

**NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA
SURATHKAL**

MINUTES

OF

***TWENTY NINTH MEETING OF
BOARD OF STUDIES***

Date : 09.09.2015 (Wednesday)
Time : 10.00 AM
**Venue : Board Room,
N.I.T.K - Surathkal,
Srinivasnagar, Mangalore
PIN - 575 025.**

Minutes of the Twenty Ninth combined Board of Studies (UG, PG, Research) Meeting held on 09th September, 2015 at 10.00 AM in the Board Room, NITK, Surathkal.

MEMBERS PRESENT

1)	Dr. Katta Venkataramana	...	Chairman
2)	Dr. A. Kandasamy	...	Member
3)	Dr. M.C.Narasimhan	...	Member
4)	Dr. Udayakumar R Y	...	Member
5)	Dr. K Chandrasekaran	...	Member
6)	Dr. M. B. Saidutta	...	Member
7)	Dr. A. Mahesha	...	Member
8)	Dr. K. Varija	...	Representative of HOD, Dept. of AM&H
9)	Dr. K.N. Lokesh	...	Member
10)	Dr. M. Govinda Raj	...	Member
11)	Mrs. Vani	...	Member
12)	Dr. M. S. Bhat	...	Member
13)	Dr. Vinatha U.	...	Member
14)	Dr. G. Ram Mohana Reddy	...	Member
15)	Dr. Raj Mohan B.	...	Member
16)	Dr. K. V. Gangadharan	...	Member
17)	Dr. Vijay Desai	...	Member
18)	Dr. Srikanth Rao	...	Member
19)	Dr. Jagannath Nayak	...	Member
20)	Prof. B. Ramachandra Bhat	...	Member
21)	Prof. Santhosh George	...	Member
22)	Prof. H.D. Shashikala	...	Member
23)	Prof. A. H. Sequeira	...	Member
24)	Mr. K. Ravindranath	...	Member
25)	Mr. Gaurav Chawdhury	...	Member

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Minutes of Twenty Ninth BOS meeting held on 09.09.2015 (Wednesday)

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

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

<p>ITEM No: 29-BOS-1:</p> <p>Introduction of new UG Program Specific Elective Course:</p> <p>The BOS resolved to <i>defer</i> the proposal of the following new UG program Specific Elective course:</p> <p>CO317 – INTRODUCTION TO GRAPH THEORY (3-0-0) 3</p>	<p><i>Reporting to Senate</i></p>
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<p>ITEM No: 29-BOS-2:</p> <p>Replacing ME200 Workshop (1 Credit) with CV210 Elements of Civil Engineering (1 Credit)-</p> <p>The BOS resolved to recommend replacing ME200 Workshop (1 Credit) with CV210 Elements of Civil Engineering (1 Credit). This will be applicable for the students admitted during academic year 2015-16 onwards.</p> <p>The details are attached as an ANNEXURE-I, Page No. 10.</p>	<p>For Senate Approval</p>
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<p>ITEM No: 29-BOS-3:</p> <p>Changes in the UG Regulations- Termination from the B.Tech Programme:</p> <p>The BOS resolved to recommend the following changes in the Regulations of Termination from the B.Tech Programme:-</p> <p>A student shall be required to leave the Institute without the award of the Degree, under the following circumstances:</p> <p>If a student fails to earn the minimum credit specified below:</p> <table border="1" data-bbox="194 1714 1250 1935"> <thead> <tr> <th>Check Point</th> <th>Existing Credit Threshold</th> <th>Proposed Credit Threshold</th> </tr> </thead> <tbody> <tr> <td>End of FIRST year</td> <td>20</td> <td>15</td> </tr> <tr> <td>End of SECOND year</td> <td>50</td> <td>40</td> </tr> <tr> <td>End of THIRD year</td> <td>80</td> <td>65</td> </tr> <tr> <td>End of FOURTH year</td> <td>110</td> <td>90</td> </tr> </tbody> </table>	Check Point	Existing Credit Threshold	Proposed Credit Threshold	End of FIRST year	20	15	End of SECOND year	50	40	End of THIRD year	80	65	End of FOURTH year	110	90	<p>For Senate approval</p>
Check Point	Existing Credit Threshold	Proposed Credit Threshold														
End of FIRST year	20	15														
End of SECOND year	50	40														
End of THIRD year	80	65														
End of FOURTH year	110	90														

ITEM No: 29-BOS-4:

Introduction of New PG Level Elective Courses:

a) The Department of Computer Science & Engineering-

The BOS resolved to *defer* the proposal of the following new PG level course:
courses:

CS868 – Graph Theory (3-0-0)3

b) The Department of Physics-

The BOS resolved to recommend the following new PG Level Elective courses (*with revised titles*) for inclusion in the Curriculum:

PH880 – Nonlinear Dynamics (3-0-0) 3

PH881 – Computational Physics (3-0-0) 3

PH882 –Density Functional Theory and
it's applications in materials science (3-0-0) 3

The details are attached as an **ANNEXURE-II, Page No.11-13.**

c) The Department of Metallurgical and Materials Engineering:

The BOS resolved to recommend a new elective for all the three PG Courses: ML, PM and NT.

MT810 X-Ray Analysis of Materials (3-1-0) 4

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

d) The Department of Civil Engineering:

The BOS resolved to recommend a new elective for M.Tech (CTM).

CM815 – Infrastructure Development and Management (3-0-0) 3

The details are attached as an **ANNEXURE-IV, Page No.15-16.**

*Reporting
to Senate*

**For Senate
Approval**

**For Senate
Approval**

**For Senate
Approval**

ITEM No: 29-BOS-5:

Proposal from the Dept. of Electronics and Communication Engineering-

The BOS resolved on the proposals of DUGC/DPGC of the Dept. of Electronics and Communication Engineering as follows:

- a) Awarding credits for the short courses conducted jointly with MoU partners - *deferred*
- b) Permitting out-station co-guides to participate in the proposal seminar, pre-synopsis seminar and final viva voce exam in M.Tech(R) and Ph.D through video conference.
- Recommended
- c) Comprehensive test for research students - *deferred*
- d) Increasing the course requirements for M.Tech (R) - *deferred*

Reporting to Senate

For Senate Approval

Reporting to Senate

The details are attached as an ANNEXURE-V, Page No.20-21.

ITEM No: 29-BOS-6:

Changes in the PG Regulations-

An eligibility criterion for the admission to a M.Tech Programme:

The BOS resolved to recommend the following changes in the Regulations of eligibility criteria for the admission to a M.Tech Programme:-

Existing	Proposed
Admission to a M.Tech Programme shall be open to candidates who passed <u>the prescribed qualifying examination, 10 (Class X) and 10+2 (Class XII / Diploma) level</u> with Cumulative Grade Point Average (CGPA) of at least 6.5 in the 0-10 scale grading system, OR not less than 60% marks in the aggregate (taking into account the marks scored in all the subjects of all the public / university examinations conducted during the entire prescribed period for the degree programme). However, this prescribed minimum shall be a CGPA of 6.0 OR 55% marks in the aggregate for SC/ST candidates.	Admission to a M.Tech Programme shall be open to candidates who passed <u>the prescribed qualifying examination with a Cumulative Grade Point Average (CGPA) of at least 6.5 in the 0-10 scale grading system, OR not less than 60% marks in the aggregate (taking into account the marks scored in all the subjects of all the public / university examinations conducted during the entire prescribed period for the degree programme). However, this prescribed minimum shall be a CGPA of 6.0 OR 55% marks in the aggregate for SC/ST candidates.</u>

For Senate Approval

ITEM No: 29-BOS-7:

Introduction of Ph.D level courses:

The BOS resolved to *defer* the proposal of the following new Ph. D level course:
 CS920 – Foundations of Cryptography 4 Credits

The BOS resolved to recommend the proposal of the following new PhD level courses:

- CS919 – Large scale data analysis 4 Credits
- CS921 – Design of secure protocols 4 Credits
- CS922 – Elliptic curve cryptosystems 4 Credits
- CS923 – Algorithmic game theory 4 Credits
- CS924 – Formal methods in computing 4 Credits
- CS925 – Green and sustainable ICT 4 Credits
- CS926 – Research practicum 2 Credits

Reporting to Senate

For Senate approval

The details are attached as an ANNEXURE-VI, Page No.22-29.

ITEM No: 29-BOS-8:

Including Ph.D in Science as an eligibility criterion for joining Ph.D in the Dept. of MME-

The BOS resolved *not to recommend* Ph.D in Science as an eligibility criterion for joining Ph.D in Engineering disciplines.

Reporting to Senate

ITEM No: 29-BOS-9:

The BOS resolved to recommend the modifications in the eligibility criteria for MBA admissions as follows:

Existing	Proposed
<p>The admissions will be on the basis of <u>CAT score</u> and performance in the qualifying examination and interview. The prescribed qualifying examinations are given separately in the Institute prospectus for MBA Programme.</p> <p>Admission to MBA Programme shall be open to candidates who have passed the prescribed qualifying examination with a Cumulative Grade Point Average (CGPA) of <u>at least 6.5 in the 0-10 scale grading system, OR not less than 60% marks</u> in the aggregate (taking into account the marks scored in all the subjects of all the public / university examinations conducted during the entire prescribed period for the degree programme). However, this prescribed minimum shall be <u>a CGPA of 6.0 OR 55% marks</u> in the aggregate for SC/ST candidates.</p>	<p>The admissions will be on the basis of <u>CAT/GMAT score</u> and performance in the qualifying examination and interview. The prescribed qualifying examinations are given separately in the Institute prospectus for MBA Programme.</p> <p>Admission to MBA Programme shall be open to candidates who have passed the prescribed qualifying examination with a Cumulative Grade Point Average (CGPA) of <u>at least 5.5 in the 0-10 scale grading system, OR not less than 50% marks</u> in the aggregate (taking into account the marks scored in all the subjects of all the public / university examinations conducted during the entire prescribed period for the degree programme). However, this prescribed minimum shall be <u>a CGPA of 5.0 OR 45% marks</u> in the aggregate for SC/ST candidates.</p>

For Senate Approval

The details are attached as an ANNEXURE-VII, Page No.30-32.

<p>ITEM No: 29-BOS-10:</p> <p>Inclusion of External Additional Guides:</p> <p>a) The Department of Applied Mechanics & Hydraulics: The BOS resolved to <i>not to approve</i> Dr. Sudheer Chintalapati, Associate Professor at ITM Gurgaon for inclusion as Additional Research Guide for Mr. Sujay Raghavendra (Reg. No. AM14F03) in the department of Applied Mechanics & Hydraulics.</p> <p>b) The Department of Metallurgical and Materials Engineering: The BOS resolved to approve Dr. C. M. Manjunatha, Sr. Principal Scientist and Group Head, Fatigue and Structural Integrity Group (FSIG), NAL Bangalore as Additional Research Guide for Mr. Nandana M. S. (Reg. No. MT14F10) in the department of Met. & Mat. Engg.</p> <p>The CV is enclosed as ANNEXURE-VIII, Page No.33-46.</p>	<p><i>Reporting to Senate</i></p> <p>For Senate Approval</p>
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<p>ITEM No: 29-BOS-12:</p> <p>The inclusion of Elective to UG Curriculum-</p> <p>The BOS resolved to recommend the following course for inclusion in B.Tech curriculum:</p> <p>CH 368 Fuel Cell Engineering (3-0-0)3</p> <p>The details are attached as an ANNEXURE-IX, Page No.47.</p>	<p>For Senate Approval</p>
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<p>ITEM No: 29-BOS-13:</p> <p>The inclusion of Elective to PG Curriculum –</p> <p>The BOS resolved to recommend a new Elective Course for M.Tech (Transportation Engineering) as follows:</p> <p>TS819: Infrastructure Development – Programmes, Planning and Appraisal (3-0-0) 3</p> <p>The details are attached as an ANNEXURE-X , Page No.48-49.</p>	<p>For Senate Approval</p>
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ITEM No: 29-BOS-14:

The inclusion of Elective course in the PG Curriculum - MBA Program -

The BOS resolved to recommend the following elective course to include in the PG curriculum – MBA programme.

Econometrics Theory and Applications (3-0-0)3

For Senate Approval

The details are attached as an ANNEXURE-XI, Page No.50.

ITEM No: 29-BOS-15:

Academic Calendar for the Even Semester (January-May 2016) and Odd Semester (July – December 2016)

The BOS resolved to recommend the Academic Calendar for the Even Semester (January-May 2016) and Odd Semester (July – December 2016).

For Senate Approval

The details are attached as an ANNEXURE -XII, Page No.51-52.

ITEM No: 29-BOS-16:

Proposal from the Department of Applied Mechanics & Hydraulics.

The BOS resolved to recommend the modification in the following course:

AM 445 - FUNDAMENTALS OF FINITE ELEMENT METHODS (3-0-0) 3

Introduction of the following new courses for UG:

AM 476 - FLOW INDUCED VIBRATION (3-0-0) 3

AM 477 - OPEN SOURCE VIRTUAL INSTRUMENTATION (2-0-2) 3

AM 478 - THEORY OF ISOTROPIC ELASTICITY (3-0-0) 3

For Senate Approval

Introduction of the following new courses for PG:

MS 818 - NONLINEAR PROBLEMS IN OCEAN ENGINEERING (3-0-0) 3

MS 819 - MECHANICS OF FLOATING BODIES (3-0-0) 3

MS 820 - HYDRO ELASTICITY (3-0-0) 3

MS 821 - OFFSHORE RENEW ABLE ENERGY (3-0-0) 3

MS 822 - COMPUTATIONAL MARINE HYDRODYNAMICS (3-0-0) 3

The details are attached as an ANNEXURE -XIII, Page No.53-60.

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



(K. Ravindranath)
Secretary –BOS, NITK



(Dr. Katta Venkataramana)
Chairman-BOS, NITK

**Department of Civil Engineering
NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA**

Minutes of the DUGC Meeting held on 28-8-2015

It was discussed and resolved as below for placing for approval at the next BOS meeting.

1. BTech curriculum :
Replacing ME200 Workshop (1 Credit) with CV210 ^{Elements of} Civil Engineering (1 Credit)

Curriculum for Elements of Civil Engineering:

Introduction to history and scope of civil engineering, brief discussion on various streams of civil engineering such as structural engineering, geotechnical engineering, transportation engineering, environmental engineering, water resources engineering, coastal and offshore engineering, construction technology and management and related topics.

Names & Signatures of Members Present:

1. A.U. Ravi Shankar
2. Sunil B.M.
3. R. SHIVASHANKAR
4. A.S. Bhat
5. G. Mahesh
6. Sitaram Nayak
7. K.S. BABU NARAYAN
8. S. SHRIHARI
9. C. Rajasekaran
- Roekhan
10. Dr. M.C. Narasimhan.
(We may have to also look @
Evaluation of this course with just
one credit weight)
11. Jayalekshmi B. R. Jayalekshmi
31/8/15

[Handwritten signatures of members 1 through 7]

Sir, if this is the
proposed syllabus for a
"Replacement" course to work
it does not qualify:

[Signature]
31/8/15
Professor & Head
(Chairman - DUGC)
Department of Civil Engineering

Proceedings of DPGC/DFC meeting held on 21/08/2015 at 3.30pm in the Department of Physics.

The meeting was held to discuss the inclusion of electives at PG level.

1. Electives proposed by Dr. Shajahan T.K., a) Introduction to Nonlinear Dynamics & b) Introduction to Computational Physics with the course were discussed and approved.
2. Electives proposed by Dr. Kartick Tarafder, Fundamentals of Density Functional Theory and Its Applications in Materials Science with the course content was discussed and approved.

The above mentioned electives may be kindly included as agenda items for discussion in BOS meeting for necessary approval and further action.

The following faculty members were present:

- | | |
|---------------------------|-------------------------------|
| 1) H.D. SHASHIKALA | H.D. Shashikala
24/08/15 |
| 2) Kartick Tarafder | Kartick
21/08/15 |
| 3) DEEPAK VAID
25/8/15 | Deepak
25/8/15 |
| 4) P. P. Das | P. P. Das
24/8/15 |
| 5) N K Udayashankar | N. K. Udayashankar
25-8-15 |
| 6) Ajith K M | Ajith S
25/8/15 |
| 7) K.V. Bangaru | K.V. Bangaru |
| 8) G. UMESH | G. Umesh
25/8/15 |
| 9) H.S. Nagamreja | H.S. Nagamreja |
| 10) F.K. Sreeraman | F.K. Sreeraman
25/8/15 |
| 11) M.N. Salyanarayan | M.N. Salyanarayan
25/8/15 |

PH 880 INTRODUCTION TO NONLINEAR DYNAMICS

(3-0-0) 3

Linear and nonlinear systems; Discrete time dynamical systems, the logistic map and period doubling, bifurcations, two dimensional maps, graphical iteration, Qualitative analysis of fixed points, Chaos, Feigenbaum's number, Representations of dynamical systems, vector fields of nonlinear systems, phase plane analysis, linear stability, limit cycles, the Lorenz equation, bifurcations in continuous time dynamical systems, the Rossler equation and forced pendulum, the Chua's circuit, introduction to fractals, Mandelbrot sets and julia sets, lyapunov exponent, frequency spectra of orbits, dynamics on a torus, control of chaos, introduction to floquet theory.

S Strogatz, Nonlinear dynamics and chaos: with applications to physics, biology, chemistry, and engineering, Westview Press, 2001

F C Moon, Chaotic Vibrations, Wiley & Sons, 2004

Alligood, Sauer, Yorke, and Crawford, Chaos- An Introduction to Dynamical Systems, Springer, 1996

PH 881 INTRODUCTION TO COMPUTATIONAL PHYSICS

(3-0-0) 3

Basics of computers; Brief introduction to Python and iPython notebooks; Solving matrix equations, matrix decomposition; Interpolation; Iterative equations, predator-prey models; Ordinary differential equations, numerical error and error propagation, numerical instabilities, Euler's method, implicit and explicit schemes, Runge-Kutta methods, Examples: linear and nonlinear oscillators; Partial differential equations, finite difference schemes, relaxation techniques, the diffusion equation; Examples: heat wave, E-M wave; Random numbers, Distribution function, Monte Carlo methods, Ising model.

A B Downey, Think Python: An introduction to software design (available online)

D Potter, Computational Physics, Wiley Newyork NY, 1973

W.H. Press, S.A. Teukolsky, W.T. Vettering, and B.R. Flannery, Numerical Recipes in C: the art of scientific programming, Cambridge University Press, Cambridge UK, 1992.

PH882 Fundamentals of Density Functional Theory and its applications in materials science.

(3-0-0)3

Introduction of many body problem (interacting and non-interacting wave-functions for N number of electrons, probability densities) Overview of electronic structure methods and DFT. Mathematical tools (Functionals, one and two-body operators and their expectation values, variational principle, Hellman-Feynman principle, virial theorem), Hartree-Fock theory and Correlation, The Uniform Electron Gas Hohenberg-Kohn Theorem, Kohn-Sham Scheme. Exchange and Correlation Energy, Adiabatic Connection, Properties of Functionals, Local Density Approximation, Gradient Expansion and Generalized Gradient Approximations, Hybrids Functionals, their performance and Challenges, Time-Dependent Density Functional Theory: The Runge-Gross Theorem, Linear Response and Excitation Spectra. Applications (metallic alloys, organic semiconductors, semiconductor nano particles)

Robert G. Parr and Weitao Yang, "Density Functional Theory of Atoms and Molecules", (Oxford University Press, 1994).

Reiner Dreizler and E. K. U. Gross, "Density Functional Theory" (Springer 1990)

John P. Perdew and Stefan Kurth: "Density Functionals for Non-Relativistic Coulomb Systems", in "A Primer in Density Functional Theory" Ed. C. Fiolhas, F. Nogueira, and M. Marques (Springer Lectures Notes in Physics, v.620, 2003).

Important journal articles in this area (will be provided during the lecture.)

Proposed Elective Course

ML 8xx X-Ray Analysis of Materials (3-1-0) 4

Course Content

Theory:

Fundamentals of X-rays, X-ray Sources: X-ray tube, Synchrotron and Inverse Compton.

X-ray-material interaction, X-ray absorption and fluorescence, Basic crystallography, Concept of scattering and structure factor, X-ray diffraction: method, measurements and analysis, Rocking curve, Texture analysis-pole figure, Resonant elastic X-ray scattering: method and application, Small angle X-ray scattering: principle, instrument and applications, X-ray reflectivity: Basic Principle, film thickness and density calculations, X-ray absorption spectroscopy (XANES, EXAFS): basic principles and examples.

Tutorial Component:

- Introduction of XRD Instrument
- Instrument settings: slits, masks, energy, detectors
- Sample preparation and data collection strategies
- 4. Indexing of XRD pattern
- 5. Lattice Parameter calculation
- 6. Phase fraction determination
- 7. Particle size analysis and strain analysis
- 8. XRD pattern refinement: GSAS-II
- 9. Texture Analysis
- 10. Analyzing fine structure

Recommended books

Elements of Modern X-ray Physics, 2nd Edition. by Jens Als-Nielsen and Des McMorrow

X-ray diffraction: In crystals, imperfect crystals and amorphous bodies – by A. Guinier

Elements of X-Ray Diffraction (2014) by B.D. Cullity (Author), S.R. Stock (Author)

Introduction to XAFS: A Practical Guide to X-ray Absorption Fine Structure Spectroscopy- by Grant Bunker (Author)

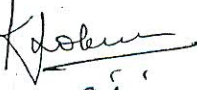

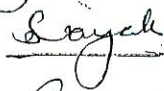
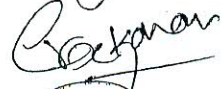



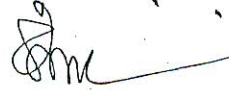

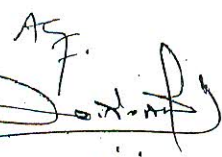
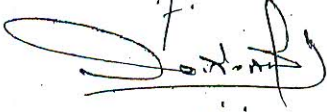
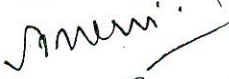
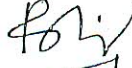

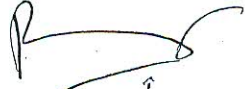


X-Ray Diffraction Procedures: For Polycrystalline and Amorphous Materials, 2nd Edition by Harold P. Klug, Leroy E. Alexander

Handouts:

Relevant publications

DPGC Meeting Minutes – Department of Civil Engineering

Proposal for a new three credit elective course titled 'CM815 - Infrastructure Development and Management' submitted by Dr. Gangadhar Mahesh, Assistant Professor, CED with course content as enclosed for M. Tech (Construction Technology and Management) was discussed at the DPGC meeting of Department of Civil Engineering held on 27 August 2015 and it was resolved to recommend the proposal for approval to the Board of Studies, NITK, Surathkal, for inclusion in the curriculum.

1. K.N. Lokesh 
2. Sivil B.M. 
3. Sitaram Nayak 
4. C. Rajasekharan - 
5. Varghese George - 
6. Subhash. C. Paragat - 
7. Katta Venkataramesh 
8. A.S. BALU 
9. SURESHA S.N. 
10. A-GOWRI 
11. G Mahesh 
12. ARUN KUMAR.T 
13. R. SHIVASHANKAR 
14. A-U. Ram Sankar 
15. Raviraj H.M 
16. BASAVARAJU MANU 
17. Narasimham H.C. 

CM 815: Infrastructure Development and Management (3-0-0)

Course objectives:

The course is designed to provide good knowledge of (i) the issues involved in development and management of infrastructure at the individual and network level, and (ii) policies aimed at improving infrastructure in India.

Course Content:

Introduction to principles of infrastructure economics, engineering and management; Infrastructure procurement and delivery practices; Public-Private-Partnerships, Concession agreement, Selection procedure of concessionaires, financial closure, Stakeholder management; Infrastructure development and management framework; Infrastructure planning, needs assessment and performance indicators; In-service Monitoring, evaluation, performance modelling and failure analysis; Maintenance, rehabilitation and reconstruction strategies; Life cycle analysis; Principles of asset management and ISO 55000.

Introduction to Indian Infrastructure; Govt. initiatives through various five year plans; Overview of various sectors of infrastructure and SEZ; Sector-wise differences in policies.

Recommended Reading:

Hudson, R. W., Haas, R. and Uddin, W.,: Public Infrastructure Asset Management, McGraw Hill Education.

India Infrastructure Reports, 3iNetwork, Oxford University Press, New Delhi and New York

Department of Electronics and Communication Engineering

NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA, SURATHKAL

27-08-2015

A combined DFC meeting was held at 3.00PM on 27-08-2015 In E&C Meeting room.

Agenda: To discuss,

Inputs from the department for next BoS meeting, to be held on 9-9-2015

1. Awarding credits for the short courses conducted jointly with MoU partners
2. Permitting out-station co-guides to participate in the proposal seminar, pre-synopsis seminar and final viva voce exam in MTech(R) and PhD through video conference.
3. Increasing the course requirements for MTech(R).

Minutes of the meeting: The following decisions have been taken.

1. Awarding credits to students for attending short courses conducted jointly by NITK, with MoU partners:

Preamble: Short courses conducted by the Department of E&C Engg with the involvement of experts from external organisations such as industry and foreign universities have become a regular activity. Many of the courses have very rigours academic content with 30+ hours of teaching and 10+ hours of Lab content. In some courses, at the end, tests will be conducted and evaluated. Many undergraduate, postgraduate and research students attend such courses.

The department resolved to place before the BoS to grant permission to award appropriate credits courses conducted jointly with MoU partners. DUGC may be empowered to decide on,

- a. Courses to be considered for awarding the credits.
- b. Number of credits for the course depending on the number of lecture hours, lab hours and evaluation.
- c. The credits earned to be counted as elective courses.
- d. Total cap on credits earned through such courses.

NITK regulations have provision to transfer upto 20 credits from MoU partner Institutions. The above scheme may be considered to be similar to the credits earned by attending courses in MoU partner institutions.

During July 14-24, 2015, the Department conducted a short course on "Mathematical Morphology and its applications in Image Processing" jointly with University of Applied Science HEIG-VD, Yverdon, Switzerland, an MoU partner of NITK. Prof. Michel Kocher was the resource person from HEIG-VD and the course had more than 50 hours of lecture component and 15+ hours of lab component. At the end there was a test and evaluation. About 35 students attended this course.

Since the course was very rigorous and had an evaluation component at the end of the course, the DFC resolved to request Dean (Academic) to approve awarding credits equivalent to an elective course, after the approval from BoS.

2. The DFC resolved to place before the BoS to relax the requirements for out-station co-guides from participating in the proposal seminar, pre-synopsis seminar and final viva voce exam for MTech(R) and PhD in person, and permit them to participate in the proceedings through video conferencing.
3. Comprehensive test for research students: It was resolved to request the BoS to accord approval to conduct a comprehensive test to PhD students at the end of their first year for students admitted to E&C Department. The test will consists of upto 6 topics/subjects of which Mathematics will be a compulsory subject. A student has to answer questions in atleast 3 topics/subjects. A committee comprising DRPC members will prepare the question papers and evaluate the students. The test will be conducted once a year for all the students who have registered for PhD in the previous year.

4. It is noted that the minimum course work requirements for MTech(R) students is low (12 credits + one MLC on Research Methodologies) compared to regular MTech students. The DFC resolved to request the BoS to increase the minimum credit requirements from 12 to 18 credits.

Signature of the members present:

Sundar
(Sundar David)

KBhat (Kalpana Bhat)

Rakha
(Rakha S.)

Laxminidhi
(Laxminidhi)

U. Sripati
(U. Sripati)

Shyam Lal
(Shyam Lal)

B.S. Raghavendra
(B.S. Raghavendra)

Deepu
(Deepu Vijayasekar)

Aparna P.
(Aparna P.)

B. NAGAVEL
(B. NAGAVEL)

Rathinajjala Rao
(Rathinajjala Rao)

S. S. S. S.

Dr. M.S. Bhat
Professor & Head,
Department of Electronics & Communication Engineering
National Institute of Technology Karnataka, Surathkal
P.O. Srinivasnagar, Mangalore - 575025, KARNATAKA, INDIA

2. Dr. P. Santhi Thilagam proposed one 900 level course to be approved by DRPC for inclusion in the Curriculum:

a. Large Scale Data Analysis

The proposed syllabus, reference books, etc., was discussed in the meeting. It was decided to approve the same and send it to BOS for further approval.

CS919

LARGE SCALE DATA ANALYSIS

4

Big Data Analysis Systems and Frameworks: Map-Reduce, Mahout, Spark, Big data Storage and Processing: Parallel DB, Data Store, Big Data Analysis Models and Algorithms : Structured Data Mining, Text Analysis, Graph mining, Image Retrieval, Dimensionality Reduction, New Research Trends, and Applications: Crowd-sourcing, Human intelligence, Probabilistic Databases, Knowledge Bases, Data Visualization

Mining of Massive Datasets by Anand Rajaraman and Jeff Ullman.

Software for Data Analysis: Programming with R (Statistics and Computing) by John M. Chambers (Springer)
Data Analysis Using Regression and Multilevel/Hierarchical Models, 1st Edition by Andrew Gelman, Jennifer Hill.
Categorical Data Analysis by Alan Agresti, Wiley publications.

3. Dr. Alwyn R. Pais proposed four 900 level courses to be approved by DRPC for inclusion in the Curriculum:

- a. Foundations of Cryptography
- b. Design of Secure Protocols
- c. Elliptic Curve Cryptosystems
- d. Algorithmic Game Theory

The proposed syllabus, reference books, etc., was discussed in the meeting. It was decided to approve the same and send it to BOS for further approval.

CS920

FOUNDATIONS OF CRYPTOGRAPHY

4

Number Theory - Divisibility, Congruences, Quadratic residues and reciprocity, Abstract Algebra Groups, rings, fields, construction of finite fields, cryptography, Stream Ciphers - One-time Pad (OTP), Perfect secrecy, Pseudo-random generators (PRG), Attacks on stream ciphers and OTP, Real world stream ciphers, Semantic security, Block ciphers- DES, attacks, AES, Block ciphers from PRG Modes of operation - one-time key and many-time keys, CBC, CTR modes, Message Integrity - MAC MAC based on PRF, NMAC, PMAC, Collision resistance - Birthday attack, Merkle-Damgar construction, HMAC, Case study:SHA-256, Authenticated encryption, Key exchange algorithms, Public key cryptosystems - RSA, El-Gamal, Rabin, Elliptic curve cryptosystems - PKC, key exchange, IBE Lattice based cryptosystem.

N. Koblitz, Number Theory and Cryptography, Springer, 2001.

J. Katz and Y. Lindell, Introduction to Modern Cryptography, CRC press, 2008.

Menezes, et.al, Handbook of Applied Cryptography, CRC Press, 2004.

Golreich O, Foundations of Cryptography, Vol.1.2, Cambridge University Press, 2004.

e-Way Functions, Pseudorandom Generators, Hash functions, Block ciphers, Stream Ciphers, Access Control Methods, Message Authentication and Digital Signatures, Vulnerabilities and Security Challenges of Wireless networks, Trust Assumptions, Adversary models and Protocols, Attacks against naming and addressing in the Internet, Security protocols for address resolution and address auto configuration, Security for global IP mobility, IP Security (IP Sec) protocol, Key Establishment and Revocation Protocols in Sensor Networks, Secure Neighbor Discovery, Secure routing protocols in multi-hop wireless networks, Provable Security for Ad-hoc Network routing protocols, Privacy preserving routing in Ad-hoc Networks, Location privacy in vehicular Ad-hoc networks, Secure protocols for behavior enforcement Game theoretic model of packet forwarding

Buttyan, J. P. Hubaux, *"Security and Cooperation in Wireless Networks"*, Cambridge University Press, 2008.
 Goldreich, *"Foundation of Cryptography-Vol. 1 and Vol. 2"*, Cambridge University Press, 2001.
 Ross Kempf, *"Wireless Internet Security: Architecture and Protocols"*, Cambridge University Press, 2008

Introduction: Weierstrass Equation, The Group Law, Projective Space and the Point at Infinity, Proof of Associativity, Equations for Elliptic Curves, Coordinate Systems, The j -invariant, Endomorphisms, Singular Curves, Elliptic Curves mod n . Torsion Points: The Tate-Lichtenbaum Pairing Elliptic Curve over Finite Fields- Zeta Functions: A Family of Curves, Schoof's Algorithm, Super singular Curves. Discrete Logarithm Problem: Elliptic Curve Cryptography: Introduction, The Basic Setup, Diffie-Hellman Key Exchange, Massey-Omura Encryption, El-Gamal Public Key Encryption. Primality and Factorization of Integers: Primality, Complexity of factoring, RSA. Elliptic Curve OVER \mathbb{Q} . The Torsion Subgroup. The Lutz-Nagell Theorem, Descent and the Weak Mordell-Weil Theorem Heights, the Height Pairing, Fermat's Infinite Descent, 2-Selmer Groups; Shafarevich-Tate Groups, A Nontrivial Shafarevich-Tate Group, Galois Cohomology, Mordell-Weil Theorem. Elliptic Curve OVER \mathbb{C} : The Torsion Subgroup: Douady's Method, Division Polynomials. Complex Multiplication: Elliptic Curves over \mathbb{C} , Elliptic Curves over Finite Fields, Integrality of invariants, Kronecker's Jugendtraum. Isogeny: The Complex Theory, The Algebraic Theory, Velu's Formulas, Point Counting, Complements.

C. Washington, *Elliptic curves: Number Theory and Cryptography*.
 Cohen and G.Frey, *Handbook of Elliptic curve and Hyperelliptic Curve Cryptography*, CRC Press, 2006.
 Arjel Hankerson, Alfred Menezes, Scott Vanstone, *Guide to Elliptic Curve Cryptography* Springer 2004.

Non-cooperative Game Theory: Games in Normal Form - Preferences and utility, examples of normal form, Analyzing games: Pareto optimality, Nash equilibrium, Maxmin and minmax strategies, dominated strategies, Rationalizability, Correlated equilibrium Computing Solution Concepts Normal-Form Games: Computing Nash equilibria of two player, zero-sum games, Computing Nash equilibria of two-player, general-sum games, Complexity of computing Nash equilibrium, Lemke-Howson algorithm, Searching the space of supports, Computing Nash equilibria of n-player, general-sum games, Computing maxmin and minmax strategies for two-player, general-sum game Computing correlated equilibria Games with the Extensive Form. Repeated games: Finitely repeated games, Infinitely repeated games, automata, Stochastic games Bayesian games: Transferable Utility Analyzing Coalitional Games, The Shapley Value, The Core Mechanism Design: strategic voting unrestricted preferences, Implementation, quasilinear setting, Efficient mechanisms, Computation applications of mechanism design, Task scheduling, Bandwidth allocation in computer network Auctions: Single-good auctions, Canonical auction families, Bayesian mechanisms, Multiunit auction Combinatorial auctions

Noam Nisan, Tim Roughgarden, Eva Tardos, Vijay V. Vazirani, Algorithmic Game Theory, Cambridge University Press, 2007.

Ronald Cohn Jesse Russell, Algorithmic Game Theory, VSD Publishers, 2012.

4. Dr. K. Chandrasekaran proposed three 900 level courses to be approved by DRPC for inclusion in the Curriculum:
 - a. Formal Methods in Computing
 - b. Green and Sustainable ICT
 - c. Research Practicum

The proposed syllabus, reference books, etc., was discussed in the meeting. It was decided to approve the same and send it to BOS for further approval.

Introduction to Formal Methods, Propositional and Predicate logic, Equality and Definite Descriptive Sets and Definitions Relations and Functions, Sequences and Free Types, Schema and Schematic Operators, Promotion and Preconditions Examples; Cyber-physical Systems and Mathematical Models of Systems: Introduction to Cyber-Physical Systems, Synchronous Models: Dataflow languages, Safety and Liveness Specifications: ω -automata and temporal logics, Asynchronous Models: Communicating machines and synchronization, Continuous Dynamical Systems Timed and Hybrid Systems, Techniques for reasoning about dynamical systems; Verification Techniques: Model Checking, Deductive Verification: Lyapunov and Barrier Certificates

Alur, Rajeev. Principles of Cyber-Physical Systems. MIT Press, 2015.

Tabuada, Paulo. Verification and control of hybrid systems: a symbolic approach. Springer Science & Business Media, 2009.

Edward A. Lee and Sanjit A. Seshia, Introduction to Embedded Systems, A Cyber-Physical Systems Approach Second Edition, ISBN 978-1-312-42740-2, 2015.

Lee, Edward A., and Sanjit A. Seshia. "An introductory textbook on cyber-physical systems." Proceedings of 2010 Workshop on Embedded Systems Education. ACM, 2010.

1 ICT and environmental sustainability: Basic Green ICT concepts, importance of Green ICT, impact of ICT components on environmental sustainability, aims of Green ICT, Green ICT standards initiatives; Greening by ICT: Planning and executing a Green ICT policy, adopting Green ICT strategies - web conferencing, telecommuting, going paperless, etc.; Greening of ICT: green devices, cloud computing, green data centres, green storage, green networking, green algorithms, green hardware; Measurement and management: metrics, measuring the resource utilization, energy consumption, GHG emission, carbon footprint of ICT components, automated power management, and techniques; Research challenges: recent trends in Green ICT research, explored and unexplored topics, open research challenges.

Murugesan, & G. R. Gangadharan (Eds.). (2012). *Harnessing Green IT: Principles and Practices*. A John Wiley & Sons, Ltd., Publication.

7 Ahmad & Sanjay Ranka (Eds.). (2012). *Handbook of Energy-Aware and Green Computing - Two Volume (1st ed.)*. Chapman & Hall/CRC.



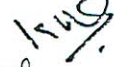


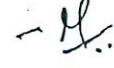


Ummad S. Obaidat, Alagan. Anpalagan & Isaac Woungang (Eds.). (2013). *Handbook of Green Information Communication Systems*. (1st ed.). Academic Press.

1 Calero Munoz, & Mario Piattini (Eds.). (2015). *Green in Software Engineering*. (1st ed.). Springer International Publishing.

This course is specifically designed for research students and is a practice oriented course. A student is expected to learn different tools that will be used in his/her areas of area of research. The tools that are used can be of any type as long as they are relevant to the current context in which the research work is planned to be carried out. The number of tools and assisting technologies is not limited by any numbers but the researcher's are expected to choose most appropriate set of tools or tool that is latest which perfectly fits into the working research area.

iteman, Wayne E., William J. Wepfer, and Jeffrey A. Donnell. "Study of a Teaching Practicum in an Engineering Ph. D. Curriculum." *American Society for Engineering Education*, 2011.

Members Present:

1. Annappa 
2. B.R. Chandavarkar 
3. K. Vinay Kumar 
4. Manu Basavaraju 
5. Mohit P. Tahiliani - Malik 
6. P. Santhi Thilagam - S. 
7. Shashidhar G. Koolagudi 
8. Vani M. 

Department of Computer Science and Engineering, NITK Surathkal.

26/8/2015

From K.Chandrasekaran,
Professor

To The Dean (AA),
NITK

Sub: new Ph.D level courses (BOS meeting)
Advance copy to Dean-AA

Through Proper Channel

Dear Sir,

I wish to propose three new Ph.D level courses at CSE department's curriculum. These are:

- (a) Green and Sustainable ICT (4 credits)
- (b) Formal methods in Computing (4 credits)
- (c) Research Practicum (2 credits)

In the above list, (a) and (b) are new courses required for the new domains of technological advancements.

And, the third one is a practice oriented course which aims to enable the research scholar to study and analyze certain issues related to his/her research while making use of certain tools and software which are either available only in the research labs (for research purpose and not available for commercial market) or some special software meant for specific study purpose. Thus, this practicum course can be a generic one and can be taken up by any research scholar of CSE and apply the role of tools and software for his/her specific work.

I request you to approve the same and do the needful.

Thanks and Regards.



(Chandrasekaran)

Ph.D 900 Level Course Proposal

Department: Computer Science and Engineering

Course Title: Green and Sustainable ICT

Course Code:

Course Credits: 4

Faculty Initiating the Proposal: Prof. K. Chandrasekaran

Course Contents:

Green ICT and environmental sustainability: Basic Green ICT concepts, importance of Green ICT, impact of ICT components on environmental sustainability, aims of Green ICT, Green ICT standards and initiatives; Greening by ICT: Planning and executing a Green ICT policy, adopting Green ICT strategies - web conferencing, telecommuting, going paperless, etc.; Greening of ICT: green devices, green cloud computing, green data centres, green storage, green networking, green algorithms, green software; Measurement and management: metrics, measuring the resource utilization, energy consumption, GHG emission, carbon footprint of ICT components, automated power management, tools and techniques; Research challenges: recent trends in Green ICT research, explored and unexplored topics, open research challenges.

References:

1. San Murugesan, & G. R. Gangadharan (Eds.). (2012). *Harnessing Green IT: Principles and Practices*. A John Wiley & Sons, Ltd., Publication.
2. Ishfaq Ahmad & Sanjay Ranka (Eds.). (2012). *Handbook of Energy-Aware and Green Computing - Two Volume Set* (1st ed.). Chapman & Hall/CRC.
3. Mõhammad S. Obaidat, Alagan Anpalagan & Isaac Woungang (Eds.). (2013). *Handbook of Green Information and Communication Systems*. (1st ed.). Academic Press.
4. Coral Calero Munoz, & Mario Piattini (Eds.). (2015). *Green in Software Engineering*. (1st ed.). Springer International Publishing.

Ph.D. 900 Level Course Proposal

Department: Computer Science and Engineering

Course Title: Research Practicum

Course Code:

Course Credits: 2

Faculty Initiating the Proposal: Prof. K. Chandrasekaran

Preamble:

A practicum is a graduate level course, often in a specialized field of study, that is designed to give students supervised practical application of a previously or concurrently studied theory. Practicums (student teaching / self study with practical exposure) are common for major courses. A Ph.D. student who undergoes a practicum course during his doctoral studies gets exposure to all kinds of tools or software systems that can be useful for his research and analytical study; Students work closely with faculty mentors in learning this kind of course. While the focus of this level of learning is on tools support for engineering design research, the goal is for students to find the experience useful regardless of domain. Practicum class is well received, valued and has been considered as an important course in many well ranked universities.

Course Contents:

This course is specifically designed for research students and is a practice oriented course. A student is expected to learn different tools that will be used in his/her areas of area of research. The tools that are used can be of any type as long as they are relevant to the current context in which the research work is planned to be carried out. The number of tools and assisting technologies is not limited by any numbers but the researcher's are expected to choose most appropriate set of tools or tool that is latest and which perfectly fits into the working research area.

References:

1. Whiteman, Wayne E., William J. Wepfer, and Jeffrey A. Donnell. "*Study of a Teaching Practicum in an engineering Ph. D. Curriculum.*" American Society for Engineering Education, 2011.

Ph.D. 900 Level Course Proposal

Department: Computer Science and Engineering

Course Title: Formal Methods in Computing

Course Code:

Course Credits: 4

Faculty Initiating the Proposal: Prof. K. Chandrasekaran

Course Contents:

Introduction to Formal Methods, Propositional and Predicate logic, Equality and Definite Description, Sets and Definitions Relations and Functions, Sequences and Free Types, Schema and Schema Operators, Promotion and Preconditions Examples; Cyber-physical Systems and Mathematical Models of Systems: Introduction to Cyber-Physical Systems, Synchronous Models: Dataflow languages, Safety and Liveness Specifications: ω -automata and temporal logics, Asynchronous Models: Communicating machines and synchronization, Continuous Dynamical Systems Timed and Hybrid Systems, Techniques for reasoning about dynamical systems; Verification Techniques: Model Checking, Deductive Verification: Lyapunov and Barrier Certificates

References:

1. Alur, Rajeev. *Principles of Cyber-Physical Systems*. MIT Press, 2015.
2. Tabuada, Paulo. *Verification and control of hybrid systems: a symbolic approach*. Springer Science & Business Media, 2009.
3. Edward A. Lee and Sanjit A. Seshia, *Introduction to Embedded Systems, A Cyber-Physical Systems Approach*, Second Edition, ISBN 978-1-312-42740-2, 2015.
4. Lee, Edward A., and Sanjit A. Seshia. "An introductory textbook on cyber-physical systems." Proceedings of the 2010 Workshop on Embedded Systems Education. ACM, 2010.

NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA SURATHKAL
DEPARTMENT OF HUMANITIES, SOCIAL SCIENCES AND MANAGEMENT (HSSM)
NITK, SURATHKAL

...

Proceedings of the DPGC Meeting held on 18/08/2015 at 12.00 Noon.

The DPGC has resolved to request BOS and Senate to consider modifying the Eligibility criteria for MBA admissions from academic year 2016 onwards as follows:

The admissions will be on the basis of CAT/GMAT score and performance in the qualifying examination and interview. The prescribed qualifying examinations are given separately in the Institute prospectus for M.B.A. Programme.

Admission to M.B.A Programme shall be open to candidates who have passed the prescribed qualifying examination with a Cumulative Grade Point Average (CGPA) of at least 5.5 in the 0-10 scale grading system, OR not less than 50% marks in the aggregate (taking into account the marks scored in all the subjects of all the public/university examinations conducted during the entire prescribed period for the degree programme). However, this prescribed minimum shall be a CGPA of 5.0 OR 45% marks in the aggregate for SC/ST candidates



(A.H. Sequiera)
Chairman, DPGC



(Suprabha K.R.)
Secretary, DPGC

DEPARTMENT OF HUMANITIES, SOCIAL SCIENCES AND MANAGEMENT (HSM)

Subject: Eligibility Criteria for MBA Admission:

At present the eligibility criteria for MBA admission in NITK Surathkal is as follows:

The admissions will be on the basis of CAT/GMAT score and performance in the qualifying examination and interview. The prescribed qualifying examinations are given separately in the Institute prospectus for M.B.A. Programme.

Admission to M.B.A Programme shall be open to candidates who have passed the prescribed qualifying examination with a Cumulative Grade Point Average (CGPA) of at least 6.5 in the 0-10 scale grading system, OR not less than 60% marks in the aggregate (taking into account the marks scored in all the subjects of all the public/university examinations conducted during the entire prescribed period for the degree programme). However, this prescribed minimum shall be a CGPA of 6.0, OR 55% marks in the aggregate for SC/ST candidates.

The criteria was decided by the Senate about two years back. The criteria of securing 60% or 6.5 CGPA in qualifying examination for admission to NITK MBA program is at a much higher level when compared to other B-Schools including IIMs, NITs and other leading B-Schools. Due to this higher fixation of eligibility criteria, many students who had valid CAT scores but are unable to secure 60% or 6.5 CGPA in qualifying exam were not eligible to apply. Hence, the number of admissions have reduced significantly. In view of the above, DPGC has proposed the modified eligibility criteria for MBA admissions which is same as that for admission in IIMs(Copy of IIMA attached) and other leading B Schools in India.

Resolution:

The DPGC resolves to propose the modified eligibility criteria for MBA admissions from academic year 2016 onwards as follows:

The admissions will be on the basis of CAT/GMAT score and performance in the qualifying examination and interview. The prescribed qualifying examinations are given separately in the Institute prospectus for M.B.A. Programme.

Admission to M.B.A Programme shall be open to candidates who have passed the qualifying examination with a Cumulative Grade Point Average (CGPA) of at least 5.5 in the 0-10 scale grading system, or not less than 50% marks in the aggregate (taking into account the marks scored in all the subjects of all the public/university examinations conducted during the entire prescribed period for the degree programme). However, this prescribed minimum shall be a CGPA of 5.0 or 45% marks in the aggregate for SC/ST candidates.

prabhakar (A. H. Sengupta)
Rashmi Uchik
Bijera
Sheena
Dr. Phishu
Dr. Sarita
Dr. P. R. Jena
K. B. Kishan

INDIAN INSTITUTE OF MANAGEMENT AHMEDABAD

Post-graduate Programme (PGP)

The two-year Post-graduate Programme in Management (PGP) is a full-time residential course for graduates from all disciplines wishing to choose a career in management. This Programme was ranked at No.16th in the world by the Financial Times Masters in Management category in the year 2014.

Eligibility

The candidate must hold a bachelor's degree, with at least 50% marks or equivalent CGPA [in case of the candidates belonging to Scheduled Caste (SC)/Scheduled Tribe (ST) and Differently Abled (DA) category, this is relaxed to 45%], of any of the Universities incorporated by an act of the central or state legislature in India or other educational institutions established by an act of Parliament or declared to be deemed as a University under section 3 of UGC Act, 1956, or possess an equivalent qualification recognized by the Ministry of HRD, Government of India. The bachelor's degree or equivalent qualification obtained by the candidate must entail a minimum of three years of education after completing higher secondary schooling (10+2) or equivalent. The percentage obtained by the candidate in the bachelor's degree would be based on the practice followed by the university/institution from where the candidate has obtained the degree. In case of the candidates being awarded grades/CGPA instead of marks, the equivalence would be based on the equivalence certified by the university/institution from where they have obtained bachelor's degree. In case the university/institution does not have any scheme for converting CGPA into equivalent marks, the equivalence would be established by IIM Ahmedabad by dividing obtained CGPA with the maximum possible CGPA and multiplying the resultant with 100.

Candidates appearing for the final year bachelor's degree/equivalent qualification examination and those who have completed degree requirement and are awaiting results can also apply. Such candidates must produce a certificate from the Principal/Head of the Department/Registrar/Director of the university/institution certifying that the candidate is currently in the final year/is awaiting final results and has obtained at least 50% marks or equivalent (45% in case of candidates belonging to SC/ST/DA category) based on latest available grades/marks. Such candidates, if selected, will be allowed to join the programme provisionally only if they submit a certificate latest by June 30, 2016 from the Principal/Registrar of their college/institute (issued on or before June 30, 2016) stating that they have completed all the requirements (the results may, however, be awaited) for obtaining the bachelor's degree/equivalent qualification on the date of issue of the certificate. Their admission will be confirmed only when the candidate submits the mark sheet and a certificate of having passed the bachelor's degree/equivalent qualification referred to in the certificate issued by the Principal/Registrar with at least 50% marks (45% in case of candidates belonging to SC/ST/DA category). It is mandatory for the final year students, who are provisionally admitted, to submit the mark-sheet and degree certificate of the final year bachelor's degree examination held on or before June 30, 2016 (including supplementaries, if any), to be eligible for admission to the Post Graduate Programme batch 2016-18. *The deadline for submission of the mark sheet and the certificate is December 31, 2016. Non-fulfillment of this condition will automatically result in the cancellation of the provisional admission. IIMA would not allow any candidate to join its programme in case the candidate is unable to complete all the requirements for a bachelor's degree on or before June 30, 2016.* The IIMA would also not offer admission to any candidate after June 30, 2016.

Admission/Selection Process

The selection of candidates for admission to the 2016-18 batch of the PGP at IIM Ahmedabad is a two-step process.

In the first step, candidates are short-listed for Academic Writing Test (AWT) and Personal Interview (PI) from among the candidates who have a valid CAT 2015 score, who have applied to the programme and who satisfy the eligibility criteria for the programme.

NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA, SURATHKAL

Request For Change of Research Guide or Inclusion of Additional-Guide

[PhD Scholar → Guide(s) → RPAC → DRPC → ... → Dean(A)]

[To be filled-in by the PhD Scholar]

Name of the Scholar: **NANDANA.M.S.** Register No.: **MT14F10**

Department: **Met & Matls Engrg** Date of joining: **09/01/15**

Research Area: **Fatigue & Fracture Analysis of Aerospace Mate**

Name of present Research Guide: **Dr. Udaya Bhat K.**

Name of present Additional-Guide (if any):

Reasons for requesting change of Research Guide OR inclusion of Additional-Guide:
 (to be stated clearly by the present Guide and/or additional-Guide if any)

1) Proposed guide has a high competency in Fatigue studies
 2) NITK has good facilities for the study. NITK does not have

Signature(s) of Research Guide(s) and Additional-Guide (if any) **Udaya Bhat K**
 22/05/15

	Name	Signature	Date
Ph.D. Scholar	: NANDANA.M.S.	Nanda	20/05/15
Present Research Guide	: Dr. Udaya Bhat K.	Udaya Bhat K	22/05/15
Present Additional-Guide	:		
Proposed Research Guide	:		
Proposed Additional-Guide	: Dr. CM MANJUNATHA	CM	05/06/2015

[Forwarding by the DRPC]

Secretary DRPC **[Signature]** Date **11-06-2015**

Professor and Head
 Chairman DRPC Metallurgical and
 Materials Engineering
 National Institute of Technology Karnataka, Surathkal
 Post Srinivasnagar, Mangalore - 575 017,
 Karnataka, India

[Verification of Records]

The Records were verified and found to be in order

Supdt. (Academic Section) DR (Academic)

[Approval]

Dean (Academic)

To be placed before BOS. -33-
 [Signature]
 13/8/15

CURRICULUM VITAE

Name	C.M. MANJUNATHA
Date of Birth / Age	17 th Jan. 1966 / 49 Years
Nationality / Sex	Indian / Male
Marital Status	Married / Two children
Address	Residence SA-51 NAL Campus Old Airport Road, Kodihally Bangalore – 560 017, INDIA Phone: +91-(0)80-2520 0390
Correspondence / Office	Sr. Principal Scientist and Group Head Fatigue and Structural Integrity Group Structural Technologies Division National Aerospace Laboratories Bangalore- 560 017, INDIA Ph./Fax: +91-(0) 80- 2508 6310 e-mail: manjucm@nal.res.in

Academic Qualifications

Post- Doctoral	Fatigue of nanocomposites	2008	Imperial College, London United Kingdom
Ph. D.	Fatigue and Fracture Mechanics	1995	University of Cambridge United Kingdom
M.E.	Metallurgy	1991	Indian Institute of Science Bangalore, India
B. E.	Metallurgical Engineering	1988	Mangalore University, Karnataka, India

Awards and Scholarships:

- UKIERI Research Fellow, Imperial College, London, UK – 2008-2009
- Cambridge Nehru Scholarship for studying Ph.D. at the University of Cambridge, United Kingdom : 1991-1994
- Overseas Research Student (ORS) award by the Council of Vice Chancellors and Principals (CVCP), London : 1991-1994
- 'SMIORE' Gold Medal for First Rank in B.E. (Metallurgical Engineering), Mangalore University : 1988

Positions Occupied

Scientist 'F' & Group Head	Structural Technologies Division National Aerospace Laboratories Bangalore – 560 017, India	Nov. 2010 – till today
Scientist 'E2' & Group Head	Structural Technologies Division National Aerospace Laboratories Bangalore – 560 017, India	Nov. 2005 – Nov. 2010
Scientist 'E1'	Structural Integrity Division National Aerospace Laboratories Bangalore – 560 017, India	Nov. 2001 – Nov. 2005
Scientist 'C'	Structural Integrity Division National Aerospace Laboratories Bangalore – 560 017, India	Nov. 1997 – Nov. 2001
Visiting Scientist	Structural Integrity Division National Aerospace Laboratories Bangalore – 560 017, India	Nov. 1995 – Oct. 1997

Professional Experience

As a Scientist (R&D) in the Structural Technologies Division, I have been involved in various research and developmental activities of the division, which includes

- Fracture Mechanics and Fatigue
- Mechanical properties characterization of aerospace materials
- Component level static and fatigue testing of aircraft structural components
- Full scale fatigue testing of aircraft
- Damage tolerance evaluation of aircraft structural materials and components
- Fatigue of Composites, Nanocomposites etc.

Miscellaneous

- Member of professional societies: Indian Institute of Metals (IIM), Aeronautical Society of India (AeSI), ISAMPE, Materials Research Society of India (MRSI).
- Internal auditor for ISO 9001:2000

Area of Specialization and Interests:

Fatigue and Fracture Mechanics; Fatigue Crack Initiation and Growth; Fatigue Crack Closure; Analytical modeling; Fatigue life prediction

Mechanical Metallurgy; Mechanical Properties of Materials; Mechanical Testing of Materials; Structure-Property Correlation

Damage Tolerance Evaluation; Life Extension of Aging Aircraft; Static and Fatigue Testing of Aircraft Components; Full Scale Fatigue Testing of Aircraft

Fiber Reinforced Polymer Matrix Composite Materials; Environmental Effects; Impact Damage in FRP Materials, Nanocomposites

Academic experience:

- Faculty AcSIR
- Visiting faculty, Dept. of Mech and Aerospace Engg., IIT, Hyderabad
- Reviewer for international journals
- Guided/Guiding Ph.D. students (IISc, VTU, AcSIR, VNIT)
- Taught courses for PGRPE course of CSIR
- Guided over 20 students for their M.E./ B.E. thesis work

List of Publications:

(a) International Peer-Reviewed Journals:

1. B.K. Parida, C.M. Manjunatha, H.M. Girish, "Fatigue Crack Closure Evaluation Under Constant Amplitude and Spectrum Loading", *Journal of Testing and Evaluation*, Vol. 31, No. 4, 2003, pp.337-346
2. C.M. Manjunatha, B.K. Parida, "Prediction of Fatigue Crack Growth After Single Overload in an Aluminum Alloy", *AIAA Journal*, Vol. 42, No. 8, 2004, pp 1536-1542
3. C.M. Manjunatha, "Fatigue Crack Growth Prediction Under Spectrum Load Using Crack Driving Force ΔK^* ", *AIAA Journal*, Vol. 44, No. 2, 2006, pp. 396-399
4. C.M. Manjunatha, " Fatigue crack growth prediction under spectrum load sequence in an aluminum alloy by K^* -RMS approach" *International Journal of Damage Mechanics*, Vol. 17, 2008, pp 477-492
5. C.M. Manjunatha, A.C. Taylor, A.J. Kinloch, S. Sprenger, "The effect of rubber micro particles and silica nano particles on the tensile fatigue behaviour of a glass fiber epoxy composite, *Journal of Materials Science*, Vol. 44, 2009, pp 342-345
6. C.M. Manjunatha, A.C. Taylor, A.J. Kinloch, S. Sprenger, "The cyclic-fatigue behaviour of an epoxy polymer modified with micron-rubber and nano-silica particles", *Journal of Materials Science*, Vol. 44, No. 16, 2009, pp 4487-4490
7. C.M. Manjunatha, A.C. Taylor, A.J. Kinloch, S. Sprenger, " The Tensile Fatigue Behaviour of a GFRP Composite With Rubber Particle Modified Epoxy Matrix, *Journal of Reinforced Plastics and Composites*, Vol. 29, No. 14, 2010, pp 2170-2183
8. C.M. Manjunatha, A.C. Taylor, A.J. Kinloch, S. Sprenger, "The tensile fatigue behaviour of a silica nanoparticle-modified glass fibre reinforced epoxy composite", *Composites Science and Technology*, Vol. 70, 2010, pp. 193-199

22. A. Revathi, M. Sendil Murugan, Shylaja Srihari, N. Jagannathan, **C. M. Manjunatha**, Effect of Hot-Wet Conditioning on the Mechanical and Thermal Properties of IM7/ 8552 Carbon Fiber Composite, *Indian Journal of Advances in Chemical Science*, Vol. 2, 2014, pp. 84-88.
23. **C.M. Manjunatha**, Ramesh Bojja, N. Jagannathan, Enhanced Fatigue Performance of a Polymer Nanocomposite under Spectrum Loads, *ASTM Journal of Materials Performance and Characterization*, Vol. 3, No. 1, 2014, pp 327-341.
24. N. Jagannathan, Ramesh Bojja, A. Revathi, Shylaja Srihari, **CM Manjunatha**, Mechanical Properties of a Hybrid Nanocomposite Under Room Temperature and Hot-Wet Environments, *Transactions of Indian Institute of Metals*, Oct 2014, DOI 10.1007/s12666-014-0463-y
25. MM Thawre, KN Pandey, A Dubey, KK Verma, DR Peshwe, RK Paretkar, N Jagannathan, **CM Manjunatha**, Fatigue life of a carbon fiber composite T-joint under a standard fighter aircraft spectrum load sequence, *Composite Structures*, Vol. 127, 2015, pp 260-266.
26. N. Jagannathan, AR Anil Chandra, **CM Manjunatha**, Onset-of-growth behaviour of mode II delamination in a carbon fiber composite under spectrum fatigue loads, *Composite Structures*, 2015 (Accepted)

(b) International / National Conference/Seminar Papers:

1. **C.M.Manjunatha** and J.E.King, 'Temperature and Environmental Effects on Fatigue Crack Growth Rate Behavior in Ni-Cr-Mo Steel', Proceedings of International Conference FATIGUE 93, Montreal, Canada, Eds., J.P.Bailon and J.I.Dickson, EMAS, 1993, Vol. II, pp 853-858
2. **C.M.Manjunatha** and B.K.Parida, "Automated Crack Length Measurement with Modified Single Cantilever COD Gage", Proceedings of 6th National Seminar on Aircraft Structures (NASAS), Eds., B.R.Somashekhar, B.K.Parida, D.Dattaguru and K.Rajaiah, Allied Publishers, New Delhi, India, 1996, pp 129-136
3. **C.M.Manjunatha** and B.K.Parida, "The Growth Behavior of Short Fatigue Cracks in an Aluminum Alloy", International Conference on Recent Advances in Metallurgical Processes ICRAMP-97, IISc, Bangalore, India, Eds., D.H.Sastry, E.S.Dwarakadasa, G.N.K.Iyengar and S.Subramanian, New Age International (P) Ltd., New Delhi, India, Vol. II, pp 1097-1102
4. B.K.Parida, **C.M.Manjunatha** and P.K.Dash, "Fatigue Crack Growth Behavior of Small Cracks Emanating From a Corner Notch" Small Fatigue Cracks: Mechanics, Mechanisms and Applications, K.S. Ravichandran, R.O. Ritchie and Y. Murakmi, Eds. , Elsevier, Oxford, 1999, pp 475-482
5. **C.M. Manjunatha**, R.K. Puty, P.K. Dash and B.K. Parida, "Derivation of Test Load Spectrum for Full Scale Fatigue Testing of an Aircraft", International Conference on Life Extension of Aging Aircraft -ALEX-2000, Nasik, India, Jun 2000
6. **C.M. Manjunatha** and B.K. Parida, ' A New Model for Predicting the Effects of Tensile Overload on Fatigue Crack Growth Behaviour', 44th AIAA Conference on Structures, Structural Dynamics, and Materials, Paper No. SDI-2003-1523, Norfolk, Virginia, USA, April. 2003

9. **C.M. Manjunatha**, S. Sprenger, A.C. Taylor, A.J. Kinloch, "The tensile fatigue behavior of a glass fiber reinforced plastic composite using a hybrid toughened epoxy matrix", *Journal of Composite Materials*, Vol. 44, No. 17, 2010, pp. 2095-2109
10. **C.M. Manjunatha**, K. Padmalatha, N. Jagannathan, "The enhanced fatigue behavior of a fiberglass reinforced polymer nanocomposite under a three-step decreasing block load sequence", *Bharathi Vidyapeeth Deemed University Scientific and Research Journal*, Vol. VIII; No. 2, March 2011, pp 39-45.
11. M.M. Thawre, R.K. Paretkar, D.R. Peshwe, Ramesh Sundaram, **C.M. Manjunatha**, "Construction of constant fatigue life diagram for a carbon fiber composite", *Transaction of Indian Institute of Metals*, Vol. 63, No. 3, June 2011, pp 301-303.
12. **C.M. Manjunatha**, N. Jagannathan, K. Padmalatha, A.J. Kinloch, A.C. Taylor, "Improved variable-amplitude fatigue behavior of a glass-fiber-reinforced hybrid-toughened epoxy composite", *Journal of Reinforced Plastics and Composites*, Vol. 30, No. 21, 2011, pp. 1783-1793.
13. **C.M. Manjunatha**, N. Jagannathan, K. Padmalatha, A.C. Taylor, A.J. Kinloch, "The effect of micron-rubber and nano-silica particles on the fatigue crack growth behavior of an epoxy polymer", *International Journal of Nanoscience*, Vol. 10, Nos. 4 & 5, 2011, pp. 1095-1099.
14. P K Sahoo, , B Dattaguru, , **C M Manjunatha**, , C R L Murthy, "Fatigue De-bond Growth in an Adhesively Bonded Single Lap Joint", *SADHANA Journal*, Vol. 37, Part 1, February 2012, pp. 79-88.
15. **C.M. Manjunatha**, N. Jagannathan, K. Padmalatha, A.C. Taylor, A.J. Kinloch, "The fatigue and fracture behavior of micron-rubber and nano-silica particles modified epoxy polymer", *International Journal of Nanoscience*, Vol. 11, No. 3, 2012, pp 1240002-1 – 1240002-7.
16. M. Sujata, M. Madan, K. Raghavendra, N. Jaganathan, **C.M. Manjunatha**, S.K. Bhaumik, "Fatigue Fracture of a Compressor Disc of an Aeroengine" *Journal of Failure Analysis and Prevention*, Vol. 13, issue 4, 2013, pp. 437-444.
17. **C.M. Manjunatha** Ramesh Bojja, N. Jagannathan, Fatigue behavior of a nanocomposite under a fighter aircraft spectrum load sequence, *Journal of Nano Research*, Vol. 24, 2013, pp. 58-66.
18. **C.M. Manjunatha**, Ramesh Bojja, N. Jagannathan A.J. Kinloch, A.C. Taylor, "Enhanced Fatigue Behavior of a Glass Fiber Reinforced Hybrid Particles Modified Epoxy Nanocomposite under WISPERX Spectrum Load Sequence", *International Journal of Fatigue*, Vol. 54, 2013, pp. 25-31.
19. KL Singh, VR Ranganath, **CM Manjunatha**, "Numerical and Experimental Analysis to Predict the Compressive Strength of Pristine Composite Laminates", *Journal of Aerospace Sciences and Technologies*, Vol. 65, No.1, 2013, pp. 47-54
20. N Jagannathan, Ramesh Bojja, **CM Mnjunatha**, AC Taylor, AJ Kinloch, "Fatigue behavior of a hybrid particle modified fiberglass/epoxy composite under a helicopter spectrum load sequence", *Advanced Composites Letters*, Vol. 22, Issue 3, 2013, pp. 52-56
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7. R. Srinivasa Murthy, T.C. Subba Reddy, **C.M. Manjunatha** and K. Vijayaraju, "Testing and Evaluation of a Carbon Fiber Composite L-Joint", Proceedings of ISAMPE National Conference on Composites -INCCOM-2 and National Seminar on Aerospace Structures-NASAS, Eds. R. Balasubramaniam, B. Dattaguru, B.S. Sarma, A.R. Upadhy and N.G. Vijaya Vittala, ISAMPE-Bangalore, Sept. 2003, pp.32-38
8. T.C. Subba Reddy, R. Srinivasa Murthy, **C.M. Manjunatha**, K. Vijayaraju and P.D. Mangalgiri, "Effect of Impact Damage on the Static T-shear Strength of Co-cured Carbon Fiber Composite Specimen", Proceedings of ISAMPE National Conference on Composites - INCCOM-2 and National Seminar on Aerospace Structures-NASAS, Eds. R. Balasubramaniam, B. Dattaguru, B.S. Sarma, A.R. Upadhy and N.G. Vijaya Vittala, ISAMPE-Bangalore, Sept. 2003, pp.39-45
9. **C.M. Manjunatha**, T.C. Subba Reddy, R. Srinivasa Murthy and K. Vijayaraju, "Effect of Environment on the T-shear Strength of Co-cured CFC T-Joint Specimen", Proceedings of the International Conference on Structural Integrity ICASI-2004 and national Seminar on Aerospace Structures XIII-NASAS , Eds., P.D. Mangalgiri, K. Vijayaraju and S. Gopalkrishnan, IISc., Bangalore, Apr. 2004, Paper No. CM-C18
10. M.D. Praveenkumar, T.C. Subba Reddy, R. Srinivasa Murthy, **C.M. Manjunatha** and K. Vijayaraju, " Testing and Evaluation of Composite T-beam under Pressure Loading", Proceedings of the International Conference on Structural Integrity ICASI-2004 and national Seminar on Aerospace Structures XIII-NASAS , Eds., P.D. Mangalgiri, K. Vijayaraju and S. Gopalkrishnan, IISc., Bangalore, Apr. 2004, Paper No. CM-C19
11. R. Srinivasa Murthy, T.C. Subba Reddy, **C.M. Manjunatha** and M.D. Praveenkumar, "Tensile Testing and Evaluation of CFC Panel With Rectangular Cut-out", Proceedings of the International Conference on Structural Integrity ICASI-2004 and national Seminar on Aerospace Structures XIII-NASAS , Eds., P.D. Mangalgiri, K. Vijayaraju and S. Gopalkrishnan, IISc., Bangalore, Apr. 2004, Paper No. CM-C20
12. **C.M. Manjunatha**, T.C. Subbareddy, R. Srinivasa Murthy and K. Vijayaraju, "Influence of Moisture on the Bearing Strength of CFC Bolted Joints", Proceeding of the 3rd ISAMPE conference on Composites INCCOM-3, 7-9 Oct. 2004, Pune, India, pp. 85-91
13. **C.M. Manjunatha**, K.S. Narayana Rao, M. Jeeva Peter and S. Ravikumar, "A statistical approach to the determination of Design Allowable for a Structural Composite Material of a Helicopter", Proceedings of the 3rd ISAMPE National Conference on Composites INCCOM-3, 7-9th Oct. 2004, Pune, India, pp. 197-203
14. **C.M. Manjunatha**, T.C. Subba reddy, R. Srinivasamurthy, K. Vijayaraju and P.D. Mangalgiri, "Effect of off-axis loading and countersunk hole on the bearing strength of CFC Bolted joint", Proceedings of the Int. Conf. On Recent Advances in Composite Materials ICRACM-2004, 17-19 Dec. 2004, BHU, Varanasi, India, V. K. Srivastava and M. Singh, Eds., Allied Publishers Pvt. Ltd. New Delhi, India, pp. 55-60
15. T.C. Subbareddy, R. Srinivasamurthy and **C.M. Manjunatha**, "Tensile Testing of Fuselage CFC cut-out panels", Proceedings of the Int. Conf. On Recent Advances in Composite Materials ICRACM-2004, 17-19 Dec. 2004, BHU, Varanasi, India, V. K. Srivastava and M. Singh, Eds., Allied Publishers Pvt. Ltd. New Delhi, India, pp. 113-116
16. **C.M. Manjunatha**, K. Balakrishna, M. Jeeva Peter and S. Ravikumar, "Effect of moisture on the tensile strength degradation of fibers in composite fabric materials", Proceedings of the Int. Conf. On Theore. Appl. Comput. And Exptl. Mechanics ICTACEM-2004, Dec. 28-30, 2004, IIT Kharagpur, India, Paper No. 256.

17. M. Raghavendra, **C.M. Manjunatha**, C.V. Venugopal and M. Jeeva Peter, "Effect of moisture on the mechanical properties of GFRP woven fabric material", Proceedings of the International seminar for Research Students ISRS-2004, IIT Madras, India.
18. M.S. Dasharathi, K. Annamalai, M. Adithan, V.R. Ranganath, **C.M. Manjunatha** and P.S.S. Rao Patange, "On-line measurement of fatigue crack growth rate in servo hydraulic testing machine using labview software", 21st International conference on CAD/CAM Robotics, CARS & FOF 2005, 17-20 July 2005, Krakow, Poland
19. K.L. Singh and **C.M. Manjunatha**, "Finite Element Analysis of CFC panel Buffered T-Stiffened Carbon Fiber Composite Panel With Circular Cut-Out", Proceedings of National Conference on Composite Component Construction, Eds. V.V. Subba Rao, L. Vinod Babu, T. rajagopalachary, JNTU college of Engg., Kakinada, 12-13 Sept. 2005, pp. 24 – 28
20. **C.M. Manjunatha** and V.R. Ranganath, "Fatigue crack growth prediction under spectrum loading sequence", Presented in Annual Technical Meeting: NMD-ATM 2005, IITM, 14-16th Nov. 2005, Chennai, India, Paper No. FF-I.8
21. **C.M. Manjunatha** and V.R. Ranganath, "Prediction of optimum test load spectrum based on materials for full scale fatigue testing of an aircraft", Proceedings of Int. Conf. on Computational and Experimental Engg. and Science, ICCES05, Eds. S.M. Sivakumar, A. Meher Prasad, B. Dattaguru, S. Narayanan, A.M. Rajendran, S.N. Atluri, Dec. 1-6, 2005, IITM, Chennai, pp. 2223-2228
22. **C.M. Manjunatha** and V.R. Ranganath "Fatigue crack growth analysis to modify spectrum load sequence for full scale fatigue testing of an aircraft", Presented in national symposium on Fatigue, Fracture and Integrity Assessment, 17-18, Jan. 2006, Tata Steel, Jamshedpur.
23. **C.M. Manjunatha** and V.R. Ranganath , "Spectrum modification for full scale fatigue testing of an ageing aircraft", Proc. XIV National Seminar on Aerospace Structures, XI NASAS, Eds. C.M. Manjunatha, V.R. Ranganath, R.K. paretkar, D.P. Peshwe, 30-31 Jan. 2006, VNIT, Nagpur, pp. 93-98
24. **C.M. Manjunatha** and V.R. Ranganath , "Effect of materials on the spectrum modification for full scale fatigue testing of an ageing aircraft , Proc. XIV National Seminar on Aerospace Structures, XI NASAS, Eds. C.M. Manjunatha, V.R. Ranganath, R.K. Paretkar, D.P. Peshwe, 30-31 Jan. 2006, VNIT, Nagpur, pp. 139-143
25. M.S. Duragkar, D.P. Peshwe, R.K. Paretkar, V.R. Ranganath and **C.M. Manjunatha**, "Fatigue Behavior of carbon fiber composite laminate under block-type spectrum loading", Proc. XIV National Seminar on Aerospace Structures, XI NASAS, Eds. C.M. Manjunatha, V.R. Ranganath, R.K. paretkar, D.P. Peshwe, 30-31 Jan. 2006, VNIT, Nagpur, pp. 360-365
26. **C.M. Manjunatha** and V.R. Ranganath, " Damage tolerance evaluation: Recent trends in fatigue crack growth prediction under spectrum loads", Proceeding of the conference on Emerging Trends in Mechanical Engineering, ETIME-2006, BMSCE, Bangalore, Feb. 2006.
27. **C.M. Manjunatha**, A.R. Anil Chandra and V.R. Ranganath , " Modification of FALSTAFF load sequence to accelerate fatigue tests", Proc. of National Conf. On Mechanical Engg. – NATCON.ME-2006, Siddaganga Institute Of Technology, Tumkur, India, 26-27th May 2006
28. **C.M. Manjunatha**, A.R. Anil Chandra and V.R. Ranganath, "Fatigue crack growth prediction under FALSTAFF load sequence by K*-RMS Approach", International Seminar on Fatigue, Fracture and Durability, IISc., 26-28 Jun 2006, Bangalore.

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34. Praveen Kumar Jain, **C.M. Manjunatha** and Udupi Srinivasa, "Measurement and simulation of elasto-plastic deformation", DREAMS 2007, JFW Technology Centre, Bangalore, 12th March 2007
35. **C.M. Manjunatha** "Damage tolerance evaluation of aircraft materials", National symposium on Fatigue, Fracture and Integrity Assessment, FFIA-07, 6-7, Mar. 2007, Tata Steel, Jamshedpur.
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72. **C.M. Manjunatha** Ramesh Bojja, N. Jagannathan, Fatigue behavior of a nanocomposite under a fighter aircraft spectrum load sequence, 2nd International Conference on Nanotechnology, NANOCON-2012, 18-19 Oct. 2012, BVUCOE, Pune, India
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(c) Books Edited:

1. **C.M. Manjunatha**, V.R. Ranganath, R.K. Paretkar, D.P. Peshwe, (Eds.) Proceedings of XIV NASAS, National Seminar on Aerospace Structures, 30-31 Jan. 2006, VNIT, Nagpur
2. P.K. Sahoo, B. Dattaguru, C.M. Manjunatha, C.R.L. Murthy, Strength Prediction Methods for Adhesively Bonded Lap Joints between Composite-Composite/Metal Adherends in *Advances in Modeling and Design of Adhesively Bonded Systems*, S. Kumar and K.L. Mittal (eds.), Scrivener Publishing LLC, 2013, pp 219-236.

(d) Project Reports and Documents:

Over 50 numbers of project reports and documents prepared and submitted to sponsor.

National Institute of Technology Karnataka, Surathkal
CHEMICAL ENGINEERING DEPARTMENT

The DUGC of the Department of Chemical Engineering met on 31/08/15 at 3.00 pm to include the elective subjects for B.Tech. in Chemical Engineering.

Resolution: The following subject is recommended for inclusion in B.Tech. curriculum as agenda for BOS meeting

(CH 368) Fuel cell Engineering-Departmental Elective-3 Credits (3-0-0)

Overview of Fuel Cells- What is a fuel cell, brief history, classification, how does it work, why do we need fuel cells, Fuel cell basic chemistry and thermodynamics, heat of reaction, theoretical electrical work and potential, theoretical fuel cell efficiency

Fuel cell electrochemistry- electrode kinetics, types of voltage losses, polarization curve, fuel cell efficiency, Tafel equation, exchange currents.

Fuel cell process design (PEM Cells)- Main PEM fuel cell components, materials, properties and processes: membrane, electrode, gas diffusion layer, bi-polar plates, Fuel cell operating conditions: pressure, temperature, flow rates, humidity.


Main components of Solid Oxide Fuel Cells- Main components of solid-oxide fuel cells, Cell stack, Electrode polarization, testing of electrodes, cells and short stacks.

Fuel Processing- Direct and in-direct internal reforming, Reformation of hydrocarbons by steam, CO₂ and partial oxidation, Direct electro-catalytic oxidation of hydrocarbons, carbon decomposition, Sulphur tolerance and removal, Using renewable fuels for SOFCs

Reference Book:

1. Gregor Hoogers, Fuel Cell Technology Hand Book, CRC Press, 2003.
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3. F. Barbir, PEM Fuel Cells: Theory and Practice (2nd Ed.) Elsevier/Academic Press, 2013.
4. Subhash C. Singal and Kevin Kendall, High Temperature Fuel Cells: Fundamentals, Design and Applications, 2003


D.V.R. Murthy

G. Srinikethan

I. Regupathi

M.B. Saidutta
M.B. Saidutta



Prasanna B.D.

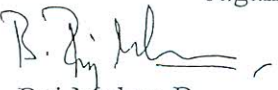

P.E. Jaghadeesh Babu


D. Ruben Sudhakar


B. Ashraf Ali

T.K. Jagannathan
Jagannathan T.K.


Hari Prasad Dasari
Secretary-DUGC


Raj Mohan B.
Chairman-DUGC & HOD

HEAD OF THE DEPARTMENT
Chemical Engineering
National Institute of Technology Karnataka, Surathkal
P.O. Surathkal, Tal. Surathkal, Dist. D.K. Karnataka
575 025

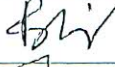

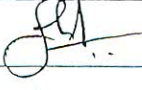



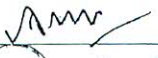

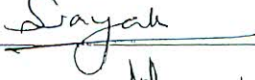
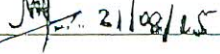
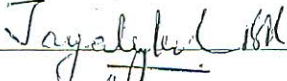






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Department of Civil Engineering
National Institute of Technology Karnataka, Surathkal

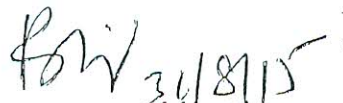
DPGC meeting minutes:

Proposal for a new three credit PG Open elective course titled 'TS819: Infrastructure Development – Programmes, Planning and Appraisal' submitted by Dr. Suresha S. N., Assistant Professor, CED with course content as enclosed for M.Tech (Transportation Engineering) was discussed at the DPGC meeting of the Department held on 31 August 2015 and it was resolved to recommend the proposal for approval to the Board of Studies, NITK, Surathkal, for inclusion in the curriculum.

Signatures of DPGC-members

Sl.No.	Faculty Name	Signature
1	R. SHIVASHANKAR	
2	A.U. Ram Shankar	 31/8/15
3	SUNIL B.M.	
4	S. SHRIHARI	
5	C. RAJASHEKHARAN	
6	Subhash. C. Yavagal	
7	ARUN KUMAR THALLA	
8	Varghese George	
9	Siddaram Nayak	
10	SURESHA S.N.	 31/8/15
11	Jayalakshmi - B.R	
12	BASAVARATU MANU	
13	A. Gowri	
14	C.P. Devaltha	
15	A S BALE	
16	B. B. Das	
17	Raviog H.M	

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 31/8/15

Professor and Head
Department of Civil Engineering
National Institute of Technology Karnataka, Surathkal
Mangalore - 575 025, Karnataka, INDIA

Overview on infrastructure development policies of central and state governments in India. Programmes and initiatives for development of roads, railways, airports, and urban infrastructure in India. Planning of infrastructure projects- contexts, perspectives, objectives. Project-wise studies and development of alternatives. Screening of alternatives and Masterplanning. Overview of various planning tools. Project appraisal by financial analysis, economic analysis, environmental and societal impact assessments. Concept of sustainable infrastructure development. Considerations to uncertainty and risk assessments.

Alvin S. Goodman and Makarand Hastak, Infrastructure Planning, Engineering, and Economics, Second Edition, McGraw-Hill Education, 2015.

NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA, SURATHKAL
DEPARTMENT OF HUMANITIES, SOCIAL SCIENCES AND MANAGEMENT

Title of the Course Proposed: Econometrics Theory and Applications

Credit: 3-0-0

Instructor: Dr. Pradyot Ranjan Jena

Course Justification

Today, econometrics is used not only in economics and business but also in several other disciplines such as politics, international relations and health sciences. With the availability of statistical software packages students and researchers find it very useful to estimate and predict real world situations with the help of econometric techniques. These techniques help users to identify and measure the relationship between variables of interest and to predict the future values of one variable based on the available current information of the determinant variables. This approach has been extensively used predicting future inflation and economic growth scenarios as well as climate change and other important phenomena. This course is a blend of both theoretical econometric methods and their applications to the real world data. Students will apply this method to a data set with the help of some statistical software like STATA or R.


COURSE CONTENTS


- Econometrics as a tool for Economic and Managerial Analysis – Modeling, Data and Methodology
- The Classical Multiple Linear Regression Model –Least Squares Regression , Goodness of Fit and Analysis of Variance, Asymptotic Properties of the Least Squares Estimator, Multicollinearity, Heteroscedasticity and Autocorrelation
- Qualitative Response Regression Models – Logit, Probit and Tobit Models
- Panel Data Regression Models –Estimation of Fixed and Random Effects Models
- Endogeneity and Instrumental variable (IV) Model, Simultaneous Equation Methods
- Timeseries Econometrics and Forecasting –AR, MA, ARMA and ARIMA Models, Vector Auto Regression


Wooldridge, J. (2002). Econometric Analysis of Cross section and Panel data, MIT Press


Gujarati, Damodar N. (2003). Basic Econometrics. Fourth Edition, McGraw – Hill Higher Education


Enders, W. (2003). Applied Econometric Time Series, 2nd Edition, John Wiley & Sons



(Dr. P.R. Jena)


(A.A. Gopinath)


(Suprabhat R)



Bijena C Mohan


(Sheena)


(RASHMI UCHIL)

Gopalakrishna B.V


(Dhish)


(Suvil C D'Souza)


(SAVITA BHAT)

NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA, SURATHKAL

January - May 2016

ACADEMIC CALENDAR

Even-semester

Week No.	SUN	MON	TUE	WED	THU	FRI	SAT	Week No.
w01	Dec-27	Dec-28 Course Registration Inst. fee payment without fine	Dec-29 Classes Start * Course Registration Inst. fee payment without fine	Dec-30 Registration with fine Inst. fee payment with fine	Dec-31 Registration with fine Inst. fee payment with fine	Jan-01 Registration with fine Inst. fee payment with fine	Jan-02	w01
w02	Jan-03	Jan-04 Last date for Registration with fine Inst. fee payment with fine	Jan-05	Jan-06	Jan-07	Jan-08	Jan-09	w02
w03	Jan-10	Jan-11 Drop/c/U-options	Jan-12	Jan-13	Jan-14 Makar Sankranti	Jan-15	Jan-16	w03
w04	Jan-17	Jan-18	Jan-19	Jan-20	Jan-21	Jan-22	Jan-23	w04
w05	Jan-24	Jan-25	Jan-26 Republic Day	Jan-27	Jan-28	Jan-29	Jan-30	w05
w06	Jan-31	Feb-01	Feb-02	Feb-03	Feb-04	Feb-05	Feb-06	w06
w07	Feb-07	Feb-08	Feb-09	Feb-10	Feb-11	Feb-12	Feb-13	w07
w08	Feb-14	Feb-15 Mid-Sem Exam	Feb-16 Mid-Sem Exam	Feb-17 Mid-Sem Exam	Feb-18 Mid-Sem Exam	Feb-19 Mid-Sem Exam	Feb-20	w08
w09	Feb-21	Feb-22	Feb-23 Mid Sem Results	Feb-24 Mid Sem Results	Feb-25	Feb-26	Feb-27	w09
w10	Feb-28	Feb-29	Mar-01	Mar-02	Mar-03 Incident-No Classes	Mar-04 Incident-No Classes	Mar-05 Incident	w10
w11	Mar-06 Incident	Mar-07 No Classes	Mar-08 Class Commi. Meeting	Mar-09 Class Commi. Meeting	Mar-10 Class Commi. Meeting	Mar-11 Class Commi. Meeting	Mar-12	w11
w12	Mar-13	Mar-14	Mar-15	Mar-16	Mar-17	Mar-18	Mar-19	w12
w13	Mar-20	Mar-21	Mar-22	Mar-23	Mar-24	Mar-25 Good Friday	Mar-26	w13
w14	Mar-27	Mar-28	Mar-29	Mar-30	Mar-31	Apr-01	Apr-02	w14
w15	Apr-03	Apr-04**	Apr-05	Apr-06	Apr-07	Apr-08	Apr-09	w15
w16	Apr-10	Apr-11 Pre-Registration	Apr-12 Pre-Registration	Apr-13	Apr-14	Apr-15	Apr-16	w16
w17	Apr-17	Apr-18 Course Evaluation	Apr-19*** Course Evaluation	Apr-20 Mahaveera Jayanthi	Apr-21 Classes End	Apr-22	Apr-23	w17
w18	Apr-24	Apr-25 End-Sem Exam	Apr-26 End-Sem Exam	Apr-27 End-Sem Exam	Apr-28 End-Sem Exam	Apr-29 End-Sem Exam	Apr-30	w18
w19	May-01	May-02 End-Sem Exam	May-03 End-Sem Exam	May-04 End-Sem Exam	May-05 End-Sem Exam	May-06	May-07	w19
w20	May-08	May-09 End Sem Results	May-10 DUGC/DPGC/DRPC Meeting & Grades Display	May-11 Appeal on Grades	May-12 DAAB Meeting	May-13 Grades to Exam Section	May-14	w20

**Depts. to announce list of courses & instructors for the next semester

Submission of M.Tech Thesis on or after: 30th April 2016

Semester Make-up Exam from May 23rd to 27th May, 2016

* Course Instructors to provide Course Plan & Evaluation Plan

*** Announcement of Attendance Status and In Semester Marks

Note: Odd Semester Reopening-20th July 2016 (Tentative)

ACADEMIC CALENDAR

week	SUN	MON	TUE	WED	THU	FRI	SAT	week
w00	July-17	July-18 Branch Change (III Sem)	July-19	July-20 Course Registration Inst. fee payment without fine	July-21 Classes Start * Course Reg. Inst. fee payment without fine	July-22 Registration with fine Inst. fee payment with fine	July-23	w00
w01	July-24	July-25 Registration with fine Inst. fee payment with fine	July-26 Registration with fine Inst. fee payment with fine	July-27 Last date for Registration with fine & Inst. fee payment with fine	July-28	July-29	July-30	w01
w02	July-31	Aug-01	Aug-02	Aug-03 Drop/cU options	Aug-04	Aug-05	Aug-06 Inst. Round from Day	w02
w03	Aug-07	Aug-08	Aug-09	Aug-10	Aug-11	Aug-12	Aug-13	w03
w04	Aug-14	Aug-15 Independence Day	Aug-16	Aug-17	Aug-18	Aug-19 Monday's Time Table	Aug-20	w04
w05	Aug-21	Aug-22	Aug-23	Aug-24	Aug-25 Jammastam	Aug-26	Aug-27	w05
w06	Aug-28	Aug-29	Aug-30	Aug-31	Sept-01	Sept-02	Sept-03	w06
w07	Sept-04	Sept-05 Gandhi Chaurathi	Sept-06 Mid-Sem. Exam	Sept-07 Mid-Sem. Exam	Sept-08 Mid-Sem. Exam	Sept-09 Mid-Sem. Exam	Sept-10	w07
w08	Sept-11	Sept-12 ID III / Zuhail Baiqrid	Sept-13 Mid-Sem. Exam	Sept-14 Monday's Time Table	Sept-15	Sept-16	Sept-17	w08
w09	Sept-18	Sept-19 Mid Sem Results	Sept-20	Sept-21	Sept-22	Sept-23	Sept-24	w09
w10	Sept-25	Sept-26	Sept-27	Sept-28	Sept-29	Sept-30	Oct-01	w10
w11	Oct-02 Mahatma Gandhi's Birth Day	Oct-03	Oct-04	Oct-05	Oct-06	Oct-07	Oct-08	w11
w12	Oct-09	Oct-10 Maha Navami	Oct-11 Vijaydashami	Oct-12 Vijaydashami	Oct-13 Class Commi. Meeting	Oct-14 Class Commi. Meeting	Oct-15	w12
w13	Oct-16	Oct-17 Class Commi. Meeting	Oct-18 Class Commi. Meeting	Oct-19	Oct-20 Engineer-No Classes	Oct-21 Engineer-No Classes	Oct-22 Engineer	w13
w14	Oct-23 Engineer	Oct-24 No Classes	Oct-25	Oct-26	Oct-27	Oct-28**	Oct-29	w14
w15	Oct-30 Deepavali	Oct-31	Nov-01	Nov-02	Nov-03	Nov-04	Nov-05	w15
w16	Nov-06	Nov-07 Pre-Registration	Nov-08 Pre-Registration	Nov-09	Nov-10 Course Evaluation	Nov-11 Course Evaluation	Nov-12	w16
w17	Nov-13 Gourmanak's Birthday	Nov-14	Nov-15***	Nov-16	Nov-17 Classes END Monday's Time Table	Nov-18	Nov-19	w17
w18	Nov-20	Nov-21 End-Sem. Exam	Nov-22 End-Sem. Exam	Nov-23 End-Sem. Exam	Nov-24 End-Sem. Exam	Nov-25 End-Sem. Exam	Nov-26	w18
w19	Nov-27	Nov-28 End-Sem. Exam	Nov-29 End-Sem. Exam	Nov-30 End-Sem. Exam	Dec-01 End-Sem. Exam	Dec-02 End-Sem. Exam	Dec-03	w19
w20	Dec-04	Dec-05 End Sem Results	Dec-06 DUGCD/DPGCDRPC Meeting	Dec-07 Appeal on Grades	Dec-08 DAAB Meeting	Dec-09 Grades to Exam Section	Dec-10	w20
w21	Dec-11	Dec-12	Dec-13 DUGCDRPC Meeting	Dec-14	Dec-15	Dec-16	Dec-17	w21
w22	Dec-18	Dec-19	Dec-20	Dec-21	Dec-22	Dec-23	Dec-24	w22
w23	Dec-25 Christmas Day	Dec-26	Dec-27	Dec-28	Dec-29	Dec-30	Dec-31	w23

Semester Make-up Exam from 12th Dec to 16th Dec, 2016

** Depts. to announce list of courses & instructors for the next semester
Even Semester Reopening-27th December 2016 (Tentative)

* Course Instructors to provide Course Plan & Evaluation Plan
*** Announcement of Attendance Status and In Semester Marks

DEPARTMENT OF APPLIED MECHANICS AND HYDRAULICS
NITK - Surathkal

Ref No: NITK/AMD/2015/ 869	Date: 09.09.2015
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From	To	Through	Copy to
Head of the Department	Dean (Academic)		

Sub: New and modified Subjects - BoS

I am hereby sending the modified subject and details of the new subjects to be offered by our faculty members from Department of Applied Mechanics and Hydraulics.

Courses to be modified

AM 445- FUNDAMENTALS OF FINITE ELEMENT METHODS

New Courses for UG

AM 476- FLOW INDUCED VIBRATION

AM 477- OPEN SOURCE VIRTUAL INSTRUMENTATION

AM 478- THEORY OF ISOTROPIC ELASTICITY

New Courses for PG

MS 818 - NONLINEAR PROBLEMS IN OCEAN ENGINEERING

MS 819 - MECHANICS OF FLOATING BODIES

MS 820 - HYDRO ELASTICITY

MS 821-OFFSHORE RENEWABLE ENERGY

MS 822- COMPUTATIONAL MARINE HYDRODYNAMICS

I request you to include as an agenda for BOS and oblige.



Head of the Department
विभागाध्यक्ष/HOD

अनुप्रयुक्त यांत्रिकी विभाग/AMD
राष्ट्रीय प्रौद्योगिकी संस्थान, सुरथकल
NITK, SURATHKAL.
मंगलूर - ५७५ ०२५, भारत

Mangalore - 575 025, INDIA

DEPARTMENT OF APPLIED MECHANICS AND HYDRAULICS

NITK - Surathkal

AM 445 FUNDAMENTALS OF FINITE ELEMENT METHOD

(3-0-0) 3

Direct approach. Basic structural elements. Finite difference method, Galerkin weighted residual approach, Rayleigh Ritz method, Element properties. Linear and quadratic elements, shape functions. Isoparametric elements. Numerical integration using Gauss-Legendre quadratures, 1-D problems. Shape function for 4, 8 and 9 nodal quadrilateral elements, Stiffness matrix and consistent load vector, Evaluation of element matrices using numerical integration.

References:

- Robert D Cook, David S Malkus, Michael E Plesha, 'Concepts and Applications of Finite Element Analysis', 4th edition, John Wiley and Sons, Inc., 2003.
- Reddy J.N., *An Introduction to Finite Element Method*, McGraw Hill – 2000.
- Rao. S.S., *Finite Element Methods in Engineering*, Butterworth and Heinemann, 2001.
- L.T. Segerlind, *Applied Finite Element Analysis*, John-Wiley, 2nd edition, 1984.



NEW COURSES FOR UG

AM476

FLOW INDUCED VIBRATION

(3-0-0) 3

Flow around bluff bodies Vortex - shedding and induced vibrations - Fluid elastic excitations and instabilities - Galloping, ovaling and turbulence induced vibrations - Acoustic excitation - Interference effects - Jet switching - Vibrations of fluid conveying conduits and flexible tubes - Wave induced vibrations. Some practical problems: Tube bundle vibrations in heat exchangers and nuclear reactors - Vibrations of stacks, T.V. towers and other tall structures -Off-shore structures, transmission line vibrations - method of suppression.

Eduard Naudascher, Donald Rockwell, Flow induced vibrations: An engineering guide, Dover publications Inc.

AM 477 Open Source Virtual Instrumentation

(2-0-2) 3

Introduction to Open Source virtual instrumentation, Basics of Open Source Programming and data acquisition, Basics of Open Source sensors, actuators and its characteristics, Design and development of Smart Management Systems using Virtual Instrumentation.

Lab component

Open source technique for identification of natural frequency of simplified real world system. Experimental methods of system parameter identification. Experiment on smart monitoring of Agricultural related sensors, pumps, energy meter. Experiment on development of Smart Management Systems.

Reference

D Patranabis, Sensors and Transducers, Phl 2nd Edition (2003)

J.P. Holman Experimental Methods for Engineers, McGrawHill, 6th Edition (2000)

Matt Richardson, Shawn Wallace, Getting Started with Raspberry Pi, Maker Media, Inc (2012)

This course is with two hour theory and two hour practical based. This course is for BTech Students (all branches). The courses will be offered by Department of Applied Mechanics & Hydraulics and will be making use of facilities created at Centre for System Design.

This is to encourage students having multi-disciplinary approach towards research, exposing non circuit branch students to sensors and actuators with practical applications of it. This course will have peer mentoring of non-circuit branch students by circuit branch students.

PREREQ.: A pass in either AM200 or AM201

AM 478 THEORY OF ISOTROPIC ELASTICITY

(3-0-0) 3

Definition of Stress and Strain: Stress - Strain relationships - Equations of Equilibrium, Compatibility equations, Boundary Conditions, Saint Venant's principle - Principal Stresses, Stress Ellipsoid - Stress invariants. Airy's stress function, Bi-harmonic equations, Polynomial solutions, Simple two dimensional problems in Cartesian coordinates like bending of cantilever and simply supported beams. Equations of equilibrium, Strain - displacement relations, Stress - strain relations, Airy's stress function, Axi - symmetric problems, Introduction to Dunder's table, Curved beam analysis, Kirsch, Michell's and

DEPARTMENT OF APPLIED MECHANICS AND HYDRAULICS

New Electives for M.Tech (Marine Structures)

MS820 Subject Name : HYDROELASTICITY

L-T-P : 3-0-0 Credit : 3

Introduction to Hydrodynamics and Structural mechanics: Unsteady hydroelasticity problems: Hull and its structural dynamic behaviour: Wave forces: Response of VLFS to waves: Statistical analysis of ship response - Flow-induced vibration: Transient loading seaquakes and Tsunamis: Analysis of floating structures on fluid base-stationary loads: Moving loads and critical speed.

Fluid structure interaction-structures in steady flow and structures in waves: Structural damping: Numerical methods associated with hydroelasticity problems - mode matching method. conjugate gradient method. finite element and boundary element methods: Application of hydroelasticity - Sloshing in vertical caisson. hydroelasticity of multi-module structures. wave ice interaction and wave interaction with floating and submerged structures. high speed vessel. very large hinged vessels. array of elastically connected cylinders. risers and pipelines.

Books Suggested:

- R.E.D. Bishop and W.G.Price "Hydroelasticity of ships": Cambridge University Press. 1979.
- S.K.Chakrabarti and C.A.Brebbia. "Fluid structure interaction". Southampton: Boston: WIT Press. 2001.
- S.K.Chakrabarti and C.A.Brebbia. "Fluid structure interaction and moving boundary problems IV". Southampton: WIT Press. 2007.
- S.K.Chakrabarti. "Handbook of offshore engineering". Amsterdam: London: Elsevier. 2005.
- S.K. Chakrabarti. "Hydrodynamics of offshore structures". Southampton: Computational Mechanics: Berlin: Springer Verlag. 1987.



MS 821 : Subject Name: OFFSHORE RENEWABLE ENERGY

L-T-P : 3-0-0 Credit : 3

Wave Energy: Description of wave oscillation; Wave power and energy transport; Resonance absorption; Wave transport of energy and momentum; Description and operation of various wave energy converters for inshore and offshore application; Design of wave environment; Maximum power absorption from ocean waves. Hydrodynamic characteristics of wave energy converters. Response of floating structures; Time and frequency domain numerical methods.

Wind Energy: Design of offshore wind turbines; Mounting/mooring arrangements; installation; Design of wind environment; Aerodynamic characteristics of horizontal and vertical axis wind turbines; Aerofoil theory; Boundary element method; Momentum method; Boundary element momentum method.

Tidal Energy: Current stream devices; Barrage systems hydrodynamics characteristics of tidal devices; Wave and current effects. Energy storage; Transmission and distribution issues and solutions.

Books suggested:

- Joao Cruz. "Ocean Wave Energy: Current Status and Future Perspectives". Springer Verlag, 2007.
- Johannes Falnes, "Ocean Waves and Oscillating Systems", Cambridge University Press, 2002.
- John Twidell and Gaetano Gaudiosi, "Offshore Wind Power", Multi-Science Publishing Co-Ltd. UK. 2009.
- Wei Tong, "Wind power generation and wind turbine design". WIT Press. 2010.
- R.H. Charlier, C.W. Finkl., "Ocean Energy: Tide and Tidal Power", Springer Verlag. 2009.

MS 822 : Subject Name: COMPUTATIONAL MARINE HYDRODYNAMICS

L-T-P : 3-0-0 Credit : 3

Numerical hydrodynamics: Averaged Navier-Stokes Equations; Pressure Equation (or an Incompressible Fluid; Vorticity Equation; Inviscid Fluid Mechanics; Euler's Equation; Bernoulli Theorems for Inviscid Flow; Vorticity Dynamics and Kelvin's Circulation Theorem; Potential Flows and Mostly Potential Flows; Green Functions. Green's Theorem and Boundary Integral Equations; Kelvin-Neumann Problem; Kelvin-Neumann Green Function; Derivation of Gauss' Theorem; Froude-Krylov Surge Force on a Ship; Transport Theorem; Pressure Forces and Moments on an Object.

Numerical methods for scientific computation: Numerical solution to non-linear equation: Approximation of functions; Numerical solution to differential equation: Numerical solution to system of linear equation: Numerical Integration; Simpson's Rule: Euler's Method, Modified Euler's Method; Fourth Order Runge-Kutta Method; Predictor-Corrector Method.i: Higher Order Differential Equations: Numerical Hydrodynamics Problems: Solution of Partial Differential Equation.

Boundary Condition of Perturbation Potential: Three Dimensional Flows; Two Dimensional Panel Methods: Two-Dimensional Steady Boundary Layer Equations; Boundary Layer Parameters; Sea Spectra; Fourier Transforms; Computational FFT and IFT of Real Numbers; Simulation or Random Waves; Potentials and Boundary Conditions; Simulations of Ship Motions in Random Seas.

Books suggested :

- Hans-Gerhard Ramming. "Numerical Modelling of Marine Hydrodynamics: Applications to Dynamic Physical Processes", Elsevier. 2000.
- O.M Faltinsen. "Sea Loads on Ships and Offshore Structures", Cambridge University Press, 1990.
- Whitham, G.B. "Linear and Nonlinear Waves", John Wiley & Sons. 1974.
- Kendall L. Atkinson. "An Introduction to Numerical Analysis". John Wiley & Sons. 2008.

Plamen

VFC

Date: 8/9/15

Time: 3:30 pm

Venue: H-011 Chombur

Name of the Faculty Members with Signature

Sl. No.	Name	Signature
1	Dr. S.G. Mayya	
2.	Dr. A. Vittal Hegde	— conference —
3.	Dr. Lakshman Nandagiri	Lakshman
4.	Dr. M.K. Nagaraj	
5.	Dr. Subba Rao	— conference —
6.	Dr. A. Mahesha	Ah
7.	Dr. G.S. Dwarakish	— conference —
8.	Dr. Kiran G. Shirlal	— conference —
9.	Dr. Amba Shetty	
10.	Dr. K. Varija	K. Varija
11.	Dr. B. M. Dodamani	
12.	Dr. Paresh chandra Deka	
13.	Mr. Subrahmanya K	
14.	Mr. Manu	— conference —
15.	Mr. Pruthviraj U	Pruthviraj U
16.	Dr. H. Ramesh	H. Ramesh
17.	Dr. Vadimchezhian K	Vadimchezhian K 8/9/15
18.	Dr. T. NASAR	T. Nasar