submitting Minutes of meeting for your kind Perusal.

Thanking You,

Yours sincerely

25/6/2019

Dr B.V.Appa Rao,
Chairman BOS,
Department of Mathematics,

Dr. B.V. APPA RAO
Professor & Head
Department of Mathematics
(Deemed to be University)
Green Fields, Vaddeswaram-522 502,
Guntur Dist., A.P., India.

Koneru Lakshmaiah Education Foundation
(Category -1, Deemed to be University estd. u/s. 3 of the UGC Act, 1956)
Accredited by NAAC as 'A++' Grade University ❖Approved by AICTE ❖ ISO 9001-2015 Certified
Campus: Green Fields, Vaddeswaram - 522 502, Guntur District, Andhra Pradesh, INDIA.
Phone No. 0863 - 2399999; www.klef.ac.in; www.klef.edu.in; www.kluniversity.in
Admin Off: 29-36-38, Museum Road, Governorpet, Vijayawada - 520 002. Ph: +91 - 866 -2577715, Fax: +91-866-2577717.

Department of Mathematics

BOS No. 07/2018-19

Minutes of the BOS meeting, Mathematics Department held on 25-06-2019 in F-008(Conference Hall) from 10.00 A.M.

The following members present in the meeting:

1. Dr.Pranvir S.Satvat, Dean(Academics), Internal Member.
2. Dr.B.V.Appa Rao, Chairman-BOS, Professor & H.O.D., Department of Mathematics, K.L.E.F.
3. Dr.K.Jayarami Reddy, Internal Member, Professor, Department of Mathematics, K.L.E.F.
4. Dr.Y.V.S.S.Sanyasi Raju, Academic Expert, Professor, Department of Mathematics, IIT, Madras.
5. Dr.Debasish Dutta, Academic Expert, Professor & H.O.D., Department of Mathematics, NIT, Warangal.
6. Dr.M.Mutyala Rao, Industry Expert, Scientist/Engineer, Applied Mathematics Division, ISRO, Trivandrum.
7. Dr.B.Nageswara Rao, Subject Expert, Professor, Department of Mathematics, K.L.E.F.
8. Mr.Hari Kiran, V, Subject Expert, Professor & H.O.D., Department of C.S.E., K.L.E.F.
9. Dr.V.Vasanta Kumar, Internal Member, Professor, Department of Mathematics, K.L.E.F.
10. Dr.Ch.V.Ramanamurthy, Internal Member, Professor, Department of Mathematics, K.L.E.F.
11. Dr.V.S.Bhagavan, Internal Member, Professor, Department of Mathematics, K.L.E.F.
12. Dr.G.V.Ramana Reddy, Internal Member, Professor, Department of Mathematics, K.L.E.F.
13. Dr.N.Srimannarayana, Internal Member, Professor, Department of Mathematics, K.L.E.F.
14. Dr.K.Prasad, Internal Member, Professor, Department of Mathematics, K.L.E.F.
15. Dr.V.B.V.N.Prasad, Internal Member, Professor, Department of Mathematics, K.L.E.F.
16. Dr.P.Kousalya, Internal Member, Professor, Department of Mathematics, K.L.E.F.
17. Dr.G.Suresh Kumar, Internal Member, Associate Professor, Department of Mathematics, K.L.E.F.
18. Dr.T.Srinivasa Rao, Internal Member, Associate Professor, Department of Mathematics, K.L.E.F.
19. Dr.K.Rajya Lakshmi, Internal Member, Assistant Professor, Department of Mathematics, K.L.E.F.
20. Dr.Pavan Kumar, Internal Member, Assistant Professor, Department of Mathematics, K.L.E.F.

25/6/2019

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 502,
Guntur Dist., A.P., India.

Dr.B.V.Appa Rao, Chairman of BOS opened the meeting by welcoming and introducing the external members, to the internal and co-opted members and thanked them for accepting to become the member of the Board of Studies.

After due deliberations, the following resolutions have been adopted:

AGENDA ITEMS

1. To revise the existing structure of 2018-19 M.Sc.(Applied Mathematics) program.
2. To approve the list of scholars admitted into Ph.D. Program in Mathematics during January, 2019, their Research Guides, Doctoral Committees and Pre-Ph.D. syllabus.
3. To revise the syllabus of Continuum Mechanics (18AM2112) course.
4. Removing the Technical Skill component from Transform Techniques (18AM1208) course and introducing new technical skill course.
5. Review of Program Outcomes.
6. Review of Revised M.Sc. (Applied Mathematics) Curriculum with effect from 2019-20 with new Elective Streams as application areas.
   1. ELECTIVE STREAM: CRYPTOGRAPHY & CYBER SECURITY.
   2. ELECTIVE STREAM: DATA ANALYTICS.
   3. ELECTIVE STREAM: FLUID MECHANICS.
7. Review of Intake for M.Sc.(Applied Mathematics).
8. To introduce Computer related courses for 2019-20 admitted batch.

AGENDA and RESOLUTIONS

BOS Chairman presented the detailed M.Sc(Applied Mathematics) curriculum for 2019 admitted batch to all the members. Upon due deliberations, the external members suggested the following:

AGENDA ITEM-1

To revise the existing structure of 2018-19 M.Sc.(Applied Mathematics) program.	Approved and recommended to Academic Council for approval

It was resolved to revise the existing structure of 2018-19 M.Sc. (Applied Mathematics) program by BOS members and recommended to the academic council for final approval.
(Annexure-1)

25/6/19

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

AGENDA ITEM-2

To Approve the list of scholars admitted into Ph.D. Program in Mathematics during January, 2019, their Research Guides, Doctoral Committees and Pre-Ph.D. syllabus	Approved and recommended to Academic Council for approval

It was resolved to approve the list of scholars admitted into Ph.D. Program in Mathematics during January, 2019, their Research Guides, Doctoral Committees and Pre-Ph.D. syllabus by BOS members and forwarded to Academic Council for final approval.

AGENDA ITEM-3

To revise the syllabus of Continuum Mechanics (18AM2112) course.	Approved and recommended to Academic Council for approval

Dr.Ch.V.Ramanamurthy, Professor, recommend to revise the syllabus of Continuum Mechanics (18AM2112) Course. BOS members recommended the same to Academic Council for approval.
(Annexure-2)

AGENDA ITEM-4

Removing the Technical Skill component from Transform Techniques (18AM1208) course and introducing new Technical Skill course.	Approved and recommended to Academic Council for approval

Dr.V.S.Bhagavan, Professor, recommended to introduce the Technical Skill course by removing the Skill component from Transform Techniques(18AM1208) Course. BOS members recommended the same to Academic Council for approval.
(Annexure-3)

AGENDA ITEM-5

Review of Program Outcomes.	Approved and recommended to Academic Council for approval

It was resolved to review of Program Outcomes. BOS members recommended the same to Academic Council for approval.

25/6/2019

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

AGENDA ITEM-6

Review of Revised M.Sc.(Applied Mathematics) Curriculum with effect from A.Y.: 2019-20 with new Elective Streams as application areas. To introduce Computer related courses. 1. **ELECTIVE STREAM : CRYPTOGRAPHY & CYBER SECURITY.** **2. ELECTIVE STREAM : DATA ANALYTICS.** **3. ELECTIVE STREAM : FLUID MECHANICS.**	Approved and recommended to Academic Council for approval

- Dr.Y.V.S.S.Sanyasi Raju, Professor, Department of Mathematics, IIT, Madras and Dr.Debasish Dutta, Professor & HOD, Department of Mathematics, NIT, Warangal, recommended to introduce the Elective Streams considering application area courses based on contemporary industry needs. BOS members recommended and forwarded to Academic Council for approval.

S.No.	Course Code	**Course Title**	**Category**	**Year of Study**
		ELECTIVE STREAM : CRYPTOGRAPHY & CYBER SECURITY		
1	19AM2106	CRYPTO ANALYSIS AND CYBER DEFENSE	PE	II
2	19AM2204	COMPUTER NETWORKS AND SECURITY	PE	II
3	19AM2205	CRYPTO CURRENCIES AND BLACK CHAIN TECHNOLOGIES	PE	II
		ELECTIVE STREAM : DATA ANALYTICS		
4	19AM2107	STATISTICS WITH R-PROGRAMMING	PE	II
5	19AM2206	BIG DATA ANALYTICS	PE	II
6	19AM2207	CLOUD COMPUTING	PE	II
		ELECTIVE STREAM : FLUID MECHANICS		
7	19AM2108	CONTINUUM MECHANICS-1	PE	II
8	19AM2208	CONTINUUM MECHANICS-2	PE	II
9	19AM2209	COMPUTATIONAL FLUID DYNAMICS	PE	II

(Annexure-4)

25/6/2019

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

AGENDA ITEM-7

Review of Intake for M.Sc.(App.maths).	Approved and recommended to Academic Council for approval

It was resolved to approve for intake of 40 for M.Sc.(Applied Mathematics) program for the A.Y.: 2019-20 and forwarded it to Academic Council for the necessary approval.

AGENDA ITEM-8

It is resolved to introduce computer related course for M.Sc.(Applied Mathematics).	Approved and recommended to Academic Council for approval

- Dr.M.Mutyala Rao, Scientist/Engineer, Applied Mathematics Division, ISRO, Trivandram, recommended to introduce Computer related courses as per the present industry needs. Soft Computing Course has been introduced in Y19 curriculum and it has been forwarded to Academic Council for approval.

(Annexure-4)

20/6/2019

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

S.NO	NAME OF THE PERSON	DESIGNATION	Position in Meeting	Signature
1	Dr.Pranvir Satvat	Dean(Academics)	BOS Patron	25/6/19
2	Dr B V Appa Rao Professor & HOD	Department of Mathematics, KLEF	Chairman	25/6/2019
3	Dr.K.Jayarami Reddy Professor	Department of Mathematics, KLEF	Secretary	25/6/19
4	Dr.Y.V.S.S.Sanyasi Raju, Professor	Department of Mathematics, IIT, Madras	External Member-Subject Expert	25/6/19
5	Dr.Debasish Dutta, Professor & HOD	Department of Mathematics, NIT, Warangal	External Member-Subject Expert	25/6/2019
6	Dr.M.Mutyala Rao, Scientist/Engineer	Applied Mathematics Division, ISRO, Trivandram.	External Member-Industry/R&D	25/6/19
7	Dr.B.Nageswara Rao, Professor of M.E. (Retd. Scientist, ISRO)	Dept. of M.E., K.L.E.F.	Subject Expert	25/06/2019
8	Mr.Hari Kiran, V Professor & H.O.D.	Dept. of C.S.E., K.L.E.F.	Member	25/06/2019
9	Dr.V.Vasanta Kumar, Professor	Dept. of Mathematics	Internal Member	25/6/19
10	Dr Ch V Ramana Murty Professor	Department of Mathematics	Internal Member	25/6/19
11	Dr V S Bhagavan Professor	Department of Mathematics	Internal Member	25/06/2019
12	Dr G V Ramana Reddy Professor	Department of Mathematics	Internal Member	25/6/19
13	Dr N Srimannarayana Professor	Department of Mathematics	Internal Member	25/6/2019
14	Dr.K.Prasad, Professor	Department of Mathematics	Internal Member	25/06/2019
15	Dr V B V N Prasad Professor	Department of Mathematics	Internal Member	25/06/2019
16	Dr.P.Kousalya, Professor	Department of Mathematics	Internal Member	25/6/2019
17	Dr G Suresh Kumar Associate Professor	Department of Mathematics	Internal Member	25/6/2019
18	Dr T.Srinivasa Rao Associate Professor	Department of Mathematics	Internal Member	25/06/2019
19	Dr K Rajya Lakshmi Assistant Professor	Department of Mathematics	Internal Member	25/6/2019
20	Dr.Pavan Kumar Assistant Professor	Department of Mathematics	Internal Member	25/6/19

25/6/2019

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

Annexure:1

(Curriculum_2018-19)

Department of Mathematics									
M.Sc.(Applied Mathematics)									
2018-19 COURSE STRUCTURE(Y18)									
SNO	COURSE CODE	COURSE NAME	Type	L	T	P	S	Cr	Pre requisites
1	18AM1101	REAL ANALYSIS	PC	4	0	0	0	4	NIL
2	18AM1102	ORDINARY DIFFERENTIAL EQUATIONS	PC	3	0	2	0	4	NIL
3	18AM1103	NUMERICAL METHODS	PC	3	0	2	0	4	NIL
4	18AM1104	COMPLEX ANALYSIS	PC	4	0	0	0	4	NIL
5	18AM1105	MATHEMATICAL STATISTICS	PC	4	0	0	0	4	NIL
6	18AM1106	SEMINAR-1	PC	0	0	2	0	1	NIL
7	18AM1206	TOPOLOGY	PC	4	0	0	0	4	NIL
8	**18AM1207**	**ABSTRACT ALGEBRA**	PC	4	0	0	0	4	NIL
9	**18AM1208**	**TRANSFORM TECHNIQUES**	PC	**3**	**0**	**2**	**0**	**4**	**NIL**
10	**18AM1209**	**DISCRETE MATHEMATICS**	PC	4	0	0	0	4	NIL
11	18AM1210	INTRODUCTION TO COMPUTER PROGRAMMING	PC	3	0	2	0	4	NIL
12	18AM1211	SEMINAR-2	PC	0	0	2	0	1	NIL
13	18AM2111	PARTIAL DIFFERENTIAL EQUATIONS	PC	4	0	0	0	4	NIL
14	18AM2112	CONTINUUM MECHANICS	PC	4	0	0	0	4	NIL
15	18AM2113	DATA STRUCTURES	PC	3	0	2	0	4	NIL
16	18AM2114	FUNCTIONAL ANALYSIS	PC	4	0	0	0	4	NIL
		Elective-I							
17	18AM2105	SEMINAR-3	PC	0	0	2	0	1	NIL
18	**18AM2101**	**Technical Skills**	**Skill**	**0**	**0**	**0**	**4**	**1**	**NIL**
19	18AM2215	FLUID DYNAMICS	PC	4	0	0	0	4	NIL
20	18AM2216	OPERATION RESEARCH	PC	4	0	0	0	4	NIL
21	18AM2226	DISSERTATION WITH RESEARCH PUBLICATION	PC	0	0	24	0	12	NIL
		ELECTIVE-I	PC						

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

22	18AM2011	MATHEMATICAL CONTROL THEORY	PE	4	0	0	0	4	NIL
23	18AM2012	STATISTICAL INFERENCE	PE	3	0	2	0	4	NIL
24	18AM2013	DATA BASE MANAGEMENT SYSTEM	PE	3	0	2	0	4	NIL
		ELECTIVE-II							
25	18AM2021	FUZZY MATHEMATICS AND APPLICATIONS	PE	4	0	0	0	4	NIL
26	18AM2022	ADVANCED NUMERICAL ANALYSIS	PE	3	0	2	0	4	NIL
27	18AM2023	DESIGN AND ANALYSIS OF ALGORITHMS	PE	3	0	2	0	4	NIL
		ELECTIVE-III							
28	18AM2031	DYNAMICAL SYSTEMS	PE	4	0	0	0	4	NIL
29	18AM2032	NUMBER THEORY	PE	4	0	0	0	4	NIL
30	18AM2033	MATHEMATICAL MODELLING	PE	3	0	2	0	4	NIL

Annexure:2

Course Name: **CONTINUUM MECHANICS(Revised Syllabus)**

Course Code: 18AM2112 **L-T-P-S : 4-0-0-0**

Credits : 4

Syllabus

Physical Properties of Fluids: Concept of fluids, Continum Hypothesis, Density, Specific Weight and Specific Volume, Pressure, Viscosity and Surface tension. **Thermodynamics of Fluids:** Introduction to thermodynamics, Equation of State, First Law of thermodynamics, Second Law of Thermodynamics and Clausius Inequality

Kinematics of Fluids: Eulerian and Lagranges methods of Description of Fluids, Equvalence of Lagrangian and Eulerian Methods, Translation, Rotation and Deformation of Fluid Elements, Analytical Approach to Deformation, Stress - strain relations, Steady and unsteady flows, Stream Lines, Path Lines and Streak Lines. **Stress in Fluids and Constitutive Equations:** Stress tensor, Normal Stresses, Shear Stresses, Symmetry of Shear of Stress tensor, newtonian Fluids, Non Newtonian Fluids, Purely viscous fluids, Reiner Rivlin Fluids, Power Law Fluids, Visco elastic fluids.

Conservation Laws: Equation of conservation of Mass, Equation for the conservation of momentum, Equation for energy, Basic equations in different coordinate systems, Boundary conditions. **Irrotational and Rotational Flows:** Kelvins minimum energy theorem, Gauss theorem, Bernoullis equation and its application, 2D irrotational incompressible flows, D' Alemberts paradox, Flow due to a moving cylinder with circulation, Flow over an aerofoil, Voretex motion, velocity potential due to a vortex, velocity potential due to a vortex

Incompressible Viscous Fluid Flows: Flow between two parallel plates, Plane ciutte flow, Plane poiseuille flow, Flow over an inclined plane, Flow of two immissible fluids, Flow through circular pipe,Flow through an annulus, Flow between two porous plates,Plane couette flow, Flow through convergent and divergent channels, Stagnent point, Unsteady flows, Unsteady flow over a flat plate, Unsteady flow between two parallel plates.

Dr. B.V.APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 30
Guntur Dist., A.P., India.

Suggested Books:

1. S. Valiappan: Continum Mechanics, Oxford & IBH Publishing Company

2. Goldstein : Classical Mechanics, Narosa Publications

3. R. K. Rathy, An Introduction to Fluid Mechanics, Oxford & IBH Publishing Company

4.Fluid Mechanics : Frank M. White, Fluid Mechanics, McGraw Hill Publications.

Classical and Continuum Mechanics (Existing Syllabus)

Generalized co-ordinates, holonomic and non holonomic systems, unilateral and bilateral constraints; principle of virtual work, D'Alemberts principle. Variational principle, problems of mechanics, moving problems of calculus of variations, shortest distance, minimum surface of revolution, Brachistochrone problem iso-perimetric problem, geodesic. Lagranges equation of first kind and of second kind, uniqueness of solution, Energy equation of conservative fields, generalized momentum, problem of Liouville type, cyclic coordinates.Hamilton's principle, principle of least action, Routh's equation, Hamilton-canonical equation of Motion. **Stress**: Body force, Surface force, Cauchy's stress principle. Stress vector, State of stress at a point, Stress tensor, The stress vector-stress tensor relationship. Force and moment equilibrium, Stress tensor symmetry, Stress quadric of Cauchy, Stress transformation laws, Principal stress, Stress invariant, Stress ellipsoid. **Strain**: Deformation Gradients, Displacement Gradient, Deformation tensor, Finite strain tensors, Small deformation theory—infinitesimal strain tensor, Relative displacement, Linear rotation tensor, Interpretation of the Linear strain tensors, Strain ratio, Finite strain interpretation, principal strains, strain invariant, cubical dilatation, Compatibility equation for linear strain, Strain energy function. Hook's Law. Saint Venant's Principle, Airy's strain function.
Solutions of Navier-Stocks Equations.

SuggestedBooks:

S. No.	Name of Authors / Books / Publishers	Year of Publication
1.	D.N.Berghese and A.M.Downs, Classical mechanics and Control, John Willey	
2.	Goldstein, Classical Mechanics, Narosa Publications	
3.	Rana and Jong, Classical Mechanics, Narosa Publications	
4.	E.T.Whittecker, Treatise on the Analytical Dynamics and Rigid bodies	
5.	I.S.Sokolnikoff : Mathematical Theory of Elasticity , Tata Mc. Grawhill	1997
6.	S.Valliappan : Continuum Mechanics , Oxford & IBH Publishing Company	

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

Annexure:3

2nd Year I Semester (2018-19)

Course Name : **Technical Skill**

Course Code : 18AM2101 **L-T-P-S : 0-0-0-4**

Credits : 1

Syllabus

Calculus, linear algebra, algebraic and ordinary differential equations, equation simplification, and equation manipulation using symbolic computation. Probability Distribution: Fit continuous and discrete distributions, use statistical plots to evaluate goodness-of-fit, compute probability density functions and cumulative distribution functions, and generate random and quasi-random numbers from probability distributions. Functions for fitting curves and surfaces to data. Exploratory data analysis, pre-process and post-process data, compare candidate models, and remove outliers. Regression analysis using the linear and nonlinear models. Non parametric modelling techniques, such as splines, interpolation, and smoothing. Functions for finding parameters that minimize or maximize objectives while satisfying constraints. Linear programming (LP), mixed-integer linear programming (MILP), quadratic programming (QP), nonlinear programming (NLP), constrained linear least squares, nonlinear least squares, and nonlinear equations.

Text books:

1. **P. Mohana Shankar,** Differential Equations: A Problem Solving Approach Based on MATLAB, CRC Press; 1 edition (23 May 2018).
2. Cesar Perez Lopez, MATLAB Optimization Techniques, Apress Academic, Springer, 2014.

Reference Books:

1. Xue, Dingyu and YangQuan Chen, Solving Applied Mathematical Problems with MATLAB, , CRC Press, Taylor & Frances, Boca Raton, 2009.
2. Nikolaos Ploskas and Nikolaos Samaras, Linear Programming Using MATLAB, 1 edition 2017, Springer.
3. Braselton J.Curve Fitting with MATLAB, LINEAR and NON LINEAR REGRESSION, INTERPOLATION, CreateSpace Independent Publishing Platform, 2016, USA.

25/6/2019

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 502,
Guntur Dist., A.P., India.

Annexure:4

(Curriculum_2019-20)

Department of Mathematics										
M.Sc.(Applied Mathematics)										
2019-20 COURSE STRUCTURE(Y19)										
	19AM1201	**SOFT COMPUTING**	**PC**	4	0	0	0	4	4	NIL
		ELECTIVE STREAM : CRYPTOGRAPHY & CYBER SECURITY								
21	19AM2106	CRYPTO ANALYSIS AND CYBER DEFENSE	**PE**	3	0	2	0	5	4	NIL
22	19AM2204	COMPUTER NETWORKS AND SECURITY	**PE**	3	0	2	0	5	4	NIL
23	19AM2205	CRYPTO CURRENCIES AND BLACK CHAIN TECHNOLOGIES	**PE**	3	0	2	0	5	4	NIL
		ELECTIVE STREAM : DATA ANALYTICS								
24	19AM2107	STATISTICS WITH R-PROGRAMMING	**PE**	3	0	2	0	5	4	NIL
25	19AM2206	BIG DATA ANALYTICS	**PE**	3	0	2	0	5	4	NIL
26	19AM2207	CLOUD COMPUTING	**PE**	3	0	2	0	5	4	NIL
		ELECTIVE STREAM : FLUID MECHANICS								
27	19AM2108	CONTINUUM MECHANICS-1	**PE**	4	0	0	0	4	4	NIL
28	19AM2208	CONTINUUM MECHANICS-2	**PE**	4	0	0	0	4	4	NIL
29	19AM2209	COMPUTATIONAL FLUID DYNAMICS	**PE**	3	0	2	0	5	4	NIL

Course Name : **CRYPTO ANALYSIS AND CYBER DEFENSE**

Course Code : 19AM2106 **L-T-P-S : 3-0-2-0**

Credits : 4

Syllabus :

Introduction to Security: Security Concepts, Security Attacks, Security Services and Mechanisms, A Security Model, Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques. Block Ciphers and DES: Traditional Block Cipher Structure, DES, DES Example, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles. AES: Finite Field Arithmetic, AES Structure, AES Transformation Functions, AES Example, AES Implementation. Block Cipher Operation: Multiple Encryption and Triple DES, Modes of Operation, Pseudorandom Number Generation and Stream Ciphers: Principles and Pseudorandom Number Generation,

Pseudorandom Number, Generators, Pseudorandom Number Generation using a Block Cipher, Stream, Ciphers, RC4

Public-key Cryptography and RSA: Principles of Public-Key Cryptosystems, the RSA algorithm. Other Public-key Cryptosystems: Diffie-Hellman Key Exchange, El Gamal Cryptosystem, Elliptic Curve Arithmetic Elliptic Curve Cryptography.

Cryptographic Hash Functions: Applications of Cryptographic Hash functions, Two Simple Hash Functions,

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

Requirements and Security, Hash Functions based on Cipher Block Chaining, SHA. Message Authentication, Digital Signatures: Digital Signatures, El Gamal Digital Signature Scheme

List of Lab Experiments

Lab session No	List of Experiments	CO-Mapping
1	Write a C program to implement Multiplicative Inverse	CO1
2	Write a C program to implement encryption and decryption Using Ceaser cipher substitution.	CO1
3	Write a C program to implement encryption and decryption using Substitution technique like Play fair	CO1
4	Write a C program to implement encryption using Hill Cipher assuming a 2x2 matrix key.	CO2
5	Write a C program to implement encryption and decryption using Transposition technique like railfence	CO2
6	Write a C program to implement encryption and decryption using Transposition technique like Columnar.	CO2
7	Write a C program to implement DES Key Generation by taking 10 bit key.	CO2
8	Write a C program to implement AESMix Column operation.	CO2
9	Write a C program to generate hash code using simple hash function	CO3
10	Implement RSA algorithm using Cryp Tool	CO3
11	Implement Diffie-Hellman Key Exchange algorithm using Crypt tool.	CO3
12	Implement Elgamal digital signature algorithm using Crypt tool.	CO4

Suggested Books:

S. No.	Author(s) / Title/ Edition No./ Publisher	Year of Publication/ Reprint
1	Cryptography and Network Security Principles and Practice, by William stallings, 5th Ed., Pearson.	Latest Edditio n
2	Applied Cryptography: Protocols, Algorthms, and Source Code in C , by Bruce Schneier, Second Edition , John Wiley & Sons, Inc.,2015	**2015**
3	Applied Cryptography for Cyber Security and Defense: Information Encryption and Cyphering, by Hamid R. Nemati and Li Yang, IGI Global.	**2011**
4	Forouzon B, "Cryptography and Network Security," Indian Edition, TMH	**2010**

Course Name : **COMPUTER NETWORKS AND SECURITY**

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

Course Code : 19AM2204 **L-T-P-S : 3-0-2-0**

Credits : 4

Syllabus

Overview of networking using the Internet as an example, Introduction, Symmetric Encryption and Message Confidentiality: Public-Key Cryptography and Message Authentication. Key Distribution, Message authentication: HAMAC, User Authentication: Symmetric Key Distribution Using Symmetric Encryption Kerberos, Key Distribution Using Asymmetric Encryption, X.509 Certificates, Public-Key Infrastructure. User Authentication: Remote User Authentication Principles, Remote User Authentication using Symmetric Encryption, Remote User Authentication Using Asymmetric Encryption, Transport-Level Security: Web Security Considerations, Secure Socket Layer and Transport Layer Security, HTTPS, Secure Shell (SSH).Wireless Network Security: IEEE 802.11 Wireless LAN Overview, IEEE 802.11i Wireless LAN Security, Wireless Application Protocol Overview, Wireless Transport Layer Security, WAP, End-to-End Security. Electronic Mail Security: Pretty Good Privacy, S/MIME, Domain Keys Identified Mail IP Security: IP Security Overview. IP Security Policy, Encapsulating Security Payload, Combining Security Associations, Internet Key Exchange, Cryptographic Suites

Suggested Books:

S. No.	Author(s) / Title/ Edition No./ Publisher	Year of Publication/ Reprint
1	William Stallings, "Network Security Essentials",6th Ed.,Pearson Education.	**2017**
2	Charlie Kaufman, Radia Perlman, Mike Speciner, "Network Security", 2nd Ed., Prentice Hall.	**2017**
3	Eric Cole, Ronald L. Krutz, James Conley 2005, Network Security Bible, Wiley.	Latest Edition

List of lab Experiments

Lab session No	Experiments	CO-Mapping
1	Study the use of network reconnaissance tools like WHOIS, dig, traceroute, nslookup to gather information about networks and domain registrars.	CO1
2	Study of packet sniffer tools like wire shark, ethereal, tcpdump etc. Use the tools to do the following (i) Observer performance in promiscuous as well as non-promiscousmode.	CO1
3	Study of packet sniffer tools like wireshark, ethereal, tcpdump etc. Use the tools to do the following (ii) Show that packets can be traced based on different filters.	CO1
4	Download and install nmap. Use it with different options to scan open ports, perform OS fingerprinting, do a ping scan, tcp port scan, udp port scan, etc.	CO2
5	Use the Nessus tool to scan the network for vulnerabilities.	CO2
6	Install IDS (e.g. SNORT) and study the logs.	CO3
7	Attacking Web Application: SQL injection	CO3
8	Practical approach to study Wireshark	CO4
9	Practical approach to study SNORT(Intrusion Detection System)	CO4
10	Practical approach to study Web Application Vulnerability.	CO4

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 3
Guntur Dist., A.P., India.

Course Name : **CRYPTO CURRENCIES AND BLACK CHAIN TECHNOLOGIES**

Course Code : 19AM2205 **L-T-P-S : 3-0-2-0**

Credits : 4

Syllabus

Introduction to cryptography & crypto currencies , Crypto currency and Markets, Mining and Crypto currencies, Bit coin applications & security overview of block chain technology, what is block chain: Transactions, Blocks, Hashes, Distributed consensus. The Double-Spend and Byzantine Generals' Computing Problems, Crowd funding, Bit coin Prediction Markets, Hash cryptography, Encryption vs hashing. Transactions: Recordintransactions, Digital signature, Information technology program, verifying and confirming transactions. Security and safeguards: protecting block chain from attackers, Forks soft and hard.

Suggested Books:

S. No.	Author(s) / Title/ Edition No./ Publisher	
1.	Bitcoin and Cryptocurrency Technologies : A comprehensive Introduction by Joseph Bonneau, Aravind Narayanan, Edward Felten, 2016 Ed., Prince Town university press, ISBN:9780691171692.	2016
2.	Block chain, blueprint for a new economy by Melanie Swan, 1st Ed., orielly publications.	2015
3.	Cryptocurrency Investing Bible: The Ultimate Guide About Blockchain, Mining, Trading, ICO, Ethereum Platform, Exchanges, Top Cryptocurrencies for Investing and Perfect Strategies to Make Money,Kindle Edition By Alan T.Norman, Kindle Edition	2017
4.	A Short Introduction to the World of Cryptocurrencies, Aleksander Berentsen and FabianSchär	Latest Eddition
5.	Blockchain: A Step-By-Step Guide For Beginners to Implement Block chain Technology And Leveraging Blockchain Programming By Tailor Jacobs, volume-1,2017,ISBN: 1548009598	Latest Eddition

List of Lab Experiments:

Lab session No	Experiment	CO-Mapping
1	Write a program to create block chain	CO1
2	Write a program for implementation of block chain	CO1
3	Implement Merkle trees	CO1
4	Implement Proof of Stake protocol	
5	Write a program to implement Proof of Work protocol	
6	Write a program for Mining Proof of Work	

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

7	Write a program for validate the second signature with second key	
8	Write a program to**generate Hash from File**	
9	Write a program on RPC handles or delegates network communication for all RPC requests.	
10	Write a program for adding transactions in block chain	
11	Implement Wallet structure	
12	Write a program to create address structure	

Course Name : **STATISTICS WITH RPROGRAMMING**

Course Code : 19AM2107 **L-T-P-S : 3-0-2-0**

Credits : 4

Syllabus

Introduction, How to run R, R Sessions and Functions, Basic Math, Variables, Data Types, Vectors, Conclusion, Advanced Data Structures, Data Frames, Lists, Matrices, Arrays, Classes. R Programming Structures, Control Statements, Loops, - Looping Over Non vector Sets,- If-Else, Arithmetic and Boolean Operators and values, Default Values for Argument, Return Values, Deciding Whether to explicitly call return- Returning Complex Objects, Functions are Objective, No Pointers in R, Recursion, A Quick sort Implementation- Extended Example: A Binary Search Tree. Doing Math and Simulation in R, Math Function, Extended Example Calculating Probability- Cumulative Sums and Products-Minima and Maxima- Calculus, Functions Fir Statistical Distribution, Sorting, Linear Algebra Operation on Vectors and Matrices, Extended Example: Vector cross Product- Extended Example: Finding Stationary Distribution of Markov Chains, Set Operation, Input /out put, Accessing
the Keyboard and Monitor, Reading and writer Files,
Graphics, Creating Graphs, The Workhorse of R Base Graphics, the plot () Function Customizing Graphs, Saving Graphs to Files. Probability Distributions, Normal Distribution- Binomial Distribution- Poisson Distributions Other Distribution, Basic Statistics, Correlation and Covariance, T-Tests,-ANOVA.
Linear Models, Simple Linear Regression, -Multiple Regression Generalized Linear Models, Logistic Regression, - Poisson Regression- other Generalized Linear Models-Survival Analysis, Nonlinear Models, Splines- Decision- Random Forests,

Suggested Books:

S. No.	Author(s) / Title/ Edition No./ Publisher	Year of Publication/ Reprint
1	The Art of R Programming, Norman Matloff, Cengage Learning	
2	R for Everyone, Lander, Pearson	
3	R Cookbook, PaulTeetor, Oreilly	
4	R in Action,Rob Kabacoff, Manning	

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
K.L.E.F. (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

LAB EXPERIMENTS:

Tutorial session No	Topics	CO-Mapping
1	Lab on Basic functions and data types using R	CO5
2	Lab on Data Frames, Lists, Matrices, Arrays, Classes	CO5
3	Lab on control statements, loops, Arithmetic and Boolean Operators	CO5
4	Lab on Math and Simulation in R	CO5
5	Lab on Calculating Probability- Cumulative Sums and Products-	CO5
	Minima and Maxima	
6	Lab on Linear Algebra Operation on Vectors and Matrices	CO5
7	Lab on Creating Graphs, the plot () Function, Customizing Graphs	CO5
8	Lab on Normal Distribution, Binomial Distribution, Poisson Distributions	CO5
9	Lab on correlation, covariance, t-test and ANOVA	CO5
10	Lab on Simple Linear Regression, Multiple Regression and Logistic regression	CO5

Course Name : **Big DataAnalytics**

Course Code : 19AM2206 **L-T-P-S : 3-0-2-0**

Credits : 4

Syllabus

Introduction to Big Data Analytics: Big Data Overview, State of the Practice of Analytics, Big Data Analytics in Industry Verticals. It also covers Overview of Data Analytics Lifecycle, Discovery, Data Preparation, Model Planning, Model Building, Communicating Results and Findings, Operationalizing. Initial Analysis of the Data: Initial Exploration and Analysis of the Data, Basic Data Visualization. Basic data analytics, reporting, and apply basic data visualization techniques to your data. Apply basic analytics methods such as distributions, statistical tests and summary operations, and differentiate between results that are statistically sound vs. statistically significant. Identify a model for your data and define the null and alternative hypothesis. Experimentation and demonstration of initial analysis of data. Advanced Analytics and Statistical Modeling for Big Data — Theory and Methods: Need of analytic and select an appropriate technique based on business objectives; initial hypotheses; and the data's structure and volume. Apply some of the more methods in Analytics solutions, algorithms and the technical foundations for the methods. The environment (use case) in which each technique can provide the most value. Use appropriate diagnostic methods to validate the model created Use Randin-database analytical functions to fit, score and evaluate models. Advanced Analytics and Statistical Modeling for Big Data — Technology & Tools: Tool to Perform Analytics on Unstructured data using Map Reduce Programming paradigm. Use Hadoop, HDFS, HIVE, PIG and other products in the Hadoop ecosystem for unstructured data analytics, Effectively use advanced SQL functions and Greenplum extensions forin-database analytics. Use MADlab to solve analytics problems in-database. Endgame - Operationalizing an Analytics Project: Tasks needed to operationalize an analytics project. Four common deliverables of an analytics lifecycle project meet the needs of key stakeholders. Use a framework for creating final presentations for sponsors and analysts. Evaluate data

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
LEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

visualization and identify ways to improve it. Apply these concepts to a big data analytics problem in the final lab. using R.

List of Lab Experiments:

Lab session No	List of Experiments	CO-Mapping
1	To draw and explain Hadoop Architecture and Ecosystem with the help of a case study using Work Count example to define and install Hadoop.	CO1
2	To implement the following file management tasks in Hadoop Sysem (HDFS) : Adding files and directories, retrieving files, deleting files	CO1
3	To run a basic word count Map reduce program to understand Map reduce Paradigm: To count words in a given file, To view the output file and to calculate execution time.	CO1
4	To perform NoSQL database using mongodb to create, update and insert.	CO2
5	To study and implement basic functions and commands in R Programming.	CO2
6	To build word cloud, a text mining method using R for easy to understand and visualization than a table data.	CO3
7	To implement Bloom filters for filter on stream data in C++/Java.	CO3
8	To implement clustering program using R programming.	CO4
9	To finding similar documents with cosine similarity in R.	CO4

Suggested Books:

S.No	Author(s) / Title/ Edition No./ Publisher	Year of Publication
1.	Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data by EMC Education Services	2014
2.	EMC Material/Courseware :https://education.etnc.com/	
3.	Map Reduce Design Patterns, Author: Donald Miner, Publisher: O'Reilly, ISBN-3:- 9789350239810	2012
4.	Practical Data Science with R-Nina Zumel, John Mount-Manning Publications	2014
5.	R for Business Analytics-A. Ohri-Springer	2012
6.	Agile data science: building data analytics applications with Hadoop-Russell Journey- O'Reilly Media	2013
7	An Introduction to Applied Multivariate Analysis with R -Brian Everitt, Torsten Hothorn-Springer-2011	2011

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
K.L.E.F. (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

8	Statistical Modeling and Analysis for Database Marketing: Effective Techniques for Mining Big Data-Bruce Ratner-Chapman and Hall/CRC-2003	2013
9	Big Data Analytics with R and Hadoop-Vignesh Prajapati-Packt Publishing-2013	2013

Course Name : **CLOUDCOMPUTING**

Course Code : 19AM2207 **L-T-P-S : 3-0-2-0**

Syllabus : Cloud Computing: Introduction to Cloud Computing, History of Cloud Computing, Cloud service providers Properties, Characteristics & Disadvantages: Pros and Cons of Cloud Computing, Benefits of Cloud Computing, Cloud computing vs. Cluster computing vs. Grid computing Deployment Models: Public cloud, Private cloud, Hybrid cloud, Community cloud. Introduction to IaaS. IaaS definition, Introduction to virtualization, Infrastructure as a Service(IaaS) Different approaches to virtualization, Hypervisors, Machine Image, Virtual Machine(VM)

Resource Virtualization

- Server
- Storage

Network

Virtual Machine (resource) provisioning and manageability, storage as a service, Data storage in cloud computing (storage as a service)

Implementation of cloud services

- AmazonEC2
- Renting, EC2 Compute Unit, Platform and Storage, pricing, customers
- Eucalyptus
- Platform as a Service(PaaS)
- Introduction to PaaS
- What is PaaS, Service Oriented Architecture(SOA)
- Cloud Platform and Management
- Computation
- Storage
- Examples
- Google AppEngine
- MicrosoftAzure
- SalesForce.com
- Force. complatform
- Software as a Service(PaaS)
- Introduction to SaaS
- Web services
- Web2.0
- Web OS
- Case Study on SaaS
- Service Management in Cloud Computing
- Comparing Scaling Hardware: Traditional vs Cloud
- Economics of scaling: Benefitting enormously
- Managing Data
- Looking at Data, Scalability & Cloud Services
- Database & Data Stores in Cloud
- Large Scale Data Processing
- Cloud Security
- Infrastructure Security

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

- Network level security, Host level security, Application level security
- Data security and Storage
- Data privacy and security Issues, Jurisdictional issues raised by Data location
- Identity & Access Management
- Access Control
- Trust, Reputation, Risk
- Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations
- Case Study on Open Source & Commercial Clouds
- Eucalyptus
- Microsoft Azure

- AmazonEC2

List of lab Experiments

Lab session No	Experiments	CO-Mapping
1	Create a spreadsheet by using Google forms.	CO1
2	Create and Store a fine using Amazon S3 .	CO1
3	Create and deploy a cloud-based application using Amazon EC2.	CO1
4	Create and deploy a cloud-based application using IBM Blue Mix.	CO2
5	Use Yahoo! Pipes to create a mashup.	CO2
6	Create and deploy a cloud-based application using Google App Engine.	CO2
7	Find procedure to do Desktop virtualization that allows a computer to run two or more operating systems at the same time and allows user to switch between the systems.	CO3
8	Install a virtual machine and execute a sample C program.	CO4
9	Execute a sample C or C++ Program using Server Virtualization.	CO4

Suggested Books:

S. No.	Author(s) / Title/ Edition No./ Publisher	
1.	Cloud Computing Bible, Barrie Sosinsky, Wiley-India	2011

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

2.	Block chain, blueprint for a new economy by Melanie Swan, 1st Ed., orielly publications.	2015
3.	James Broberg, Andrzej M. Goscinski, Wile.	2013
4.	Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer.	2012
5.	Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley- India, 2010	2010

Course Name : **ContinuumMechanics-1**

Course Code : 19AM2108 **L-T-P-S : 4-0-0-0**

Credits : 4

Syllabus : Physical Properties of Fluids: Concept of fluids, Continuum Hypothesis, Density, Specific Weight and Specific Volume, Pressure, Viscosity and Surface tension. Thermodynamics of Fluids: Introduction to thermodynamics, Equation of State, First Law of thermodynamics, Second Law of Thermodynamics and Clausius Inequality Kinematics of Fluids: Eulerian and Lagranges methods of Description of Fluids, Equvalence of Lagrangian and Eulerian Methods, Translation, Rotation and Deformation of Fluid Elements, Analytical Approach to Deformation, Stress - strain relations, Steady and unsteady flows, Stream Lines, Path Lines and Streak Lines Stress in Fluids and Constitutive Equations: Stress tensor, Normal Stresses, Shear Stresses, Symmetry of Shear of Stress tensor, newtonian Fluids, Non Newtonian Fluids, Purely viscous fluids, Reiner Rivlin Fluids,Power Law Fluids, Visco elastic fluids.

Suggested Books:

S. No.	Name of Authors / Books / Publishers Year of Publication
1.	D.N.Berghese and A.M.Downs, Classical mechanics and Control, John Willey
2.	Goldstein, Classical Mechanics, Narosa Publications
3.	Rana and Jong, Classical Mechanics, Narosa Publications
4.	E.T.Whittecker, Treatise on the Analytical Dynamics and Rigid Bodies
5.	I.S.Sokolnikoff : Mathematical Theory of Elasticity , Tata Mc. Grawhill 1997
6.	S.Valliappan : Continuum Mechanics , Oxford & IBH Publishing Company

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

Course Name : **ContinuumMechanics-2**

Course Code : 19AM2208 **L-T-P-S : 4-0-0-0**

Credits : 4

Syllabus

Conservation Laws: Equation of conservation of Mass, Equation for the conservation of momentum, Equation for energy, Basic equations in different coordinate systems, Boundary conditions, Irrotational and Rotational Flows: Kelvins minimum energy theorem, Gauss theorem, Bernoullis equation and its application, 2D irrotational incompressible flows, D' Alemberts paradox, Flow due to a moving cylinder with circulation, Flow over an aerofoil, Voretex motion, velocity potential due to a vortex, velocity potential due to a vortex, Incompressible Viscous Fluid Flows:Flow between two parallel plates, Plane ciutte flow, Plane poiseuille flow, Flow over an inclined plane, Flow of two immissible fluids, Flow through circular pipe. Flow through an annulus, Flow between two porous plates, Plane couette flow, Flow through convergent and divergent channels, Stagnent point, Unsteady flows. Unsteady flow over a flat plate, Unsteady flow between two parallel plates.

Suggested Books:

S. No.	**Author(s) / Title/ Edition No./ Publisher**
1.	D.N.Berghese and A.M.Downs, Classical mechanics and Control, John Willey
2.	Goldstein, Classical Mechanics, Narosa Publications
3.	Rana and Jong, Classical Mechanics, Narosa Publications
4.	E.T.Whittecker, Treatise on the Analytical Dynamics and Rigid Bodies
5.	I.S.Sokolnikoff : Mathematical Theory of Elasticity , Tata Mc. Grawhill 1997
6.	S.Valliappan : Continuum Mechanics , Oxford & IBH Publishing Company

Course Name : **Computational FluidDynamics**

Course Code : 19AM2209 **L-T-P-S : 3-0-2-0**

Credits : 4

Syllabus

Introduction to Computational Fluid Dynamics and Principles of Conservation: Continuity Equation, Navier Stokes Equation, Energy Equation and General Structure of Conservation Equations, Classification of Partial Differential Equations and Physical Behaviour, Approximate Solutions of Differential Equations: Error Minimization Principles: Finite Element Method, Finite Difference and Finite Volume Method, Finite Volume Method: Some Conceptual Basics and Illustrations through 1-D Steady State Diffusion Problems, Boundary Condition Implementation and Discretization of Unsteady State Problems, FTCS (Forward time central space) scheme, Stability analysis of parabolic equations (1-D unsteady state diffusion problems): CTCS scheme (Leap frog scheme), Dufort- Frankel scheme, FTFS, FTBS and CTCS Schemes, Finite Volume Discretization of 2-D unsteady State Diffusion type Problems, Solution of Systems of Linear Algebraic Equations: Elimination Methods, Iterative Methods, - Diffusion Equations: A Finite Volume Approach, Discretization of Navier Stokes Equations: Stream FunctionVorticity approach and Primitive variable approach, SIMPLE Algorithm, SIMPLER Algorithm.

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

Suggested Books:

S. No.	Author(s) / Title/ Edition No./ Publisher	
1.	K. Muralidhar, T. Sundararajan, Computational Fluid Flow and Heat Transfer, 2nd Ed., Narosa.	2011
2.	Fluid Mechanics by Jenkins and White	
3.	Chung T. J., Computational Fluid Dynamics, Cambridge University Press.	2003
4.	Tapan K. Sengupta, Computational Fluid Dynamics by University Press.	2005
5.	Hirch C., Numerical Computation of Internal and External Flows, Elesvier.	2007
6	S. V. Patankar, Numerical Heat Transfer and Fluid Flow (Hemisphere Series on Computational Methods in Mechanics and	Latest Eddition

Course Name : **Soft Computing**

Course Code : 19AM2209 **L-T-P-S : 3-0-2-0**

Credits : 4

Syllabus

Problem Solving Methods : Problem Space, Problem solving, State space, Algorithm's performance and Complexity, Search Algorithms, Depth first search method, Breadth first search method, Branch and Bound search method, Introduction to P type, NP complete and NP Hard problems. Classical methods versus Non-traditional methods. Evolutionary Methods: Principles of Evolutionary Processes and genetics, Introduction to evolutionary algorithms, Evolutionary strategy, Evolutionary programming. Genetic Algorithm : Basic concepts, working principle, procedures of GA, flow chart of GA, Genetic representations, (encoding) Initialization and selection, Genetic operators, Mutation, Generational Cycle, Genetic programming, Simple applications. Artificial Neural Networks: Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, recurrent networks. Back propagation algorithm, factors affecting back propagation training, Simple applications. Swarm Optimization: Introduction to Swarm intelligence, Ant colony optimization (ACO), Meta heuristic, Algorithm for Travelling Salesman Problem, Particle swarm optimization (PSO), Other variants of swarm intelligence algorithms, Simple problems and applications.

Suggested books:

S.No.	Author(s) / Title/ Edition No./ Publisher	Year of Publication
1	Kalyanmoy Deb, *Multi-objective Optimization using Evolutionary Algorithms* John Wiley and Sons	2012
2	Maurice Clerc, *Particle Swarm optimization*, ISTE, USA, South Asian Edn	2007
3	Marco D & Thomas S, *Ant Colony optimization*, MIT Press, London,	2004

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

4	Tettamanzi Andrea, Tomassini and Marco, *Soft Computing Integrating Evolutionary, Neural and Fuzzy Systems*, Springer.	2001
5	S S Rao, *Engineering Optimization*, New Age, New Delhi,	2014

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

Program Structutre :

SNO	COURSE CODE	COURSE NAME	Category	L	T	P	S	CH	Cr	Prerequisites	New Course/Reviseed/Retained Course	Changes Proposed By	Focused on Emp./Entrepreneurship
1	19AM1101	REAL ANALYSIS	**PC**	4	0	0	0	4	4	NIL	Retained		Employability
2	19AM1102	ORDINARY DIFFERENTIAL EQUATIONS	**PC**	3	0	2	0	5	4	NIL	Retained		Employability
3	19AM1103	NUMERICAL METHODS	**PC**	3	0	2	0	5	4	NIL	Retained		Employability
4	**19AM1104**	**INTRODUCTION TO COMPUTER PROGRAMMING**	**PC**	**3**	**0**	**2**	**0**	**5**	**4**	**NIL**	**Retained**		Employability
5	19AM1105	MATHEMATICAL STATISTICS	**PC**	4	0	0	0	4	4	NIL	Retained		Employability
6	19AM1106	SEMINAR-1	**Skill**	0	0	2	0	2	1	NIL	Retained		Employability
7	**19AM1201**	**SOFT COMPUTING**	**PC**	**4**	**0**	**0**	**0**	**4**	**4**	**NIL**	**New Course**	Industry Persons	Employability

25/6/2019

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

8	**19AM1202**	**DATA STRUCTURES**	**PC**	**3**	**0**	**2**	**0**	**5**	**4**	**NIL**	**Retained**		Employability
9	19AM1203	STATISTICAL INFERENCE	**PC**	4	0	0	0	4	4	NIL	Retained		Employability
10	19AM1204	DISCRETE MATHEMATICS	**PC**	4	0	0	0	4	4	NIL	Retained		Employability
11	19AM1205	COMPLEX ANALYSIS	**PC**	4	0	0	0	4	4	NIL	Retained		Employability
12	19AM1206	SEMINAR-2	**PC**	0	0	2	0	2	1	NIL	Retained		Employability
13	19AM2101	PARTIAL DIFFERENTIAL EQUATIONS	**PC**	4	0	0	0	4	4	NIL	Retained		Employability
14	**19AM2102**	**RELATIONAL ALGEBRA AND DBMS**	**PC**	**3**	**0**	**2**	**0**	**5**	**4**	**NIL**	**Retained**		Employability
15	19AM2103	ABSTRACT ALGEBRA	**PC**	4	0	0	0	4	4	NIL	Retained		Employability
16	19AM2104	TRANSFORM TECHNIQUES	**PC**	3	0	2	0	5	4	NIL	Retained		Employability
17	19AM2105	SEMINAR-3	**PC**	0	0	2	0	2	1	NIL	Retained		Employability
18	19AM2201	TOPOLOGY	**PC**	4	0	0	0	4	4	NIL	Retained		Employability
19	19AM2202	MATHEMATICAL PROGRAMMING	**PC**	4	0	0	0	4	4	NIL	Revised		Employability
20	19AM2203	DISSERTATION WITH RESEARCH PUBLICATION	**PC**	0	0	24	0	24	12	NIL	Retained		Employability
		ELECTIVE STREAM : CRYPTOGRAPHY & CYBER SECURITY											
21	19AM2106	CRYPTO ANALYSIS AND CYBER DEFENSE	**PE**	3	0	2	0	5	4	NIL	New Course	Academic Peers	Employability
22	19AM2204	COMPUTER NETWORKS AND SECURITY	**PE**	3	0	2	0	5	4	NIL	New Course	Academic Peers	Employability
23	19AM2205	CRYPTO CURRENCIES AND BLACK CHAIN TECHNOLOGIES	**PE**	3	0	2	0	5	4	NIL	New Course	Academic Peers	Employability

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

		ELECTIVE STREAM : DATA ANALYTICS												
24	19AM2107	STATISTICS WITH R-PROGRAMMING	**PE**	3	0	2	0	5	4	NIL	New Course	Academic Peers	Employability
25	19AM2206	BIG DATA ANALYTICS	**PE**	3	0	2	0	5	4	NIL	New Course	Academic Peers	Employability
26	19AM2207	CLOUD COMPUTING	**PE**	3	0	2	0	5	4	NIL	New Course	Academic Peers	Employability
		ELECTIVE STREAM : FLUID MECHANICS												
27	19AM2108	CONTINUUM MECHANICS-1	**PE**	4	0	0	0	4	4	NIL	New Course	Academic Peers	Employability
28	19AM2208	CONTINUUM MECHANICS-2	**PE**	4	0	0	0	4	4	NIL	New Course	Academic Peers	Employability
29	19AM2209	COMPUTATIONAL FLUID DYNAMICS	**PE**	3	0	2	0	5	4	NIL	New Course	Academic Peers	Employability

Percentage of Syllabus Revision=10/29 = 35%

Percentage of Courses focusing on Employability= 29/29= 100%

Percentage of Courses focusing on Entrepreneurship= Nil

Percentage of Courses focusing on Skill Development = Nil

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302.
Guntur Dist., A.P., India.

BOS_ATR

S.No	Recommendations	Action taken	Name of the Programme	Department
1. Students				
1	No specific comments on curriculum		M.Sc.(Applied Mathematics)	Mathematics
2. Parents				
1	No specific comments on curriculum		M.Sc.(Applied Mathematics)	Mathematics
3. Alumni				
1		**No Alumni Available as no passed out Batch.**	M.Sc.(Applied Mathematics)	Mathematics
4. Faculty				
1	Dr.Ch.V.Ramanamurthy, Professor, recommend to revise the Continuum Mechanics (18AM2112) course.	As per the recommendations, modified the syllabus. In BOS also discussed and forwarded to Academic Council for approval.	M.Sc.(Applied Mathematics)	Mathematics
2	Dr.V.S.Bhagavan, Professor, recommended to introduce the Technical Skill course by removing the Skill component from Transform Techniques (18AM1208) Course.	As per their recommendations, introduced the Technical Skill Course for 2018-19 Batch in the 3rd Semester and forwarded to Academic Council for approval.	M.Sc.(Applied Mathematics)	Mathematics
5. Academic Peers				

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 502,
Guntur Dist., A.P., India.

1	Dr.Y.V.S.S.Sanyasi Raju, Professor, Department of Mathematics, IIT, Madras and Dr.Debasish Dutta, Professor & HOD, Department of Mathematics, NIT, Warangal, recommended to introduce the Elective Streams considering application areas.	As per their suggestions introduced Elective Streams in M.Sc. (Applied Mathematics) and forwarded to Academic Council for approval.	M.Sc.(Applied Mathematics)	Mathematics
6. Industry				
1	Dr.M.Mutyala Rao, Scientist/Engineeri, Applied Mathematics Division, ISRO, Trivandram, recommended to introduce Computer related courses as per the present industry needs.	As per his suggestion introduced **Soft Computing** Course in M.Sc.(Applied Mathematics) and forwarded to Academic Council for approval.	M.Sc.(Applied Mathematics)	Mathematics

25/6/2019

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

AAA:

Percentage Change in syllabus A.Y. : 2019-20								
S. No	Course Code	Course Title	Existing Syllabus	New Syllabus	Topics added/removed/replaced	Changes in Course Outcome(s)	Justification for no change in percentage of change in syllabus	Revision(%)
1	19AM2106	Crypto Analysis And Cyberdefense		Introduction to Security: Security Concepts, Security Attacks, Security Services and Mechanisms, A Security Model, Classical Encryption Techniques: Symmetric Cipher Model,Substitution Techniques, Transposition Techniques. Block Ciphers and DES: Traditional Block Cipher Structure, DES, DES Example, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles. AES: Finite Field Arithmetic, AES Structure, AES Transformation Functions, AES Example, AES Implementation. Block Cipher Operation: Multiple Encryption and Triple DES, Modes of Operation, Pseudorandom Number Generation and Stream Ciphers: Principles and Pseudorandom Number Generation, Pseudorandom Number, Generators, Pseudorandom Number Generation using a Block Cipher, Stream, Ciphers, RC4 Public-key Cryptography and RSA: Principles of Public-Key Cryptosystems, the RSA			By the recommendations of Academic Peers and Industry Peers	100%

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
K.L.E.F. (Deemed to be University)
Green Fields, Vaddeswaram-522 302.
Guntur Dist., A.P., India.

				algorithm. Other Public-key Cryptosystems: Diffie-Hellman Key Exchange, ElGamal Cryptosystem, Elliptic Curve Arithmetic Elliptic Curve Cryptography. Cryptographic Hash Functions: Applications of Cryptographic Hash functions, Two Simple Hash Functions, Requirements and Security, Hash Functions based on Cipher Block Chaining, SHA. Message Authentication, Digital Signatures: Digital Signatures, ElGamal Digital Signature Scheme				
2	19AM2204	COMPUTER NETWORKS AND **SECURITY**		Overview of networking using the Internet as an example, Introduction, Symmetric Encryption and Message Confidentiality: Public-Key Cryptography and Message Authentication. Key Distribution, Message authentication: HAMAC, User Authentication: Symmetric Key Distribution Using Symmetric Encryption Kerberos, Key Distribution Using Asymmetric Encryption, X.509 Certificates, Public-Key Infrastructure. User Authentication: Remote User Authentication Principles, Remote User Authentication using Symmetric Encryption, Remote User Authentication Using Asymmetric Encryption, Transport-Level Security: Web Security Considerations, Secure Socket Layer and Transport Layer Security, HTTPS, Secure Shell (SSH). Wireless Network Security: IEEE 802.11 Wireless LAN Overview, IEEE 802.11i Wireless LAN Security, Wireless Application Protocol Overview, Wireless Transport Layer Security,			By the recommendations of Academic Peers and Industry Peers	100%

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

				WAP, End-to-End Security. Electronic Mail Security: Pretty Good Privacy, S/MIME, Domain Keys Identified Mail IP Security: IP Security Overview. IP Security Policy, Encapsulating Security Payload, Combining Security Associations, Internet Key Exchange, Cryptographic Suites				
3	19AM2205	Crypto Curriences & Block Chain Technologies		Introduction to cryptography & crypto currencies , Crypto currency and Markets, Mining and Crypto currencies. Bit coin applications & security overview of block chain technology, what is block chain: Transactions, Blocks, Hashes. Distributed consensus. The Double-Spend and Byzantine Generals' Computing Problems, Crowd funding, Bit coin Prediction Markets, Hash cryptography, Encryption vs hashing. Transactions:Recording transactions, Digital signature, Information technology program, verifying and confirming transactions. Security and safeguards: protecting block chain from attackers, Forks soft and hard.			By the recommendations of Academic Peers and Industry Peers	100%
4	19AM2107-	STATISTICS WITH RPROGRAMMING		Introduction, How to run R, R Sessions and Functions, Basic Math, Variables, Data Types, Vectors, Conclusion, Advanced Data Structures, Data Frames, Lists, Matrices, Arrays, Classes. R Programming Structures, Control Statements, Loops, - Looping Over Non vector Sets,- If-Else, Arithmetic and Boolean Operators and values, Default Values			By the recommendations of Academic Peers and Industry Peers	100%

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

				for Argument, Return Values, Deciding Whether to explicitly call return- Returning Complex Objects, Functions are Objective, No Pointers in R, Recursion, A Quick sort Implementation- Extended Example: A Binary Search Tree. Doing Math and Simulation in R, Math Function, Extended Example Calculating Probability- Cumulative Sums and Products- Minima and Maxima- Calculus, Functions Fir Statistical Distribution, Sorting, Linear Algebra Operation on Vectors and Matrices, Extended Example: Vector cross Product- Extended Example: Finding Stationary Distribution of Markov Chains, Set Operation, Input /out put, Accessing the Keyboard anc Monitor, Reading and writer Files, Graphics, Creating Graphs, The Workhorse of R Base Graphics, the plot () Function Customizing Graphs, Saving Graphs to Files. Probability Distributions, Normal Distribution- Binomial Distribution- Poisson Distributions Other Distribution, Basic Statistics, Correlation and Covariance, T-Tests,-ANOVA. Linear Models, Simple Linear Regression, - Multiple Regression Generalized Linear Models, Logistic Regression, - Poisson Regression- other Generalized Linear Models- Survival Analysis, Nonlinear Models, Splines- Decision- Random Forests,				
5	19AM2206	Big Data Analytics		Introduction to Big Data Analytics: Big Data Overview, State of the Practice of Analytics, Big Data Analytics in Industry Verticals. It also			By the recommendations of Academic	100%

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
K.L.E.F. (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India

				covers Overview of Data Analytics Lifecycle, Discovery, Data Preparation, Model Planning, Model Building, Communicating Results and Findings, Operationalizing. Initial Analysis of the Data: Initial Exploration and Analysis of the Data, Basic Data Visualization. Basic data analytics, reporting, and apply basic data visualization techniques to your data. Apply basic analytics methods such as distributions, statistical tests and summary operations, and differentiate between results that are statistically sound vs. statistically significant. Identify a model for your data and define the null and alternative hypothesis. Experimentation and demonstration of initial analysis of data Advanced Analytics and Statistical Modeling for Big Data — Theory and Methods: Need of analytic and select an appropriate technique based on business objectives; initial hypotheses; and the data's structure and volume. Apply some of the more methods in Analytics solutions, algorithms and the technical foundations for the methods. The environment (use case) in which each technique can provide the most value. Use appropriate diagnostic methods to validate the model screated Use Randin-database analytical functions to fit, score and evaluate models. Advanced Analytics and Statistical Modeling for Big Data — Technology & Tools: Tool to			Peers and Industry Peers	

25/6/2019

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

				Perform Analytics on Unstructured data using Map Reduce Programming paradigm. Use Hadoop, HDFS, HIVE, PIG and other products in the Hadoop ecosystem for unstructured data analytics, Effectively use advanced SQL functions and Greenplum extensions for in-database analytics. Use MADlib to solve analytics problems in-database. Endgame - Operationalizing an Analytics Project: Tasks needed to operationalize an analytics project. Four common deliverables of an analytics lifecycle project meet the needs of key stakeholders. Use a framework for creating final presentations for sponsors and analysts. Evaluate data visualization and identify ways to improve it. Apply these concepts to a big data analytics problem in the final lab. using R.				
6	19AM2207	CLOUDCOMPUTING		Cloud Computing: Introduction to Cloud Computing, History of Cloud Computing, Cloud service providers Properties, Characteristics & Disadvantages: Pros and Cons of Cloud Computing, Benefits of Cloud Computing, Cloud computing vs. Cluster computing vs. Grid computing Deployment Models: Public cloud, Private cloud, Hybrid cloud, Community cloud. Introduction to IaaS IaaS definition, Introduction to virtualization, Infrastructure as a Service(IaaS) Different approaches to virtualization, Hypervisors,			By the recommendations of Academic Peers and Industry Peers	100%

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India

				Machine Image, Virtual Machine(VM) ResourceVirtualization • Server • Storage Network Virtual Machine(resource) provisioning and manageability, storage as a service, Data storage in cloud computing(storage as a service) Implementation of cloud services • AmazonEC2 • Renting, EC2 Compute Unit, Platform and Storage, pricing, customers • • Platform as aService(PaaS) • Introduction to PaaS • What is PaaS, Service Oriented Architecture(SOA) • Cloud Platform andManagement • Computation • Storage • Examples • Google AppEngine • MicrosoftAzure • SalesForce.com • Force.complatform • Software as aService(PaaS) • Introduction to SaaS • Webservices • Web2.0 • Web OS • Case Study on SaaS • Service Management in				

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

				CloudComputing • Comparing Scaling Hardware: Traditional vs.Cloud • Economics of scaling: Benefittingenormously • ManagingData • Looking at Data, Scalability & CloudServices • Database & Data Stores inCloud • Large Scale DataProcessing • CloudSecurity • InfrastructureSecurity • Network level security, Host level security,Application level security • Data security andStorage • Data privacy and security Issues, Jurisdictional issues raised by Datalocation • Identity & AccessManagement • Access Control • Trust, Reputation, Risk • Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations • Case Study on Open Source & Commercial Clouds • Eucalyptus • Microsoft Azure • AmazonEC2				

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

7	19AM2108	Continuum Mechanics-1		Physical Properties of Fluids: Concept of fluids, Continum Hypothesis, Density, Specific Weight and Specific Volume, Pressure, Viscosity and Surface tension. Thermodynamics of Fluids: Introduction to thermodynamics, Equation of State, First Law of thermodynamics, Second Law of Thermodynamics and Clausius Inequality Kinematics of Fluids:Eulerian and Lagranges methods of Description of Fluids, Equvalence of Lagrangian and Eulerian Methods, Translation, Rotation and Deformation of Fluid Elements, Analytical Approach to Deformation, Stress - strain relations, Steady and unsteady flows, Stream Lines, Path Lines and Streak Lines Stress in Fluids and Constitutive Equations: Stress tensor, Normal Stresses, Shear Stresses, Symmetry of Shear of Stress tensor, newtonian Fluids, Non Newtonian Fluids, Purely viscous fluids, Reiner Rivlin Fluids, Power Law Fluids, Visco elastic fluids			By the recommendations of Academic Peers and Industry Peers	100%
8	19AM2208	Continuum Mechanics-2		Conservation Laws: Equation of conservation of Mass, Equation for the conservation of momentum, Equation for energy, Basic equations in different coordinate systems, Boundary conditions, Irrotational and Rotational Flows: Kelvins minimum energy theorem, Gauss theorem, Bernoullis equation and its application, 2D irrotational incompressible flows, D' Alemberts paradox,			By the recommendations of Academic Peers and Industry Peers	100%

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

				Flow due to a moving cylinder with circulation, Flow over an aerofoil, Voretex motion, velocity potential due to a vortex, velocity potential due to a vortex, Incompressible Viscous Fluid Flows: Flow between two parallel plates, Plane ciutte flow, Plane poiseuille flow, Flow over an inclined plane, Flow of two immissible fluids, Flow through circular pipe. Flow through an annulus, Flow between two porous plates, Plane couette flow, Flow through convergent and divergent channels, Stagnent point, Unsteady flows. Unsteady flow over a flat plate, Unsteady flow between two parallel plates.				
9	19AM2209	Computational FluidDynamics		Introduction to Computational Fluid Dynamics and Principles of Conservation: Continuity Equation, Navier Stokes Equation, Energy Equation and General Structure of Conservation Equations, Classification of Partial Differential Equations and Physical Behaviour, Approximate Solutions of Differential Equations: Error Minimization Principles: Finite Element Method, Finite Difference and Finite Volume Method, Finite VolumeMethod: Some Conceptual Basics and Illustrations through 1-D Steady State Diffusion Problems,Boundary Condition Implementation and Discretization of Unsteady State Problems, FTCS (Forward time central space) scheme, Stability analysis of parabolic equations (1-D unsteady state diffusion problems): CTCS scheme (Leap			By the recommendations of Academic Peers and Industry Peers	100%

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

				frog scheme), Dufort- Frankel scheme, FTFS, FTBS and CTCS Schemes, Finite Volume Discretization of 2-D unsteady State Diffusion type Problems, Solution of Systems of Linear Algebraic Equations: Elimination Methods, Iterative Methods, - Diffusion Equations: A Finite Volume Approach, Discretization of Navier Stokes Equations: Stream FunctionVorticity approach and Primitive variable approach, SIMPLE Algorithm, SIMPLER Algorithm,				
10	19AM12041	**SOFT COMPUTING**		Problem Solving Methods : Problem Space, Problem solving, State space, Algorithm's performance and Complexity, Search Algorithms, Depth first search method, Breadth first search method, Branch and Bound search method, Introduction to P type, NP complete and NP Hard problems. Classical methods versus Non-traditional methods. Evolutionary Methods: Principles of Evolutionary Processes and genetics, Introduction to evolutionary algorithms, Evolutionary strategy, Evolutionary programming. Genetic Algorithm : Basic concepts, working principle, procedures of GA, flow chart of GA, Genetic representations, (encoding) Initialization and selection, Genetic operators, Mutation, Generational Cycle, Genetic programming, Simple applications. Artificial Neural Networks: Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions, Neural network				

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India

				architecture: single layer and multilayer feed forward networks, recurrent networks. Back propagation algorithm, factors affecting back propagation training, Simple applications. Swarm Optimization: Introduction to Swarm intelligence, Ant colony optimization (ACO), Meta- heuristic, Algorithm for Travelling Salesman Problem, Particle swarm optimization (PSO), Other variants of swarm intelligence algorithms, Simple problems and applications.				

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

DAC MEETING AGENDA

DAC meeting held on 24th June, 2019 at 2.30P.M.

Venue: F-204

The following points were discussed in the Departmental Academic Committee meeting held on **24-06-2019**virtually at 2.30 P.M.

AGENDA of the meeting: to discuss academic related issues & inclusion of new courses /disciplines in the department

As per the agenda, the following points were discussed. After that, reviewed and resolved the following items.

1. To revise the existing structure of 2018-19 M.Sc.(App.Maths) program.
2. To Approve the list of scholars admitted into Ph.D. Program in Mathematics during January, 2019, their Research Guides, Doctoral Committees and Pre-Ph.D. syllabus.
3. To revise the syllabus of Continuum Mechanics (18AM2112) course.
4. Removing the Technical Skill component from Transform Techniques(18AM1208) course and introducing new technical skill course.
5. Review of P.O.'s.
6. Review of Revised M.Sc. (App.Maths) Curriculum with effect from 2019-20.
7. Review of Intake for M.Sc. (App.Maths).
8. It resolved to introduce computer related course in Y19 curriculum.

24/6/2019

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 502,
Guntur Dist., A.P., India.

BOS Meeting (Preceding an Academic Year)

AGENDA and RESOLUTIONS

AGENDA ITEM-1

1.Confirmation of Minutes of the previous meeting of the Board of Studies	Approved

AGENDA ITEM-2

Introduced new curriculum for Y19 regulation	Approved

It was resolved to introduce Y19 Curriculum.

25/6/2019

Dr. B.V. APPA RAO
Professor & Head Dept. of Mathematics
KLEF, (Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.