

**NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA
SURATHKAL**

MINUTES

OF

***THIRTY FIRST MEETING OF
BOARD OF STUDIES***

Date : 27.04.2017 (Thursday)
Time : 10.00 AM
**Venue : Board Room,
N.I.T.K - Surathkal,
Srinivasnagar, Mangalore
PIN - 575 025.**

Minutes of the Thirty First combined Board of Studies (UG, PG & Research) Meeting held on 27th April, 2017 in the Board Room, NITK, Surathkal.

MEMBERS PRESENT

1)	Dr. Katta Venkataramana	...	Chairman
2)	Dr. Ashok Babu	...	Member
3)	Dr. A. U. Ravishankar	...	Member
4)	Dr. S. M. Hegde	...	Member
5)	Dr. Prasad Krishna	...	Member
6)	Dr. A. Mahesha	...	Member
7)	Dr. Varghese George	...	Member
8)	Dr. M. Govinda Raj	...	Member
9)	Mrs. Vani	...	Member
10)	Dr. Alwyn Roshan Pais	...	Member
11)	Dr. U. Sripathi	...	Member
12)	Dr. Vinatha U	...	Member
13)	Dr. G. Ram Mohana Reddy	...	Member
14)	Dr. Raj Mohan B.	...	Member
15)	Dr. Narendranath S.	...	Member
16)	Dr. Udaya Bhat K.	...	Member
17)	Dr. D. Krishna Bhat	...	Member
18)	Dr. P. Sam Johnson	...	Member
19)	Dr. M. N. Satyanarayanan	...	Member
20)	Dr. K. B. Kiran	...	Member
21)	Dr. M. K. Nagaraj	...	Member
22)	Dr. Kumar G. N	...	Member
23)	Mr. K. Ravindranath	...	Member
24)	Mr. Kamlabh Kumar Singh	...	Member
25)	Mr. Gaurav Chowdhury	...	Member
26)	Dr. Jaya Kumar Seelam	...	External Member

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**Minutes of Thirty First BOS meeting held on
27.04.2017 (Thursday)**

The Chairman (BOS) and Dean (Academic) chaired the meeting and welcomed all the members to the **Thirty First BOS meeting**.

The minutes of **Thirtieth BOS** meeting was approved as there were no comments received from the members.

ITEM No: 31-BOS-1:

Introduction of new UG programme Elective Course :

- a) Department of Mathematical and Computational Sciences -
The BOS resolved to recommend the inclusion of following elective in the list of Electives of UG programme.

MA 409 Advanced Linear Algebra (3-0-0) 3
PREREQ: A pass in MA 204/EC224/EE243

The details are attached as an **ANNEXURE- I, Page No. 10-11.**

- b) Department of Metallurgical & Materials engineering –
BOS resolved to recommend the inclusion of following elective in the list of elective for UG programme.

MT 417 – Thin Films, Coatings & Applications.

The details are attached as an **ANNEXURE- II, Page No. 12.**

BOS resolved to ***defer*** the proposal of inclusion of following electives in the list of electives for UG programme.

MT 477 – Mineral Beneficiation

- c) Department of Information Technology -
The BOS resolved to recommend the additional elective courses for B.Tech as follows:

- | | | | |
|------------|---|---------|---|
| i) IT 368 | Data Analytics | (3-0-0) | 3 |
| ii) IT 369 | Communication Technologies for Internet of Things | (3-0-2) | 4 |

The details are attached as an **ANNEXURE-III, Page No.13-14.**

- d) Department of Mechanical Engineering -
The BOS resolved to recommend the inclusion of following new courses:

- | | | | |
|--------|--|---------|---|
| ME 333 | Introduction to Additive Manufacturing | (3-0-0) | 3 |
| ME 216 | Analytical Dynamics | (2-1-0) | 3 |

The details are attached as an **ANNEXURE-IV, Page No.15.**

**For
Senate
Approval**

**For
Senate
Approval**

*Reporting
to Senate*

**For
Senate
Approval**

**For
Senate
Approval**

- e) Department of Civil Engineering –
The BOS resolved to recommend the inclusion of a new elective in the curriculum of B.Tech Civil Engineering as follows:

CV 490 Non – Destructive Testing and Evaluation for Concrete Structures (3-0-0) 3

The details are attached as an **ANNEXURE-V, Page No.16-17.**

**For
Senate
Approval**

ITEM No: 31-BOS-2:

Modification of courses in the curriculum under UG Programme:

Department of Metallurgical & Materials engineering -
The BOS resolved to recommend the modifications in the in the following Syllabus due to certain reasons:

MT 266 – Measurements and Control (3-0-0) 3
MT 325 – Fuels, Furnaces and Refractories (3-0-0) 3

The details are attached as an **ANNEXURE-VI, Page No.18-20.**

**For
Senate
Approval**

ITEM No: 31-BOS-3:

Introduction of New PG Level Elective Courses :

- a) Department of Mathematical and Computational Sciences -
The BOS resolved to recommend the inclusion of following elective in the list of Electives of MCA programme.

MCA 830 Object Oriented Programming with JAVA (3-0-0) 3

The details are attached as an **ANNEXURE-VII, Page No.21.**

- b) Department of Information Technology -
The BOS resolved to recommend the additional elective courses for M.Tech as follows:

i) IT 827 Topics in Soft Computing (3-0-2) 4
ii) IT 828 Designing Internet of Things (3-0-2) 4

The details are attached as an **ANNEXURE-VIII, Page No.22-23.**

- c) Department of Metallurgical & Materials engineering -
The BOS resolved to recommend the inclusion of new elective course:

PM 807 – Advanced Mineral Processing (3-0-0) 3

The details are attached as an **ANNEXURE-IX, Page No.24.**

**For
Senate
approval**

**For
Senate
approval**

**For
Senate
approval**

<p>d) Department of Applied Mechanics and Hydraulics - The BOS resolved to recommend the inclusion of the following PG Programs:</p> <ul style="list-style-type: none"> i) AM 803 Numerical Methods for Civil Engineering Applications (3-0-0)3 ii) AM 804 Statistical Methods for Civil Engineering Applications (3-0-0)3 iii) MS 823 Fundamentals of Submarine Hydrodynamics (3-0-0)3 iv) MS 824 Computational Hydrodynamics Lab (3-0-0)3 v) MS 825 Foundation for Offshore Structures (3-0-0)3 vi) MS 826 Design of Offshore Structures (3-0-0)3 vii) RS 709 Application of unmanned Aerial Vehicles in Civil Engineering (3-0-0)3 viii) WR 814 Integrated Watershed Management (3-0-0)3 <p>The details are attached as an ANNEXURE-X, Page No.25-30.</p>	<p>For Senate approval</p>
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<p>ITEM No: 31-BOS-4:</p> <p>Modification of courses in the curriculum under PG Programme:</p> <ul style="list-style-type: none"> a) Department of Mathematical and Computational Sciences - The BOS resolved to defer the proposal on reducing the MCA intake strength from 92 to 46, as it is an administrative matter. b) Department of Metallurgical & Materials engineering – The BOS resolved to recommend the modifications in the following course: ML 705 – Ceramics Engineering (3-1-0) 4 The details are attached as an ANNEXURE-XI, Page No.31. c) Department of Applied Mechanics and Hydraulics - The BOS resolved to recommend the revision of following course: MS 801 Numerical Modelling of Coastal Processes (3-0-0) 3 The details are attached as an ANNEXURE-XII, Page No.32. d) Department of Mechanical Engineering – The BOS resolved to recommend the revision of the following courses: i) TH 704 Thermal Engineering Lab (0-0-3) 2 ii) ME 803 Wind Energy Conversion (2-0-2) 3 The details are attached as an ANNEXURE-XIII, Page No.33. 	<p style="text-align: center;"><i>Reporting to Senate</i></p> <p style="text-align: center;">For Senate Approval</p> <p style="text-align: center;">For Senate approval</p> <p style="text-align: center;">For Senate approval</p>
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ITEM No: 31-BOS-5:

Expedition of PhD Evaluation :

Department of Applied Mechanics and Hydraulics has forwarded the procedure of selection of referees at IITB.

The BOS noted the procedure which is partially followed at NITK. But it was decided to **defer** the discussion on the issue.

Reporting to Senate

ITEM No: 31-BOS-6:

Introduction of 900 level courses for PhD Programme :

Department of Information Technology –

The BOS resolved to recommend the additional 900 Level Courses for Ph.D. Programme as follows:

- i) IT 930 : Natural Language Processing and Applications 4
- ii) IT 931 : Deep Learning for Natural Language Processing 4
- iii) IT 932 : Intelligent Information Retrieval 4

For Senate Approval

The details are attached as an **ANNEXURE-XIV, Page No.34-35.**

BOS resolved to **defer** the proposal of 'IT 933 : Designing Internet of Things'

4

Reporting to Senate

ITEM No: 31-BOS-7:

Starting of MTech (Research) and PhD Programme in collaboration with APDDRL, Bangalore.

- i) BOS resolved to recommend the acceptance of the proposal, which is based on the MOU signed between NITK and APDDRL, and admit annually up to 10 students each for MTech (Research) and PhD programmes in various departments, as external registrants.

The details are attached as an **ANNEXURE-XV, Page No.36-50.**

For Senate approval

- ii) BOS authorized the Chairman-BOS to assign the additional Guides among the approved list of experts from APDDRL, after candidates from APDDRL are selected for admission and Institute Guides are identified. If any expert, other than among the enclosed list, is suggested for additional guide, the same has to be approved by the BOS separately. List of experts approved :

1. Dr. M. Abdul Kader (PhD, IIT Kharagpur)
2. Dr. S. Rajkumar (Ph.D. University of Totonto, Canada)
3. Dr. K. Rajashekar (Ph.D. University of Totonto, Canada)
4. Dr. Rajesh Panda (Ph.D. University of Totonto, Canada)

Reporting to Senate

ITEM No: 31-BOS-8:

Inclusion of External Additional Guides:

- | | |
|---|---|
| <p>a) Department of Physics –
The BOS resolved to approve that, Dr. T. Srinivas, Assoc. Professor, Applied Photonics Lab, IISc, Bangalore be considered for inclusion as an Additional Research Guide for Mr. Yadunath T R (PH15P03) in the department of Physics.</p> | <p><i>Reporting to Senate</i></p> |
| <p>b) Department of Electronics & Communication Engineering –
The BOS resolved to approve that, Dr. Mohammad S. Sharawi, Professor, Electrical Engineering Dept. King Fahd University of Petroleum and Minerals Dhahran, Saudi Arabia, be considered for inclusion as an Additional Research Guide for Ms. Princy Maria Paul (EC15F05) in the department of Electronics & Communication Engineering</p> | <p><i>Reporting to Senate</i></p> |
| <p>c) Department of Metallurgical & Materials Engineering –
The BOS resolved to approve that,</p> <p>i) Dr. Dipti Gupta, Professor, Material Science and Engineering, IIT Bombay, be considered for inclusion as an Additional Research Guide for Mr. Pavan Pujar (MT15F03) in the department of Metallurgical & Materials Engineering.</p> <p>ii) Dr. K. Devakumaran, Deputy Manager, WRI, BHEL, be considered for inclusion as an Additional Research Guide for Mr. R. Rajeshkumar (MT15F09) in the department of Metallurgical & Materials Engineering.</p> <p>iii) Dr. K. Devakumaran, Deputy Manager, WRI, BHEL, be considered for inclusion as Additional Research Guide for Mr. Gurudath B. (MT16F02) in the department of Metallurgical & Materials Engineering</p> | <p><i>Reporting to Senate</i></p> <p><i>Reporting to Senate</i></p> <p><i>Reporting to Senate</i></p> |
| <p>d) Department of Mechanical Engineering –
The BOS resolved to approve that,</p> <p>i) Dr. Ch Kanna Babu, Chief Manager (Design), Aero Engine Research and Design Centre, Hindustan Aeronautics Ltd., Bangalore, be considered for inclusion as Additional Guide for Mr. Srinivasa Rao Bommisetty (ME15P04) in the Department of Mechanical Engineering.</p> <p>ii) Dr. Shakti Singh Chauhan, Institute of Wood Science and Technology, Bengaluru, be considered for inclusion as Additional Guide for Mr. Mithun Kumar (ME15F20) in the Department of Mechanical Engineering.</p> <p>iii) Dr. Santhosh B, Head, Structural Design Section, Composite Entity, Vikram Sarabhai Space Centre, Indian Space Research Organization, Thiruvananthapuram, be considered for inclusion as Additional Guide for Mr. S. Sachin (ME16F15) in the Department of Mechanical Engineering.
(Dr. Shivananda Nayaka H will be the Guide from the Department of Mechanical Engineering)</p> | <p><i>Reporting to Senate</i></p> <p><i>Reporting to Senate</i></p> <p><i>Reporting to Senate</i></p> |

ITEM No: 31-BOS-9:

Any other matter :

1. Nominating Secretary BOS.
BOS resolved to recommend that, until the appointment of Deputy Registrar (Academic), the Assistant Registrar (Academic) will act as the Secretary, BOS.
2. Inclusion of several recently recruited faculty members as special invitees for BOS :
The BOS resolved to withdraw the agenda.

**For
Senate
approval**

*Reporting
to Senate*

ITEM No: 31-BOS-10:

New Elective subject for M.Tech (IB) for Academic Year 2017-18:

The BOS resolved to recommend the following course which will be offered as **electives** for M.Tech (Industrial Biotechnology).

IB 815 – Molecular Biology of Bacterial and Viral infections (3-0-0) 3

The details attached as an **ANNEXURE-XVI, Page No:51.**

**For
Senate
approval**

The Secretary (BOS) proposed the vote of thanks to the chair and to the members.

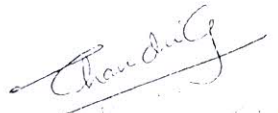
(K. Ravindranath)
Secretary –BOS, NITK

(Katta Venkataramana)
Chairman-BOS, NITK

Proceedings of DUGC meeting held on 27.04.17 at 04.00pm in the department meeting room.

Members Present :

1. Dr. Chandhini G



2. Dr. V. Murugan



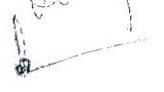
3. Dr. P. Sam Johnson



4. Dr. Kedarnath Senapati



5. Dr. Senthil Thilak A



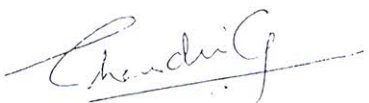
Minutes :

As discussed in the BoS meeting held on 27.04.2017, the prerequisite for the proposed course "MA409 Advanced Linear Algebra" is given below.

A Pass in at least one of the following courses:

- MA204 LINEAR ALGEBRA AND MATRICES
- EC224 MATHEMATICS FOR ELECTRONICS & COMMUNICATION ENGG.
- EE243 MATHEMATICS FOR ELECTRICAL ENGINEERS

It is resolved to forward revised version of the proposed course "MA409 Advanced Linear Algebra" to Dean (Acad).



For Secretary, DUGC



(P. Sam Johnson)

for Chairman - DUGC

MA 409 ADVANCED LINEAR ALGEBRA (3-0-0) 3 PREREQ : A Pass in MA204/EC224/EE243

Vector spaces, subspaces, quotient spaces, basis, change of basis, linear functional, dual space, projection, eigenvalues and eigenvectors, Cayley-Hamilton theorem, elementary canonical forms, annihilating polynomials, invariant subspaces, simultaneous diagonalization, direct sum decomposition, invariant direct sum, the primary decomposition theorem, Jordan form, inner product spaces, orthonormal basis, Gram-Schmidt process; adjoint operators, normal and unitary operators, self adjoint operators, spectral theorem for self adjoint operators.

Linear systems; Gaussian elimination, iterative methods - Gauss-Jordan, Gauss-Seidel and successive over relaxation method; LU decomposition, positive definite system, Cholesky decomposition, condition numbers; orthogonal matrices, Householder transformation, Givens rotations, QR factorization, stability of QR factorization, singular value decomposition, sensitivity analysis of singular values and singular vectors, least square problems.

K. Hoffman and R. Kunze, Linear Algebra, 2nd edition, Pearson Education, New Delhi, 2006.

C.D. Meyer, Matrix Analysis and Applied Linear Algebra, SIAM, 2001.

L.N Trefethen and David Bau, Numerical Linear Algebra, SIAM , 1997.

S. Axler, Linear Algebra Done Right, Springer, 1997.

Course Name: Thin Films, Coatings and Applications (MTH17)

Programme: B.Tech (MME)

Semester: Seventh,

Category: Programme Specific Elective (PSE),

Credits (L-T-P): (3-0-0) 3

Need for miniaturization, Basics of thin film, Brief review of kinetic theory of adsorption, desorption, film growth: nucleation and growth kinetics. Vacuum science and technology, vacuum pumps, surface: role of substrate surface, substrate cleaning. Epitaxy, thin film growth control, physical vapor deposition (PVD) processes, evaporation: thermal and e-beam. Principles of glow discharge and various sputtering processes. Fundamentals of Chemical Vapor Deposition (CVD) processes. Pulsed laser deposition (PLD), other techniques: electro-deposition, spin coating, sol-gel, Langmuir Blodgett (LB) techniques, SILAR technique, Doctor blade technique, printing. Hard coating: physical, mechanical and protective properties, basic thin film thickness measurement, microstructural characterization of films/coating. Thin film devices: optoelectronic devices, photo-detectors, solar cells. Applications: high hardness, corrosion resistance, biocompatibility and high temperature stability.

Milton Ohring, Materials Science of Thin Films, 2nd Edition, Academic Press, 2001

Hartmut Frey and Hamid R Khan, Handbook of Thin Film Technology, Springer, 2016

K. L. Chopra & L. K. Malhotra, Thin film Technology and Application, Tata McGraw-Hill, 1985

Peter M. Martin, Handbook of Deposition Technologies for Films and Coatings, Elsevier, 1994

Sam Zhang, Nanostructured Thin Films and Coating, CRC Press, 2010

Narendra B. Dahotre and T.S. Sudarshan, Intermetallic and Ceramics Coatings, Marcel Dekker Inc., 1999

L. Tushinsky, I. Kovensky, A. Plokhov, V. Sindeyev, P. Reshedko, Coated Metal, Springer, 2002.

Department: Metallurgical and Materials Engineering

Instructor: Dr. Saumen Mandal

S. Mandal

Proceedings of DUGC and DPGC Meeting held on 28/04/2017 at 10.00 AM in HOD Chamber.

Members Present

Signature

- 1. Prof. G. Ram Mohana Reddy
- 2. Dr. Jaidhar C D
- 3. Dr. Nagamma Patil
- 4. Dr. Geetha V
- 5. Dr. Sowmya Kamath S
- 6. Mr. Dinesh Naik
- 7. Mr. Biju R Mohan

The signatures are handwritten in black ink. From top to bottom, they correspond to: Prof. G. Ram Mohana Reddy, Dr. Jaidhar C D, Dr. Nagamma Patil, Dr. Geetha V, Dr. Sowmya Kamath S, Mr. Dinesh Naik, and Mr. Biju R Mohan. The signature for Dr. Jaidhar C D is the largest and most prominent, written in a cursive style.

Agenda Items: BOS Suggestion for Additional Elective Courses of B.Tech (IT) and M.Tech (IT)

Business Transacted:

As per BOS suggestion, the following modifications made by the Elective courses of B.Tech (IT) and M.Tech (IT) Programs offered by IT Department.

B.Tech (IT):

- 1. IT368: Data Science and Analytics (3-0-0) 3
-Changed as IT368: Data Analytics (3-0-0) 3
- 2. IT369: Communication Technologies for Internet of Things (3-0-2) 4
-No changes

M.Tech (IT):

- 1. IT827: Topics in Soft Computing (3-0-2) 4
- Add Latest References
- 2. IT828: Topics in Internet of Things (3-0-2) 4
- Changed as IT828: Designing Internet of things (3-0-2) 4

Elective Courses for B.Tech (IT)

IT368: Data Analytics

(3-0-0) 3

Introduction to Data analysis: statistical modeling, total information awareness, Bonferroni's Principle; Distributed File systems: MapReduce and Spark; Dimensionality Reduction: PCA, SVD, IGA; Finding Similar Items: Distance Measures, Near Neighbour Search, Similarity based search algorithms; Mining Data Streams: Stream Data Model, Sampling, filtering, Counting distinct elements; Link Analysis: Hubs and Authorities, PageRank, Personalized PageRank; Recommendation Systems: Content based, Collaborative filtering, Hybrid models, Evaluating recommender systems; Mining Social-network Graphs: graph centrality concepts, clustering, community detection, partitioning, overlapping community detection, SimRank; Applications of Large-scale Machine Learning, Current trends and research.

Jure Leskovec, Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets" Cambridge University Press, 2014
Gareth James, Daniela Witten, Trevor Hastie and Robert Tibshirani, "An Introduction to Statistical Learning with Applications in R", Springer, 2013

Nina Zumel and John Mount, "Practical Data Science with R", 2014, Manning Publishers

IT 369: Communication Technologies for Internet of Things (3-0-2) 4

Prereq: IT251

Introduction, IPv6 packet: IPv6 base header, Hop by Hop extension Header, Source Routing, Structure of IPv6 packet: fragmentation, IPv6 packet processing in routers, IPv6 address architecture, Current IPv6 prefix allocation, IPv6 addressing. ICMPv6: functionalities, neighbor discovery, address auto configuration. Communication standards: IEEE 802.15.4, IEEE 802.11, 6LoWPAN. Routing in low power lossy networks: RPL. Introduction to service oriented architecture and Web services, RESTful web services and applications for networked embedded systems. The Constrained Application Protocol (CoAP): features, interaction model, messages and request and response sub layer

J. Biron and J. Follett, Foundational Elements of an IoT Solution, O'Reilly Media, 2016.

Keysight Technologies, The Internet of Things: Enabling Technologies and Solutions for Design and Test, Application Note, 2016.

Charles Bell, Beginning Sensor Networks with Arduino and Raspberry Pi, Apress, 2013

Arshdeep Bahga and Vijay Madisetti, Internet of Things: A hands on approach, VPT Publications 2014

Olivier Hersent, David Boswarthick, Omar Elloumi, The Internet of Things : Key applications and protocols, Wiley publications 2015

Introduction to Additive Manufacturing, History of AM, AM Process Chain, Software for AM, ASTM classification of AM processes, Polymer AM, Metal Laser-Mater Interaction in AM, Materials science for AM, Mathematical Models for AM, Issues and Qualification of Powders for Metal AM, Process Control and Insitu Monitoring, Postprocessing of AM Parts, Inspection and Qualification of AM Parts, Economics of AM, Materials and Design Innovations using AM, Applications and Case Studies.

Text/ References Books:

1. Edited by Milan Brandt, "Laser Additive Manufacturing: Materials, Design, Technologies and Applications", Woodhead Publishing, 2017.
2. Andreas Gebhardt, Jan-steffen Hotter, "Additive Manufacturing: 3D Printing for prototyping and Manufacturing", Hanser Publications, 2016.
3. Bhaskar Dutta, Francis Froes, "Additive Manufacturing of Titanium Alloys", Butterworth-Heinemann, 2016.
4. Chua Chee Kai, Leong Kah Fai, "3D printing and Additive Manufacturing: Principles and Applications", World Scientific, 2014.
5. Ian Gibson, David W Rosen, Brent Stucker, "Additive Manufacturing Technologies: Rapid Prototyping to Direct Digital Manufacturing", Springer, 2010.
6. Hod Lipson, Melba Kurman, "Fabricated: The New World of 3-D Printing", Wiley 2013.

ME216

Analytical Dynamics

(2-1-0) 3

Review of kinematics of Planar mechanisms. Three dimensional kinematics of rigid bodies, vector character of angular velocity, rotational couples, general motion of a rigid body, velocities and acceleration in a rigid body, relative motion and rotating reference frames. Numerical simulation and analysis of mechanisms.

Analytical Mechanics: Generalized coordinates and constraints, Velocity representation, Virtual displacement and virtual work for rigid bodies, Generalised forces, Principle of virtual work for static equilibrium, D'Alembert's principle, General formulation, Extension to rigid bodies, using D'Alembert's principle to obtain equation of motion, Hamilton's principle, Lagrange's Equations, Constrained systems, Lagrange multiplier method, Constraint relaxation method, Kane's equation, Natural and Nonnatural systems equilibrium, Small motions about equilibrium, Rayleigh's dissipation function, Generalized momentum, First integrals, Impulsive motion, Impulsive excitation in Lagrangian mechanics, Impulse momentum relations for Kane's equation.

References:

1. Haim Baruh, "Applied Dynamics", CRC Press, 2014.
2. Leonard Meirovitch, "Methods of Analytical Dynamics," Dover Publications, 2014.
3. Gans Roger F, "Engineering Dynamics, From the Lagrangian to simulation", Springer Publications, 2013.
4. J L Meriam and L G Kraige, "Engineering Mechanics: Dynamics", 7th Edition, John Wiley and Sons, 2012.
5. Andrew Pytel and Jaan Kiusalaas, "Engineering Mechanics: Dynamics", 3rd Edition, CL Engineering Publishers, 2009.

National Institute of Technology Karnataka, Surathkal
Department of Civil Engineering



Proceedings of Faculty Council Meeting

Time : Date: Venue: 4 pm ,19/04/2017 , Office of Professor and Head, CED.

The faculty council of Department of Civil Engineering has discussed the proposal of Er. Prashanth M H, Assistant Professor, for the possible inclusion of a new elective CV 490 **Nondestructive Testing and Evaluation for concrete structures (3-0-0)** in the curriculum of BTech (Civil Engineering). The requirement and scope of the course were put forward. The brief syllabus and reference for the new course were presented in the meeting.

After detailed discussions, the DFC recommends to propose the same for the possible inclusion in the list of Program Specific Electives of the BTech (Civil Engineering). It was decided to request the secretary to include this item in the agenda, for the forth coming meeting of combined BOS.

List of faculty members

- | | |
|--------------------------------------|------------------------------------|
| 1) Prashanth M H . <u>Prash</u> | 10) Katta Venkataramana <u>Vel</u> |
| 2) Braharaju Mannu - <u>B. Mannu</u> | 11) A.S. BALU - <u>ASB</u> |
| 3) M.C. Narayan Hnaran <u>M.C.N.</u> | 12) G. Mahesh <u>G.M.</u> |
| 4) R. Shivastankar <u>R.S.</u> | 13) Ravraj H m <u>R.H.</u> |
| 5) S. Shrikari <u>S.S.</u> | 14) Sidaram Nayagi <u>S.N.</u> |
| 6) A - Gowri <u>A.G.</u> | 15) D.V. Reddy <u>D.V.R.</u> |
| 7) Anjana <u>Anj</u> | 16) K. SWAMINATHAN <u>K.S.</u> |
| 8. C-P. Desai <u>C.P.D.</u> | 17) Subhash. Yaragal <u>S.Y.</u> |
| 9) Soure B.M. <u>S.B.M.</u> | 18) C. Rajeskan <u>C.R.</u> |
| | 19) Arun Kumarthelle <u>A.K.</u> |
| | 20) A.U. Kon <u>A.U.K.</u> |
| | 21) B.B. Des <u>B.B.D.</u> |
| | 22) SURESHA S.N. <u>S.S.N.</u> |
| | 23) Jayalekshmi B.R <u>J.B.R.</u> |

Dr. D Venkat Reddy

Dr. D Venkat Reddy
Professor and Head
Department of Civil Engineering
National Institute of Technology Karnataka, Surathkal
Mangalore - 575 025, Karnataka, India

CV 490 NON-DESTRUCTIVE TESTING AND EVALUATION FOR CONCRETE STRUCTURES (3-0-0) 3

Fundamentals and basic concepts of Non Destructive Testing & Evaluation. Principles and applications of different Non Destructive Evaluation tools viz., ultrasonics, radiography, electromagnetic methods, acoustic emission, thermography for testing and evaluation of concrete structures.

References

1. *Guidebook on non-destructive testing of concrete structures-International Atomic Energy Agency, Vienna, 2002*
2. *Nondestructive Evaluation - Theory, Techniques, and Applications, by P.J. Shull, Marcell Decker Inc., NY 2002*
3. *Non destructive Testing and Evaluation of Materials, Tata McGraw Hill Education Private Limited , Second Edition, 2011.*
4. *Acoustic Emission testing -Basics for Research-Applications in Civil Engineering - Christian U Grosse, Masayasu Ohtsu, Springer; 2008*
5. *Current Literature.*

PROPOSED SYLLABUS

MT 266 MEASUREMENTS AND CONTROL (3-0-0)3

Measurement and Instrumentation: Introduction, Measurement, Instrument, Measurement methods, Generalized measurement system and its functional elements, Classification of instruments, Basic standards and units

Instrument Characteristics: Introduction, Static terms and characteristics, Dynamic terms and characteristics, standard test-inputs, Zero, first and second order instruments, First order system responses, Second order system responses

Measurement Errors and Statistical Analysis: Introduction, Classification of errors, Statistical analysis of test data, Curve fitting by least squares, Selecting an instrument

Pressure Measurement: Introduction, Terminology, Pressure units and measuring instruments

Flow Measurement: Introduction, Nature of flow, Classification of fluid flow measurement techniques, Variable head-meters, Pitot tubes, Variable area flow meters, Quantity meters

Temperature Measurement: Introduction, Temperature scales, Temperature measuring instruments, Liquid-in-glass thermometers, Bimetallic thermometers, Filled-system thermometers, Thermocouples, Resistance thermometers and thermistors, Radiation and optical pyrometers, Pyrometric cones, crayons, paints and pellets

Strain Gauges and Strain Measurement: Introduction, Strain measuring techniques, Requirements of a strain gauge, Resistance strain gauge, Strain gauge alloys and materials, Metal resistance strain gauges, Unbonded versus bonded gauges

Force and Torque Measurements: Introduction, Force measurement, Torque measurement

Miscellaneous Measurements: Density and specific gravity, Liquid level, Viscosity

Control Systems and their Classification: Introduction, Examples of control systems, Classification of control systems, Control systems terminology, Servomechanism, process control and regulators, Manual and automatic control systems

References

Kumar, D.S., Mechanical Measurements and Control, Metropolitan, New Delhi, 2001

Instrumentation for engineering measurements: J.W. Dally, W.F. Riley, K.G. McConnell, John Wiley Publ., 1995.

Industrial instrumentation-Al Sutko, J.D. Faulk, Cengage Learning, 1996

Principles of Industrial Instrumentation- D. Patranabis, McGraw Hill, 2001

Industrial Instrumentation, D.P. Eckman, John Wiley, 2002.

AS

Changes

1. The syllabus topics have been restricted to only that required for a Metallurgical & Materials Engineering B. Tech. student
2. The syllabus could be covered in a 3 credit course, which was difficult in the old syllabus
3. All the topics have been fully listed, which was not there in the old syllabus

AS

New

Course Name: Fuels, Furnaces and Refractories (MT325)

Programme: B.Tech (MME)

Semester: Fifth

Category: Programme Specific Elective (PSE)

Credits (L-T-P): (3-0-0) 3

Classification of fuels, properties and tests, coal origins, carbonization and gasification. Other solid fuels. Liquid fuels-Types, testing, properties. Gaseous fuels, Hydrates, Introduction to nuclear fuels, Indian fuel deposits. Principles of theory of combustion, Combustion calculations, Waste heat utilization. Classification of furnaces – various methods including Glinkov's. Thermal characteristics of furnace operation. Heat Balance. Advanced metallurgical furnaces: Electric arc furnace, Induction furnace, Microwave furnace, Spark Plasma Sintering furnaces. Definition of refractory, Classification, Properties and testing of refractories. General Production method of refractories, Selection of refractories for metallurgical applications, Special types of refractories.

O.P.Gupta, Elements of fuels, furnaces and refractories, 2011.

J. D. Gilchrist, Fuels, Furnaces and Refractories, 1977.

V. A. Krivandin, B. L. Markov, Metallurgical Furnaces, 1980.

F. H. Norton, Refractories, Mcgraw-Hill; 4 Reprint edition, 1992.

A. O. Surendranathan, An Introduction to Ceramics and Refractories, CRC Press, 2014.

Samen Maell

-6-

-20-

MCA830 Object oriented programming with JAVA

(3-0-0) 3

Introduction to Programming, and Java; Primitive Data Types and Operations; Selection Statements, Loops, Methods, Arrays, Strings and Text I/O; Exceptions and Assertions, Objects and Classes; Inheritance and Polymorphism; Getting Started with GUI Programming; Creating User Interfaces; Event Driven Programming; Java Database Programming; Remote Method Invocation; Java Server Pages; Multithreading; Networking; Advanced Swing Models; Menus, Toolbars, Dialogs; Containers, Layout Managers, and Borders.

References:

1. Y. Daniel Liang, *Introduction to Java Programming Comprehensive version, Tenth Edition*, Pearson publishers, 2015.
2. Herbert Schildt, *Java: The Complete Reference, Ninth Edition*, Oracle press (Mc. Graw Hill), 2014.
3. Bruce Eckel, *Thinking in Java fourth edition*, Prentice Hall, 2005.

Proceedings of DUGC and DPGC Meeting held on 28/04/2017 at 10.00 AM in HOD Chamber.

Members Present

Signature

1. Prof. G. Ram Mohana Reddy
2. Dr. Jaidhar C D
3. Dr. Nagamma Patil
4. Dr. Geetha V
5. Dr. Sowmya Kamath S
6. Mr. Dinesh Naik
7. Mr. Biju R Mohan

G. Ram Mohana Reddy

Jaidhar C D

Nagamma Patil

Geetha V

Sowmya Kamath S

Dinesh Naik

Biju R Mohan

Agenda Items: BOS Suggestion for Additional Elective Courses of B.Tech (IT) and M.Tech (IT)

Business Transacted:

As per BOS suggestion, the following modifications made by the Elective courses of B.Tech (IT) and M.Tech (IT) Programs offered by IT Department.

B.Tech (IT):

1. IT368: Data Science and Analytics (3-0-0) 3
-Changed as IT368: Data Analytics (3-0-0) 3
2. IT369: Communication Technologies for Internet of Things (3-0-2) 4
-No changes

M.Tech (IT):

1. IT827: Topics in Soft Computing (3-0-2) 4
- Add Latest References
2. IT828: Topics in Internet of Things (3-0-2) 4
- Changed as IT828: Designing Internet of things (3-0-2) 4

Elective Courses for M.Tech (IT)

IT827: Topics in Soft Computing

(3-0-2) 4

Fuzzy logic: Classical sets and fuzzy sets, fuzzy sets operations, fuzzy relations, Membership functions, defuzzification, fuzzy rule based systems. Artificial neural network: Model of a neuron, learning rules, activation functions, single layer perceptron networks, multilayer feed forward networks, back-propagation algorithm, Deep learning. Genetic algorithm-Fitness function, genetic algorithm operators: selection, crossover, mutation. Swarm optimization techniques: Particle swarm optimization and global swarm optimization. Hybrid soft computing methods. Classification Methods: Naive Bayes, Decision tree, Support vector machine, K-nearest neighbor method. Clustering Techniques: Partitioning methods, Hierarchical methods, Density Based methods, Clustering high Dimensional data. Feature selection methods.

Vojislav Kecman, Learning and Soft Computing, Pearson Education (Asia) PTE, 2004

Ross T.J., Fuzzy logic with engineering applications-McGraw Hill, 1995

J. M. Zurada, Introduction to artificial neural networks, Jaico publishing, 1997.

Goldberg D., Genetic algorithms- Addison-Wesley, 1st edition, 1989.

J. Han and M. Kambar, Data Mining: Concepts and Techniques, Morgan Kaufmann Publishers (Elsevier), 2008.

S. N. Sivanandam, S. N. Deepa, Principles of Soft Computing 2nd edition, Wiley, 2011.

Ian Goodfellow, Yoshua Bengio, Aaron Courville, Deep Learning, MIT Press, 2017.

Shishir K. Shandilya, Smita Shandilya, Kusum Deep, Atulya K. Nagar, Handbook of Research on Soft Computing and Nature-Inspired Algorithms, IGI Global, 2017.

IT 828: Designing Internet of Things

(3-0-2) 4

Introduction to Internet of Things: Technology drivers, Business drivers, Applications of IoT. Sensors and sensor nodes: sensing devices, sensors modules, nodes and systems. Connectivity and networks: Wireless Technologies for IoT, Edge connectivity and protocols, Wireless Sensor Networks. Communication technology for IoT, Design principles for Connected Devices, Internet principles, Prototyping embedded devices, Prototyping the physical design, Prototyping Online Components, Business models. Design of Semantic IoT, Cloud analytics and applications.

Olivier Hersent, David Boswarthick, Omar Elloumi, The Internet of Things : Key applications and protocols, Wiley publications 2015

Adrian McEwen And Hakim Cassimally, Designing Internet of Things, John Wiley and Sons 2014

Karin Breitman, Marco Antonio Casanova and Walter Truszkowski, Semantic Web: Concepts, Technologies, and Applications, Springer 2007

Charles Bell, Beginning Sensor Networks with Arduino and Raspberry Pi, Apress, 2013

Zhong, N., Ma, J., Liu, J., Huang, R., Tao, X. Wisdom Web of Things, Web Information Systems Engineering and Internet Technologies Book Series, 2016

Rajkumar Buyya Amir Vahid Dastjerdi, Internet of Things - Principles and Paradigms, Morgan Kaufmann, 2016

Kai Hwang, Jack Dongarra, Geoffrey C Fox, Distributed and Cloud Computing: From Parallel Processing to the Internet of Thing, Morgan Kaufmann, 2012

Course Name: Advance^d Mineral Processing (PM807)

Programme: Process Metallurgy (M. Tech)

Semester: Second (M. Tech)

Category: Elective

Credits (L-T-P): (3-0-0) 3

Introduction: Economic Justification, Economic Benefits; Crushing Technique and Fine Grinding; Classification: Factor influencing settling rates, free settling and hindered settling, air Classifiers and concentrate by classification; Metallurgical accounting and simulation: Mass balance method and mass balance on complex circuits, Particle size analysis; Dewatering: Thickeners, Filtering, Type of Filters; Flotation: Application of flotation, wettability, bubble column concentration, cell type; Working principle of advance magnetic separator such as vertical pulsating high gradient magnetic separator, multi stage magnetic separator, hybrid magnetic separator. Electrostatic Separator, electrodynamic separator; Gravity concentration: Shaking table, Jigs, spiral, Heavy media Separator, Particle Dynamics in shaking table, spiral, jigs and spirals; Recycling of E-waste: Purpose of recycling, Treatment method and processing.

D.V. Subba Rao, Mineral Beneficiation: A Concise Basic Course, 2011, CRC Press.

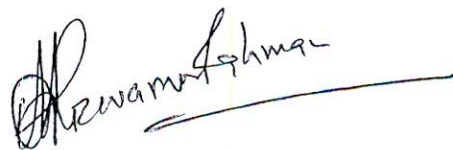
B. A. Wills Mineral Processing Technology: An Introduction to the Practical Aspects of Ore Treatment and Mineral Recovery, 7 edition, 2006, Butterworth-Heinemann.

Charles Burroughs Gill, Materials Beneficiation, Materials Research and Engineering, 1991, Springer-Verlag New York, Inc.

Nam S&t, Minerals Processing and Beneficiation 2015, Daya Publishing House.

Department: Metallurgical and Materials Engineering

Instructor: Dr. Mohammad Rizwanur Rahman



**DEPARTMENT OF APPLIED MECHANICS AND HYDRAULICS
NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA, SURATHKAL**

Date: 02.05.2017

Minutes of DUGC/DPGC/DRPC meeting held on 02.05.2017 at 3.00 PM in HOD Chamber

Agenda

List of electives to be proposed / revised to PG programs of the Department

Resolution

As per BoS resolution, the committee resolved to send the modified proposal / revision of the following electives for the PG program of the Department (from 2017-18 onwards) for the consideration of the Chairman, BoS.

Proposed

1. AM 803	Numerical Methods for Civil Engineering Applications	3 credits
2. AM 804	Statistical Methods for Civil Engineering Applications	3 credits
3. MS 823	Fundamentals of Submarine Hydrodynamics	3 credits
4. MS 824	Computational Hydrodynamics Lab	2 credits
5. MS 825	Foundation of Offshore Structures	3 credits
6. MS826	Design of Offshore Structures	3 credits
7. RS 709	Application of unmanned Aerial Vehicles in Civil Engineering	3 credits
8. WR814	Integrated Watershed Management	3 credits

Revised

1. MS 801	Numerical Modelling of Coastal Processes	3 credits
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Name and signature of the faculty members present

PRUTHVIRAJ U Pruthviraj U.

Amba Shetty

AS

T. NASAR

T. Nasar

D. KARMAKAR

D. Karakar

SUBRAMANIAN K.

S. Subramanian

H. Ramesh

H. Ramesh


A. Vittal Hegde

A. Vittal Hegde

Subba Rao

S. Subba Rao

-25-


 जिभागाध्यक्ष / HOD/5/17
 अनुप्रयुक्त यांत्रिकी विभाग / AMD
 राष्ट्रीय प्रौद्योगिकी संस्थान कर्नाटक, सुरत्कल



New Electives

Subject Code: AM 803, L-T-P: 3-0-0 Credit: 3, Category: Elective Course
Subject Name: NUMERICAL METHODS FOR CIVIL ENGINEERING APPLICATIONS

Numerical Solution of Non-linear Equations: Method of Bisection; Regula Falsi method; Secant method; Newton-Raphson Method; Fixed Point of a Function; Generalised Newton Raphson Method. Approximation of Functions; *Numerical Differentiation:* Richardson's Extrapolation Method; Approximation Formulas for Higher Order Derivatives. *Numerical Integration:* Newton-Cotes Rules; Compound Quadrature Rules; Gauss Quadrature Rules; Gauss Legendre Rules; Approximate Evaluation of Double Integrals. *Numerical Solution of Differential Equations:* Euler's method; Modified Euler method; Runge-Kutta Methods; *System of Linear Equations:* Direct methods; Iterative methods.

Application: Surface Gravity Wave Interaction with Floating Structure; Flow in Porous Media; Free Surface Flows.

S.C. Chapra and R.P. Canale, Numerical Methods for Engineers, McGraw Hill, 2013.

R.L Burden and J.D. Faires, Numerical Analysis, Clengage Learning, USA, 2011.

K. Atkinson, An Introduction to Numerical Analysis, John Wiley & Sons, USA, 1989.

M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical methods for Scientific and Engineering Computation, Wiley Eastern, 1985.

C.G. Koutitas & P.D. Scarlatos, Computational Modelling in Hydraulic and Coastal Engineering, CRC Press, Taylor & Francis Group, 2016.

Subject Code: AM 804, L-T-P: 3-0-0 Credit: 3, Category: Elective Course
Subject Name: STATISTICAL METHODS FOR CIVIL ENGINEERING APPLICATIONS

Elements of Probability; *Random Variables and Expectations:* Random Variables and Distribution Function; Jointly Distributed Random Variables; Mathematical Expectation; Covariance and Variance; Moment Generating Function. *Special Discrete and Continuous Probability Distribution:* Discrete Uniform Distribution; Binomial Distribution; Multinomial Distribution; Geometric Distribution; Poisson Distribution; Normal Distribution; Exponential Distribution; Weibull Distribution; Gamma and Beta Distribution. *Correlation and Regression:* Method of Least Square and Curve Fitting; Carl Pearson Coefficient of Linear Correlation; Rank Correlation and Spearman's Coefficient; Stochastic Processes.

Application: Statistical Approach in the Analysis of Random Waves; Fatigue Load Analysis.

G. Geoffrey Vining, Scott Kowalski, Statistical Methods for Engineers, Brooks/Cole, Clengage Learning, USA, 2010.



H.C. Taneja, *Statistical Methods for Engineering and Sciences*, I.K International Publishing House, New Delhi, 2009.

M. S. Ross, *Introduction to Probability and Statistics for Engineers and Scientists*, Wiley.

R.V. Hogg and A.T. Craig, *Introduction to Mathematical Statistics* McMillan.

Subject Code: MS 823, L-T-P: 3-0-0 Credit: 3, Category: Elective Course

Subject Name: FUNDAMENTALS OF SUBMARINE HYDRODYNAMICS

Under Sea Environment; Submarine Controls; *Hydrostatic and Stability*: Static Control; Ballast Tanks; Stability when Surfacing and Bottoming; *Manoeuvring and Control*: Manoeuvring in Horizontal and Vertical Plane; Manoeuvring Limitation; Submarine Manoeuvring Trials; *Resistance and Flow*: Components of Resistance; Prediction of Submarine Resistance; Propulsion: Propulsor/Hull Interaction; Axisymmetric Hull with Single Propeller; Prediction of Propulsor Performance; *Appendage Design*: Forward Control Surfaces; Aft Control Surfaces.

N Bruggen and L. Wisedale, *Model Submarine Technology: Radio Control Systems, Auxiliary Functions, Diving Techniques, Attitude Control*, Traplet Publications Ltd, 1996.

P.R Franklin, *Handbook of Submarine Operations*, Frontier India Technology, 2015.

M. Renilson, *Submarine Hydrodynamics*, Springer, New York, 2015.

N. Friedman, *Submarine Design and Development*, Conway Maritime, 1984.

Subject Code: MS 824, L-T-P: 0-0-3 Credit: 2, Category: Elective Course

Subject Name: COMPUTATIONAL HYDRODYNAMICS LAB

Numerical Simulation for Coastal Erosion; Sediment Transport; Modelling of Tidal Hydraulics; Wind and Wave Generated Currents and Storm Surges using MIKE21.

Design and Analysis of Offshore Structures; Dynamic response due to Environmental Loads; Pile Structure Interaction using SACS.

Numerical Modelling using MATLAB.

MIKE 21 & MIKE 3 Flow Model, Hydrodynamic Module, DHI, Denmark.

SACS Bentley User Manual, USA.

R.K. Bansal, A.K. Goel & M.K. Sharma, *MATLAB and its Applications in Engineering*, Pearson, 2009.

Basic soil properties: correlation between engineering parameters, geotechnical investigation, bore log. Pile foundation: Jacket main piles, skirt piles, driven piles, drilled and grouted piles, steel and concrete piles, axial capacity, point bearing and skin friction, factor of safety, lateral load on piles, p-y, t-z and q-z curves, pile group effect, scour around piles, Seabed subsidence and design of piles against seabed movement, negative skin friction, cyclic degradation, main pile to jacket connections, skirt pile to jacket connections, API RP 2A provisions. Pile installation: Minimum pile wall thickness, pile handling stresses, static and dynamic stresses, pile stick up, stresses during stick up, wave and current loads, hammer selection, pile driving stresses, wave equation analysis, pile driving fatigue, API RP 2A provisions. Pile Testing: Working load test, ultimate load test, pile monitoring during driving, pile integrity Testing, high strain dynamic testing, rebound method. Special foundations: Mud-mats: bearing capacity, sliding stability, overturning stability, short term and long Term settlements, factor of safety, bucket foundation, suction anchors, gravity foundation. Use of SACS software in the analysis and design.

Bowles, J.E., Foundation analysis and design, McGraw Hill, 2001.

Poulos, H.G and Davis, E.H., Pile Foundation Analysis and Design, John Wiley, 1980

Winter Korn and Fang, Foundation Engineering hand book, 2001

Prakash S., Soil Dynamics, McGraw Hill, 1981

API recommended practice 2A-WSD (RP 2A-WSD)

API recommended practice 2A-WSD (RP 2A-LRFD)

MS826**Design of Offshore Structures****(3-0-0) 3**

Loads on Offshore Structures: Wind Loads; Wave and Current Loads; Calculation based on Maximum base Shear and Overturning Moments; Design Wave heights and Spectral Definition; Hydrodynamic Coefficients and Marine growth; Fatigue Load Definition and Joint Probability distribution; Seismic Loads. Concepts of Fixed Platform Jacket and Deck: Jacket concepts, redundant framing arrangement; Launch and Lift jackets; Simple Deck configurations for Lift and float-over installations; In-service and Pre-service Loads and analysis. Steel Tubular Member Design: Principles of WSD and LRFD; Allowable stresses and Partial Safety Factors; Tubular Members, Slenderness effects; Column Buckling, Design for Hydrostatic pressure; Design for combined axial and bending stresses (API RP 2A guidelines). Tubular Joint Design for Static and Cyclic Loads: Simple tubular joints, design using allowable loads; stress concentration factors; S-N curves and fatigue damage calculations. Jackup Rigs: Configuration and operation of jackups; Simplified analysis; Spudcan Penetration and extraction; Spudcan – pile interaction; Design of jackup legs; Design against Accidental Loads (Fire, Blast and Collision): Behaviour of steel at elevated temperature; Fire Rating for Hydrocarbon fire; Design of structures for high temperature; Blast Mitigation-Blast walls; Collision of Boats and energy. Use of SACS software in the analysis and design.

Subrata K.Chakrabarti, Handbook of Offshore Engineering, Elsevier, 2005.

Y.Goda, Random seas and design of marine structure, World Scientific, 2010.

Dawson, Offshore Structural Engineering, Prentice Hall, 1983.

A.S. Arya and J.L. Ajmani, Design of steel structures, Nem Chand Bros, Roorkee, 1996.

Johon E. Lothers-Advanced Structural Design in Steel, 1999.

API recommended practice 2A-WSD (RP 2A-WSD)

API recommended practice 2A-WSD (RP 2A-LRFD)

Basics of Aerial Photogrammetry using unmanned Aerial Vehicles, Theory and Techniques of Orientation, Project Planning for Aerial Photogrammetry, georeferenced 2D maps and 3D models, 3D Point Cloud, Digital Surface & Terrain Model, Volume calculation, Contour line, 3D textured model and its applications in archeology and mining, Thermography and multispectral imaging

ELEMENTS OF PHOTOGRAMMETRY, 3rd edition, 2014, by P. Wolf and B. Dewitt, McGraw-Hill Book Co.

MANUAL OF PHOTOGRAMMETRY, 5th edition, 2010 American Society of Photogrammetry.

PHOTOGRAMMETRY, 3rd edition, 1980 by F. Moffitt and E. Mikhail, Harper & Row, Inc.

Handbook of Unmanned Aerial Vehicles (Volume 1) 2010 by Valavanis, K., Vachtsevanos, George J. (Eds.)

Introduction and basic concepts of watersheds; Sustainable watershed approach & watershed management practices; Integrated watershed management- integrated approach, conjunctive use, rainwater harvesting; Watershed modelling- modelling approaches, system concept, hydrologic processes, rainfall, run-off, sub-surface flow; Socio-economic aspects, RS&GIS in watershed management; Water quality management – sources of pollution, water quality modelling, environmental guidelines; Flood and drought management; Principles of water conservation and recycling.

1. *Murthy JVS 1998. Watershed management, New Age International, New Delhi.*
2. *V. Lazarova, and Akica Bahri 2004. Water re-use for irrigation. CRC Press, London.*
3. *Black Peter E. 1991. Watershed hydrology, Prentice Hall, London.*
4. *CWC Report 2005. General guidelines for water audit and water conservation. Ministry of Water Resources, New Delhi.*

NEW SYLLABUS

Bonding in Ceramics: Introduction, Ionic Bonding, Covalently Bonded Solids
Structures of Ceramics: Introduction, Oxide Structures, Structure of Silicates, Structures of Glasses
Defects in Ceramics: Introduction, Point Defects, Point Defects and Their Notation, Linear Defects, Planar Defects
Ceramic Microstructures: Introduction, Characteristics of Microstructure, Quantitative Analysis, Triaxial Whiteware Compositions, Refractories, Glazes and Enamels, Glasses, Glass-Ceramics, Electrical and Magnetic Ceramics, Abrasives, Cement and Concrete, Microstructures of Some Special Compositions
Production of Ceramic Powders: Introduction, Raw Materials, Powder Production, Powder Characterization
Forming Processes: Introduction, Pressing, Casting, Plastic Forming, Green Machining
Thermal Treatment: Introduction, Calcination, Sintering, Glazing
Mechanical Properties: Introduction, Tensile and Compressive Strengths, Creep, Fracture, Toughening Mechanisms
Thermal and Thermo-Mechanical Properties: Introduction, Thermal Properties, Thermo-Mechanical Properties
A. O. Surendranathan, An Introduction to Ceramics and Refractories, CRC Press, 2015
Michel W. Barsoum, Fundamental of Ceramics, International Edition, 1997.
W. D. Kingery, Introduction to Ceramics, 3rd Edition, John Wiley & Sons, 1993.
Man G. King, Ceramic Technology and Processing, Noyes Publications, New York, 2002.
Jhon B. Watchman, Mechanical Properties of Ceramics, Jhon Wiley & Sons, 1996.

Changes

1. The first reference book contains the whole new syllabus thereby avoiding the reference for the syllabus contents to four reference books given in the old syllabus spanning over 900 pages. This reference book is the latest among all the references in the old syllabus
2. The syllabus could be covered in a 4 credit course, which was difficult in the old syllabus
3. All the topics have been fully listed, which was not there in the old syllabus

- 4 -



Revision of Existing Elective Course

Subject Code: MS 801, L-T-P: 3-0-0 Credit: 3, Category: Elective Course
Subject Name: NUMERICAL MODELLING OF COASTAL PROCESSES

Numerical Solution of Ordinary Differential Equations and Partial Differential Equations: Finite Difference Approach; Boundary Element Method. Sediment Transport Phenomenon: Physical Properties of Fluid and Sediments; Hydrodynamic Principle; Boundary Layer; Hydrodynamic Drag and Lift on Particle; Numerical Modelling of Sediment Transport; Long Wave Theory and Applications; Boussinesq Approximation; Mild-slope Approximation; Wavemaker Theory; Spectral and Statistical Analysis of Random Waves; Wave Forces on Offshore Structures; Modelling of Wave Energy Conversion Device; Programming using MATLAB.

C.G. Koutitas & P.D. Scarlatos, Computational Modelling in Hydraulic and Coastal Engineering, CRC Press, Taylor & Francis Group, 2016.

Horikawa K., Coastal Engineering: An Introduction to ocean Engineering, University of Tokyo Press, 1978.

S. Dey, Fluvial Hydrodynamics: Hydrodynamic and Sediment Transport Phenomena, Springer-Verlag, 2014.

P.K. Banerjee, The Boundary Element Methods in Engineering, Mc-Graw Hill Book Company, London, 1994.

M.W. Dingemans, Water Wave Propagation over Uneven Bottom: Linear Wave Propagation, Part I&II, World Scientific, Singapore, 1997.

TH 704 Thermal Engineering LAB

A. Introduction to Thermal Engineering LAB

B. Experiments

1. Burning Velocity Measurement
2. Flame Stability Study
3. Determination of Flow Boiling Heat Transfer Coefficient In Conventional Channel
4. Estimation of Unknown parameters using Inverse Techniques from FIN Heat Transfer
5. Inverse Estimation of Heat Flux
6. Experiment on Pool Boiling Heat Transfer
7. Thin Foil Technique
8. Savonius Water Transfer
9. Study of CRDI Engine and Operated with Open ECU

References :

ME803

Wind Energy Conversion

(2-0-2) 3 [Earlier 3-0-0]

Introduction, Sources and Characteristics of wind, Power in the wind, Wind resource assessment , Wind measurement, Classification of wind turbines, horizontal and vertical axis wind turbines, wakes, Operational characteristics, Wind turbine design, Component design, Power control, Siting and Wind Farm design, Electric and control systems, Economic assessment, Environmental and social issues. Lab Component: Understand the operation of low-speed wind tunnel, Instrumentation for measuring force, Velocity and Pressure, and various aspects of the flow around airfoil, Pressure distribution over symmetrical airfoil measurement of the lift and the drag force, static pressure distribution , and wake velocity profile for symmetric airfoil using smoke generator, the effects of adding a pair of "trip wires" to the asymmetric airfoil, compare the wind tunnel measurements with theory and other experimental data.

Text/ References

1. J. F. Manwell, J.G.McGowan and A.L.Rogers, "Wind Energy Explained, Theory, Design and Application", Second Edition John Wiley and Sons Inc.2010.
2. Tony Burton, David Sharpe, Nick Jenkins, Ervin Bossanyi, "Wind Energy Handbook", John Wiley and Sons,ltd,2001.
3. Sathyajith Mathew, "Wind Energy Fundamentals, Resources Analysis and Economics", Springer-Verlag Berlin Heidelberg, 2006.
4. Jewel B.Barlow, William H. Rae, Alan Pope, "Low-Speed Wind Tunnel", 3rd Edition, John Wiley and Sons, 1999.

Proceedings of DRPC Meeting held on 28/04/2017 at 10PM PM in HOD Chamber.

Members Present

Signature

1. Prof. G. Ram Mohana Reddy
2. Dr. Jaidhar C D
3. Dr. Nagamma Patil
4. Dr. Geetha V
5. Dr. Sowmya Kamath S

G. Ram Mohana Reddy

Jaidhar C D

Nagamma Patil

Geetha V

Sowmya Kamath S

Agenda Items: BOS suggestion for Additional 900 Level Courses for PhD Program of IT Department.

Business Transacted:

As per BOS suggestion, the following modifications made by the additional 900 level courses for the PhD Program of IT Department.

- (i) IT930: NATURAL LANGUAGE PROCESSING AND APPLICATIONS (4-0-0) 4
- No Changes
- (ii) IT931: DEEP LEARNING FOR NATURAL LANGUAGE PROCESSING (4-0-0) 4
- No Changes
- (iii) IT932: INTELLIGENT INFORMATION RETRIEVAL (4-0-0) 4
-No Changes
- (iv) IT933: DESIGNING INTERNET OF THINGS (4-0-0) 4
- Removed

900 Level Courses

IT930 NATURAL LANGUAGE PROCESSING AND APPLICATIONS

(4-0-0) 4

Introduction to NLP, History and Applications; Language Modelling: Grammar based Language Models, Statistical Language Models; Mathematical Foundations of NLP and Information Theory; Word Level Analysis and Collocation, n-grams; Syntactic Analysis: CFGs, Parsing, Treebanks, Semantics: Representing Meaning, Lexical Similarity, Lexemes, WordNets; Semantic Analysis: Word Sense Disambiguation; Sentiment Analysis and opinion mining, Generating and developing sentiment lexicons, learning lexicons, machine learning based techniques, case studies, Text Mining and Document Categorization Techniques; Machine Translation, NL Applications.

Christopher D. Manning and Hinrich Schütze, "Foundations of Statistical Natural Language Processing" MIT Press, 1999

Daniel Jurafsky and James H. Martin. "Speech and Language Processing: An Introduction to Natural Language Processing", Prentice Hall 2000.

Tanveer Siddiqui and U.S Tiwary, "Natural Language Processing and Information Retrieval", Oxford Press, 2008

James Allen, "Natural Language Understanding". Benjamin/Cummings, 2ed, 1995

Steven Bird. "Natural Language Processing with Python". O'Reilly, 2009

IT931 DEEP LEARNING FOR NATURAL LANGUAGE PROCESSING

(4-0-0) 4

Introduction to NLP and Deep Learning, Language Modeling, History and Applications, Basic Text Processing, Simple Word Vector representations: word2vec, GloVe, Advanced word vector representations: language models, softmax, single layer networks, Neural Networks and back-propagation -- for named entity recognition; Gradient checks, overfitting, regularization, activation functions; Recurrent neural networks -- for language modeling and other tasks; GRUs and LSTMs, Recursive neural networks -- for parsing and other applications; Convolutional neural networks -- for sentence classification; Reinforcement Learning and applications, The future of Deep Learning for NLP: Dynamic Memory Networks.

Li Deng and Dong Yu, "Deep Learning Methods and Applications", Microsoft Research, Foundations and Trends Book, 2014

Josh Patterson and Adam Gibson, "Deep Learning: A Practitioner's Approach" 1st Edition, 2016

Christopher D. Manning and Hinrich Schütze, "Foundations of Statistical Natural Language Processing" MIT Press, 1999

Collobert, Ronan, et al. "Natural language processing (almost) from scratch." Journal of Machine Learning Research 12.Aug (2011): 2493-2537.

IT932 INTELLIGENT INFORMATION RETRIEVAL

(4-0-0) 4

Introduction, Basics Concepts, IR System Architecture; IR Models and Operations - Preprocessing, Bag of Words, Indexing, Boolean, Term Weighting, Vector-Space Retrieval, Probabilistic Models, Best Match Models, Latent Semantic Indexing, ; Experimental Evaluation of IR Systems; Document Representations; Query Operations and Languages; Relevance feedback and query expansion; Web Search and Link Analysis: Algorithms and evaluation; Structured Information Retrieval, Multimedia Information Retrieval; Recommender Systems; Information Extraction and Integration; Selected research papers on upcoming trends and open problems.

C. D. Manning, P. Raghavan and H. Schütze, Introduction to Information Retrieval, Cambridge University Press. 2008.

Baeza-Yates & Ribeiro-Neto, Modern Information Retrieval, Pearson Education, 2010

Information Retrieval: Algorithms and Heuristics, by D. Grossman and O. Frieder, 2004

Information Retrieval: Implementing and Evaluating Search Engines, by S. Büttcher, C. Clarke, and G. Cormack., 2010

Korfhage Robert R, Information Storage and Retrieval, John Wiley & Sons, Inc, 1997.

NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA, SURATHKAL
Srinivasnagar, Mangalore

Date: 21-03-2017

To

The Director
NITK, Surathkal

Sir,

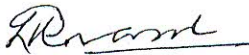
Sub: Starting of MS (by Research) and PhD programme at APDDRL, Bangalore-Reg.
Ref: Letter no. CIPET-APDDRL/RES/NITK/Prog./2017 - 18 /73 dated 14-03-2017

Please find enclosed a copy of letter cited on the above subject. APDDRL Bangalore is planning to offer MS (by Research) and PhD programmes with due approval of NITK with an intake of 10 students/scholars for each programme in the area of Materials Science and Technology, Chemistry, Mechanical Engineering and Chemical Engineering from the academic year 2017-18 and subsequent affiliation to these programmes by NITK.

The proposal may please be approved by the BOS and Senate at the earliest so as to launch the programme in the stipulated period.

Since this is a great opportunity to utilize the excellent infrastructural facility available at APDDRL Bangalore and all research centres of CIPET spread across the country, an early action is very much required.

Yours faithfully,



21.3.2017

Prof. Prasad Krishna
Dean (AA & IR)

Encl: copy of the letter from APDDRL, Bangalore

→ Dean (A)

A meeting of concerned HODs may be arranged for discussion and sorting out the future course of action.

bul
23/3/17

→ Director: Approved


29/3/17

एडवांस पॉलीमर डिजाइन
& डेवलपमेंट रिसर्च लेबोरेटरी

(सेंट्रल इंस्टिट्यूट ऑफ प्लास्टिक इंजीनियरिंग
एंड टेक्नालॉजी की आर. एंड डी. इकाई)

रसायन एवं पेट्रोसायन विभाग

रसायन एवं उर्वरक मंत्रालय, भारत सरकार

वीटीपीसी, तृतीय तल, ए ब्लॉक, बीएमटीसी कॉम्प्लेक्स,

के.एच. रोड, शांतिनगर, बेंगलुरु

फोन: 080 - 22220441/442

ईमेल: apddrl@cipet.gov.in

वेबसाइट: www.cipet.gov.in



ADVANCED POLYMER DESIGN
& DEVELOPMENT RESEARCH LABORATORY

(Central Institute of Plastics Engineering & Technology)

Dept. of Chemicals & Petrochemicals

Ministry of Chemicals & Fertilizers, Govt. of India

VTPC, 3rd Floor, A-Block, BMTC Complex,

K.H. Road, Shantinagar, Bangalore-560 027.

Tel : 080 - 22220441/442

Email: apddrbengaluru@gmail.com

Website: www.cipet.gov.in

CIPET-APDDRL/RES/NITK/Prog./2017 - 18 / 73

Date: 14.03.2017

To,

The Director

National Institute of Technology Karnataka (NITK), Surathkal
Mangalore - 575 025

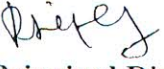
Dear Sir,


Sub: Starting of MS (by Research) and PhD programme at APDDRL, Bangalore - Reg
Ref: MoU signed between NITK and APDDRL (R&D unit of CIPET)

With reference to the above cited subject, kindly refer the Memorandum of Understanding (MoU) signed between NITK and APDDRL (R&D unit of CIPET) on 27.12.2016 at NITK, wherein it is intended to conduct research oriented programme at APDDRL Bangalore in affiliation with NITK Surathkal leading to award of MS (by Research) and PhD programme. Accordingly, APDDRL Bangalore is planning to offer MS (by Research) and PhD programmes with due approval of NITK in the academic year, 2017-18, with an intake of 10 students/scholars for each programme.

So, it is kindly requested that approval may kindly be accorded for offering MS (by Research) and PhD programmes in the area of Material Science and Technology, Chemistry, Mechanical Engineering and Chemical Engineering from the academic year, 2017-18, and subsequent affiliation to these programmes by NITK.

With regards


Principal Director
APDDRL, Bengaluru


Dean (A) / Dean (R & C)

Copy to Dean, Alumni Affairs & Institutional Relation NITK Surathkal, Mangalore

- 53 - - 37 -

Head Office : CIPET, Guindy, Chennai - 600 032. मुख्यालय : सिपेट, गिण्डी, चेन्नै - 600 032.

केन्द्र : चेन्नै, अहमदाबाद, लखनऊ, हैदराबाद, भुवनेश्वर, भोपाल, अमृतसर, मैसूर, इम्फाल, हाजीपुर, हल्दिया, गुवाहाटी, औरंगाबाद, जयपुर, कोच्चि एवं मुरथल
Centres : Chennai, Ahmedabad, Lucknow, Hyderabad, Bhubaneswar, Bhopal, Amritsar, Mysore, Imphal, Hajipur, Haldia, Guwahati, Aurangabad, Jaipur, Kochi & Murthal

**MEMORANDUM OF UNDERSTANDING
BETWEEN
ADVANCED POLYMER DESIGN AND DEVELOPMENT RESEARCH
LABORATORY (R&D Unit of CIPET) BENGALURU
AND
NATIONAL INSTITUTE OF TECHNOLOGY, KARNATAKA (NITK), SURATHKAL**

This Memorandum of Understanding (hereinafter referred to as the "MoU") entered on 27th day of December, 2016 at NITK Surathkal

BETWEEN

Advanced Polymer Design and Development Research Laboratory (hereinafter referred to as the "APDDRL"), R&D Unit of Central Institute of Plastics Engineering & Technology (CIPET) an autonomous organization under the administrative control of the Ministry of Chemicals and Fertilizers, Government of India, having its headquarters at TVK Industrial Estate, Guindy, Chennai, Tamil Nadu and represented by its Director General

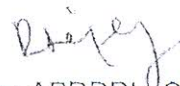
AND

National Institute of Technology, Karnataka, Surathkal, (hereinafter referred to as the "NITK") an Institution of National Importance under the NITSER Act of Parliament, No. 29 of 2007, Government of India, having its headquarters at Surathkal, Mangalore -575025, Karnataka and represented by its Director,

However, the parties are hereinafter referred to individually as "Party" and collectively as "Parties".


And whereas CIPET is a premier National Institution devoted to Skill Development, Technology support Services, Academic and Research & Development (STAR) in the field of plastics engineering & technology having centres at 28 locations including five High Learning Centres, twelve Other Learning Centres, three Specialized Centres, two R & D Wings, five Vocational Training Centre, one Petrochemical Data Services spread across


For NITK


For APDDRL, CIPET

the country catering to the needs of Polymer and allied industries. CIPET carryout various activities as under:

- Renders Technology Support Service in the areas of design, tooling, plastics processing and testing and quality assurance in India and abroad. CIPET has been in the forefront of strengthening the technological capabilities and has been constantly building capacities and leveraging its expertise, caliber and skill sets to meet the emerging and evolving needs of the industries.
- Conducts Long term professional skill development programs (Academic) and short term vocational skill development programs in four levels in accordance with the human resource requirement of Indian Polymer & allied industries.
 - Doctoral, Postgraduate & undergraduate Programs are high-ended Programs at High Learning Centre.
 - Conventional CIPET's Diploma, Post Diploma and Postgraduate Diploma Programs at all CIPET Centres.
 - Industry Specific Programs.
 - Operator Level Programs including non-conventional Programs at Selected Centres of CIPET.
- Offers high quality technical consultancy and advisory services through its Technology Support Services (TSS though its core competency in the area of Tooling, Precision Machining on CNC machines, Design and Manufacturing of Moulds, Tools & Dies for manufacturing plastics products, CAD/CAM/CAE services, plastics product manufacturing through state-of-the-art Injection molding machines, Blow molding, PET, Stretch blow moulding, Pipe and Film extrusion, Standardization, Testing and quality control for Plastics Materials and products, Pre and Post delivery inspection (PDI), etc.
- Carryout Research and Development works through its R & D wings in the area of plastics technology to help the Indian plastic industries to use


For NITK


For APDDRL, CIPET

the new polymeric materials & products, import substitution and enhance cost to performance balance.

The Advanced Polymer Design and Development Research Laboratory (APDDRL), Bengaluru, a R&D unit of CIPET shall be multifunctional "One-stop" facility consisting of all characterization facility with broad specialization in product development and modification. The major functions of the laboratory are to conduct Research & Development, test and evaluation, product evaluation & commercialization along with training to post graduate and doctorate students

And

whereas NITK offers Bachelor, Master and Doctoral Level Education Programmes in Engineering besides the MSc, MCA & MBA Programmes and undertakes Industrial consultancy, Sponsored Research and Development and Training activities.

And whereas the Parties consider it expedient and in their mutual interest to collaborate with each other as strategic partners for undertaking collaborative R&D activities in the development of polymeric materials, manufacturing processes, machine Tools, CAD/CAM/CAE and related thrust areas of technology for the benefit of the student fraternity and Industries in particular and the Manufacturing Sector at large.

Through discussions and consultations between the Parties and subject to the terms and conditions set forth in this MoU, the Parties record their intentions and understanding as follows:

1. INTENT

APDDRL, CIPET and NITK have entered in to this MoU to further their mutual intentions in the following areas:

Conduct of research oriented programme at APDDRL, Bangalore in affiliation with NITK Surathkal leading to award of MS by research and Ph.D. subject to approval of NITK Senate.


For NITK


For APDDRL, CIPET

Jointly work on R&D and Industrial projects in the areas of materials, products, Advanced Manufacturing Technologies, and machine tools, Moulds and Dies, and CAD/CAM/CAE.

Both the parties agree that they shall harness their complimentary resources (the resource persons/faculty members, Bachelor/Masters/Doctoral student fraternity of NITK and the Scientists of APDDRL) APDDRL, CIPET would collaborate and leverage the facilities available at APDDRL, CIPET & NITK expertise to work together to pursue co-operative research activities for the benefit of the polymer materials and manufacturing sector at large.

Both the parties, in line with the recitals, will agree upon detailed plan and conditions of co-operative activities.

2. OBJECTIVES AND SCOPE:

The primary objectives of this MoU are:

- a) Conduct of research oriented programme at APDDRL, Bengaluru in affiliation with NIT Surathkal leading to award of M.S. (by research) and Ph.D. degrees with due approval of the NITK Senate.
- b) To carry out collaborative Research and Development activities in the field of Materials, Products, Manufacturing Technologies, Machine Tools Engineering and CAD/CAM/CAE.
- c) To design and deliver special technology programmes with high practical and analytical content for the benefit of fresh Graduate Engineers, Postgraduate aspirants, Diploma holders, Practicing Engineers, Faculty members from Academia, etc with the objective of developing *Industry Ready Scientists/Engineers/Technologists*
- d) Training of faculty members and scholars of both APDDRL, CIPET and NITK in materials, process and product development areas on mutual understanding


For NITK


For APDDRL, CIPET

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- e) Enabling APDDRL, CIPET Scientists and Scholars to pursue MS (by research) and doctoral studies at NITK through Research at APDDRL with due approval of NITK Senate.

This list may be amended with mutual agreement in writing based on emerging needs.

Initially it is proposed to take up the following broad areas of activities:

- Conduct of research oriented programme at APDDRL, Bengaluru in affiliation with NITK leading to award of MS by research and Ph.D. with due approval of NITK senate.
- Write and Submit Joint R&D Proposal of Industry relevance to the Govt. funding agencies and to pursue the approved R&D Projects
- Joint Conferences, Seminars, Workshops, Symposia in the area of polymeric materials, design and development of plastics components

3. RESPONSIBILITIES OF APDDRL, CIPET & NITK

- a) To identify specific contextual research themes/projects in consultation with industry, as appropriate;
- b) Form Research teams consisting of APDDRL scientists and NITK faculty, on a project-to-project basis.
- c) Identify and establish a cost model for sourcing necessary materials, facilities/ equipment, consumables, etc. The facilities/resource persons can be sourced either from sponsor, APDDRL or NITK, or others on a project-to-project basis.

4. CONFIDENTIALITY:

- (a) Both NITK and APDDRL acknowledge that certain Confidential information may be disclosed by one party to the other (the Party that owns and/or discloses the Confidential Information is hereinafter referred to as the "disclosing party" and the Party receiving or accessing such Confidential Information is referred to as "receiving party") during the


For NITK


For APDDRL, CIPET

tenure of this MoU or performance of the respective obligations under the resultant definitive agreements hereunder. Confidential Information means all information identified as "Confidential", including but not limited to information concerning the trade secrets, intellectual property rights, know-how, formulae, processes, inventions, data, network configurations, system architecture, designs, flow charts, drawings, proprietary information, data or materials related to business, services, products, customers, employees, finances or operational information of either party, and any other confidential or proprietary information the disclosure of which might harm or destroy a competitive advantage of the disclosing party.

The receiving party shall not, directly or indirectly, disclose to any third party other than its employees, affiliated companies, and authorized agents any information concerning the disclosing party's business methods, products, customers or finances, or any other Confidential Information which is disclosed to it by the disclosing party, without the prior written permission of the disclosing party, unless such disclosure is specifically required in the course of the performance by the receiving party of its obligations hereunder or under the resultant definitive agreements. The obligations of receiving party under this Section shall not extend to any information which: (i) is or becomes a matter of public knowledge, not as a result of any action of the receiving party; (ii) is lawfully in the possession of the receiving party prior to a disclosure hereunder; (iii) is received from a third party who lawfully acquired such information without restriction, and without a breach hereof, by the receiving party; (iv) is disclosed by the receiving party with the disclosing party's prior written approval (v) the information is independently developed by the receiving party, without use of the disclosing party's Confidential Information;(vi) is disclosed by the receiving party under operation of law or regulation or legal process;

(b) The Parties acknowledge that this MoU contains confidential


For NITK


For APDDRL, CIPET

information that shall be considered proprietary by both Parties, and agree to limit distribution of or disclosure about the Confidential Information hereunder and/or this MoU to those individuals within their respective organizations with a legitimate need to know the contents of this MoU. Neither party shall publicize or make any public announcement concerning the terms or nature of the relationship or this MoU without the prior written consent of the other party.

(c) NITK and APDDRL both acknowledge that any breach by them of their respective obligations under this Section may cause irreparable harm to the other party for which its remedies at law may be inadequate and that in the event of any such breach either party shall be entitled to seek equitable relief (including without limitation injunctive relief and specific performance) in addition to other remedies provided hereunder or available at law.

(d) Upon termination or dissolution of this MoU, or upon earlier demand thereof, each party shall at the other party's option, either destroy under written certification of such destruction or return to the other party all properties containing the other party's confidential information and copies thereof in its possession.

(e) The Confidentiality Obligations under this Section shall survive during the term of this MoU and three (3) years thereafter.

5. INTELLECTUAL PROPERTY RIGHTS:

By entering into this MoU the Parties undertake:

- 1) To protect each other's intellectual property.
- 2) Not to use each other's intellectual property without the prior express written consent of the other.


For NITK


For APDDRL, CIPET

- 3) Ensure the confidentiality of such intellectual property as provided in Section on Confidentiality and
- 4) Not to use each other's intellectual property should this MoU be dissolved or terminated at any time.
- 5) To render itself liable, in case of infringement, to all such damages, penalties, actions as available to the other party under the law.

The Parties agree that neither of them shall gain by virtue of this MoU any rights of ownership or any other interest, right or title of copyrights, patents, trade secrets, trade marks, or any other intellectual property rights owned by the other party, and nothing herein shall mean nor shall be construed to mean that they are at any time assigned, licensed or otherwise alienated to the other party, nor the other party shall be entitled to claim any right, title or interest therein, at any time. All new inventions, innovations or ideas developed in the course of providing services to a client shall belong to the party who develops them during the project/assignment. If the Parties undertake any joint development in the course of providing services to a client or under this MoU, any such joint development will be governed by a separate agreement to be negotiated in good faith by the Parties.

6. GOVERNING LAW & ARBITRATION.

In the event of any dispute or difference arising out of or in connection with this MoU shall be settled by the Parties by mutual negotiations. Any unsettled dispute or difference shall be referred to the arbitration of three arbitrators, of which one shall be appointed by APDDRL and the other by NITK. The two arbitrators shall then appoint a third arbitrator before entering upon the reference. The Arbitration proceedings shall be regulated by the provisions of the Arbitration and Conciliation Act 1996 and the venue of the arbitration shall be Bangalore, India. The language of Arbitration shall be English. The arbitrators may from time to time with the written consent of Parties enlarge the time for making and publishing the award, which will be binding on the both Parties. The governing law for the purpose of this


For NITK


For APDDRL, CIPET

agreement shall be India. All the courts in Bangalore shall have jurisdiction to try the disputes under this agreement.

7. TERM OF MoU:

This MoU shall be effective from the date of execution hereof and shall remain in force for a period of **Three years** or until terminated by either party as above or replaced by a definitive Strategic Alliance Agreement between the Parties whichever occurs first. The Parties may mutually agree to extend the period of this MoU.

8. TERMINATION OF MOU:

(a). Either party shall, upon written notice of sixty (60) days to the other, withdraw from or terminate negotiations or terminate this MoU at any time without cause, and no such withdrawal or termination, for whatever reason will be deemed to be in bad faith, or otherwise give rise to any liability to either party (other than any liability arising from such Party's breach of Confidentiality Obligations, Intellectual Property and liability to make payments to each other for any payment then due and payable as specified in and any other breach of the respective binding definitive contract between the Parties relating to their mutual engagement in projects) . Provided that the projects already accepted for implementation will be completed by each party performing the activities and discharging the obligations assigned to it pursuant to the relevant definitive agreement and the Parties agree that all such activities and transactions will be governed by the relevant definitive agreement, not withstanding the termination of the MoU. On the termination/expiry of this MoU each party will return all property belonging to the other party and hereby undertakes not to use the said proprietary or Confidential information of the other party in any manner whatsoever without seeking the prior written consent of the other party.

(b) Either party shall also be entitled to terminate this MoU for cause in the event of:


For NITK


For APDDR, CIPET

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- (i) Breach by the other Party of the terms and conditions of this MoU and its failure to remedy such breach within a period of 30 days from date of receipt of a written notice in this regard from the non-breaching party.
- (ii) The filing by or against the other party in any court of competent jurisdiction of a petition in bankruptcy or insolvency, or for a scheme of rearrangement (reorganization) with creditors, for the appointment of a receiver or trustees; or the making of an assignment for the benefit of creditors, and such petition is not discharged within 60 days of its filing.

9. AMENDMENT

This MoU may be amended or supplemented only by written document that makes specific reference to this MoU and which is signed by the party against which enforcement of any such amendment or supplement is sought.

10. WARRANTY

Each Party warrants to the other Party that to the best of its knowledge all materials, data, information and other assistance provided by it shall not infringe third party rights.

11. OUTCOMES / DELIVERABLES:

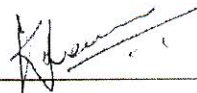
- ❖ Development of trained man power in the field of MATERIALS, MANUFACTURING PROCESS, PRODUCT, TOOLING, CAD/CAM.CAE through collaborative work leading to award of MS (by research) and Doctorate Programmes
- ❖ Development of capabilities and institutionalized platforms to work on the futuristic requirements of polymer industry & the Manufacturing Sector in the field of moulds, dies and tools
- ❖ Technology up-gradation in key Technology areas


For NITK


For APDDRL, CIPET

IN WITNESS WHEREOF, each party has caused it's duly authorized representative to execute this MOU as of the date stated above.

Signed on behalf of
NITK, Surathkal

Prof. 

Director

Director
National Institute of Technology Karnataka
Surathkal, Mangalore - 575029
Karnataka, India

Witness:



Signed on behalf of
CIPET



Principal Director, APDDRL

Witness:




For NITK


For APDDRL, CIPET

Proposal of MTech (Research) and PhD Programmes in collaboration with APDDRL, Bangalore

Preamble:

In view of the request received from the Principal Director, APDDRL, Bangalore, for starting joint Masters and PhD programmes in several specializations based on the MOU signed on 27/12/2016, a meeting was held on 30/03/2017 at 4pm in the CCMT Conference room. The members present were:

- Dean (AA&IR)
- Dean (Academic)
- Dean (R&C) (in-charge)
- HOD (Chemistry)
- HOD (in-charge) (Chemical Engineering)
- HOD (Mechanical Engineering)
- HOD (Metallurgical & Materials Engineering)

Recommendations:

After going through the request letter from APDDRL and the MOU, after detailed deliberations it was resolved as below:

- 1) Dean (AA&IR) will be the coordinator for this activity under the MOU.
- 2) Up to a maximum of 10 students each for MTech (Research) and PhD will be considered for any academic year.
- 3) The participating departments for PhD will be Departments of Chemistry, Chemical Engineering, Mechanical Engineering and Metallurgical & Materials Engineering.
- 4) The participating Institutes for MTech (Research) will be the Departments of Chemical Engineering, Mechanical Engineering and Metallurgical & Materials Engineering.
- 5) New Departments can be added depending on the research requirements and interests of the applicants.
- 6) The candidates will be admitted as External Registrants. They will be required to complete one semester of residential requirement during their registration period, as specified in the NITK regulations. Remaining period, they will be carrying out research at their parent Organization using the funds and research facilities available there.
- 7) The main Research guide will be from NITK. An Additional guide may be included from the parent Organization for each candidate, after the application from the interested person from the parent organization is scrutinized and approved by the Board of Studies.
- 8) The selection of candidates through an aptitude test and/or interview will be done by APDDRL with participation from NITK faculty and officials, and the final recommended list will be communicated to Dean (AA&IR), NITK.
- 9) The TA/DA expenses of NITK faculty and officials for the selection process including related meetings outside NITK, as well as for visiting the research facilities where the

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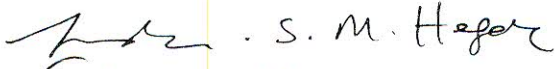




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candidates will be carrying out the research as part of PhD research will be borne by APDDRL. The visits by NITK faculty for such purposes will be treated as OOD.

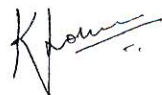
- 10) The office of Dean (AA&IR), in consultation with the HODs of concerned departments, will coordinate the visit by the recommended candidates to NITK for meeting with faculty and finalizing a suitable guide for each student within the specified period. Also the candidates are advised to visit NITK on their own before the selection process to discuss with the prospective guides.
- 11) Those applicants for whom guides are available at NITK, will be recommended for admission by the Dean (AA&IR), based on the input from the concerned HODs/DRPC Chairpersons and the list will be communicated to APDDRL. And those selected candidates will be informed to report on the dates specified for admission to MTech & PhD programmes.
- 12) The students selected under this MOU will be treated in-par with the project staff, while deciding the upper limit for guidance by a particular faculty.
- 13) Upon satisfying the minimum eligibility criteria as specified in the NITK regulations and admission brochures, the candidates will be considered for admission and will be issued provisional admission order by the Office of Dean (Academic).
- 14) This proposal along with the copy of MOU and other documents may be placed before the Board of Studies and Senate of the Institute for consideration.

Name and Signatures of members Present:

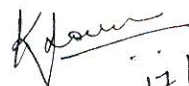
Dean (AA&IR)	 PRASAD KRISHNA
Dean (Academic)	Katta Venkataswamanna 
Dean (R&C)	 S. M. Hegde
HOD (Chemistry)	
HOD (Chemical Engineering)	 B. R. Murthy
HOD (Mechanical Engineering)	
HOD (Metallurgical & Materials Engineering)	

Submitted to the Director for approval :

may be approved



To be placed before next BOS meeting.



17/4/17

New elective course for M.Tech (Industrial biotechnology) for the academic year 2017-2018

IB815: Molecular biology of bacterial and viral infections

Credit: (3-0-0) 3

Microbes and disease-establishing relationship - viral classification – Baltimore classification system - virus infectious cycle – viral structure – viral attachment and entry – RNA and DNA viral transcription and replication – reverse transcription, mechanisms of bacterial genetic modification-mobile genetic elements- pathogenic- islands- conjugation- transposons- virulence factors-molecular approaches- transposon mutagenesis- in vivo expression technology- genomic subtractive hybridization, respiratory-anatomy and histology- respiratory stem cells and regeneration- innate and adaptive immune system- antiviral innate immune system- interferon stimulated genes- bacterial defense strategies- quorum sensing- toxins-horizontal transfer of antibiotic resistant genes-vaccination, Case studies- staphylococcus aureus- heamophilus influenza- streptococcus pneumoniae – pseudomonas aeruginosa- influenza A virus- respiratory syncytial virus – HIV -Rhino virus – COPD and infections – cystic fibrosis and infections.

Text books

1. Norkin, L. C., (2010) Virology- molecular biology and pathogenesis, ASM Press, 1st Edition
2. Snyder L., et al., (2013) Molecular genetics of bacteria, ASM Press, 4th Edition
3. Flint, S. J., Racaneillo, V. R., Enquist, L. W., Skalka, A. M., (2009) Principles of virology, ASM Press, 3rd Edition
4. Knipe D. M., Howley P. M., (2007) Fields' Virology, Lippincott Williams and Wilkins, 5th Edition
5. Wilson, B. A., (2011) Bacterial pathogenesis a molecular approach, ASM Press, 3rd Edition
6. Kier'szenbaum, A. L., Histology and Cell Biology: An Introduction to Pathology, 10th Edition