

**NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA  
SURATHKAL**

***MINUTES***

***OF***

***TWENTY EIGHTH MEETING OF  
BOARD OF STUDIES***

**Date : 23.03.2015 (Monday)**  
**Time : 03.00 PM**  
**Venue : Board Room,  
N.I.T.K - Surathkal,  
Srinivasnagar, Mangalore  
PIN - 575 025.**

**Minutes of the Twenty Eighth combined Board of Studies (UG, PG, Research) Meeting held on 23<sup>rd</sup> March 2015 at 3.00 PM 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. G. S. Dwarakish	...	Member
7.	Prof. Subba Rao	...	Member
8.	Dr. K. Swaminathan	...	Member
9.	Dr. M. Aruna	...	Member
10.	Dr. Annappa	...	Member
11.	Dr. M. S. Bhat	...	Member
12.	Sri. Jora M Gonda	...	Member
13.	Dr. Krishna Bhat	...	Member
14.	Dr. Vidya Shetty K.	...	Member
15.	Dr. Ravikiran Kadoli	...	Member
16.	Dr. K. V. Gangadharan	...	Member
17.	Dr. S. M. Kulkarni	...	Member
18.	Dr. Jagannath Nayak	...	Member
19.	Mr. Dinesh Naik	...	Member
20.	Dr. Murulidhar N N	...	Member
21.	Prof. H. D. Shashikala	...	Member
22.	Prof. A. H. Sequeira	...	Member
23.	Prof. K. B. Kiran	...	Member
24.	Dr. Bijuna C Mohan	...	Member
25.	Mr. K. Vinay Kumar	...	Member
26.	Mr. K. Ravindranath	...	Member
27.	Dr. V. Ramachandra	...	Member
28.	Mr. Kamlabh Kumar Singh	...	Member
29.	Mr. Gaurav Chawdhury	...	Member



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**Minutes of Twenty Eighth BOS meeting held on 23.03.2015 (Monday)**

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

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

**ITEM No: 28-BOS-1:**

**Introduction of new UG Level Open Elective Courses:**

**a) The Department of Computer Science & Engineering:**

The BOS resolved to recommend two new UG Level Open Elective courses for inclusion in the Curriculum:

- i. CO332 –HETEROGENEOUS PARALLEL COMPUTING (3-0-0)3
- ii. CO482 –HIGH PERFORMANCE COMPUTING (2-1-0)3

**For Senate Approval**

The details are attached as an **ANNEXURE- 1, Page No.11-12.**

**b) The Department of Department of Information Technology:**

The BOS resolved to recommend a new UG Level Elective course:

IT367 – TIME SERIES ANALYSIS (3-0-0) 3

The details are attached as an **ANNEXURE- II, Page No.15-17.**

**ITEM No: 28-BOS-2:**

**Renaming of the UG Level Open Elective Course:**

**a) The Department of Electronics and Communication Engineering:**

The BOS resolved to recommend for renaming of UG Level Open Elective Course EC231 Biomedical Instrumentation (3-0-0) to EC231 Bio medical Instrumentation and Imaging (3-0-0) 3.

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

**For Senate Approval**

**b) The Department of Department of Mechanical Engineering:**

The BOS resolved to recommend for renaming of following UG Level Open Elective Courses:

- i) ME315 – Turbomachines to ME315 – Fundamentals of Turbomachines
- ii) ME414 – Advanced IC Engines to ME414 – Analysis of IC Engines Processes

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

<p><b>ITEM No: 28-BOS-3:</b></p> <p><b>Introduction of Changes for UG Curriculum 2014:</b></p> <ul style="list-style-type: none"> <li>- <b>The Department of Metallurgy and Materials Engineering.</b> The BOS resolved to recommend for the approval of the following: <ul style="list-style-type: none"> <li>i) Addition of new reference book to Courses MT325 Fuels, Furnaces and Refractories and MT361 Ceramics Engineering.</li> <li>ii) Modifications in the syllabus of MT361 and MT325.</li> <li>iii) Changes in suggested plan of study in 2014 curriculum.</li> </ul> </li> </ul> <p>The details are attached as an <b>ANNEXURE-V, Page No.21.</b></p>	<p><b>For Senate approval</b></p>
<p><b>ITEM No: 28-BOS-4:</b></p> <p><b>Provision of Summer Course Registration for the first year Subjects - Proposal Submitted by Student Council President:</b> The BOS resolved to refer it to Senate for decision on Summer Course Registration for the first year Subjects.</p> <p>The details are attached as an <b>ANNEXURE-VI, Page No.26.</b></p>	<p><b>For Senate Approval</b></p>
<p><b>ITEM No: 28-BOS-5:</b></p> <p><b>Transfer of credits for Verified Certificate Massive Open Online Courses (MOOC):</b></p> <ul style="list-style-type: none"> <li>- <b>The Department of Electronics and Communication Engineering.</b> The BOS resolved to <i>defer</i> in principle subject to comprehensive guidelines for the implementation from the Department of Electronics and Communication Engineering.</li> </ul>	<p><i>Reporting to Senate</i></p>
<p><b>ITEM No: 28-BOS-6:</b></p> <p><b>Proposal for undertaking Major Project by Undergraduate students in an Industry or any research Organization over duration of one semester:</b></p> <ul style="list-style-type: none"> <li>- <b>The Department of Electrical and Electronics Engineering.</b> The BOS resolved to recommend to Senate to constitute a sub-committee and authorize the Chairman, Senate for its approval.</li> </ul> <p>The details are attached as an <b>ANNEXURE-VII, Page No.27.</b></p>	<p><b>For Senate Approval</b></p>



**ITEM No: 28-BOS-7:**

**Introduction of New PG Level Elective Courses:**

**a) The Department of Electronics and Communication Engineering:**

The BOS resolved to recommend to Senate for inclusion of the following new Elective Courses in the curriculum:

- |          |  |           |
|----------|--|-----------|
| 1) CE837 | Time Frequency Analysis                | (3-0-0) 3 |
| 2) CE838 | Topics in Medical Imaging              | (3-0-0) 3 |
| 3) VL834 | Heterogeneous and Parallel Programming | (2-0-2) 3 |

The details are attached as an **ANNEXURE-III(A), Page No.19.**

**b) The Department of Metallurgy and Materials Engineering:**

The BOS resolved to recommend the inclusion of following New PG Level Elective Courses for M.Tech (PM) and M.Tech (ME)

- |          |   |           |
|----------|---|-----------|
| 1) PM806 | Non Ferrous Extractive Metallurgy         | (3-0-0) 3 |
| 2) NT808 | Advanced Characterization Techniques      | (3-0-0) 3 |
| 3) ML808 | Non Equilibrium Materials and Processing  | (3-0-0) 3 |
| 4) ML809 | Advanced Polymeric Materials & Technology | (3-0-0) 3 |

The details are attached as an **ANNEXURE-V, Page No.21-25.**

**c) The Department of Civil Engineering.**

The BOS resolved to recommend the inclusion of following Open Elective Courses in the curriculum:

- |  |          |
|--|----------|
| 1) Public Transportation                             | (3-0-0)3 |
| 2) Characterization and Modeling of Asphalt Mixtures | (3-0-0)3 |

The details are attached as an **ANNEXURE-VIII, Page No.28-31.**

**d) The Department of Computer Science & Engineering:**

The BOS resolved to recommend the inclusion of PG Level Open Elective Course in the curriculum:

- |        |              |          |
|--------|--------------|----------|
| CS 867 | Data Science | (3-0-0)3 |
|--------|--------------|----------|

The details are attached as an **ANNEXURE-I(B) , Page No.13.**

**e) The Department of Mechanical Engineering:**

The BOS resolved to recommend the introduction of New PG Level Elective Courses for the following M.Tech Programmes

- |                                 |          |
|---------------------------------|----------|
| 1) M.Tech (Manufacturing Engg.) |          |
| ME 835 Additive Manufacturing   | (3-0-0)3 |

The details are attached as an **ANNEXURE-IX, Page No.30.**

- |  |          |
|--|----------|
| 2) M.Tech (Thermal Engg.)                            |          |
| i. ME 830 Convective Heat and Mass Transfer          | (3-0-0)3 |
| ii. ME 831 Design and Optimization of Thermal System | (3-0-0)3 |

The details are attached as an **ANNEXURE-IX(A), Page No.31-33.**

**For Senate approval**



**ITEM No: 28-BOS-8:**

**Introduction of Changes in the PG Curriculum:**

- a) The Department of Metallurgy and Materials Engineering:  
The BOS resolved to *defer* the changes in PG Curriculum of Process Metallurgy and Nanotechnology.
- b) The Department of Mechanical Engineering  
The BOS resolved to *defer* the changes in PG Curriculum of Manufacturing Engineering, Thermal Engineering and Mechatronics Engineering.
- c) The Department of Information Technology:  
The BOS resolved to recommend to Senate for modifications in the existing Course IT702 Advanced Web Technologies (3-0-2) 4 for PG Curriculum 2014.

*Reporting to Senate*

**For Senate Approval**

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

**ITEM No: 28-BOS-9:**

**Relaxation in eligibility criteria in qualifying examination for admissions to PG and PhD programmes to the candidates belonging to PWD categories:**

The BOS resolved to recommend to Senate that the prescribed minimum in the qualifying Degree examination for the candidates belonging to PWD (Persons With Disabilities) during the admissions to PG and Ph.D Programmes shall be CGPA of 6.0 or 55% in the aggregate.

**For Senate Approval**

The details are attached as an ANNEXURE-XI, Page No.36-37.

**ITEM No: 28-BOS-10:**

**Eligibility to Ph.D programme – Change in Regulations:**

The BOS resolved to recommend to Senate the change in eligibility requirements for admission to the Ph.D program.

The details are mentioned below:

Existing	Proposed
Admission to a Ph.D. Programme shall be open to candidates who passed the <b>undergraduate and postgraduate degree</b> in relevant field 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 <b>SC/ST</b> candidates.	Admission to a Ph.D. Programme shall be open to candidates who passed the <b>prescribed qualifying Degree examination</b> 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 <b>SC/ST/PWD</b> candidates.

**For Senate Approval**



**ITEM No: 28-BOS-11:**

**Introduction of 900 level courses for Ph.D:**

**a) The Department of Computer Science & Engineering:**

The BOS resolved to approve the three 900 level courses for inclusion in the Curriculum:

- |    |       |                                       |   |
|----|-------|---------------------------------------|---|
| 1) | CS916 | Network-on-Chips                      | 4 |
| 2) | CS917 | Architecture Simulation               | 4 |
| 3) | CS918 | Power Efficient Computer Architecture | 4 |

The details are attached as an ANNEXURE-I(A), Page No.12-13.

**b) The Department of Information Technology:**

The BOS resolved to approve two 900 Level Courses for the Departmental Ph.D Program:

- |    |       |                                 |   |
|----|-------|---------------------------------|---|
| 1) | IT928 | Topics in Internet of Things    | 4 |
| 2) | IT929 | Topics in Social Media Analysis | 4 |

The details are attached as an ANNEXURE-XII , Page No.38-40.

**c) The Department of Mechanical Engineering:**

The BOS resolved to approve a new 900 Level Course for the Departmental Ph.D Program:

- |       |                                 |         |   |
|-------|---------------------------------|---------|---|
| ME910 | Analysis of Transport Phenomena | (4-0-0) | 4 |
|-------|---------------------------------|---------|---|

The details are attached as an ANNEXURE-XIII, Page No.41.

**For Senate Approval**

**ITEM No: 28-BOS-12:**

**Change in Regulations - Proposal of Department of Computer Science and Engineering:**

**a) Increase the Ceiling of Number of Research Scholars registered with a Guide –**

The BOS resolved to recommend to Senate to increase the ceiling on number of students registered under the guide if the guide supports the students through project funding.

The details are attached as an ANNEXURE-I(C), Page No.14.

**b) Introduction of Integrated Ph.D programme –**

The BOS resolved to *defer* the recommendation of the Department of Computer Science and Engineering.

**For Senate Approval**

*Reporting to Senate*

**ITEM No: 28-BOS-13:**

**Proposal of Department of Electronics & Communication Engineering - Change in Regulations:**

The BOS resolved to recommend the modification of NITK Regulations General (G.5.13) as follows:

<i>Existing</i>	<i>Proposed</i>
There is no equivalence between the CGPA scale and percentage. However, $CGPA \geq 6.5$ can be considered as equivalent to first class and $5.5 \leq CGPA < 6.5$ can be considered as equivalent to second class. Notionally, $(CGPA - 0.5)$ may be multiplied by a factor of 10 to obtain the numerical percentage.	There is no equivalence between the CGPA scale and percentage. However, $CGPA \geq 6.5$ can be considered as equivalent to first class and $5.5 \leq CGPA < 6.5$ can be considered as equivalent to second class. Notionally, CGPA may be multiplied by a factor of 10 to obtain the numerical percentage.

The BOS further resolved to recommend the removal of statement given below from the Transcript / Grade Card:

*“Notionally, (CGPA – 0.5) may be multiplied by a factor of 10 to obtain the numerical percentage”.*

The details are attached as an ANNEXURE-XIV, Page No.42-44.

**For Senate Approval**

**ITEM No: 28-BOS-14:**

**Proposal from Department of Mechanical Engg:**

**a) Increase in Intake Seat Matrix:**

The BOS resolved to *defer* the recommendation of the Department of Mechanical Engineering.

**b) Consideration of M.Tech Project Grade in CGPA computation:**

The BOS resolved to *defer* the recommendation of the Department of Mechanical Engineering.

*Reporting to Senate*

**ITEM No: 28-BOS-15:**

**Equivalence of Departmental Level Examination to NET/GATE examination for Basic Science PhD students for the award of MHRD Fellowship:**

The BOS resolved to recommend that Departmental Level Examination can be considered equivalent to NET/GATE examination for the students of all the Departments of the Institute for the award of MHRD Fellowship to Ph.D students.

The details are attached as an ANNEXURE-XV, Page No.45-46.

**For Senate Approval**

**ITEM No: 28-BOS-16:**

**Guidelines on Late Registration from the academic year 2015-16:**

The BOS resolved to recommend to Senate for the approval of Guidelines on Late Registration from the academic year 2015-16.

The details are attached as an ANNEXURE-XVI, Page No.47.

**For Senate Approval**



**ITEM No: 28-BOS-17:**

**Residential and Credit requirements for scholar working at recognized research centers outside NITK – Proposal from the Department of Electrical and Electronics Engineering:**

The BOS resolved to recommend to Senate to constitute a sub-committee and authorize the Chairman, Senate for its approval.

The details are attached as an ANNEXURE-XVII, Page No.48.

**For Senate Approval**

**ITEM No: 28-BOS-18:**

**Inclusion of External Additional Guides:**

**a) The Department of Physics:**

The BOS resolved to approve that Prof. Navakanta Bhat, Professor at Department of ECE, CeNSE be considered for inclusion as Additional Research Guide for Mr. Sangeeth (Reg. No. 135030PH13P03) in the Department of Physics.

**b) The Department of Mechanical Engg:**

The BOS resolved to approve Dr. Vidyadhar Y. Mudkavi, Scientist G (Chief Scientist), National Aerospace Laboratories (NAL), Bangalore be considered for inclusion as Additional Research Guide for Mr. Kanaka Muthu (Reg. no. 145062ME14P03) in the Department of Mechanical Engineering.

*Reporting to Senate*

**ITEM No: 28-BOS-19:**

**CGPA to Percentage Conversion:**

- Proposal submitted by Student Representative of this Institute.
- The above item has been discussed and resolved in 28-BOS-13.

*For Senate Approval*

**ITEM No: 28-BOS-21:**

**Request for Change of Grade of a student in the Course EE213, Electrical Machines -1 - Submitted by Course Instructor Dr. P. Parthiban:**

The BOS resolved to withdraw the matter as it is related to administrative issue.

*Reporting to Senate*

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 COMPUTER SCIENCE & ENGINEERING  
NITK - Surathkal

Date: 13-03-2015

**Proceedings of the combined DFC, DUGC, DPGC and DRPC meeting held on  
13<sup>th</sup> March 2015 at 03:00PM in the department Meeting room**

The following points were discussed in the meeting:

1. Dr. Basavaraj Talawar proposed two new UG open elective courses and three 900 level courses to be approved by DUGC and DRPC, respectively for inclusion in the Curriculum:
  - a. Heterogeneous Parallel Computing (UG),
  - b. High Performance Computing (UG) and
  - c. Network-on-Chips (900 level courses),
  - d. Architecture Simulation (900 level courses),
  - e. Power Efficient Computer Architecture (900 level courses).

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.

**CO332    HETEROGENEOUS PARALLEL COMPUTING    (3-0-0) 3**

Heterogeneous Computing, CUDA C, Kernel-Based Parallel Programming. Memory Model for Locality, Tiling for Conserving Memory Bandwidth, Handling Boundary Conditions, and Performance Considerations. Parallel Convolution Pattern. Parallel Scan Pattern. Parallel Histogram Pattern and Atomic Operations. Data Transfer and Task Parallelism. OpenCL, C++AMP, OpenACC. Other Programming Models – Thrust, Bolt, and CUDA FORTRAN.

*David Kirk and Wen-mei Hwu, Programming Massively Parallel Processors: A Hands-on Approach (Applications of GPU Computing Series), 2nd Edition, Morgan Kaufmann (Elsevier), 2013.*

*Benedict Gaster, David R. Kaeli, Lee Howes, Perhaad Mistry, Heterogeneous Computing with OpenCL, Morgan Kaufmann Publishers, 2011.*

*NVIDIA, NVIDIA Programming Guides.*

*AMD, AMD Accelerated Parallel Processing OpenCL Programming Guide, 2013.*

**CO482    HIGH PERFORMANCE COMPUTING    (2-1-0) 3**

Fundamentals of Superscalar processors, Vector processors and Graphical Processing Unit architectures. Interconnection networks in multicore processors. Computer architecture of warehouse computers. Architectural optimizations in Cache Memory. Uniprocessor, Multiprocessor and Full system simulators. Recent, relevant architectural advances from literature.

*John L Hennessy and David A Patterson, Computer Architecture – A quantitative approach, 5th edition, Morgan Kaufmann.*

*John P. Shen and Mikko H. Lipasti. Modern Processor Design - Fundamentals of Superscalar Processors. Tata McGraw Hill.*

*William J Dally and Brian Towles. Principles and Practices of Interconnection Networks. Morgan Kaufmann. 2004.*



Mark Hill/Margaret Martonosi (eds.). *Synthesis Lectures on Computer Architecture*, Morgan and Claypool, 2006 - 2014.

Jean-Loup Baer. *Microprocessor Architecture: From Simple Pipelines to Chip Multiprocessors*. Cambridge University Press, 2009.

Bruce Jacob, Spencer Ng, David Wang. *Memory Systems: Cache, DRAM*, Elsevier, 2007.

Publications from reputed conferences such as ISCA, HPCA, MICRO.

Annexure I (A)

#### CS916 **Network-on-Chips** 4

Network-on-Chip specifications. Traffic patterns. Butterfly Networks, Torus, Mesh vs. Torus. Express cubes. Non-Blocking Networks - Non-blocking vs. Non-interfering, Crossbars, Clos, Benes, Sorting networks. Concentrators and distributors. Slicing multistage networks. Routing Taxonomy, Deterministic routing. Oblivious routing. Randomized routing, Adaptive routing. Flow control - Resources and allocation units, bufferless flow control. Buffered flow control Packet-buffer flow control, Flit-buffer flow control, buffer management and backpressure, flit-reservation flow control. Router architecture, router datapath. Arbitration. Network interfaces. Error control Buses. Performance analysis. Simulation of interconnection networks. Case studies and current NoC proposals.

William Dally and Brian Towles, *Principles and Practices of Interconnection Networks*. Morgan Kaufmann, 2004.

Recent publications from NOCS, ISCA, MICRO and other leading conferences.

Li-Shiuan Peh and Natalie Enright Erger. *On Chip Networks*. *Synthesis Lectures on Computer Architecture*. Morgan and Claypool Publishers.

Christopher J. Nitta, Matthew K. Farrens, Venkatesh Akella. *On-Chip Photonic Interconnects: A Computer Architect's Perspective*. *Synthesis Lectures on Computer Architecture*. Morgan and Claypool Publishers.

#### CS917 **Architecture Simulation** 4

Performance evaluation. Performance Metrics, Workloads. System throughput. Average performance: Harmonic vs. arithmetic average, Geometric average. Workload Design. Analytical Performance Modeling. Mechanistic modeling. Hybrid mechanistic-empirical modeling. Simulation Fundamentals. Functional simulation, Operating system effects, Full-system simulation, Trace-driven simulation, Execution-driven simulation. Modular simulation infrastructure. Sampled Simulation: Statistical sampling, Targeted Sampling. Initializing architecture state, Initializing microarchitecture state. Sampled multiprocessor and multi-threaded processor simulation, Statistical Simulation. Parallel Simulation and Hardware Acceleration: Parallel sampled simulation, Parallel simulation, FPGA-accelerated simulation.

Lieven Eeckhout. *Computer Architecture Performance Evaluation Methods*. *Synthesis Lectures on Computer Architecture*. Morgan and Claypool Publishers. 2010.

Recent publications from NOCS, ISCA, MICRO and other leading conferences.

#### CS918 **Power Efficient Computer Architecture** 4

Power problem. CMOS Power Consumption: Dynamic Power, Leakage, Other Forms of CMOS Power Dissipation. Modeling, Simulation, and Measurement: Dynamic-power Models, Leakage Models, Thermal models, Power Simulation. Dynamic Voltage and Frequency Scaling: System-Level DVFS, Program-Level DVFS, Offline and online Compiler Analysis, Program-Level DVFS for Multiple-Clock Domains, Hardware-Level DVFS. Optimizing Capacitance and Switching Activity to Reduce Dynamic Power, Idle-Capacity Switching Activity: Instruction Queue, Caches. Parallel Switching-Activity in Set-



Associative Caches. Cacheable Switching Activity, Value-dependent Switching Activity: Bus encodings, Dynamic Work Steering. Managing Static (Leakage) Power: Subthreshold Leakage, Gate Leakage, Architectural Techniques Using the Stacking Effect. Architectural Techniques Using the Drowsy Effect, Architectural Techniques Based on VT.

Stefanos Kaxiras and Margaret Martonosi. *Computer Architecture Techniques For Power-Efficiency. Synthesis Lectures on Computer Architecture. Morgan and Claypool Publishers. 2008.*

Recent publications from ISCA, MICRO, HPCA, ASPLOS, and other leading conferences.

Annexure - I (B)

2. Dr. Annappa proposed a PG open elective course to be approved by DPGC for inclusion in the Curriculum:

a. Data Science (PG).

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.

CS 867

Data Science

(3-0-0)3

Data collection and integration, data presentation, experimentation, longitudinal analysis, data products. Introduction to statistical inference, linear and logistic regression, variance and smoothing, analysis of variance, predictive modeling. Data types, statistical graphs, visualization of multi-dimensional data, maps and text, distance, clustering and dimensionality reduction. Managing Big Data, Map-reduce, the map tasks, grouping by key, the reduce tasks, combiners, extensions to map-reduce, workflow systems, recursive extensions to map-reduce. Statistical inference, statistical modeling, design of experiments, statistical graphics. Classification, decision trees, naïve bayes classifier, support vector machine, clustering, hierarchical clustering, k-means clustering, distribution-based clustering, ensemble learning and performance evaluation. Building the data pipelines, Map reduce, graph visualization, and storytelling.

Michael Manoochehri, *Data Just Right: Introduction to Large-Scale Data & Analytics, Addison-Wesley Data & Analytics Series, 2013*

Foster Provost, Tom Fawcett, *Data Science for Business: What you need to know about data mining and data-analytic thinking, O'Reilly, 2013*

Eric Siegel, *Predictive Analytics,, 2013, Wiley, 2013*

Drew Conway, John Myles White, *Machine Learning for Hackers, O'Reilly, 2012*


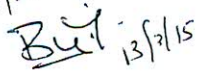





Ivan Idris, *Python Data Analysis, Packt Publishing, 2014*

Wes McKinney, *Python for Data Analysis, O'Reilly, 2012*



3. Dr. Shashidhar G. Koolagudi gave a proposal to increase the ceiling on number of students (for enabling students' enrollment through research projects) being guided by faculty members and the DRPC approved the same to forward the recommendation to BOS.
- Present Scenario: If A principal Investigator (PI) has already 5 PhD students (Institutional norms) working under him/her, no new student can register under him for PhD.
  - Expected Scenario: As, it is a normal practice in IITs and top foreign universities, there should not be any restriction on the number of students joining PhD under any eligible faculty member, if a faculty member funds the student through the project money. However institute may put some upper limit on the number of PhD students joining under a faculty member through MHRD scholarship.
4. Request by Dr. Alwyn Roshan Pais for recognition as Research Guide for Ph.D. Program was discussed in the meeting and the DRPC approved the same to forward the recommendation to BOS.
5. It is decided in the meeting that the recommendation be sent to BOS regarding accommodating exceptionally good B.Tech students for integrated Ph.D. course. Similarly, M.Tech(Research) students may continue their research and enroll for Ph.D. Necessary institutional guidelines may be formed and followed.

#### Members Present:

1. Annappa  13/13/15
2. Basavaraj Talawar  13/13/15
3. B.R. Chandavarkar 
4. Jeny Rajan 
5. P. Santhi Thilagam 
6. Saumya Hegde 
7. Shashidhar G. Koolagudi 

## IT 367 Time Series Analysis

### Overview

This course introduces the theory and practice of time series analysis, with an emphasis on practical skills. Time series data occur when a single experimental unit or process is observed repeatedly over time. Statistical methods that assume independence are inappropriate for time series data. This course will provide you with the basic theory and tools for the statistical analysis and interpretation of time series. Broadly the methods may be categorized into time-domain and frequency-domain methods. Time-domain methods develop explicit models for the evolution of a process over time. Frequency-domain methods equivalently model the correlation structure of the time series. Other topics include methods for model-based estimation, model selection, diagnostics, forecasting, and computing as they relate to time series analysis.

### Text Books

R. H. Shumway and D. S. Stoffer (2006), Time Series Analysis and Its Applications (With R Examples, Second Edition). Springer, New York.

Brockwell, Peter J & Davis, Richard A: Introduction to Time Series and Forecasting. Springer Series in Statistics. Second Edition.

Chatfield, Chris: Analysis of Time Series: an Introduction. Chapman & Hall. Sixth Edition.

Lutkepohl, Helmut: Introduction to Multiple Time Series Analysis. Springer-Verlag.

Hamilton James D: Time Series Analysis. Princeton University Press.

### Topics Covered

• Fundamental Concepts • AR, MA, ARIMA, and SARIMA Models • Unit Root Testing • Forecasting • ARCH and GARCH Models • Model Identification • Spectral Domain • Parameter Estimation • State Space Models and the Kalman Filter

### Detailed Syllabus

Week 1. Introduction

Week 2. Basic Concepts: Stochastic Processes Stochastic Difference Equations Lag Operators

Week 3. Stationary Time Series Process (Time Domain) Univariate Analysis: Autoregressive (AR) Process Moving Average (MA) Process Autoregressive Moving Average (ARMA) Process

Week4 - Causality: Granger (1969) Sims (1972) Haugh-Pierce (1977) Hsiao (1979)



Week4 - Multivariate Analysis: Autoregressive Distributed Lag (ARDL) Model , Vector Error Correction (VEC) Model , Vector Autoregressive (VAR) Model

Week 5. Spectral Analysis (Frequency Domain). Asymptotic Distribution Theory

Week 6 &7. Non-Stationary Time Series Process Trend-Stationary Series Difference-Stationary Series Unit Root Process Long-Memory Process

Week8. Unit Root Tests: Dickey-Fuller Test Phillips-Peron Test Elliott-Rothenberg-Stock Test Schmidt-Phillips Test Kwiatkowski-Phillips-Schmidt-Shin (KPSS) Test Zivot-Andrews Test

Week 9 . Cointegration: Basic Concepts Spurious Regression Single Equation Method: Engle-Granger's Two Step Procedure Phillips-Ouliaris-Hansen's Procedure Toda-Yamamoto (1995)

Week 10 Multiple Equation Method: Johansen's VAR Representation Pesaran-Shin-Smith's ARDL Representation

Week 11 Volatility: Models of Conditional Variance - ARCH Model GARCH Model Maximum Likelihood Estimation of GARCH Models

Week 12 ARCH-M Model IGARCH Model TARARCH Model EGARCH Model

Week 13 & 14. Selected Topics in Time Series Analysis: State Space and the Kalman Filter Generalized Method of Moments (GMM) Bayesian Analysis Change in Regimes

Proceedings of DUGC Meeting held on 10/03/2015 at 2.00 PM in HOD Chamber.

Members Present

Signature

1. Prof. Ananthanarayana V. S



2. Prof. G. Ram Mohana Reddy



3. Mr. Dinesh Naik



4. Mrs. Geetha V



5. Mr. Biju R Mohan



6. Mrs. Sowmya Kamath

7. Dr. Jaidhar C D

**Agenda Items:** Additional Elective course for B.Tech (IT) IT367: Time Series Analysis - (3-0-0) 3 Credits.

**Business Transacted:**

It is resolved to recommended to add IT367: Time Series Analysis for B.Tech (IT) Program as an elective course.



(b) Renaming of the BTech(E&C) open elective course

The department requests the renaming of **EC231 Biomedical Instrumentation (3-0-0)** as **EC231 Bio medical Instrumentation and Imaging (3-0-0)** 3. Syllabus and additional references are as given below.

**EC231 Bio medical Instrumentation and Imaging (3-0-0) 3**

Action potential, ECG, EEG and EMG signals, their origin and applications in medical diagnosis. Electrodes for recording ECG, EEG and EMG signals, Instrumentation amplifiers, signal conditioners, A/D and D/A converter interfaces to the PC, Computerized automatic analysis. Biotelemetry. Transducers for physiological parameter reading, their characteristics. Diagnostic methods, ultrasound, CT and MRI. Lasers and applications of lasers in medical diagnostics and therapy. Prosthesis and prosthetic devices. Patient safety, electrical shock hazards incorporation of safety aspects in Biomedical instrumentation.

*L. Cromwell, F. Weibell and E. A. Pfiffer, Biomedical Instruments and Measurements, PH, 1980.*

*R.S.Khandpur, Handbook of Biomedical Engineering, Tata McGraw Hill Publishing, 1992.*

*Jerry L. Prince, Jonathan Links, Medical Imaging Signals and Systems, 2<sup>nd</sup> Ed., Pearson Publications, 2014.*

*Andrew G. Webb, Introduction to Biomedical Imaging, Wiley-IEEE Press, 2003*

*John G. Webster, Medical Instrumentation Application and Design, 4th Edition, 2010*



प्राध्यापक एवं विभागाध्यक्ष / PROF & HEAD  
डी एवं सी विभाग / E & C Department  
एन आई टी के, सुरतकल / NITK, Surathkal  
मंगलूर / MANGALORE - 575 025

Annexure - III  
CA)

Dept. of E&C Engg., NITK Surathkal  
Details of Agenda item 8 of DUGC/DPGC/DRPC meeting held on 3.3.2015 at 3.00pm

(a) New Elective Courses for M.Tech (CE) and MTech (VL) in the Dept. of E&C Engg.

**CE 837** **Time Frequency Analysis** **(3-0-0) 3**

The need for Time-frequency analysis: introduction, simple analytic Examples, why spectra changes. Time and Frequency Description of Signals: duration and mean time in terms of the spectrum, bandwidth equations and AM and FM contributions to the bandwidth. Instantaneous Frequency and the Complex Signal: reasons for the complex signal, the analytic signal, physical interpretation of the analytic signal and density of instantaneous frequency. Densities and Characteristic functions: one and two dimensional density functions and their characteristic functions, relation between local and global averages. Fundamentals of Time-Frequency Distribution (TFD): Uncertainty principle and properties of TFD. Different Types of TFD: Short Time Fourier Transform, Wigner distribution, generalized TFD and properties of these distributions. Generation of TFD Using Kernel Methods. Kernel design for reduced interference in TFD. Positive Distributions Satisfying the Marginals. Applications of TFD in the fields of Radar, Speech, Sonar Signal Processing.

Leon Cohen, *Time-Frequency Analysis*, Prentice-Hall PTR, Upper Saddle River, 1995.  
S. Mallat, *A wavelet tour of signal processing - The sparse way*, Elsevier, Third Edition, 2009  
D. Gabor, "Theory of communication", Proceedings of IEE, pp. 429-457, 1946

**CE 838** **Topics in Medical Imaging** **(3-0-0) 3**

Introduction to Image processing, X-ray tomography, emission computer tomography, magnetic resonance imaging systems and Optical Computed Tomography. X-ray tomography: X-rays, Interaction with matter, X-ray detectors, Projection and Fourier slice theorem, Translate and rotate, translate-rotate, rotate on a circular trajectory for 2-D imaging and helical or spiral scan trajectory for 3-D imaging. Fourier inversion algorithms, filtered back projection algorithms – reconstruction with non-diffracting sources, parallel projections and fan projections for 2-D and cone beam projections on circular and spiral trajectory for 3-D reconstruction. Computer implementation. MRI Imaging: Introduction, Physics of the transmitted signal, Interaction with tissue, Signal detection and detector, Imaging, Image quality Equipment, Clinical use. Ultrasound Imaging: Ultrasound imaging: Physics of acoustic waves, Generation and detection of ultrasound, Gray scale imaging, Doppler imaging, Image quality, Equipment, Clinical use. Optical tomography: Introduction to Optical tomography.

Kak A C, Slaney M, *Principles of Computerized Tomography*, IEEE Press, New York, 1987  
Paul Suetens, *Fundamentals of Medical Imaging*, Cambridge University Press, 2<sup>nd</sup> Edition, 2009.

**VL834** **Heterogeneous and Parallel Programming** **(2-0-2) 3**

Heterogeneous platform and GPU architecture. Introduction to OpenCL. OpenCL device architecture. Concurrency and execution model. Programming examples like vector addition, convolution and matrix multiplication. Application case studies.

Benedict R. Gaster, Lee Howes, David R. Kaeli, Perhaad Mistry, Dana Schaa, "Heterogeneous Computing with OpenCL" - Revised OpenCL 1.2 Edition, Morgan Kaufmann, 2013.  
Aaftab Munshi, Benedict R. Gaster, Timothy G. Mattson, James Fung, Dan Ginsburg, "OpenCL Programming Guide", Addison-Wesley, 2012.  
David B. Kirk and Wen-mei W. Hwu, "Programming Massively Parallel Processors - A Hands-on Approach", Second Edition, Morgan Kaufmann, 2013.  
AMD Accelerated Parallel Processing OpenCL User Guide, AMD, 2014.

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प्राध्यापक एवं विभागाध्यक्ष / PROF & HEAD  
डी एवं सी विभाग, E & C Department  
एन् आई टी के. सुराथकल/NITK, Surathkal  
मंगलूर / MANGALORE - 575 025

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**Annexure-I****Proposed changes in the curriculum for B.Tech. Program in Mechanical Engg.**

1. ME315 Turbomachines should be renamed as **ME315 Fundamentals of Turbomachines;**

**Justification:** Same course name is existing in PG Thermal Engineering as TH811 Turbomachines. The contents of the course are different. While the UG students will be exposed to the fundamental aspects of Turbomachines, the PG students will be made to study the greater aspects of design and performance analysis of Turbomachines.

2. Rename of Course - **ME414 Advanced IC Engines** should be renamed as **ME414 Analysis of IC Engines processes.**

3. **AM201 Mechanics of solids** is being offered separately to M1 and M2 in the odd and even semesters during the second year B.Tech of Mechanical Engineering by Applied Mechanics and Hydraulics department. The mechanical Engineering faculty handling ME251 analysis and design of machine components feels that one section lacks prerequisite for ME215 subject being offered to mechanical engineering students during fourth semester. The department of Mechanical engineering requests Applied Mechanics and Hydraulics department to address this issue and comply.

## Agenda Items for 28<sup>th</sup> BOS, March 2015

### Department of Metallurgical and Materials Engineering

#### I. B. Tech (Metallurgical and Materials Engineering):

- } Approved
1. Proposed to add one new reference book by A O Surendranathan on "An Introduction to Ceramics and Refractories" , CRC Press, 2015 to Courses MT325 Fuels, Furnaces and Refractories and MT361, Ceramics Engineering
  2. Suggested that the following content in the syllabus of MT 361 " Classification of refractories, Production, Characteristics, Properties, Testing and Uses of Silica, Alumina, Alumino-silicate, Chrome- magnesite, Carbon and Insulating Refractories" be deleted and be added to the syllabus of MT 325.
  3. Corrections in the suggested plan of study of 2014 curriculum: code MT310 to be replaced by MT320 and MT 311 by MT 321

#### II. M. Tech (Process Metallurgy):

1. Proposed to replace the existing course MA 702 Design and Analysis of Experiments by the course MA 7xx Numerical Methods.
2. Proposed to change the category of course PM 703 Experimental Techniques from Programme core category to Elective category with the code number PM 805
3. Proposed to add a new course ML 700 Advanced Physical Metallurgy under Programme core category.
4. To change the credits of Course PM 704 Process Metallurgy Lab from (0-0-3)2 to (0-0-2)1
5. To add a new Elective course PM 806 Non-ferrous Extractive Metallurgy (Annexure-I).

#### III. M. Tech (Materials Engineering):

1. Proposed to add a new Elective Course NT 808 Advanced Characterization Techniques .
2. Proposed to add a new Elective Course ML 808 Non-Equilibrium Materials and Processing (Annexure-II).
3. Proposed to add a new Elective Course ML809 Advanced Polymeric Materials and Technology (Annexure-III).



## IV. M. Tech (Nanotechnology):

## 1. Suggested following corrections in the Course Codes

Existing	Suggested
NT 750 Nano Photonics	NT 800 Nano Photonics
NT 751 Nano Electronics	NT 801 Nano Electronics
NT 752 Surface Phenomena	NT 802 Surface Phenomena
NT 753 Carbon Nanostructures and Applications	NT 803 Carbon Nanostructures and Applications
NT 754 Nano Biotechnology	NT 804 Nano Biotechnology
NT 755 Polymer Nanotechnology	NT 805 Polymer Nanotechnology
NT 756 Nano Composites	NT 806 Nano Composites
NT 757 Chemistry of Nano Materials	NT 807 Chemistry of Nano Materials
NT 758 Advanced Characterization techniques	NT 808 Advanced Characterization techniques
NT 759 Microstructure and Mechanical Properties of Nano-structures	NT809 Microstructure and Mechanical Properties of Nano-structures
NT 760 Nano materials for Energy Conservation	NT 810 Nano materials for Energy Conservation
NT 761 Integrated Microelectronic Devices	NT 811 Integrated Microelectronic Devices
NT 762 MEMS/NEMS Devices and Systems	NT 812 MEMS/NEMS Devices and Systems
NT 763 Nanotribology	NT 813 Nanotribology
NT 764 Computational Materials Science	NT 814 Computational Materials Science

## Annexure – I

Course title: <b>Non Ferrous Extractive Metallurgy</b>	Code: : <b>PM 806</b>
Credits: <b>3 (3-0-0)</b>	Pre-requisite: None
<p>Basics of Extractive metallurgy</p> <p>Extraction of metals from oxide sources,</p> <p>Basic approaches and special features of specific extraction processes,</p> <p>Extraction of Aluminum (Bayer process, Hall-Heroult process, modern refining processes of Alumina Production</p> <p>Extraction of metals from sulphides ore sources (Pyro-metallurgy and hydro-metallurgy)</p> <p>Production of copper, zinc (conventional and advanced routes),</p> <p>Extraction of gold Extraction of titanium.</p>	
<p><b>References</b></p> <ol style="list-style-type: none"><li>1. Extraction of nonferrous metals, H.S. Ray, R. Sridhar and K.P. Abraham Affiliated East West Press Pvt Ltd., New Delhi (2007).</li><li>2. F. Habashi, Principles of Extractive Metallurgy, Vol.1-4, Gordon and Breach, New York</li><li>3. T. Rosenqvist, Principles of Extractive Metallurgy, McGraw Hill, New York (1983)</li><li>4. R.D. Pehlke, Unit processed in extractive metallurgy, Elsevier, Amsterdam (1982)</li><li>5. H.S. Ray and A. Ghosh, Principles of extractive metallurgy, Wiley Eastern Ltd., New Delhi (1991)</li><li>6. E-books and open sources</li></ol>	



## Annexure - II

Course title: <b>Non-Equilibrium Materials and Processing</b>	Code: ML 808
Credits: <b>3 (3-0-0)</b>	Pre-requisite: None
<p>Thermodynamics of equilibrium and non-equilibrium processes.</p> <p>Effect of fine structures on equilibrium,</p> <p>Suppressing of equilibrium structures, Melt quenching, Laser based processing, Ion based processes, High energy milling, Sputtering systems, ECAPs, Roll bonding, Friction based processes like friction welding, friction stir processing, friction surfacing.</p> <p>Use of shock energy for non-equilibrium processing.</p> <p>Metallic glasses, Quasicrystals, High entropy alloys.</p> <p>Atomic crystals and their reactivity.</p> <p>Non-equilibrium phases in Fe based, Cu based, Al based alloys.</p> <p>Properties of Non-equilibrium synthesized materials.</p>	
<p>References:</p> <ul style="list-style-type: none"><li>• Friction stir processing and Applications: Rajiv Mishra, Elsevier publications, 2005.</li><li>• Lecture notes</li><li>• Tribology in manufacturing technology, D J Paulo (ed)Springer, 2012</li><li>• Laser surface processing and model studies, B S Yilbas, S Z Shuja, Springer, 2013.</li><li>• An introduction to surface alloying of metals, S Hosamani et al. 2011</li></ul>	

### Annexure - III

Course title: <b>Advanced Polymeric Materials and Technology</b>	Code: ML 809
Credits: <b>3 (3-0-0)</b>	Pre-requisite: None
<b>Specialty Polymers</b> <ul style="list-style-type: none"><li>• High temperature and fire-resistant polymers</li><li>• Liquid crystalline polymers</li><li>• Dendrimers</li><li>• Drag reduction</li><li>• Polymer Cement</li><li>• Ion-Exchange Resins and Anchored Catalysts</li><li>• Photoactive Materials</li><li>• Organometallic polymers</li><li>• Adhesives</li></ul>	
<b>Biopolymers</b> <ul style="list-style-type: none"><li>• Polymeric bio-implants</li><li>• Contact lenses</li><li>• Surgical sutures</li><li>• Artificial organs</li><li>• Drug Delivery</li><li>• Tissue Engineering</li></ul>	
<b>Polymers for Advanced Technologies</b> <ul style="list-style-type: none"><li>• Conducting polymers</li><li>• Membrane Science and Technology</li><li>• Applications in Electronics and Energy</li><li>• Photonic Polymers</li><li>• Sensor Applications</li></ul>	
<b>Smart polymers</b> <ul style="list-style-type: none"><li>• Self healing polymers</li><li>• Polymer actuators</li><li>• Shape memory polymers</li><li>• Magnetorheological polymers</li><li>• Piezoelectric polymers</li><li>• Electroactive polymers</li></ul>	
<b>References</b> <ul style="list-style-type: none"><li>• M. Chanda, S. K. Roy, <i>Industrial Polymers, Specialty Polymers, and their Applications</i>, 1<sup>st</sup> Edn, CRC Press, USA, 2009.</li><li>• J. R. Fried, <i>Polymer Science and Technology</i>, 3<sup>rd</sup> Edn, Prentice Hall, USA, 2014.</li><li>• B.D.Ratner et al., <i>Biomaterials Science: an Introduction to Materials in Medicine</i>, 3<sup>rd</sup> Edn, Academic press, USA, 2012.</li><li>• J. Park, R.S. Lakes, <i>Biomaterials: an Introduction</i>, 3<sup>rd</sup> Edn, Springer, USA, 2007.</li><li>• A. K. Bhowmick, Ed., <i>Current Topics in Elastomers Research</i>, CRC Press, USA, 2008.</li></ul>	



NITK Students' Council 2014-15

To  
The Director,  
NITK Surathkal

Pl. adstn vb-a. no  
Dean (AA)  
16/2/15

Through  
The Dean Academic,  
NITK Surathkal

Date: 27<sup>th</sup> February 2015

Subject: Permission for provision of summer course for first year subjects.

Dear Sir,

Many students across all years have been facing a lot of difficulties academically because of having backlogs in first year subjects. In order to pass these subjects, these students are supposed to attend classes in the following year/years with the junior batches. Many a time classes clash with each other and they end up getting an FA. (Failed due to absence)

The credit limit per semester rule also limits students with temporary withdrawal from taking many subjects. This leads to building of huge amount of workload. The students with temporary withdrawal have a lot of subjects to cover which in turn affect placement and M.S applications if courses are not cleared by the end of 3rd year.

Considering the above situation, we kindly request you to provide a provision for having summer courses just for first year subjects so that these students can concentrate in their respective branches with more focus and effectiveness.

|| 'X'

Thanking you in anticipation.

Yours Sincerely,



Shubham Agarwal  
(Students' Council President 2014-15,  
NITK Surathkal)

Agenda for BOS meeting.  
level  
16/2/15

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING  
NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA, SURATHKAL  
SRINIVASNAGAR, MANGALORE - 575 025, KARNATAKA, INDIA**

**SEEKING APPROVAL OF THE DEPARTMENT FACULTY COUNCIL**

No.	Date	Time	Venue
DFCA-2015-03	16-03-2015		BY CIRCULATION
Ref. No. NITK/EE/FCA/BoS/2015/03/16/443			Dated: 16-03-2015

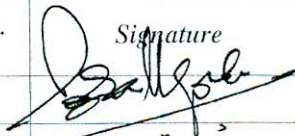
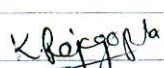
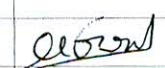
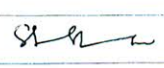
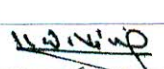



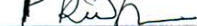
**Item:** Permitting the Undergraduate students to take up major project in an Industry or any research organization over a duration one semester.

**Preamble:** There have been requests from the Undergraduates to take up Major Projects in an Industry or any research organization over a duration one semester. There are also industries willing to entertain or looking for undergraduate students working on the projects on a longer duration than the near two months long internships they have been considering.

Through this proposal the opinion of the Faculty council is sought in this regard and the following is resolved.

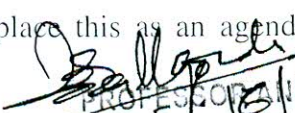
**Resolution:** The proposal is accepted with the following features/ notes:

1. The department is in principle agreement with a student taking up Major project work in an industry or any research organization.
2. This may be preferably permitted during the last semester of the B. Tech. Programme.
3. He/she has to complete all the remaining course-credit requirements in the remaining semesters.
4. The total number of credits during that semester in the industry or research organization, must be substantial; must be at least around Ten (with the two major projects combined along with the possible Mandatory Learning Courses).
5. The changes necessary in the regulation like the requirement of registration for a minimum of 15 credits must be effected.

SL. No.	Name of the Faculty member	Signature	SL. No.	Name of the Faculty member	Signature
1	Prof. Udaykumar R Y		9	Mr. Jora M. Gonda	
2	Mr. K.Rajagopala		10	Dr. Ashvini Chaturvedi	
3	Mr. I R Rao		11	Dr. A. Karthikeyan	
4	Mr. H. Girish Navada		12	Dr.K.N.Shubhanga	
5	Dr. Debashisha Jena		13	Dr. K.M. Sharma	
6	Prof.K.P. Vittal		14	Dr. D.N.Gaonkar	
7	Dr. Vinatha U		15	Dr.Parthiban P	
8	Dr. G S Punekar		16	Dr. R. Kalpana	

**Note:** Comments are indicated with appropriate reference.

Forwarded to the Dean (A), with a request to place this as an agenda item in the 28th BoS meeting scheduled on 23-03-2015.

  
PROFESSOR  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING  
NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA  
SRINIVASNAGAR, SURATHKAL, MANGALORE - 575 025, INDIA



**TS817      Public transportation****(3-0-0)3**

Modes of public transportation, comparison of transit modes and selection of technology for transit services. Bus transit operations. Efficiency and effectiveness indicators for transit planning: staff utilization. Fleet utilization, load factor, effective kilometer, earning per kilometer, cost per kilometer, fuel efficiency and profitability. Travel demand elasticity.

Performance evaluation of the public transportation system: Parametric and non-parametric methods, Benefit cost ratio, Analytical hierarchy process, Data envelopment method, Multivariate methods and related computations.

*Vuchic A and Vukun R., Urban transit: operations, planning and economics, prentice hall, 2012*

*Morlok E.K., Introduction to transportation engineering and planning, McGraw hill, 1978*

*Alvin C. Rencher and William F. Christensen, Methods of Multivariate Analysis, Wiley; 3 edition, 2012*

*Subhash C. Ray, Data envelopment analysis: theory and techniques for economics and operations research, Cambridge university press, 2012*

Hot mix asphalt mix design concepts, classical methods, Superpave method. Modeling of asphalt concrete-Performance characteristics, future asphalt concrete modeling. Asphalt rheology – Modeling of asphalt binder rheology and its application to modified binders. Stiffness characterization –Comprehensive overview of stiffness, complex modulus characterisation of asphalt concrete. Constitutive models- viscoelastoplastic damage modeling of asphalt concrete. Models for rutting by simple shear tests, creep versus repeated loading, simple performance tests. Models for fatigue cracking and moisture damage. Models for low-temperature cracking in asphalt binders, mastics, and mixtures.

*Y.Richard Kim, Modeling of Asphalt Concrete, ASCE PRESS, Mc Graw Hill, 2009.*

*E.Ray Brown, Prithvi S.Kandhal, Freddy L.Roberts, Y.Richard Kim, Dah-Yin Lee, Thomas W.Kennedy, Hot Mix Asphalt Materials, Mixture Design and Construction, Third Edition, NAPA Research And Education Foundation, Lanham, Maryland, 2009.*

*Relevant International Standards of ASTM, AASHTO, AI*



**Justification:** Contents updated to include computer applications in Metrology, Nano metrology and CMM systems. Latest reference books added.

7. MF706 Modern machining processes is removed from the syllabus.

**Justification:** It is dealt with content modification in Machining Processes course.

8. MF 804 Theory of Material Forming Processes is moved from elective to core and renamed as ME836 Materials Forming processes. Content is modified to include plasticity theory and detailed analysis of all forming processes and also aligned with DP 813:Theory of Metal Forming.

- 9. A new elective course is proposed by Prof. Bontha and approved by DFC

Course code and Name: **ME 835 Additive Manufacturing (3-0-0) 3 [Detailed syllabus is attached]** ✓

**Justification:** Additive Manufacturing (AM) encompasses a class of advanced manufacturing technologies that produce parts directly from computer aided design (CAD) models without the necessity of any part-specific tooling. AM processes offer the advantages of lower lead time and less material waste when compared to conventional manufacturing processes. Recent advances in materials, processes and machines have enabled AM processes to go beyond prototyping applications towards the fabrication of functional parts made of metals and other engineering materials. This course is designed to make students familiar with the various additive manufacturing processes, enable them to select the correct AM process for an application and demonstrate a scientific understanding of this emerging technology. This course will prepare students for a career in Advanced Manufacturing.

10. Course ME811 Technology of Engineering material is removed as the content is covered at the under graduate level.
11. Course MF818 Artificial Engineering in Manufacturing System is removed as the content is covered in ME818 Artificial Intelligence and its applications.
12. Course MF814 Industrial Tribology and DP 802 Industrial Tribology are replaced with ME834 Industrial Tribology.
13. Course MF811 Automatic Control Engineering is removed and replaced with ME 833 Modern control Engineering.
14. Course MF805 Industrial Drives is removed to avoid duplication.

**Annexure-III****Proposed changes in the curriculum for M.Tech. Program in Thermal Engg.**

1. New Core course is introduced in the first semester for PG Thermal **ME 702 Mathematical Methods for Engineers(Detailed syllabus is given in Annexure2)**

**Justification:** Mathematical methods should be a mandatory course for thermal engineering student in order to address variety of non-linear differential equations, partial differential equations to be solved in closed form or numerically or semi-analytically which are common to understanding of the behaviour of many thermal-fluid systems. The expert committee of curriculum workshop for PG Thermal Engineering had suggested the importance and inclusion of this course.

2. TH816 Advanced Thermodynamics is moved from elective to core.

**Justification:** It is an important course to know the various processes involved during the thermodynamic cycle. This course addresses chemical reaction and thermodynamics laws in advanced energy systems. It also includes statistical thermodynamics and quantum mechanics which are essential for PG Thermal Engineering students who will be intending to pursue research in the relevant field.

3. TH702 Refrigeration &Cryogenics is moved from core to elective.

**Justification:** It is a subject of application of Heat Transfer and Thermodynamics which are included as core courses in the curriculum. A student who wishes further research in the refrigeration & cryogenics can take this course as an elective.

4. A new elective course is proposed by Prof. Vijay Kumar H and approved by DFC

Course code and Name: **ME830Convective Heat and Mass Transfer (3-0-0) 3**

**(Detailed syllabus is attached)**

**Justification:** This course would be useful for MTech/PhD students of mechanical engineering. The emphasis will be on scale analysis concept. Such a course is not available in the present curriculum.

5. TH701 Heat &Mass Transfer should be renamed as **TH701 Advanced Heat & Mass Transfer** and the contents has been modified.

**(Detailed syllabus is attached)**



**Justification:** During the Curriculum Workshop meeting, the external experts felt that the current syllabus is overlapping with the UG syllabus (ME350 Heat Transfer). The proposed syllabus has been enriched by the addition of new contents like IHCP, Scale analysis concept, convection in porous media and removing some redundant content in radiation part of the old syllabus.

6. A new elective subject is proposed by Prof. N. Gnanasekaran and approved by DFC  
Course code and Name: **ME 831 Design and Optimization of Thermal System (3-0-0) 3**  
**(Detailed syllabus is attached)**

**Justification:** This is an important course for PG-Thermal Engineering where modelling of thermal systems helps us understand physics behind heat transfer phenomena. When too many input parameters are associated in a heat transfer system then optimization techniques such as deterministic/stochastic is helpful for finding out the best inputs for efficient heat transfer processes. This subject will be an added advantage to all thermal engineering PG students when they join industries power generation, energy sectors.

7. TH811 Turbomachines syllabus has been modified

**Justification:** Much of the contents are similar to the course ME315 Turbomachines, which is offered to the UG students. The contents has been modified according to Program Educational Objective of the PG Thermal students. **(Modified syllabus is attached as Annexure2)**

M. Tech. in Thermal Engineering (TH)

Suggested Plan of Study:

Sl. No.	Semester			
	I	II	III	IV
1	TH700	TH706	TH891/ TH897	TH899
2	TH701	TH707	TH898	
3	TH702	TH816		
4	TH703	TH890		
5	TH704	Elective 3		
6	Elective 1	Elective 4		
7	Elective 2	Elective 5		

Credit Requirements:

Category	Minimum Credits to be Earned
Programme Core (Pc)	21
Elective Courses (Ele)	15
Mandatory Learning Courses (MLC)	04
Major Project (MP)	20
<b>Total</b>	<b>60</b>

Programme Core (Pc)		
TH700	Advanced Fluid Mechanics	(3-0-0) 3
TH701	Advanced Heat and Mass Transfer	(3-0-0) 3
ME702	Mathematical Methods for Engineers	(3-0-0) 3
TH703	Combustion	(3-0-0) 3
TH704	Thermal Engg. Lab	(0-0-2) 1
TH816	Advanced Thermodynamics	(3-0-0) 3
TH706	Measurement in Thermal Systems	(3-0-0) 3
TH707	Thermal Computation Lab	(0-0-3) 2
Mandatory Learning Courses (MLC)		
TH890	Seminar	2
TH891/ TH897	Practical Training/Minor Project	2
<i>(to be completed during vacation between 2<sup>nd</sup> &amp; 3<sup>rd</sup> sem.)</i>		
Major Project (MP)		
TH898	Major Project (3 <sup>rd</sup> sem.)	6
TH899	Major Project (4 <sup>th</sup> sem.)	14

Suggested Electives

Elective (Ele) courses		
TH702	Refrigeration and Cryogenics	(3-0-0) 3
ME830	Convective Heat and Mass Transfer	(3-0-0) 3
ME831	Design and Optimization of Thermal Systems	(3-0-0) 3



**IT702: Advanced Web Technologies (Core)****(3-0-2) 4 credits***Class and Semester: 1st semester M.Tech (IT)*Course Description:

In the two decades since its invention, the World Wide Web has transformed society and changed the way we work, learn, trade, communicate and relate to each other. The fast changing nature of the Web means that a deep understanding is essential to understand the latest developments and their potential. This course delves into the concepts and techniques in advanced Web application development, and explores new challenges and research issues that are critical for developing such systems, such as Web engineering methodologies, web data standards like XML and XML Schema, data representation on the Web, Search Engines (including robots and indexing servers), Web servers, application servers (such as the E-commerce information servers like eBay, Amazon), distributed computing with Web services and the Social Web. The Next Generation Web, i.e. the Semantic Web and the Web of Services will also be discussed along with current research problems and trends in these areas.

Course Objectives:

- To discuss the concepts and principles of web architecture, software engineering methodologies & web standards and apply them to develop advanced Web applications.
- Understanding the challenges and issues in Web search and information retrieval over the Web.
- Design and develop distributed systems over the Web using the service orientation paradigm.
- Understand the concepts and technologies of the Next Generation Web and Web of Services.
- Carry out research level activities on open research problems in the area of Advanced Web technologies.

Proposed Modified Syllabus

*Introduction:* Structure of the Web, Architecture and Components., *Web Engineering:* Fundamentals, Current challenges and new developments in the WWW; *Web Data Standards:* XML basics, Document Object Model, DTD and Schemas, XML Namespaces, XML for data representation and for display – XPath and XSLT, XML Manipulation; *Information Retrieval on the Web:* The Web and the problem of Search, Handling unstructured, semi-structured, structured data on the Web; Search Engines and search issues.; *Web as a Distributed computing platform:* Understanding Web Services technology, Service oriented Architecture and REST based web services (Resource Oriented Architecture); *The Web 2.0 phenomenon:* The Social Web, Social Network Analysis, Trends and research; *Web Intelligence:* The Semantic Web, principles, standards and technologies, Web of Services, Linked Open data and applications, Trends and research.

References Textbooks

1. Anders Møller and Michael I. Schwartzbach, "An Introduction to XML and Web Technologies", (Addison-Wesley, 2006)
2. Gerti Kappel and Birgit Prýýll, "Web Engineering: The Discipline of Systematic Development of Web Applications", (Wiley Publishers, 2006)
3. Christopher Manning, Prabhakar Raghavan and Hinrich Schütze, "Information Retrieval", (Cambridge University Press, 2008).
4. Alonso, G et al, "Web Services - Concepts, Architectures and Applications Series: Data-Centric Systems and Applications", (Springer, 2004)
5. Robert A. Hanneman and Mark Riddle. "Introduction to social network methods", (University of California, Riverside, 2005)
6. Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, "Foundations of Semantic Web Technologies", (Chapman & Hall, 2009)

Proceedings of DPGC Meeting held on 10/03/2015 at 2.00 PM in HOD Chamber.

Members Present

Signature

1. Prof. Ananthanarayana V. S



2. Prof. G. Ram Mohana Reddy



3. Mr. Dinesh Naik



4. Mrs. Geetha V



5. Mr. Biju R Mohan



6. Mrs. Sowmya Kamath



7. Dr. Jaidhar C D



**Agenda Items:** Modification of content of core PG course, IT702: Advanced Web Technologies - (3-0-2) 4 Credits for departmental M.Tech (IT) Program.

**Business Transacted:**

It is resolved to recommend the modification of content of IT702: Advanced Web Technologies in view of including Web Engineering Methodology for Web Application Development, Web Search, Information Retrieval on the Web, Web Intelligence and current trends in www is recommended.



**Item-1.10: Any Other Item with the permission of Chair**

The following items were discussed with the permission of the Chair.

**Item-1.10.1: Possible Inclusion of new participating institutes (PI)**

Chairman, CCMT-2015 informed that Director, NIT Manipur and Director, IEST Shibpur have requested to participate in CCMT-2015. The committee approved the same. It was also decided that, on behalf of the Core Committee, Chairman CCMT-2015 may accept other Govt. institutes on their requests.

**Item-1.10.2: Relaxation to PWD candidates**

It was decided that the eligibility criteria in the qualifying examination for the PWD candidates appearing in CCMT-2015 will be 6.0 CGPA (in 10 point scale) or 55% marks in aggregate, equal to that for SC/ST candidates.

**Item-1.10.3: Exploring the possibilities of Centralized Counselling for MSc.**

Prof. Sunil Kumar Sarangi, Director, NIT Rourkela had given a proposal for conducting centralized counselling for MSc. admissions during 2015, based on JAM-2015 Score. The proposal was highly appreciated by the committee members. The committee assigned the responsibility to Prof. Sarangi to take the necessary initiatives for conducting centralized counselling for MSc. admissions during 2015. The committee also requested Prof. Sarangi to work out the frame work for software development for the counselling process.

The meeting ended with thanks to the Chair.



03/02/2015

Prof. Sunil Kumar Sarangi  
Chairman, CCMT-2015



Dean (AD)  
18/12/15

**MINUTES OF THE FIRST MEETING OF THE CORE COMMITTEE OF CCMT-2015 HELD AT HOTEL HINDUSTHAN INTERNATIONAL, BHUBANESWAR ON 24<sup>TH</sup> JANUARY, 2015 AT 2:00 PM**

The following members were present

1	Prof. Sunil Kumar Sarangi, Director, NIT Rourkela	Chairman
2	Prof. D. P. Mahapatra, Asso. Prof. (CS), NIT Rourkela & Chairman, Local organising committee	Convener
3	Prof. G. R. C. Reddy, Director, NIT Goa & Director I/C Calicut	Member
4	Prof. Rambabu Kodali, Director, NIT Jamshedpur	Member
5	Prof. S. K. Sinha, Dean SW, NIT Jalandhar	Member
6	Prof. Shailendra Kumar, Asso. Dean (AC), SVNIT Surat	Member
7	Prof. A. M. Rawani, Dean (AC), NIT Raipur	Member
8	Prof. A. P. Singh, Dean (AC), NIT Delhi	Member
9	Prof. (Mrs.) S. K. Pandey, Director, NIT Puducherry	Member
10	Prof. K K Shukla, Dean (AC), MNNIT Allahabad	Member
11	Prof. Neetesh Purohit, Faculty-Incharge (Admission & Exam), IIIT Allahabad	Member
12	Prof. S. R. Kumar, Associate Dean (PG), NIFFT Ranchi	Member
13	Prof. Sandeep Chaudhary, Asso. Prof., Civil Engg., MNIT Jaipur & Coordinator, CCMT – 2014, MNIT Jaipur	Member
14	Prof. T. Srinivas Rao, Director, NIT Warangal	Member
15	Prof. P Gupta, Dean (AC), NIT Durgapur	Member
16	Prof. Narendra S. Chaudhari, Director, VNIT Nagpur	Member
17	Prof. Swarnendu Ku. Chakraborty, Asst. Prof. (CS), NIT Arunachal Pradesh	Member
18	Prof. I N Sinha, Professor (MN), IEST Shibpur	Member
19	Prof. Baldev Setia, Dean (AC), NIT Kurukshetra	Member
20	Prof. Gopal Mugeraya, Director, NIT Agartala	Member
21	Prof. Saikat Mukherjee, CCMT Centre incharge, NIT Meghalaya	Member
22	Prof. Upendra Kumar, Asso. Prof. (CE), NIT Silchar	Member
23	Prof. Sunil Pandey, Dean (R&C), SLEIT Longowal	Member
24	Prof. K Venkatraman, Dean (AC), NIT Surathkal	Member
25	Sri. Rajesh Singh Solanki, Under Secretary (NITs), MHRD New Delhi	Member

**ITEM-1.1: Welcome to all members by Chairman**

At the outset, the Chairman CCMT-2015 welcomed all the core committee members to the first meeting of the Core Committee of CCMT-2015.

**ITEM-1.2: Creation of Technical Committee and Local Committee**

The following members were nominated to the technical committee

1. Prof. D. P. Mohapatra, Chairman
2. Prof. Sandeep Chaudhary, MNIT Jaipur, Convener of technical committee of CCMT-2014
3. Prof. Mukesh Gupta, NIT, Rourkela.
4. Prof. Pankaj Sa, NIT, Rourkela.
5. Prof. R. P. Sharma, Dean Academic, NIT, Agartala (From Eastern Region)



# IT928: Topics in Internet of Things

4 Credits ✓

## Course Description:

Internet of Things (IoT) refers to physical and virtual objects that have unique identities and are connected to the internet to facilitate intelligent applications that make energy, logistics, industrial control, retail, agriculture and many other domains "smarter". Internet of Things is a new revolution of the Internet that is rapidly gathering momentum driven by the advancements in sensor networks, mobile devices, wireless communications, networking and cloud technologies. This course will examine the issues of the vast implementation of smart devices known as the Internet of Things (IoT). The IoT is an environment where smart devices sense, anticipate, and respond to our needs as we manage them remotely. These smart devices often act as the gateway between our digital and physical world. The IoT touches many aspects of life including transportation, health care, safety, environment, energy, and more. This course will examine and discuss IoT technology and market specific topics, relevant case studies of IoT i.e. health, safety, privacy, and economic impacts of IoT.

## Objective:

This course looks at the Internet of Things (IoT) as the general theme of physical/real-world things becoming increasingly visible and actionable via Internet and Web technologies. The main objective of this course is to look top-down as well as bottom-up, to provide students with a comprehensive understanding of the IoT.

- By looking at a variety of **real-world application scenarios** of the IoT and diverse implemented applications, the various understandings and requirements of IoT applications become apparent. This allows students to understand what IoT technologies are used for today, and what is required in certain scenarios.
- By looking at a variety of existing and developing **technologies and architectural principles**, students gain a better understanding of the types of available technologies and can be utilized to implement IoT solutions.
- Finally, students will be given the opportunity to **apply these technologies** to tackle scenarios of their choice in teams of two or three, using an experimental platform for implementing prototypes and testing them.

## Syllabus:

IoT definitions: overview, applications, potential & challenges, and architecture; IoT examples: Case studies, e.g. sensor body-area-network and control of a smart home; Internet of Things: layers, protocols, packets, services, performance parameters of a packet network as well as applications such as web, Peer-to-peer, sensor networks, and multimedia; Mobile Networking: roaming and handoffs, mobile IP, and ad hoc and infrastructure less networks; Real-time networking: soft and real time, quality of service/information, resource reservation and scheduling, and performance measurements; IoT Security; IoT Ethics/Privacy; IoT in Energy/Environment; IoT in Infrastructure: Smart Homes/Cities; IoT in Healthcare.

## References:

1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things: A Hands-On Approach", Published by VPT, 1st Ed., Aug. 2014.
2. Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", John Wiley & Sons, 2014.
3. Honbo Zhou, "The Internet of Things in the Cloud: A Middleware Perspective", CRC Press (Taylor & Francis), 2013.
4. Articles from IEEE Internet of Things Journal [2014 to Till Date].
5. Articles from IEEE Transactions on Emerging Topics in Computing [2013 to Till date].



# IT929: Topics in Social Media Analysis

4 Credits

## Course Description:

The proliferation of social media – social networking websites, blogging and micro-blogging, and other forms of online interaction and content generation – has introduced a powerful tool for people to communicate and share information. This course will introduce methods for analyzing and understanding how people use these technologies and their societal implications. The biggest story of the last few years has been the phenomenal growth of social media, and the technological, social and political transformations that accompanied it. Social media sparked an information revolution by putting knowledge production and communication tools in the hands of the masses. Today on sites such as Twitter, Facebook, Google+, Flickr, and YouTube, large numbers of users publish rich content, annotate it with descriptive metadata, and engage in discussions and collaborations with others. Social media promises to transform how we create and use knowledge, respond to disasters, monitor environment, manage resources, and interact with the world and one another. Social media offers new research opportunities and challenges. The phenomenal growth of social media has transformed the social, political, and technological landscape. Social media sparked an information revolution by putting knowledge production and communication tools in the hands of the masses. Today on sites such as Twitter, Facebook, Google+ and YouTube, large numbers of people publish rich content, annotate it with descriptive metadata, communicate and collaborate with others. Social media promises to transform how we create and use knowledge, respond to disasters, monitor environment, manage resources, and interact with the world and one another. By exposing individual and collective behaviour, social media delivers large quantities of social data for analysis, offering new research opportunities and challenges. This course will examine topics in social data analysis, including influence and centrality, information diffusion, sentiment analysis, modelling collective dynamics and show how AI, social network analysis, and statistical methods can be used to study these topics.

## Objectives:

The objectives of this course are as follows:

- To Understand the basic concepts of social network analysis
- To Collaborative with peers to apply these methods to a variety of social media
- To Understand the link between qualitative and quantitative methods of social network analysis
- To Understand how these social technologies impact society and vice versa

## Syllabus:

Introduction and Phenomenology of Social Media: Social Information Processing in Social News Aggregation, Influence and correlation in social networks; Social Network Analysis: Networks, Crowds, and Markets: Reasoning about a Highly Connected World, Four Degrees of Separation; Topic Analysis: Probabilistic topic models, Matrix Factorization Techniques For Recommender Systems; Sentiment Analysis and Opinion Mining; Influence and Centrality in Social Networks; Wikipedia Knowledge Extraction; Search Query Logs; Social Ties and Information Diffusion; Social Ties and Link Prediction; Social Spam & Malicious Behavior; Geospatial Social Data Mining; Privacy in a Networked World; Health and Social Media; Politics and Social Media; Predicting Future with Social Media; Emotional Contagion, Friendship Paradox and Detection of Contagions; Crowd Sourcing; Modelling individuals and collective behaviour; Social Multimedia Analysis: Photos, Videos.

## References:

1. Stanley Wasserman, Katherine Faus, "Social Network Analysis: Methods & Applications", Cambridge University Press, 1994.
2. David Easley and Jon Kleinberg, "Networks, Crowds and Markets", Cambridge University Press, 2010
3. Christina Prell, "Social Network Analysis: History, Theory and Methodology", SAGE Publications, 2011.
4. John Scott, "Social Network Analysis", SAGE Publications, 3rd Edition, 2013.
5. Journal Articles from IEEE Transactions on Computational Social Systems, Elsevier Journal of Social Networks and Springer International Journal of Social Network Analysis and Mining.



Proceedings of DRPC Meeting held on 10/03/2015 at 2.00 PM in HOD Chamber. ✓

Members Present

Signature

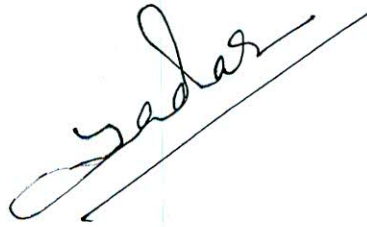
1. Prof. Ananthanarayana V. S



2. Prof. G. Ram Mohana Reddy



3. Dr. Jaidhar C D



Agenda Items: Additional 900 Level Courses for the departmental PhD Program.

**Business Transacted:**

It is resolved to recommend the following additional 900 level courses for the departmental PhD Program:

- |   |                 |
|---|-----------------|
| (i) IT928: Topics in Internet of Things     | ..... 4 Credits |
| (ii) IT929: Topics in Social Media Analysis | ..... 4 Credits |

NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA, SURATHKAL

**Department of Mechanical Engineering**

**Annexure-V**

**Proposed changes in the curriculum of PhD Program**

1. New 900 Level course is suggested by Prof. Vijay Kumar H and approved by DFC with minor modifications.

Course code and Name: **ME910 Analysis of Transport Phenomena** (4-0-0) 4 ✓

**(Detailed syllabus is attached)**

**Justification:** This course would be useful for PhD students of mechanical engineering especially for applications involving jets, porous media and reacting flows. Such a course is not available in the present curriculum.

**ME910 Analysis of Transport Phenomena**

**(4-0-0) 4**

Review of concept of Vectors & Tensors, Fundamentals of Heat & mass Transfer, Formulation & Approximation, Solution Methods based on scaling Concepts, Solution Methods for Linear Problems, unidirectional & nearly unidirectional flow, creeping flow, Laminar Flow at High Reynolds Number, Forced Convection Heat & Mass Transfer in confined & unconfined laminar flows, Transport in Buoyancy Driven & Turbulent Flow, Simultaneous Energy & Mass Transfer & Multicomponent Systems.

*William M. Deen, "Analysis of Transport Phenomena", Oxford University Press, 2013, ISBN13, 978-0-19-809858-4.*

*John C. Slattery, "Advanced Transport Phenomena", Cambridge University Press, ISBN 0-521-635659.*

*Larry A. Glasgow, "Transport Phenomena: An Introduction to Advanced Topics," John Wiley & Sons, ISBN 978-0-470-38174-8.*



Department of Electronics and Communication Engineering  
NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA, SURATHKAL

03-03-2015

A combined DUGC/DPGC/DRPC meeting was held on 03-03-2015 at 3.00pm in E&C Conference room to discuss the agenda for the BOS meeting to be held on 23-3-2015. Following points were discussed and it was resolved to request the Dy. Registrar(Academic) to include them in the agenda of BOS meeting.

The committees resolved to request,

1. The removal of the conversion formula from CGPA to percentage from the transcripts/grade card.
2. The inclusion of Maximum, Minimum and Average CGPA / SGPA of the class in the grade cards (preferably for all the 4 years of UG and two years of PG) to reflect the relative position of the student in the class.
3. The removal of First class degree requirement in MTech for PhD admission.
4. The computerization of course registration process (on-line registration).
5. To delay the "Drop Option" date from 1 week to 3-4 weeks after course registration.
6. To make Internships "optional" in BTech program (Input to next curriculum revision)
7. To make two Btech degree options: thesis and non-thesis option (Input to next curriculum revision).
8. New elective courses for MTech (CE) and renaming of BTech (E&C) course.

9. Transfer of Credits - NITK B.Tech students.

Members Present:

- |                    |                       |                         |                            |
|--------------------|-----------------------|-------------------------|----------------------------|
| Dr. U Sripati      | <i>U. Sripati</i>     | Dr. Prashanth Kumar     | <i>Prashanth Kumar</i>     |
| Dr. Ramesh kini M. | <i>M. Ramesh Kini</i> | Dr. P. Srihari          | <i>P. Srihari</i>          |
| Dr. N S V Shet     | <i>N. S. V. Shet</i>  | Dr. Arulalan            | <i>Arulalan</i>            |
| Dr. T. Laxminidhi  | <i>T. Laxminidhi</i>  | Dr. Deepu Vijayasenani  | <i>Deepu Vijayasenani</i>  |
| Dr. Aparna         | <i>Aparna</i>         | Dr. A. V. Narasimhadhan | <i>A. V. Narasimhadhan</i> |
| Dr. Rekha S.       | <i>Rekha S.</i>       | Dr. Shyam Lal           | <i>Shyam Lal</i>           |
| Mrs. Kalpana Bhat  | <i>Kalpana Bhat</i>   |                         |                            |

*M. S. Bhat*

Dr. M. S. Bhat  
HOD E&C

प्राध्यापक एवं विभागाध्यक्ष / PROF & HEAD  
डी एवं सी विभाग / E & C Department  
एन आई टी के, सुरतकल / NITK, Surathkal  
मंगलूर / MANGALORE - 575 025

Existing

## Grade Card

**B.TECH. ( ELECTRONICS AND COMMUNICATION ENGINEERING )**

NAME:

REGISTRATION NO.:

COURSE CODE	COURSE CATEGORY	COURSE TITLE	CREDITS	GRADE
Academic Year : 2014 - 2015				
Semester Earned Credits:		SGPA:		
Cumulative Earned Credits:		CGPA:		
Semester Earned Credits:		SGPA:		
Cumulative Earned Credits:		CGPA:		

Note:

- 1) Grade points : AA=10; AB=09; BB=08; BC=07; CC=06; CD=05; DD=04; FF=0 (Fail);  
FA=0 (Fail due to attendance shortage); W=Withdrawal; U=Audited; S=Satisfactory; N=Unsatisfactory
- 2) Grades AA to DD & S indicate the successful completion of course and are considered for earned credits.
- 3) Grades FF and FA are counted for computation of both SGPA as well as CGPA.
- 4) No class or division is awarded at this Institute. There is no equivalence between the CGPA scale and percentage. However,  $CGPA \geq 6.5$  can be considered as equivalent to First Class and  $5.5 \leq CGPA < 6.5$  can be considered as equivalent to Second Class. Notionally,  $(CGPA - 0.5)$  may be multiplied by a factor of 10 to obtain the numerical percentage.
- 5) Credits of course work under S/N option are not counted for computation of SGPA & CGPA.
- 6) BSC=Basic Science Core; ESC=Engineering Science Core; HSC=Humanities & Social Sciences Core; PC=Programme Core  
PSE=Programme Specific Elective; OE=Open Elective; PMP=Programme Major Project; MLC=Mandatory Learning Courses

Prepared by:

Scrutinised by:

Date: 23-Mar-2015

Institute seal

Deputy Registrar(Academic)

42 a



Revised.

## Grade Card

**B.TECH. ( ELECTRONICS AND COMMUNICATION ENGINEERING )**

**NAME:**

**REGISTRATION NO.:**

COURSE CODE	COURSE CATEGORY	COURSE TITLE	CREDITS	GRADE
		Academic Year : 2014 - 2015		
<b>Semester Earned Credits:</b>		<b>SGPA:</b>		
<b>Cumulative Earned Credits:</b>		<b>CGPA:</b>		
<b>Semester Earned Credits:</b>		<b>SGPA:</b>		
<b>Cumulative Earned Credits:</b>		<b>CGPA:</b>		

Note:

- 1) Grade points : AA=10; AB=09; BB=08; BC=07; CC=06; CD=05; DD=04; FF=0 (Fail);  
FA=0 (Fail due to attendance shortage); W=Withdrawal; U=Audited; S=Satisfactory; N=Unsatisfactory
- 2) Grades AA to DD & S indicate the successful completion of course and are considered for earned credits.
- 3) Grades FF and FA are counted for computation of both SGPA as well as CGPA.
- 4) No class or division is awarded at this Institute. There is no equivalence between the CGPA scale and percentage. However,  $CGPA \geq 6.5$  can be considered as equivalent to First Class and  $5.5 \leq CGPA < 6.5$  can be considered as equivalent to Second Class.
- 5) Credits of course work under S/N option are not counted for computation of SGPA & CGPA.
- 6) BSC=Basic Science Core; ESC=Engineering Science Core; HSC=Humanities & Social Sciences Core; PC=Programme Core  
PSE=Programme Specific Elective; OE=Open Elective; PMP=Programme Major Project; MLC=Mandatory Learning Courses

Prepared by:

Scrutinised by:

Date: 23-Mar-2015

Institute seal

Deputy Registrar(Academic)

42.6

To,  
The Senate,  
NITK Surathkal

Date: 14.10.2014

May be discussed  
in AOU and this  
placed in Senate with  
AOU observation  
V.S.,  
19/10/15

Dean (A),

Subject: CGPA to Percentage Conversion mentioned in Transcript

Respected Sir,

As per the resolution of the 36<sup>th</sup> Senate of the institute vide Item No.26-BOS-14, "CGPA  $\geq$  6.5 can be considered as equivalent to First Class and CGPA  $\geq$  5.5 and less than 6.5 can be considered as equivalent to second class. Notionally, (CGPA-0.5) may be multiplied by a factor of 10 to obtain the numerical percentage." We, the student council oppose the inclusion of the final clause.

The rule for CGPA to Percentage conversion before the 36<sup>th</sup> Senate did not specify the (CGPA-0.5) clause. Thus, there was no rule specified by the institute. So, generally students converted CGPA to Percentage by multiplying CGPA with 10. Due to requests for a specific rule, from PSU sector companies, the current rule was brought in. We would like to highlight some serious disadvantages of this inclusion:

1. Our College follows the relative grading system. This is completely different from the absolute scale and there is no simple way to interconvert between these two systems. The current formula that is specified (CGPA-0.5 \* 10) has no mathematical basis and is only causing harm to students applying to PSU's or higher studies.
2. The rule is not uniformly followed across all the NITs and thus puts students of our institute at a disadvantage.
3. Examinations like Common Admission Test (CAT) specifically ask for percentage in their registration form. Also, the bachelor's degree score carries a great weightage across leading IIMs (methodologies followed for admissions by some IIMs have been hereby attached). Thus, (CGPA-0.5) is proving to be a big disadvantage because for example, a student with CGPA 7.5 will now be considered as having 70%, as compared to 75% before the new rule. Same applies for other prestigious examinations such as UPSC.
4. Many companies visiting our campus for placements have cut-offs in form of percentage. For example, if a company has a cut-off of 70% everyone above CGPA 7.0 were eligible earlier. But as per the new rule only students above CGPA above 7.5 will be eligible as (7.5 is equivalent to 70%).

Forwarded to  
Secretary - Senate  
and  
19/10/15



Also other leading NITs and IITs have no specific rule for CGPA to percentage conversion. Most of the entrance examinations ask to multiply CGPA by 10 to obtain percentage, if the institute does not specify any conversion formula. Hence the general norm is to multiply CGPA by 10 to obtain equivalent percentage which means CGPA 7.5 is equivalent to 75%. We have confirmed with students of IIT Bombay, IIT Delhi IIT Guwahati, NIT Warangal and NIT Tiruchirappalli that there is no specific conversion formula officially provided by the institute. Hence the students multiply CGPA by 10 for various entrance examinations and placements. Thus, they have a clear advantage over students of NITK.

Thus to ensure that NITK students are at par with the students from other institutes, this clause should be eliminated. This would permit students to use the commonly used formula which considers the percentage to be 10 times the CGPA.

Thus, we sincerely request the Senate to look into this matter and come up with a solution so that students of our college are not at a disadvantage with respect to other premier institutes in our country.

Yours Sincerely,

Karik Sreenivasan

Student Representative,

NITK Senate



**Proceedings of the DPGC meeting held on 13/3/2015 in the Dept. of HSM at  
12.15 noon**

**Subject:**

**Equivalence of Departmental Level Examination to NET/ GATE examination for Basic Science PhD students for the award of MHRD Fellowship** ✓

The Institute has received a letter vide F.No. 17-2/2014-TS.1 dated 28th November, 2014 of Department of Higher Education, MHRD, Government of India on the subject of Revision of emoluments and guidelines on service conditions for the Research personnel working on R&D programmes funded by Central Government / Agencies, which is adopted by the CFTIs. The details are enclosed in **Annexure A-1** and **A-2 (FAQ Item No. 2)**.

In continuation, MHRD, GOI issued letter No. F.No.17-2/2014-TS.1 dated 18.02.2015 regarding revision of the Scholarship / Fellowship / Assistantship in AICTE approved and Centrally Funded Technical Institutions under the Ministry of Human Resource Development. The details are annexed in **Annexure B**


In continuation MHRD GOI issued revised letter No. **F.NO.17-2/2014-TS.I** dated 2nd March, 2015; in which candidates with Post Graduate Degree in Basic Science with NET / GATE qualification is eligible for the award of PhD Scholarships.

The details are enclosed as **Annexure C**.

**Resolution :**

The DPGC resolves to recommend for consideration of Department Level Examination equivalent to NET / GATE examination for basic science /Humanities & Management PhD Students for the award of fellowship.






Rakesh A.






Chopalaremma B.V.



**F.NO.17-2/2014-TS.I**

Government of India  
Ministry of Human Resource Development  
Department of Higher Education  
Technical Section-I

Shastri Bhavan, New Delhi  
Dated the 2<sup>nd</sup> March, 2015

To,

The Chairman, AICTE  
The Directors, IITs (As per standard list)  
The Directors, IIITs (as per standard list)  
The Director, IISc, Bangalore  
The Directors, IISERs (as per standard list)  
The Directors, NITs (as per standard list)  
The Director, NITIE, Mumbai  
The Director, ISM, Dhanbad  
The Director, NERIST, Nirjuli, Arunachal Pradesh  
The Director, SLIET, Longowal  
The Director, NIFFT, Ranchi  
The Directors, NITTRs (as per standard list)  
The Directors, SPAs (as per standard list)  
The Director, IEST, Shibpur

Subject: Revision of rates of Ph.D. Scholarship in AICTE funded and Centrally Funded Technical Institutions under the Ministry of Human Resource Development

Sir/Madam,

In partial modification of the Order of even number dated 18.02.2015 and in pursuance of the DST's Order No.SR/S9/Z-09/2012 dated 21.10.2014 on the subject mentioned above, paragraph 2, 7 & 8 of the order dated 18.02.2015 are modified to the extent indicated below:

S.No.	Qualifying Degree	Revised Emoluments (Per Month)
01.	<b>JUNIOR RESEARCH FELLOW (JRF):</b> Post Graduate Degree in Basic Science with NET/GATE Qualification or Graduate Degree in Professional Course with NET/GATE Qualification or Post Graduate Degree in Professional Courses.	<b>Rs.25,000/-</b>
02.	<b>SENIOR RESEARCH FELLOW (SRF)</b> JRF Qualification with two years of research experience.	<b>Rs.28,000/-</b>

Contd...2/-

*Handwritten signature*

**Guidelines on Late Registration from the academic year 2015-16**

Schedule of Academic Activities for a Semester including **Dates of Registration** is included in the Academic Calendar and is approved by the Senate. Physical presence of students is a must on the day of registration. However, keeping in view exceptional circumstances often faced by some students, the Institute authority **may** be made provisions for Late Registration. ✓  
The proposed Guidelines and **Applicable Fine for Late Registration** are as follows:

1. Late registration under normal circumstances beyond the date specified in Academic Calendar i.e. Registration-without-fine and Registration-with-fine (Fine - Rs 1000/-), is **not permitted**. However, under exceptional circumstances like severe sickness, accident, natural calamities etc. a student may be permitted to do late registration, with prior approval from Dean (Academic) and payment of Additional fine @ **Rs.100/- per day** from the **next day of Registration-with-fine** up to 12 Teaching days as per Academic calendar.
2. A student seeking late registration therefore must complete the entire process of late registration strictly within Last Date of Registration (with-fine) including obtaining of Medical Certificate from the Senior Medical Officer of the Institute (if late on medical ground), reporting to Academic Section for obtaining permission from Dean (Academic) for late registration, payment of registration fees (with fine, if applicable) etc.
3. Waiver of fine for late registration, if at all, may be done only for such a student who intimates about his/her problem in writing to the Dean (Academic) on or before the scheduled date for semester registration and decision will be on the basis of the merit of the case.

Amul



NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA  
DEPARTMENT OF ELECTRICAL & ELECTRONICS, NITK.

Agenda items for the BoS meeting scheduled on 23-03-2015

2015/03/16/436  
NITK/EE/BoS.....  
Date: 16/03/2015

BoS-17

**Agenda item-EED-DRPC/DPGC-1:**

*Residential and Credit requirements for scholar working at recognized research centers outside NITK:*

1. Research scholars working in recognized research center outside NITK (e.g. CPRI) shall be exempted from residential requirement. ✓
2. Research scholars interested in registering as external registrants from Industries having Research and Development wing shall be exempted from residential requirement.
3. Credit requirements for such candidates shall be through only self study courses taken from 9 level courses.

←  
(see