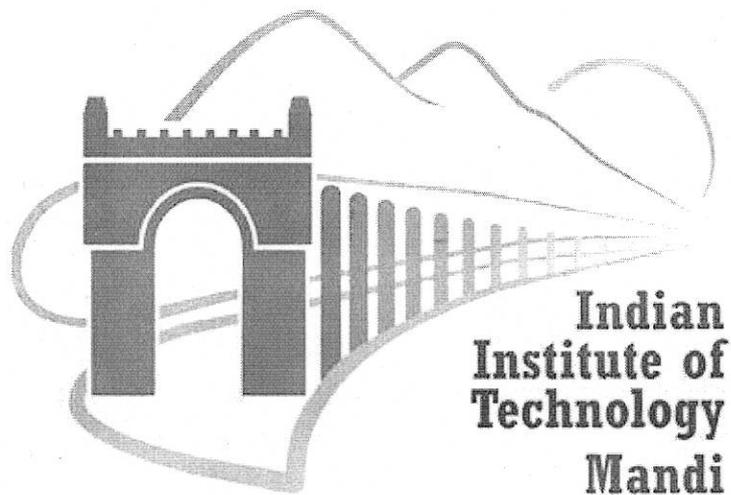


INDIAN INSTITUTE OF TECHNOLOGY MANDI
KAMAND, DISTT. MANDI – 175005 (HIMACHAL PRADESH)



MINUTES OF 14TH BOARD OF ACADEMICS MEETING

VENUE : NKN CONFERENCE ROOMS (KAMAND & MANDI)
DATE : 30TH SEPTEMBER, 2016 (FRIDAY)
TIME : 4:00 P.M.

Following members attended the meeting

Sl.No.		Name	
1.	Dean Academics	Prof. B.D. Chaudhary	Chairman
2.	Associated Dean (Research)	Dr. Venkata Krishnan	Member
3.	Associated Dean (Courses)	Dr. Pradeep Parameswaran	Member
4.	Chairman Library Advisory Committee	Dr. Astrid Kiehn	Member
5.	Chairman Course Proposal Committee	Dr. Chayan K Nandi	Member
6.	Course Coordinator (B.Tech.- CSE)	Dr. Dileep A.D.	Member
7.	Course Coordinator (B.Tech.- EE)	Dr. Maben Rabi	Member
8.	Course Coordinator (B.Tech.- ME)	Dr. Dhiraj V Patil	Member
9.	Course Coordinator (M.Tech. (Energy Materials))	Dr. Atul Dhar	Member
10.	Course Coordinator (M.Sc. (Chemistry))	Dr. Aniruddha Chakraborty	Member
11.	Course Coordinator (M.Tech-BioTech)	Dr. Shyam K Masakpalli	Member
12.	Course Coordinator (I-Ph.D.)	Dr. Hari Varma	Member
13.	Nominee-1: School of Engineering	Dr. Anil Kishan	Member
14.	Nominee-1: School of Computing & Electrical Engineering	Dr. Padmanabhan	Member
15.	Nominee-2: School of Computing & Electrical Engineering	Dr. Bhakti Joshi	Member
16.	Nominee-1: School of Basic Sciences	Dr. Aditi Halder	Member
17.	Nominee-2: School of Basic Sciences	Dr. Prasanth P Jose	Member
18.	Nominee-1: School of Humanities & Social Sciences	Dr. Suman S	Member
19.	Academic Affairs Secretary : Student Member	Mr. Paawan Mukker	Member
20.	Research Affairs Secretary: Student Member	Ms. Moumita Ganguli in place of Mr. Ajay	Member
21.	Assistant Registrar (Academics)	Mr. Vivek Tiwari	Secretary

Following members could not attend the meeting

1	Course Coordinator (M.Sc.-Applied Maths)	Dr. Rajendra Ray	Member
2	Course Coordinator (M.Tech-VLSI)		Member
3	Course Coordinator (B.Tech.- Civil)	Dr. Deepak Swami	Member
4	Course Coordinator (IC Courses)	Dr. Bharat S Rajpurohit	Member
5	Course Coordinator (SHSS courses)	Dr. Rahul Vaish	Member
6	Nominee-2: School of Engineering	Dr. Mohammad Talha	Member
7	Nominee-2: School of Humanities & Social Sciences	Dr. Manu Devadevan	Member

PART-A

(Issues discussed by the BoA when the Student Members were present)

- 14.1 Confirmation of Part-A minutes of the 13th meeting of Board of Academics:**
The Part-A minutes of the 13th meeting of Board of Academics (BoA) held on 27th June, 2016 were confirmed.
- 14.2 Action Taken Report**
The BoA noted the actions taken on the decisions taken in the 13th Board of Academics meeting.
- 14.3 To consider courses presentation by CPC:**
The Chairperson, CPC, presented the following two courses to the BoA:
(i) EE-611P: VLSI Fabrication Practicum
(ii) HS 541: Technical Communication
After due deliberations the BoA recommended the courses for approval by the Senate. The courses are placed as Annexure-A.
- 14.4 One time approval (OTA) of the courses already taken by the graduating students:**
(a) The Associate Dean (Courses) presented a list of the courses taken by the graduating batch of students for one time approval by the Senate. The list is placed as Annexure-B. The BoA recommended it to the Senate for approval.

(b) Board also recommended that the courses PH-413 Quantum Mechanics-I and PH-411 Mathematical Physics which were taken by B.Tech students of the graduating batch for One Time Approval to include these in minor basket for the award of minor degree in 'Applied Physics'.
- 14.5 To consider award of Ph.D., MS (by Research), M.Tech., M.Sc. (Chemistry), and B.Tech. degree on the registered students who have completed all the requirements of the degree.**

The board recommended the following lists of the students who have completed all the requirements for the above degrees to the Senate for award of the degree during 4th Convocation scheduled to be held on October 10, 2016.

a) Doctor of Philosophy (Ph.D.)

Sl. No	Name & Roll No.	School	Date of Joining/Date of Completion	Thesis Title	Guide	Viva- Voce Board	External Examiners
1	Diwaker (D10011)	SBS	DoJ:19.10.2010 DoC:11.12.2015 (5 Years, 2 months)	Exact Solution of Few Multistate Problems in Quantum and Statistical Mechanics	Dr. Aniruddha Chakraborty	Dr. Prasanth P Jose (Chairman) Dr. N. Sathyamurthy (Examiner) Dr. Rajesh Kumar (Specialist) Dr. Hari Varma (Nominee) Dr. Pradyumna Pathak Dr. Viswanath Balakrishnan	Prof. Eli Pollak (Weizmann Institute of Science) Dr. N. Sathyamurthy (ISER, Mohali)
2	Abhishek Chaudhary (D10012)	SBS	DoJ:19.10.2010 DoC:11.03.2016 (5 Years, 5 months)	Anisotropic Gold Nanoparticles for Sensors, Protein Conformation Studies and Sustained Drug Release	Dr. Chayan Kant Nandi	Dr. Prasanth P Jose (Chairman) Dr. Pramit K. Chowdhary (Examiner) Dr. Ganga Ram Chaudhary (Specialist) Dr. Subrata Ghosh Dr. Suman K. Pal	Prof. Reinhard Zellner (University of Duisburg- Essen) Prof. Pramit K Chowdhury (IIT Delhi)
3	Chander Kant Sushel (D10015)	SE	DoJ:01.03.2011 DoC:26.07.2016 (5 Years, 4 months)	Geometric Nonlinear Shape and Vibration control of Functionally Graded Smart Structures	Dr. Rajeev Kumar (Guide) Dr. Vishal Singh Chauhan (co-guide)	Dr. Bharat S Rajpurohit (Chairman) Dr. S. Narayanan (Examiner) Dr. Rajneesh Sharma (Specialist) Dr. Sudhir K Pandey Dr. Atul Dhar Dr. Syed Abbas Dr. Subrata Ghosh	Prof. Sathya V Hanagud (Georgia Institute of Technology) Prof. S. Narayanan, (IIT Madras)
4	Ashish Kumar (D10016)	SBS	DoJ:01.03.2011 DoC:23.09.2016 (5 Years, 6 months)	Photoionization Dynamics of Some Free and Confined Atomic Systems	Dr. Hari Varma (guide) Prof. P. C. Deshmukh (Co-guide)	Dr. Prasanth P Jose (Chairman) Dr. Rajesh Srivastava (Examiner) Dr. Yugul Khajuria (Specialist) Dr. Bindu Radhamany Dr. C.S.Yadav	Prof. Anthony F Starae (University of Nebraska) Dr. Rajesh Srivastava (IIT Roorkee)
5	Hari Vansh Rai Mittal (D11023)	SBS	DoJ:31.07.2011 DoC:26.07.2016 (5 Years, 0 months)	A Class of Higher Order Accurate Schemes for Fluid Interface Problems	Dr. Rajendra K Ray	Dr. Prasanth P Jose (Chairman) Dr. Y.V.S.S.Sanyasiraju (Examiner) Dr. Manoranjan Mishra (Specialist) Dr. Manoj Thakur Dr. Syed Abbas Dr. P Anil Kishan Dr. Muslim Malik	Prof. Jitesh S.B.Gajjar (University of Manchester) Prof. Y.V.S.S.Sanyasiraju (IIT Madras)
6	Satyansh Patel (D12076)	SE	DoJ:31.07.2012 DoC:14.05.2016 (3 Years, 10 months)	Investigation of Solid State Refrigeration Potential in $\text{Ba}_{0.85}\text{Ca}_{0.15}\text{Zr}_{0.1}\text{Ti}_{0.9}\text{O}_{3}$ -based Ferroelectric Ceramics	Dr. Rahul Vaish	Dr. Vishal S Chauthan (Chairman) Dr. K.B.R. Varma (Examiner) Prof. S. Ray (Specialist) Dr. Rajeev Kumar Dr. Atul Dhar Dr. Manoj Thakur	Prof. Jurgen Rodel (TU Darmstadt) Prof. K.B.R. Varma (IS, Bengaluru)

b) Master of Science (M.S. (by Research))

Sl. No	Name & Roll No.	School	Date of Joining/ Date of Completion	Thesis Title	Guide	Academic Progress Committee	External Examiners
1	Manoj Dhiman (S12024)	SE	DoJ:31.07.2012 DoC:28.07.2016 (4 Years, 0 months)	Salt Fingers in Two and Three Dimensions	Dr. O.P.Singh	Dr. Rajeev Kumar (Chairman) Dr. Atul Dhar Dr. P Anil Kishan Dr. Rajendra K Ray	Dr. Prodyut R Chakraborty (IIT Jodhpur) Dr. Kirti Chandra Sahu (IIT Hyderabad)
2	Abhijeet Sachdev (S13004)	SCEE	DoJ: 29.07.2013 DoC:27.06.2016 (2 Years, 11 months)	Example-Specific Density Based Matching Kernels for Varying Length Patterns of Speech and Images	Dr. A.D. Dileep	Dr. Anil K Sao (Chairman) Dr. Pratibha Garg Dr. Padmanabhan Rajan	Dr. Shirish K Shevade (IISc Bangalore) Dr. Balaraman Ravindran (IIT Madras)
3	Manish Sharma (S13007)	SE	DoJ: 29.07.2013 DoC:12.04.2016 (2 Years, 9 months)	A study on solar energy harvesting using pyroelectric materials	Dr. Rahul Vaish (Guide) Dr. Vishal S Chauhan (Co-guide)	Dr. O.P.Singh (Chairman) Dr. Mohammad Talha Dr. Atul Dhar Dr. Satinder Sharma	Dr. Mahesh Kumar (IIT Jodhpur) Dr. Srinibas Satapathy (RRCAT, Indore)
4	Monisha Rastogi (S13011)	SE	DoJ:14.02.2014 DoC: 24.02.2016 (2 Years, 0 months)	Ab Initio Molecular Dynamics and DFT Calculations as Support Tool and Predecessor to Experimental Investigations of New Energy Materials	Dr. Rahul Vaish	Dr. Vishal S Chauhan (Chairman) Dr. Arpan Gupta Dr. Rajeev Kumar Dr. C.S.Yadav	Dr. Neelam Kumari (CSIR, Chandigarh) Dr. Satyendra Singh (JNU, New Delhi)

c) **Master of Technology in Energy Engineering with Specialisation in Materials:**

Sl. No.	Roll No.	STUDENT NAME
1	T14001	Abhishek Singh
2	T14003	Nitesh Das
3	T14004	Ram Krishan

d) **Master of Science in Chemistry:**

Sl. No.	Roll No.	STUDENT NAME
1	V14001	Arpit Bharadwaj
2	V14002	Diksha Gambhir
3	V14003	Prashant Gupta
4	V14004	Reena
5	V14005	Rituporn Gogoi
6	V14006	Shifali Bajaj
7	V14007	Snigdha Jain
8	V14009	Vaidehi Pandit
9	V14010	Vikky
10	V14011	Vinod Kumar

- e) **Bachelor of Technology (B.Tech.) in Computer Science and Engineering**
45 students have completed all the requirements for the award of 'Bachelor of Technology' degree in Computer Science and Engineering. Their names and Roll. Nos. are as given below:

Sl. No.	Roll No.	Student Name	Sl. No.	Roll No.	Student Name
1	B12001	JAYDEEP KUMAR GONDALIYA	24	B12024	AMBUJ SOM
2	B12002	SOHIL SAMIR SAVLA	25	B12025	JYOTI
3	B12003	AKANKSHA GUPTA	26	B12027	AADIL AHMAD ANSARI
4	B12004	NEERAJ SHARMA	27	B12028	ABHAY PRATAP SINGH
5	B12005	AMAN GROVER	28	B12029	A SANJEEVA RAIDU
6	B12006	MOHIT SHARMA	29	B12030	HIMANSHU KAMBOJ
7	B12007	RISHIKESH BARVE	30	B12031	NANDESHWAR HIMANSHU MAHADEO
8	B12008	KAUSTUBH MALLIK	31	B12032	SUNIL KUMAR
9	B12009	MD ANZER MOID	32	B12033	ANKIT KUMAR GAUTAM
10	B12010	HRUDAYA RANJAN SAHOO (With Minor in German Language)	33	B12035	MRSRINATH
11	B12011	KARRA SAITEJA REDDY	34	B12036	PAWAN KUMAR
12	B12012	MANI KUMAR	35	B12038	RAMAVATH SAIKIRAN
13	B12013	AMAN GARG	36	B12039	AJAY KUMAR
14	B12014	NIKHIL GARG (With Minor in Management)	37	B12053	MS ANSHU SHARMA
15	B12015	ROHIT PATIYAL	38	B12059	DEVANG BACHARWAR
16	B12016	SEHAJ DUGGAL	39	B12066	GAUTAM VIJ
17	B12017	JIBRAAN SINGH CHAHAL	40	B12068	GAUTAM SURI
18	B12018	NEHA GUPTA	41	B12069	SANDESH KUMAR SINGH * (With Minor in Applied Physics)
19	B12019	ADITYA CHAUHAN	42	B12101	MEHTA KUMAR JITESH
20	B12020	SHIVAM SATIJA	43	B12114	VARIGONDA PAVANTEJA
21	B12021	PARMAR ANANDKUMAR KISHORBHAI	44	B12120	ABHISHEK CHAUDHARY
22	B12022	TEJPAL YADAV	45	B12130	AMIT YADAV
23	B12023	SUBHASH KUMAR (With Minor in Management)			

* Subject to the approval of the course in the minor basket.

- f) **Bachelor of Technology (B.Tech.) in Electrical Engineering**
32 students have completed all the requirements for the award of 'Bachelor of Technology' degree in Electrical Engineering. Their names and Roll. Nos. are as given below:

Sl. No.	Roll No.	Student Name	Sl. No.	Roll No.	Student Name
1	B12051	VIKRAM PALIWAL	17	B12075	HIMANSHU RATHORE
2	B12052	YOGESH JAIN	18	B12076	SHRUTI PAL
3	B12055	SARVESH KUMAR GUPTA (With Minor in Applied Physics)	19	B12078	R ROHIT KUMAR
4	B12056	KARTIK JAIN	20	B12079	MUJAVAR RASUL NABILAL (With Minor in German Language)
5	B12057	ZOHAIB MAJEED	21	B12080	PARAMJIT SINGH
6	B12058	ANUP MISHRA	22	B12081	NIRAJ KUMAR SINGH

7	B12060	GUMMULURU PANNAGA SAMEER KAUSHIK	23	B12082	SANDEEP KUMAR
8	B12061	PESALA ROHITH VENKATA	24	B12083	ANIL KUMAR MATHUR
9	B12063	CHERUKURI SUMANTH	25	B12086	PEETALA SNEHITH RANA
10	B12064	AITA AVINASH NATH	26	B12087	ROHIT RAGHAV
11	B12067	DIVAKAR MAURYA	27	B12088	BHUVNESH MEENA
12	B12070	SHREYA TANGRI	28	B12089	RAHUL KUMAR MEENA
13	B12071	BHUJADE RAHUL SADANAND	29	B12090	KAJAL MEENA
14	B12072	PRASHANT KUMAR <i>(With Minor in German Language)</i>	30	B12037	REETA MEENA
15	B12073	SUBHASH KUMAR	31	B12122	SAKSHAMA GHOSLYA
16	B12074	SUDHEER KUMAR	32	B12129	SEELA AISWARYA

g) Bachelor of Technology (B.Tech.) in Mechanical Engineering

35 students have completed all the requirements for the award of 'Bachelor of Technology' degree in Mechanical Engineering. Their names and Roll. Nos. are as given below:

Sl. No.	Roll No.	Student Name	Sl. No.	Roll No.	Student Name
1	B12102	AMLADI AMOGH GAUTAM <i>(With Minor in German Language)</i>	19	B12125	DEVENDER KUMAR
2	B12103	RISHABH RANJAN SINGH	20	B12126	ADESH KUMAR
3	B12104	DESHINGE AKSHAY AJAY	21	B12127	MOHD ZAKIR HUSSAIN
4	B12105	KUNAL JOSHI	22	B12128	BOPANA KARTHIKEYULU
5	B12106	NIKHIL KUMAR KAYATHWAL	23	B12131	ANURAJ G P
6	B12107	AARJAV MALHOTRA	24	B12132	ABHISHEK BADWAN
7	B12108	PRATEEK GAUBA	25	B12133	HEMANT KUMAR
8	B12109	KUMAR VAIBHAV	26	B12135	AKSHAY KUMAR RAMTEKE
9	B12110	AMAN AGRAWAL	27	B12136	PARAMJIT SINGH KAINTH
10	B12111	MAYANK SINGH RAJPUT	28	B12137	ROHIT KUMAR BHARTI
11	B12112	DHRUV VASHISTH	29	B12138	VIPIN RAJ MEENA
12	B12113	ANKIT AGARWAL	30	B12139	RAMRAJ MEENA
13	B12115	SREEPADA VENKATA RATNA KIRITI	31	B12140	MANISH KUMAR BHUARYA
14	B12117	UDAY SOOD <i>(With Minor in Applied Physics)</i>	32	B12054	GOURAV PANWAR
15	B12119	MOHIT BHATIA <i>(With Minor in German Language)</i>	33	B12062	GARIMELLA HARIKA
16	B12121	KRISHNA WALSE	34	B12065	MONIL CHUGH
17	B12123	SHISHIR PRIYADARISI	35	B12084	HIMANSHU RANJAN
18	B12124	RAJAT RAJ			

14.6 Requirement of ISTP in B.Tech (Honors) programme:

The board deliberated on the issue and agreed to recommend the proposal to the Senate for additionally including ISTP as a requirement for the B.Tech. (Honors) programme. This will be made effective for the students admitted in the year 2014, who would be graduating in the year 2018. As a consequence of this recommendation, clause 'c' of B.Tech. (Honors) guidelines will be as follows:

'Student should do MTP and ISTP compulsorily and obtain a grade of 'B' or above in these courses.'

14.7 Introduction of ISTP and MTP as an additional requirement for Awards & Medals to be given during the Convocations:

The Chairman, BoA presented the following proposals for the consideration of members:

- Inclusion of good performance in both ISTP and MTP courses as eligibility criteria for all medals and awards conferred in the Convocation.
- To include additional academic achievement parameters in addition to CGPA for president Gold Medal and Awards for standing first in respective discipline and year.

The BoA deliberated on this proposal and constituted a committee comprising of Dr. Atul Dhar (Coordinator), Dr. Padmanabhan Rajan and Dr. Aditi Halder to consider the views expressed by the members and to make recommendation.

14.8 Any other item with the permission of the Chair.

On the request of the Academics Secretary, the Chairperson assured the board that a compiled handbook of rules approved by the Senate will be prepared and shared with the students.

PART-B

(Issues discussed by the BoA without the Student Members being present)

14.1 Confirmation of Part-A minutes of the 13th meeting of Board of Academics:

The Part-A minutes of the 13th meeting of Board of Academics held on 27th June, 2016 were confirmed.

14.2 Action Taken Report

The Board of Academics noted the actions taken on implementation of the decisions taken in the 13th Board of Academics meeting.

14.3 Change in rules for admission in in B.Tech. programme:

The board discussed on the following proposals and decided to recommend it to the Senate:

- (i) Non-PIO/OCI foreign candidates, BOTH of whose parents are also not Indian/OCI/PIO, may be permitted to write JEE (Advance) without qualifying through JEE (Main).
- (ii) Not to allow a student who has already joined an IIT to take JEE (Adv) the next year so that s/he can rejoin in another branch and/or another IIT.

14.4 Any other item with the permission of the Chair.

None

VLSI Fabrication Practicum

Course number: EE-611P

Credit: 0-0-3-2 (L-T-P-C)

Prerequisite: Device modeling and microelectronics (EE 519)

Students intended for: M.Tech. in EE (VLSI)

Elective or Core: Core

Semester: Even

Preamble: This course designed to build up the in depth understanding among the PG students (VLSI specialization) about the VLSI state of art technology. The major goal of this course is to make the students familiarized with device fabrications and characterizations to demonstrate the basic concepts of different device operations and their characteristics for certain real world applications. Clean room, vacuum technology, thin films or nanostructures deposition by physically and chemically are integral part of the course. Additionally, it will illustrate the students the concepts discussed in the class room teaching and give an opportunity to build, feel and test real systems in the lab. Moreover, the application orientated devices such as MOS capacitor diode, photo-detector, bio or gas sensors will also be fabricated by the students in the lab. As summarized, the objective of this course is to provide an understanding of the state of the art microelectronics fabrication processing technologies.

Course content:

Module: 1 Basic clean room training and introduction to instruments

[3 hours]

- Clean room: do's and don'ts
- Identification of wafers and its type
- Wafer dicing techniques
- Standard wafer cleaning procedures (RCA)
- Instruments: oxidation furnace, pulsed layer deposition, plasma enhance chemical vapor deposition and RF sputtering, spin coater, thermal evaporator, mask aligner, electron beam lithography (EBL), reactive ion etching (RIE), mask less lithography, atomic force microscopy, parametric analyzer, probe station.
- Wet bench demonstration

Experiment 1:

Draw a comprehensive wafer clean process flow/cleaning of wafer and validate the hydrophobic and hydrophilic nature through contact angle measurements.

Module: 2 Metal-Semiconductor contact fabrications and characterizations

[3 hours]

- Design and fabricate metal semiconductor junction
- Characterize it to determine its nature (Ohmic / Schottky)
- If Schottky, deduce the Schottky barrier height and built-in potential from both I-V and C-V characteristics. Discuss the results.

Experiment 2:

- a) Ag/p-type Si based Schottky barriers fabrication and characterization
- b) Al/n-type Si based Schottky barriers fabrication and characterization.

Module: 3 MOS capacitor fabrications and characterizations

[3+3+3 hours]

- Design and fabricate a MOS based diode using a standard deposition and lithography techniques.
- Observe the current voltage (I-V) characteristics.
- Determine the On resistance, ideality factor, reverse saturation current, breakdown voltage and explain the result with respect to material quality.
- Observe capacitance voltage (C-V) characteristics at different frequency.

Experiment 3:

- a) Basic process flow for NMOS device fabrication having constant transistor channel width $W=10$ micron and $L=5$ to 12 micron
- b) Photolithography process flow.
- c) Fabrication and characterization of Si/SiO₂/Al based MOS device

Module: 4 Transistor fabrications and characterizations

[3+3+3 hours]

- Design and fabricate a MOSFET/MESFET device using standard thin film and lithography techniques.
- Characterize material compositions; observe topography, measure thickness of films.
- Measure drains current, transfer and gate leakage current characteristics.
- Comment on linearity and gain of the transistor
- Determine threshold voltage, breakdown voltage and sub-threshold slope.
- Discuss the application areas of the fabricated FET depending on the obtained results.

Experiment 4:

- a) Diffusion process flow with subsequent steps for dry diffusion, implantation and wet diffusion.
- b) Fabrication and characterization of SiO₂ and High-k based n/p-MOSFET and characterization.

Module: 5 Sensor device fabrications and characterizations

[3+3+3 hours]

- Design and fabricate a sensor device for gas or pressure.
- Characterize physical properties.
- Characterize sensitivity (response magnitude), stability, reproducibility, baseline recovery, selectivity.
- Determine response time, recovery time.

Experiment 5:

- a) Fabrication and characterization of thin film based acoustic/ gas/chemical/ biological sensors: e.g Palladium/ Si based hydrogen gas sensors.
- b) Fabrication and characterization of ID/comb/accelerometer structure based gas/chemical/biological sensors.

Module: 6 Photo detector fabrications and characterizations

[3+3+3 hours]

- Design and fabricate a photo-detector using metal-semiconductor-metal configuration.
- Characterize photo-responsivity, time domain response, repeatability and stability.
- Determine quantum efficiency, sensitivity, linearity, time constant, and leakage current.

Experiments 6:

Synthesis and characterization of CuCl or CuBr deposition on Si for blue light emission or electroluminescence or ultraviolet applications.

[Note: Different types of quantum structures (heterojunction, nanowire, quantum dots) based on different types of materials such as oxides, compound semiconductor, polycrystalline or two dimensional may be further used to realize the above applications]

Text book:

1. S. M. Sze, VLSI Technology, 2nd Edition.
2. Sorab K. Ghandhi, VLSI Fabrication Principles: Silicon and Gallium Arsenide, 2nd Edition.
3. Dieter K. Schroder, Semiconductor Material and Device Characterization, 3rd Edition.

Reference books:

1. James D. Plummer, M. D. Deal and P. B. Griffin, Silicon VLSI Technology: Fundamentals, Practice and Modeling
2. E. H. Nicollian, J. R. Brews, MOS (metal oxide semiconductor) physics and technology.

Other Faculty interested in teaching this course: – Dr. Satinder Kumar Sharma

Proposed by: Dr. Ankush Bag

School: SCEE

Signature

Date: September 30, 2016



Recommended/Not Recommended, with Comments:

Date: _____

Chairman, CPC

Approved / Not Approved

Date: _____

Chairman, Senate

Technical Communication

Course Number: HS 541

Course Title: **Technical Communication**

Credit: **1-0-1**

Prerequisites: **None**

Students intended for: **MS/Ph.D**

Elective or Compulsory: **Elective/Mandatory**

Semester: **Odd/Even**

Course Permeable:

This course is designed to serve as a basic introduction to the practice of technical writing for those who work as scientists and technical researchers. We will refine methods for composing documentation, proposals, analyses, and articles, and consider strategies for organizing and condensing technical information. Several short writing assignments, frequent revisions, and two short oral presentations are required. Some assignments will be individual while others will be collaborative.

Course Outline:

I. Scope and Objective of the course:

The goal of this course is to help students become better able to accomplish the writing that is needed for academics/research. Specifically, the course is designed to help students develop abilities to do the following things:

1. Acquire a sense that writing to effects, and to communicate academic and research interests.
2. Constructively read and respond to colleagues' work.
3. Become better at and be able to reflect on and manage the composing process; drafting, revising, and copy-editing.

II. Course Plan:

1. Introduction

(1 Contact hour)

Technical Writing Style

In-class Writing Sample

2. Technical Writing Style (cont.)

(1 Contact hour)

Overview of Formal Paper

Weinberg, Alvin. "Can Technology Replace Social Engineering?" In *Technology and the Future*. (1966) 10 Ed. By Albert H. Teich. New York: Wadsworth Publishing, 2005.

3. Writing Style continued... Discussion of Carson's "The Obligation to Endure" (2 Contact hours)

Carson, Rachel. "The Obligation to Endure," chapter 2 in *Silent Spring*. 104th anniversary ed. New York, NY: Mariner Books, 2002. ISBN: 9780618249060. (Originally published in 1962. Any edition will do.)

Workshop: Critical Review

4. Overview of 6 Articles (2 Contact hours)

Overview of APA Citation Format

[Holton, W. Conrad. "Power Surge: Renewed Interest in Nuclear Energy." *Environmental Health Perspectives* 113, no. 11 (November 2005): A742-A749.

Charman, Karen. "Brave Nuclear World?" *World Watch* 19, no. 4 (July/August 2006): 12-20.
Stem Cell Research

Mieth, Dietmar. "Going to the roots of the stem cell debate." *EMBO Reports* 1, no. 1 (July 15, 2000): 4-6.

Cohen, Eric. "Science, Democracy, and Stem Cells." *Philosophy Today* 48, no. 5 (2004): 23-29.
GM Food

Cayford, Jerry. "Breeding Sanity into the GM Food Debate." *Issues in Science and Technology* 20, no. 2 (Winter 2004): 49-56.

Goklany, Indur M. "The Future of Food." *Forum for Applied Research and Public Policy* 16, no. 2 (Summer 2001): 59-65.]

5. Structuring the Critique (1 Contact hours)

Writing a Summary

Citing Sources

6. Literature Review (3 Contact hour)

Overview of Sample Literature Reviews

Review Student Written Abstracts

General Introduction to the Literature Review

Sample Literature Reviews

Brown, Robert D., and Copper, Susan M. "The Nutritional, Ecological, and Ethical Arguments Against Baiting and Feeding White-Tailed Deer." *Wildlife Society Bulletin* 34, no. 2 (June 2006): 519-524.

Colvin, Jan, and Jane Lanigan. "Ethical Issues and Best Practice for Internet Research." *Journal of Family and Consumer Science* 97, no. 3 (September 2005): 34-39.

Peslak, Alan R. "An Ethical Exploration of Privacy and Radio Frequency Identification." *Journal of Business Ethics* 59 (2005): 327-345.

7. Oral Presentation with PowerPoint or Overheads (3 Contact hours)

Use of visual aids

Power point

Edward R. Tufte. *The Cognitive Style of Power Point*. NY: Graphics Press, 2006.

ISBN 0961392169, 9780961392161

Reference

Perelman, Leslie C., and Edward Barrett. *The Mayfield Handbook of Scientific and Technical Writing*. New York, NY: McGraw-Hill, 1997. ISBN: 9781559346474.

General Resources

Day, Robert A., and Barbara Gastel. *How to Write and Publish a Scientific Paper*. 6th ed. Westport, CT: Greenwood Press, 2006. ISBN: 9780313330407.

---. *Scientific English: A Guide for Scientists and Other Professionals*. 2nd ed. Phoenix, AZ: Oryx Press, 1995. ISBN: 978-0897749893.

Hacker, Diana. *A Pocket Style Manual*. 4th spiral ed. New York, NY: Bedford/St. Martin's, 1999. ISBN: 9780312406844.

Jackson, Ian C. *Honor in Science*. Sigma Xi, The Scientific Research Society, Research Triangle Park, N. C., 1992.

Klotz, Irving M. *Diamond Dealers and Feather Merchants: Tales from the Sciences*. Boston: Birkhauser, 1986.

Merton, Robert K. *The Sociology of Science*. Chicago: University of Chicago Press, 1973.

Michaelson, Herbert B. *How to Write and Publish Engineering Papers and Reports*. 3rd ed. Phoenix, AZ: Oryx Press, 1990. ISBN: 9780897746502.

Sindermann, Carl J. *The Joy of Science*. New York: Plenum Publishers, 1985.

Wilkinson, Antoinette M. *The Scientist's Handbook for Writing Papers and Dissertations*. Upper Saddle River, NJ: Prentice Hall, 1991. ISBN: 9780139694110.

William, Joseph M. *Style: Ten Lessons in Clarity and Grace*. 9th ed. New York, NY: Longman, 2006. ISBN: 9780321479358.

Wilson, E. Bright. *An Introduction to Scientific Research*. New York: McGraw-Hill, 1952.
"The Science of Scientific Writing." *American Scientist* 78 (Nov-Dec 1990): 550-558.

Other Faculty Members interested in teaching this course:

Proposed by: Dr. Aruna Bommareddi

School: SHSS

Signature _____ Date _____

Approved / Not Approved

_____ Date: _____

Chairman, Senate

Annexure-B

(1) The following are the courses taken by the 4th batch of graduating B.Tech students, M.S., Ph.D. 1st batch of graduating M.Sc.(Chemistry) & M.Tech on (2016 October Convocation) of IIT Mandi for which there are some changes in Course Name or Course Code or credit structure from the Senate approved courses.

Sl. No.	Course No (Credits in bracket)	Course Name	Semester in which this course was offered	Faculty Name	Remarks
1	CS-207(2)	Database Practicum	3S (Aug-Dec 2013)	Dr. Sukumar Bhattacharya	Approved in 9th senate with name Applied Database Practicum CS-207(2)
2	CS-302(4)	Paradigms of Programming	5S (Aug-Dec 2014) 2013 Batch 5S (Aug-Dec 2015)	Dr. Sukumar B Dr. Sriram Kailasam	Approved in 9th senate with 2 credits.
3	CS-561(3)	Big Data and Map Reduce	8S (Jan-July 2016)	Dr. Arti Kashyap	Approved in 9th senate with name Map Reduce and Big Data and 3 credits
4	HS-301(3)	Public Policy and Advocacy Skills	3S (Aug-Dec 2013)	Dr. Varun Dutt	Approved in 2nd adhoc meeting with name Policy Analysis and Advocacy Skills and 3 credits
5	MA-551(3)	Numerical Methods	6S (Jan-July 2015) 2013 Batch: Ph.D. (Aug-Dec 2015)	Dr. Muslim Malik	Approved in 8th senate with name Numerical Analysis and 3 credits
6	ME-352(3)	Finite Element Methods	6S (Jan-July 2015)	Dr. Rajeev Kumar	Approved in 3rd senate with name Finite Element Methods in Engg and 3 credits
7	PH-506(3)	Physics Project Course	5S (Aug-Dec 2014)	Dr. Ajay Soni	Approved in 2nd adhoc meeting with name Physics Project and 3 credits
8	MA-702 (3)	Numerical Analysis	Ph.D. (Aug-Dec 2011)	Dr. Rajendra K Ray	Approved in 8 th senate with MA-551(3) (Numerical Analysis) but again Approved in 10 th senate with MA523(Numerical Analysis with 4 credits.
9	EE-693 (3)	Compressed Sensing and its Applications	M.S./Ph.D. (Jan-July 2014)	Dr. Anil K Sao	Approved in 2 nd Senate with CS-693 (Compressed Sensing and its applications and 3credits)

(2) The following are the courses taken by the 4th batch of graduating B.Tech students, M.S., Ph.D. 1st batch of graduating M.Sc.(Chemistry) & M.Tech on (2016 October Convocation) of IIT Mandi. The below courses have already been given OTA. Some of the courses are core courses at the respective branches. Therefore, One Time Approval is further required:

Sl. No	Course No. (Credits)	Course Name	Sem in which this course was offered	Faculty name	Remarks
1	CS-304(3)	Automata Theory	5S (Aug-Dec 2014) 7S (Aug-Dec 2015)	Dr. Samar Agnihotri	convocation adhoc (Oct 2013)
2	CS-310(4)	Introduction to Communicating Distributed Processes	6S (Jan-July 2015) 8S (Jan-July 2016)	Dr. Aditya Nigam	OTA in 3 rd convocation (Oct 2015) / In 9 th senate approved with 3 credits
3	CS-507(3)	Advanced Computer Architecture	6S (Jan-July 2015)	Dr. B.D. Chaudhary	OTA in 2 nd convocation (March 2015)
4	CS-601(3)	Probability & Random Processes	7S (Aug-Dec 2015) M.S.(Aug-Dec 2013)	Dr. Arnav B Dr. Manoj Thakur	convocation adhoc (Oct 2013)
5	CS-669(4)	Pattern Recognition	5S (Aug-Dec 2014) 7S (Aug-Dec 2015)	Dr. Dileep A D	OTA in 3 rd convocation (Oct 2015)
6	CS-670(4)	Kernal Methods for Pattern Recognition (NKN)	6S (Jan-July 2015)	Dr. Dileep A D	OTA in 2 nd convocation (March 2015)
7	EE-607(3)	Optical Communication Systems	7S (Aug-Dec 2015)	Dr. Abhishek Dixit	convocation adhoc (Oct 2013)
8	HS-252(3)	Introduction to Psychology	5S (Aug-Dec 2014) 7S (Aug-Dec 2015)	Dr. Shail Shankar	convocation adhoc (Oct 2013)
9	HS-344(3)	Introduction to Sociology	5S (Aug-Dec 2014) 7S (Aug-Dec 2015)	Dr. Ashok M	convocation adhoc (Oct 2013)
10	MA-605(3)	Statistical Data Analysis	5S (Aug-Dec 2014) 7S (Aug-Dec 2015)	Dr. Sarita Azad	OTA in 2 nd convocation (March 2015)
11	ME-308(3)	Manufacturing	5S (Aug-Dec 2014)	LC: Dr. Jaspreet	convocation adhoc

		Engineering	7S (Aug-Dec 2015)	Kaur Dr. Satvasheel	(Oct 2013)
12	ME-310(2)	Thermo-fluid lab	7S (Aug-Dec 2015)	Dr. P Anil Kishan	OTA in 2 nd convocation (March 2015)
13	ME-311P(1)	Design Lab I	6S (Jan-July 2015) 7S (Aug-Dec 2015)	Dr. Vishal Chauhan	OTA in 3 rd convocation (Oct 2015)
14	ME-312P(1)	Design Lab II	7S (Aug-Dec 2015)	Dr. Arpan Gupta	OTA in 3 rd convocation (Oct 2015)
15	ME-355(3)	Internal Combustion Engine	6S (Jan-July 2015)	Dr. Atul Dhar	convocation adhoc (Oct 2013)
16	ME-452(4)	Robotics and Control	6S (Jan-July 2015) 8S (Jan-July 2016)	LC: Dr. Jaspreet Kaur Dr. Arpan Gupta	OTA in 3 rd convocation (Oct 2015)
17	ME-617(3)	Mechanics of Composite Materials	6S (Jan-July 2015)	Dr. M. Talha	OTA in 2 nd convocation (March 2015)

- (3) The following are the courses which were taken by the 4th batch of graduating B.Tech students, M.S., Ph.D. 1st batch of graduating M.Sc.(Chemistry) & M.Tech on (2016 October Convocation) of IIT Mandi. The below courses are not approved, therefore, One Time Approval is required:

Sl. No.	Course Code (Credits in bracket)	Course Name	Semester in which this course was offered	Faculty name	Remarks
1	CS-404(3)	Embedded Linux	7S (Aug-Dec 2015)	Dr. Mark Yoder	Not Approved
2	CS-405(3)	Verification of Reactive Systems	8S (Jan-July 2016)	Dr. Astrid	Not Approved
3	HS-305(3)	Science Writing	8S (Jan-July 2016)	Dr. Aruna B	Approved in 9 th senate with course no. HS-358(3)
4	HS-349(3)	Indo-German Encounters	7S (Aug-Dec 2015)	Dr. Pramod Talgeri	Not Approved
5	HS-350(3)	Traditional Media	7S (Aug-Dec 2015)	Dr. Tripti singh	Approved in 10 th Senate with course name Traditional

					Media Arts
6	HS-382(3)	Social Movements in India	8S (Jan-July 2016)	Dr. Ashok Kumar	Approved in 9 th senate with course no. HS-536(3)
7	ME-623(3)	Fundamentals of Fracture Mechanics	8S (Jan-July 2016)	Dr. Rajesh Ghosh	Not Approved
8	PH-413(4)	Quantum Mechanics 1	7S (Aug-Dec 2015)	Dr. Pradeep Kumar	Not Approved
9	PH-424(4)	Atomic and Molecular Spectroscopy	8S (Jan-July 2016)	Dr. Hari Varma	Not Approved
10	PH-506(3)	Project	6S (Jan-July 2015)	Dr. Prasanth P Jose	Not Approved
11	PH-701 (3)	Advanced Electrodynamics	Ph.D. (Jan-July 2011)	Dr. Vojislav Rado	Not Approved
12	PH-703 (3)	Elementary Quantum Optics	Ph.D. (Jan-July 2011)	Dr. P. Pathak	Not Approved
13	MA-708 (3)	Research Methodology	Ph.D. (Jan-July 2012)	Dr. Rajendra Ray	Not Approved
14	PH-703 (3)	Electrodynamics	Ph.D. (Jan-July 2012)	Dr. Vojislav Rado	Not Approved
15	EM-602 (4)	Experiments in Material Science	MS/Mtech (Aug-Dec 2014)	Dr. Jaspreet Kaur	Not Approved
16	EM-500P (2)	Design Practicum	Mtech (Aug-Dec 2014)	Dr. Sudhir Pandey	Not Approved
17	EM-651(3)	Solar Photovoltaic Materials and Fabrication	Mtech (Jan-July 2015)	Dr. Kunal Ghosh	Not Approved
18	EM-604(4)	Environment Policy and Law	8S (Jan-July 2016)	Dr. Varun Dutt	Not Approved
19	DP-504P(4)	Mini Project	M.Sc.(Aug-Dec 2015)	Dr. Chayan Nandi	

- (4) The following are the courses taken by the 1st batch of I-Ph.D. (Physics) at IIT Mandi. One Time Approval is requested for the below courses.

Sl. No	Course No. (Credits)	Course Name	Sem in which this course was offered	Faculty name	Remarks
1	PH-411(4)	Mathematical Physics	Aug-Dec 2015	Dr. P Pathak	Approved in 10 th senate PH-511
2	PH-412(4)	Classical Mechanics	Aug-Dec 2015	Dr. Prasanth P Jose	Approved in 10 th senate PH-512
3	PH-413(4)	Quantum Mechanics 1	Aug-Dec 2015	Dr. Pradeep Kumar	Approved in 10 th senate PH-513 with 3 credits
4	PH-414(4)	Electronics	Aug-Dec 2015	Dr. Kaustav Mukherjee	Approved in 10 th senate PH-514 with 3 credits
5	PH-415P (3)	Electronics Laboratory Practicum	Aug-Dec 2015	Dr. Ajay Soni	Approved in 10 th senate PH-515P
6	PH-421(4)	Electromagnetic Theory	Jan-July 2016	Dr. C.S.Yadav	Approved in 10 th senate PH-521
7	PH-422(4)	Statistical Mechanics	Jan-July 2016	Dr. Prasanth Jose	Approved in 10 th senate PH-522
8	PH-423(4)	Condensed Matter Physics	Jan-July 2016	Dr. Ajay Soni	Approved in 10 th senate PH-523 with 3 credits
9	PH-424(4)	Atomic and Molecular Spectroscopy	Jan-July 2016	Dr. Hari Varma	Approved in 10 th senate PH-524 with 3 credits
10	PH-425P(3)	Physics Laboratory	Jan-July 2016	Dr. Kaustav Mukherjee & Dr. Suman K Pal	Approved in 10 th senate PH-525P
11	PH-426(1)	Seminar	Jan-July 2016	Dr. Hari Varma	Approved in 9 th senate PH-526

(5) The following are the courses taken by the graduating B.Tech.2012 batch students (2016 October, Convocation) of IIT Mandi while they were on Semester Exchange to BTH, TUM, etc..

Sl. No.	Course Code (Credits in bracket)	Course Name	Remarks
1	DV2541#(5)	Agent Systems	Course taken at BTH Sweden through Semester Exchange Programme
2	ET1446#(5)	Software Development For Telecommunication Systems	Course taken at BTH Sweden through Semester Exchange Programme
3	SV0008#(5)	Swedish Language Introduction I	Course taken at BTH Sweden through Semester Exchange Programme
4	SV0009#(5)	Swedish Language Introduction II	Course taken at BTH Sweden through Semester Exchange Programme
5	UD1431#(5)	Game Prototype Deveopment	Course taken at BTH Sweden through Semester Exchange Programme
6	ET2534#(5)	Simulation	Course taken at BTH Sweden through Semester Exchange Programme
7	MW0799#(3.33)	Introduction to Nuclear Energy	Course taken at TUM Germany through Semester Exchange Programme
8	MW1407#(3.33)	Computational Solid and Fluid Dynamics (MSE)	Course taken at TUM Germany through Semester Exchange Programme
9	MW1419#(3.33)	Thermodynamics for Energy Conversion	Course taken at TUM Germany through Semester Exchange Programme
10	MW1421#(3.33)	Dynamics of Mechanical Systems	Course taken at TUM Germany through Semester Exchange Programme
11	MW1475#(2)	Renewable Energy Technology I	Course taken at TUM Germany through Semester Exchange Programme
12	MW2149#(3.33)	Introduction to Wind Energy	Course taken at TUM Germany through Semester Exchange Programme
13	WI000031#(2)	Organizational Psychology	Course taken at TUM Germany through Semester Exchange Programme
14	MW0884#(3.33)	Fundamentals of Nuclear Engineering	Course taken at TUM Germany through

			Semester Exchange Programme
15	MW1364#(2.67)	Internal Combustion Engines	Course taken at TUM Germany through Semester Exchange Programme
16	MW1581#(3.33)	Fluid Machinery	Course taken at TUM Germany through Semester Exchange Programme
17	WI000688#(2)	Marketing	Course taken at TUM Germany through Semester Exchange Programme
18	MW2134#(2.67)	Computational Thermo-Fluid Dynamics	Course taken at TUM Germany through Semester Exchange Programme
19	MW2228#(3.33)	Aeroelasticity	Course taken at TUM Germany through Semester Exchange Programme
20	IN2227*(3.33)	Compiler Construction I	Course taken at TUM Germany through Semester Exchange Programme
21	IN2239*(3.33)	Algorithmic Game Theory	Course taken at TUM Germany through Semester Exchange Programme
22	IN2305*(4)	Cyber-Physical Systems	Course taken at TUM Germany through Semester Exchange Programme
23	IN2147*(3.33)	Parallel Programming	Course taken at TUM Germany through Semester Exchange Programme
24	MW1476#(2)	Renewable Energy Technology II	Course taken at TUM Germany through Semester Exchange Programme
25	MW1532#(3.33)	Thermal Power Plants (MSPE)	Course taken at TUM Germany through Semester Exchange Programme
26	MW1410#(3.33)	Heat Transfer (MSE)	Course taken at TUM Germany through Semester Exchange Programme
27	WI000158#(4)	Entrepreneurial Finance	Course taken at TUM Germany through Semester Exchange Programme