S 37.05 **To consider and approve new B.Tech. scheme of Electrical Engg. to incorporate project in 7th/ 8th semester of the scheme.**

The Senate in its 36th meeting held on 21.9.2019 vide item no. S 36.09 approved the guidelines for awarding Best Project Award. These guidelines will be applicable to both old B.Tech. (2016 batch) and new B.Tech. schemes (2017-18 onwards). HoD, Electrical Engg. was requested to make necessary changes in new B.Tech. scheme for Elect. Engg. so as to incorporate Project in 7th & 8th semester of the scheme.

The proposal as received from HoD, Elect. Engg. is enclosed as Annexure S 37.05 from pages 80 to 106.

The Senate may consider and approve new B.Tech. scheme of Electrical Engg. to incorporate project in 7th & 8th semester of the scheme.

DEPARTMENT OF ELECTRICAL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA-136119

No.EED/DAC/2019/1994 **Dated: 09/11/2019**

Minutes of the DAC Meeting

A meeting of the Departmental Affairs Committee (DAC) was held on 08.11.2019 at 04:00 PM in Conference Room E-112 (Ground Floor) of the Department. Following members were present:

1. Dr. A. Swarup
2. Dr.(Mrs.) Lillie Dewan
3. Dr. G.L. Pahuja
4. Dr. (Mrs.) Ratna Dahiya
5. Dr. L.M. Saini (In Chair)
6. Dr. (Mrs.) Jyoti Ohri
7. Dr. J.S.Lather
8. Dr. (Mrs.) Rupanshi Batra
9. Dr. (Mrs.) Monika Mittal
10. Dr. Atma Ram Gupta

The HOD welcomed the members before taking up the agenda items. Faculty members Dr. R.S. Bhatia, Dr. Ashwani Kumar Sharma, Dr. Sathans, Dr. Yashpal were on leave. Faculty member Dr. K.S. Sandhu could not attend the meeting.

Item I **To prepare new B.Tech scheme to incorporate Project in 7th & 8th semester of the scheme.**

Letter No. Acad./2019/1111 dated 15.10.2019 received from Dean (Academic) was discussed and minor changes were recommended by DAC for scheme of B.Tech. (Electrical Engineering) 8th semester. The old scheme is attached as Annexure-I and the new scheme with relevant changes is attached as Annexure-II.

Item II **To consider and approve the Paper Setter List for End Semester Exam Nov/Dec-2019.**

The DAC recommended the paper setter list attached as Annexure-III.

Item-III **To consider and approve the proposal of reviving M.Tech (Biomedical Engineering.**

The Head of Department informed the DAC that in previous years, GATE exam was not conducted in Biomedical Engg. and NIT Kurukshetra enforced GATE compulsory for admission in any branch of M. Tech. Students doing B. Tech. in Biomedical Engg were required to appear in GATE (Instrumentation) or GATE (Ec & CE) in order to take admission in M. Tech.(Biomedical), where they were tested for many subjects which they have not studied during their undergraduation. This results in their poor GATE score, which for most cases used to be less than the minimum qualifying

criteria. Hence, graduates in Biomedical Engg. could not take admission in Masters in Biomedical Engg. resulting into low intake at NIT, Kurukshetra. HOD requested GATE authorities by sending emails in all IITs resulting into a GATE exam in Biomedical Engineering from the year 2020. The DAC recommended admission to M.Tech. Biomedical Engineering from July, 2020. DAC also recommended appointment of regular faculty and Non-Teaching staff in the area of Biomedical Engineering.

Item-IV **To discuss preparation of department for NBA**

The letter Dean(P&D)/19/467 dated 05.11.2019 received from Dean (P&D) was discussed and the PG Section Heads were requested to do the needful.

Item-V **To consider proposal of Dr. Sathans and his team under SPARC.**

DAC recommends the SPARC proposal of Dr. Sathans and his team in the thrust area, "Future of Earth: Green and Renewable Technologies

Item-VI **Any other item with the permission of chair.**

Under this, two items were placed for discussion before HOD as under:

First item was regarding difficulties faced by M. Tech. 2nd year students (who are doing internship - Dissertation outside NIT, Kurukshetra) for appearing in viva-voce exam of "Evaluation for preparatory work for M.Tech. dissertation".

Second item was proposed by Dr. G. L. Pahuja to shift the course of Reliability Engineering in M. Tech. (Control System) from ODD Semester to Even semester so that it may run as Department/Open elective. HOD asked Dr. G. L. Pahuja to submit the proposal by modifying scheme and syllabi code etc. through PG section head of M. Tech. (CS).

For first item, it was notified via notice no. NITK/EED/2019/1981 dated 05.11.2019 circulated by HOD that students should appear by 11.11.2019. In this regard the Head of Department informed the DAC that he has received request from eight students to get evaluated for midterm evaluation of preparatory work for M.Tech. dissertation through SKYPE as they are facing difficulties in travelling To and Fro to NIT Kurukshetra (Annexure-III-A). DAC recommends that the students may be evaluated for the above said evaluation by Nov 21, 2019

09/11/19

(Dr. L.M. Saini)
Head of the Department

All DAC Member
Copy to:
1. Dean (Academic)
2. Sr. Secy. to Director for kind information of the Director

18.11.19 Ms Madhu to put as agenda

Ms Madhu

Annexure - I Old

B.Tech.(Electrical Engineering)

Semester VII

Sr. No.	Course Code	Course	L	T	P	Credit	
1	HSIR**	Management	3	0	0	3	EPR
2	EEPC41	Reliability Engineering	3	1	0	4	PC17
3	EEPC43	Advanced Power Electronics and Drives	3	1	0	4	PC18
4	EEPC45	Industrial Control	3	1	0	4	PC19
5	EEPE41	*				3	PE5
6	EEPE43	*				3	PE6
7	EELR41	Control Systems Lab-II	0	0	3	1	Lab PC15
8	EELR43	Advanced Power Electronics and Drives Lab	0	0	2	1	Lab PC18
			18/17	3	5/7	23	

* Elective(s) [PE/OE] offered from the list

Semester VIII

Sr. No.	Course Code	Course	L	T	P	Credit	
1	HSIR42	Professional Ethics & IPR	2	0	0	2	EPR
2	EEPC40	Power System Operation and Economics	3	0	0	3	PC20
3	EEPE40	*				3	PE7
4	EEPE42	*				4	PE8
5	EEPE44	*				3	PE9
6	EEIR42	Comprehensive Viva/Project			6	3	EPR
7	EEPC48	Seminar			2	2	
			14	0/1	10/8	19	

* Elective(s) [PE/OE] offered from the list

Semester	I	II	III	IV	V	VI	VII	VIII	Total
Credits	21	29	26	27	25	10	23	19	180

Old

BOS (EED) 24-05-2017

B.Tech.(Electrical Engineering)

List of Program Electives (PE) / Open Electives (OE)

PE / OE	Course Code	Course	L	T	P	Credits
PE1	EEPE22A	Renewable Energy	3	1	0	4
	EEPE22B	Mechatronics	3	1	0	4
	EEPE22C	Modelling and Simulation	3	1	0	4
PE2	EEPE24A	Distribution system analysis and Automation	3	0	0	3
	EEPE24B	Power Plant Instrumentation	3	0	0	3
	EEPE24C	Power System Compensation	3	0	0	3
PE3	EEPE31A	Power System Restructuring	3	0	0	3
	EEPE31B	High Voltage Engineering	2	0	2	3
	EEPE31C	Electrical Energy Utilization	3	0	0	3
PE4	EEPE33A	Power Quality	3	0	0	3
	EEPE33B	Distributed Generation	3	0	0	3
	EEPE33C	Multivariable Control	3	0	0	3
PE5	EEPE41A	EHV AC and DC Transmission	3	0	0	3
	EEPE41B	Real Time Systems	2	0	2	3
	EEPE41C	Robotics	3	0	0	3
PE6	EEPE43A	Energy Management	3	0	0	3
	EEPE43B	Information Security	3	0	0	3
	EEPE43C	Micro Electro Mechanical systems	3	0	0	3
	EEPE43D	Analysis of Wind and Solar Systems	3	0	0	3
PE7	EEPE40A	Electric Vehicles	3	0	0	3
	EEPE40B	Fault Tolerance and Reliability Engineering	3	0	0	3
	EEPE40C	Intelligent Instrumentation	3	0	0	3
	EEPE40D	Soft Computing	3	0	0	3
PE8	EEPE42A	Renewable Energy Converters	3	1	0	4
	EEPE42B	Virtual Instrumentation	3	0	2	4
	EEPE42C	Optimization Theory	3	1	0	4
	EEPE42D	Advanced Control Techniques	3	1	0	4
PE9	EEPE44A	Smart Grid Systems	3	0	0	3
	EEPE44B	Signal Processing	3	0	0	3
	EEPE44C	Electrical Safety and Standards	3	0	0	3

Annexure-II Proposed-

B.Tech.(Electrical Engineering)

Semester VII

Sr. No.	Course Code	Course	L	T	P	Credit	
1	HSIR**	Management	3	0	0	3	EPR
2	EEPC41	Reliability Engineering	3	1	0	4	PC17
3	EEPC43	Advanced Power Electronics and Drives	3	1	0	4	PC18
4	EEPC45	Industrial Control	3	1	0	4	PC19
5	EEPE41	*	-	-	-	3	PE5
6	EEPE43	*	-	-	-	3	PE6
7	EELR41	Control Systems Lab-II	0	0	3	1	Lab PC15
8	EELR43	Advanced Power Electronics and Drives Lab	0	0	2	1	Lab PC18
			18/17	3	5/7	21	

* Elective(s) [PE/OE] offered from the list

Semester VIII

Sr No.	Course Code	Course	L	T	P	Credit	
1	HSIR42	Professional Ethics & IPR	2	0	0	2	EPR
2	EEPC40	Power System Operation and Economics	3	0	0	3	PC20
3	EEPE40	*	-	-	-	3	PE7
4	EEPE42	*	-	-	-	4	PE8
5	EEIR42	Comprehensive Viva	0	0	0	3	EPR
6	EEPC48	Seminar	0	0	2	2	
7	EEPC50	Project	0	0	3	3	
			14	0/1	10/5	20	

* Elective(s) [PE/OE] offered from the list

Semester	I	II	III	IV	V	VI	VII	VIII	Total
Credits	21	29	27	27	25	10	21	20	180

Proposed.

B.Tech.(Electrical Engineering)

List of Program Electives (PE) / Open Electives (OE) (Modified)

PE / OE	Course Code	Course	L	T	P	Credits
PE1	EEPE22A	Renewable Energy	3	1	0	4
	EEPE22B	Mechatronics	3	1	0	4
	EEPE22C	Modelling and Identification	3	1	0	4
PE2	EEPE24A	Distribution system analysis and Automation	3	0	0	3
	EEPE24B	Power Plant Instrumentation	3	0	0	3
	EEPE24C	Distributed Generation	3	0	0	3
PE3	EEPE31A	Power System Restructuring	3	0	0	3
	EEPE31B	High Voltage Engineering	2	0	2	3
	EEPE31C	Electrical Energy Utilization	3	0	0	3
PE4	EEPE33A	Power Quality	3	0	0	3
	EEPE33B	Power System Compensation	3	0	0	3
	EEPE33C	Multivariable Control	3	0	0	3
PE5	EEPE41A	EHV AC and DC Transmission	3	0	0	3
	EEPE41B	Real Time Systems	2	0	2	3
	EEPE41C	Robotics	3	0	0	3
PE6	EEPE43A	Energy Management	3	0	0	3
	EEPE43B	Information Security	3	0	0	3
	EEPE43C	Micro Electro Mechanical systems	3	0	0	3
	EEPE43D	Analysis of Wind and Solar Systems	3	0	0	3
PE7	EEPE40A	Electric Vehicles	3	0	0	3
	EEPE40B	Fault Tolerance and Reliability Engineering	3	0	0	3
	EEPE40C	Intelligent Instrumentation	3	0	0	3
	EEPE40D	Soft Computing	3	0	0	3
PE8	EEPE42A	Renewable Energy Converters	3	1	0	4
	EEPE42B	Virtual Instrumentation	3	0	2	4
	EEPE42C	Optimization Theory	3	1	0	4
	EEPE42D	Advanced Control Techniques	3	1	0	4

DEPARTMENT OF ELECTRICAL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, KURUKSHETRA

No. EED/2019/ Dated: 08/11/2019

List of Paper-setters/ Course Coordinators/ Evaluators (Theory/practical/Projects/Seminar/ Viva-Voce) for various odd semester B Tech, M Tech. programmes for the examinations to be held in session 2019-20 approved by DAC on 08th November 2019 (No. of Pages - 7).

Sr. No	Course No	Course Title	Paper-setter/ Coordinator Prof/Dr	Evaluators Prof/Dr
B TECH				
First Semester (New Scheme)				
1.	EEIR-11 (EE-A;EE-B)	Familiarization to Electrical Engineering	Rupanshi Batra	1. Rupanshi Batra 2. Sandeep Kakran
2.	CSIR-11 (EE-A; EE-B)	Basics of Programming	Kulbir Singh	1. Kulbir Singh 2. Kulbir Singh
		Basics of Programming Lab	Kulbir Singh	1. Kulbir Singh/***Naveen Kumar*** 2. Amandeep Kaur 3. Shivam 4 Shivam 5. M. P. R. Prasad 6. Kulbir Singh/***Shahnawaj*** 7. Kulbir Singh 8. Gaurav Sharma
	CSIR-11 (ME-A; ME-B)	Basics of Programming	Kulbir Singh	1. Kulbir Singh 2. Kulbir Singh
		Basics of Programming Lab	Kulbir Singh	1. Gaurav Sharma 2. Amit Kumar 3. Shashi Bhushan Singh 4. Pradeep Kumar 5. Amandeep Kaur 6. Amandeep Kaur 7. Rahul Sharma 8. M. P. R. Prasad
	CSIR-11 (PI-A; PI-B)	Basics of Programming	Kulbir Singh	1. Kulbir Singh 2. Kulbir Singh
		Basics of Programming Lab	Kulbir Singh	1. Rahul Sharma 2. Amandeep Kaur 3. Gaurav Sharma 4. Bhanu Pratap 5. Kulbir Singh 6. Kulbir Singh/***Sanjay Dewangan***

First Semester (Old Scheme)				
1.	ELT-105	Basic Electrical Engg	Anil Kumar Dahiya	1. Anil Kumar Dahiya
2.	ELT-107	Basic Electrical Engineering Lab	Monika Mittal	1. Monika Mittal
Third Semester (New Scheme)				
1.	EEPC-21	Control Systems-I	A. Swarup	1. J. S. Lather 2. A. Swarup
2.	EEPC-23	Electrical Machines-I	Yash Pal	1. Yash Pal 2. Yash Pal
		Electrical Machines-I Lab	Yash Pal	1. K. K. Sharma 2. Jyoti Ohri 3. Ratna Dahiya 4. Ratna Dahiya 5. K. K. Sharma 6. Yash Pal 7. Monika Mittal 8. Jyoti Ohri
3.	EEPC-25	Electronic Devices & Circuits	Amit Kumar	1. Shashi Bhushan Singh 2. Amit Kumar
		Electronic Devices & Circuits Lab	Amit Kumar	1. Shashi Bhushan Singh (1) + ***Sanjay Dewangan (1)*** 2. Sunita Chauhan 3. Amit Kumar/***Naveen Kumar*** 4. Rupanshi Batra 5. Sunita Chauhan 6. Amit Kumar/***Sanjay Dewangan*** 7. Sunita Chauhan 8. Rupanshi Batra
4.	EEPC-27	Power Engineering-I	Saurabh Chanana	1. Anil Kumar Dahiya 2. Saurabh Chanana
5.	EEPC-29	Power Electronics -I	Ratna Dahiya	1. Ratna Dahiya 2. K. K. Sharma
6.	EEPC-211	Network Synthesis and Filters	Modi Pandu Ranga Prasad	1. Rupanshi Batra 2. M. P. R. Prasad
Third Semester (Old Scheme)				
1.	ET-201	Circuit Theory	Jyoti Ohri	1. Jyoti Ohri
2.	ET-203	Analog Electronics	Amit Kumar	1. Amit Kumar
3.	ET-205	Measurements and Instrumentation-1	Modi Pandu Ranga Prasad	1. M. P. R. Prasad
4.	ET-207	Electric Machines-I	Yash Pal	1. Yash Pal
5.	ET-209	Transmission and Distribution	Saurabh Chanana	1 Saurabh Chanana
6.	ET-211	Electric Machines-I Lab	Atma Ram Gupta	1 Atma Ram Gupta
7.	ET-213	Measurements and Instrumentation-1 Lab	Sunita Chauhan	1. Sunita Chauhan
8.	ET-215	Analog Electronics Lab	K. K. Sharma	1. K. K. Sharma
9	ET-217	Computer Techniques Lab	Sandeep Kakran	1. Sandeep Kakran

Fifth Semester (New Scheme)				
1.	PC31	Power Engineering-III	Ashwani Kumar Sharma	1. Sandeep Kakran 2. Ashwani Kumar Sharma
2.	EEPC33	Microprocessor and Microcontrollers	G. L. Pahuja	1. G. L. Pahuja 2. L. M. Saini
3.	EEPC35	Control Systems -II	Lillie Dewan	1. Lillie Dewan (2)+Sathans (1) 2. Sathans (2)+Lillie Dewan (1)
4.	EEPC37	Special Machines & Drives	K. S. Sandhu	1. K. S. Sandhu 2. Shivam
5.	EEPE31A	Power System Restructuring	Pradeep Kumar	1. Pradeep Kumar
6.	EEPE31B	High Voltage Engineering	Atma Ram Gupta	1 Atma Ram Gupta
		High Voltage Engineering Lab	Atma Ram Gupta	1. Atma Ram Gupta 2. Atma Ram Gupta 3. Atma Ram Gupta 4. Atma Ram Gupta
7.	EEPE33A	Power Quality	Shashi Bhushan Singh	1. Shashi Bhushan Singh
8.	EEPE33B	Distributed Generation	Rahul Sharma	1. Rahul Sharma
9.	EELR31	Power Engineering-III Lab	Ashwani Kumar Sharma	1. Ashwani Kumar Sharma/ ***Monika Gaba*** 2. Saurabh Chanana 3. Saurabh Chanana 4. Ashwani Kumar Sharma 5. Sandeep Kakran 6. Ashwani Kumar Sharma/ ***Surinder Chauhan*** 7. Atma Ram Gupta 8. Saurabh Chanana
10.	EELR33	Microprocessor and Microcontrollers Lab	G. L. Pahuja	1. M. P. R. Prasad 2. G. L. Pahuja/***Aman Prakash*** 3. Bhanu Pratap 4. G. L. Pahuja 5. Bhanu Pratap 6. L. M. Saini 7. G. L. Pahuja 8. Amandeep Kaur
11.	EELR35	Special Machines & Drives Lab	K. K. Sharma	1. Amit Kumar (1)+ ***Surinder Chahuah (1)*** 2. Shivam 3. K. K. Sharma/***Surinder Chauhan*** 4. Pradeep Kumar 5. K. K. Sharma/***Pandry Narendra Rao*** 6. Sandeep Kakran 7. K. K. Sharma 8. Sandeep Kakran

Fifth Semester (Old Scheme)				
1	ET-301	Networks Analysis and Synthesis	Modi Pandu Ranga Prasad	1. M. P. R. Prasad
2.	ET-303	Power Electronics-II	Shivam	1. Shivam
3.	ET-305	Power Systems Analysis	Ashwani Kumar Sharma	1. Ashwani Kumar Sharma
4.	ET-307	Materials, Components and Processes	Shashi Bhushan Singh	1. Shashi Bhushan Singh
5.	ET-309	Control Systems	G. L. Pahuja	1. G. L. Pahuja
6.	ET-311	Power Electronics-II Lab	Ratna Dahiya	1. Ratna Dahiya
7.	ET-313	Control Systems Lab	Sathans	1. Sathans
8.	ET-315	Signal Systems Lab	Monika Mittal	1. Monika Mittal
9.	ET-317	Electrical Workshop	Sandeep Kakran	1. Sandeep Kakran
Seventh Semester				
1.	ET-401	Computer Methods in Power Systems	Shelly Vadhera	1. Shelly Vadhera/ ***Shahnawaj*** 2 Shelly Vadhera
2.	ET-403	Digital Signal Processing	Monika Mittal	1 Monika Mittal 2. Amandeep Kaur
3.	ET-413	Control Theory	Jyoti Ohri	1. Jyoti Ohri
4.	ET-415	Computer Organization and Architecture	Amadeep Kaur	1. Amadeep Kaur
5.	ET-417	Information Technology	Gaurav Sharma	1. Gaurav Sharma
6.	ET-421	Electrical Machines Design	Shivam	1. Shivam
7.	ET-423	Problem Solving, Data-structure and Algorithms	Kulbir Singh	1. Kulbir Singh / ***Farhana Fayaz***
8.	ET-425	Digital and Non-Linear Control Systems	Bhanu Pratap	1. Bhanu Pratap
9.	ET-461	Non Conventional Energy Sources	Amit Kumar	1. Amit Kumar
10.	ET-465	Fault Tolerance & Reliability Engg.	Sunita Chauhan	1. Sunita Chauhan
11.	ET-467	Illumination Engg.	Gaurav Sharma	1. Gaurav Sharma
12.	ET-469	Microprocessor Applications (***For Re-appear)***	Gaurav Sharma	1. Gaurav Sharma
13.	ET-405	Seminar-I	Sathans	1. G. L. Pahuja 2. Sathans 3. Ratna Dahiya 4. Sathans/***Prashant Singh*** 5. Lillie Dewan 6. Monika Mittal 7. Yash Pal 8. Ashwani Kumar Sharma

14.	ET-407	Advanced Programming & Software Engineering Lab	J. S. Lather	1. J. S. Lather/***Sanjay Kumar*** 2. J. S. Lather/***Farhana Fayaz*** 3. Sathans 4. J. S. Lather 5. J. S. Lather/***Aman Prakash*** 6. J. S. Lather/***Farhana Fayaz (1)+ Prashant Singh (1)*** 7. J. S. Lather/***Sanjay Kumar*** 8. J. S. Lather/***Farhana Fayaz***
15.	ET-409	Computer Methods in Power System Lab	Shelly Vadhera	1. Anil Kumar Dahiya 2 Anil Kumar Dahiya 3. Shelly Vadhera/ ***Shahnawaj*** 4. Shelly Vadhera 5. Shelly Vadhera/ ***Bharat Singh*** 6. Shelly Vadhera 7. Shelly Vadhera/ ***Pandry Narendra Rao*** 8. Shelly Vadhera/ ***Bharat Singh***
16.	ET-411	Minor Project	Rupanshi Batra	1. M. P. R. Prasad 2 Rupanshi Batra 3. Anil Kumar Dahiya 4. Rahul Sharma 5 Shelly Vadhera 6 Shashi Bhushan Singh 7. Amit Kumar 8. Bhanu Pratap
17.	ET-429	Design Project - I (E1; E2; E3)	Sandeep Kakran	1. Monika Mittal 2. Sandeep Kakran 3. Sathans
18.	ET-433	Design Project –I (E4; E5; E6)	Lillie Dewan	1. Jyoti Ohri 2. Lillie Dewan 3. J. S. Lather
19.	ET-431	Design Project – I (E7; E8)	Pradeep Kumar	1. Pradeep Kumar/***Monika Gaba*** 2. Pradeep Kumar
20.	ET-436	Major Project (E1; E2; E3)	Ratna Dahiya	All Regular Faculty
21.	ET-440	Major Project (E4; E5; E6)	L. M. Saini	
22.	ET-438	Major Project (E7; E8)	A. Swarup	

M.TECH

First Semester (New Scheme)

1.	MEE1C01	Linear System Theory	Bhanu Pratap	Bhanu Pratap
	MEE3C01	Modeling Of Electrical Machines	K. K. Sharma	K. K. Sharma
2.	MEE2C01	Advanced Power System Analysis	Ratna Dahiya	Ratna Dahiya

3.	MEE1C03	Digital Control System	Lillie Dewan	Lillie Dewan
	MEE2C03	Power System Stability & Control	Ratna Dahiya	Ratna Dahiya
4.	MEE3C03	Power Conversion Techniques	L. M. Saini	L. M. Saini
	MEE1E45	Guidance and Control	Modi Pandu Ranga Prasad	Modi Pandu Ranga Prasad
5.	MEE1C05	Optimal Control and Applications	Jyoti Ohri	Jyoti Ohri
	MEE2C05	Power System Operation & Economics	Saurabh Chanana	Saurabh Chanana
	MEE3C05	Electric Drives	K. S. Sandhu	K. S. Sandhu
6.	MEE1E37	Reliability Engineering	G. L. Pahuja	G. L. Pahuja
	MEE2E31	EHVAC Transmission	Ashwani Kumar	Ashwani Kumar
	MEE3E19	Design and Analysis of Power Converters	Rahul Sharma	Rahul Sharma
7.	MEE1E31	Intelligent Control	Sathans	Sathans
	MEE2E33	Power System Deregulation and Pricing	Pradeep Kumar	Pradeep Kumar
	MEE3E13	Advanced Theory of Electrical Machines	K. S. Sandhu	K. S. Sandhu
8.	MEE1E33	Control System Design	A. Swarup	A. Swarup
	MEE2E39	Design & Testing of High Voltage Apparatus	Atma Ram Gupta	Atma Ram Gupta
9.	MEE1E43	Optimization Theory	Sunita Chauhan	Sunita Chauhan
	MEE2E41	Solar Energy in Power Systems	Shelly Vadhera	Shelly Vadhera
10.	MEE1E47	Introduction to Machine Learning	J. S. Lather	J. S. Lather
11.	MEE1E35	Mathematical Structure in System and Control	Monika Mittal	Monika Mittal
	MEE2E37	Energy Auditing & Management	Anil Kumar Dahiya	Anil Kumar Dahiya
12.	MEE1L01	Modeling & Simulation LAB	A. Swarup	A. Swarup
13.	MEE1S01	Seminar (CS)	J. S. Lather	J. S. Lather
14.	MEE2L01	Advanced Power System Lab	Ashwani Kumar	Ashwani Kumar
15.	MEE3L01	Power Electronics Lab	L. M. Saini	L. M. Saini
16.	MEE3L03	Machine and Drives Lab	K. S. Sandhu	K. S. Sandhu

First Semester (Old Scheme)

1.	EE-501T	Linear Systems Theory (CS)*	J. S. Lather	J. S. Lather
	EE-561T	DC Convertors & Drives (PED)*	K. K. Sharma	K. K. Sharma
2.	EE-503T	Digital Control Systems (CS*,PED#)	Lillie Dewan	Lillie Dewan
	EE-533T	EHV AC Transmission (PS)*	Shelly Vadhera	Shelly Vadhera
3.	EE-509T	Optimization Theory (CS#,PED#,PS#)	Sunita Chuahan	Sunita Chuahan
	EE-537T	Power System Planning (PED#,PS#)	Saurabh Chanana	Saurabh Chanana

4.	EE-513T	Reliability Engineering (CS#,PED#)	G. L. Pahuja	G. L. Pahuja
5.	EE-507T	Control Systems Design (CS)#	Bhanu Pratap	Bhanu Pratap
6.	EE-531T	Advanced Power Systems Analysis (PED#,PS*)	Ratna Dahiya	Ratna Dahiya
7.	EE-535T	Power Systems-Dyanamics & Stability (PS)*	Ratna Dahiya	Ratna Dahiya
	EE-565T	PLC & Micro-controllers (CS#,PED*)	L. M. Saini	L. M. Saini
8.	EE-505T	Identification and Estimation (CS)*	A. Swarup	A. Swarup
	EE-563T	Advanced Theory of Elec. Machinery (PED*,PS#)	K. S. Sandhu	K. S. Sandhu
	EE-543T	Power System operation in Restructured Environment (PS)#	A. K. Sharma	A. K. Sharma
9.	EE-569P	EMD Lab (PED)	K. S. Sandhu	K. S. Sandhu
10.	EE-571P	Seminar-I (PED)	Yash Pal	Yash Pal
11.	EE-523P	Simulation Lab (CS)	J. S. Lather	J. S. Lather
12.	EE-525P	Seminar-I (CS)	Jyoti Ohri	Jyoti Ohri
13.	EE-545P	Power System Lab (PS)	A.K.Sharma	A. K. Sharma
14.	EE-547P	Programming Lab-I (PS)	Saurabh Chanana	Saurabh Chanana
15.	EE-549P	Seminar-I (PS)	Ratna Dahiya	Ratna Dahiya

** Core Subject* *# Elective Subject*

08/11/19

(Dr. L. M. Saini)
Chairperson, DAC

8/11

Prof. I/C Exam

Annexure-III

Annexure B

List of Course Coordinator for B.Tech & M.Tech for the session Nov./Dec. 2019 (Odd & Even Semester) as per prescribed format are approved by DAC on 08.11.2019 (No. of Pages – 6)

Sr. No.	Subject Code	Subject Title	Subject Credit	Course Coordinators (Dr./Mrs./Ms./Mr.)
1st Semester (New Scheme)				
1.	EEIR-11	Familiarization to Electrical Engineering (EE-A; EE-B)	2.0	Rupanshi Batra
2.	CSIR-11	Basics of Programming (EE-A; EE-B; ME-A; ME-B; PI-A & PI-B)	3.0	Kulbir Singh
1st Semester & 2nd Semester (Old Scheme)				
1.	ELT-105/ ELT-101	Basic Electrical Engg/ Basic Electrical Engg	---	Anil Kumar Dahiya
2.	ELT-107	Basic Electrical Engineering Lab	---	Monika Mittal
2nd Semester (New Scheme)				
1	EEPC10	Electrical Circuits &Networks	4.0	Rahul Sharma
2	EEPC12	Measurement & Instrumentation	4.0	Shashi Bhushan Singh
3	EEPC14	Signal and System	4.0	Kiran Kumar Jaladi
3rd Semester (New Scheme)				
1.	EEPC-21	Control Systems-I	4.0	A. Swarup
2.	EEPC-23	Electrical Machines-I	5.0	Yash Pal
3.	EEPC-25	Electronic Devices & Circuits	6.0	Amit Kumar
4.	EEPC-27	Power Engineering-I	4.0	Saurabh Chanana
5.	EEPC-29	Power Electronics -I	4.0	Ratna Dahiya
6.	EEPC-211	Network Synthesis and Filters	4.0	Modi Pandu Ranga Prasad
3rd Semester (Old Scheme)				
1.	ET-201	Circuit Theory	3.5	Jyoti Ohri
2.	ET-203	Analog Electronics	4.5	Amit Kumar
3.	ET-205	Measurements and Instrumentation-1	3.5	Modi Pandu Ranga Prasad
4.	ET-207	Electric Machines-I	4.5	Yash Pal
5.	ET-209	Transmission and Distribution	3.5	Saurabh Chanana
6.	ET-211	Electric Machines-I Lab	1.5	Atma Ram Gupta
7.	ET-213	Measurements and Instrumentation-1 Lab	1.0	Mrs. Sunita Chauhan
8.	ET-215	Analog Electronics Lab	1.0	K. K. Sharma
9.	ET-217	Computer Techniques Lab	1.0	Sandeep Kakran
4th Semester (New Scheme)				
1	EEPC24	Power Engineering - II	5.0	Sandeep Kakran
2	EEPC26	Electrical Machines - II	5.0	Yash Pal
3	EEPC28	Power Electronics-II	5.0	K. K. Sharma
4	EEPE22A	Renewable Energy	4.0	Anil Kumar Dahiya
5	EEPE22C	Modelling and Simulation	4.0	J. S. Lather
6	EEPE24A	Distribution system analysis and Automation	3.0	Pradeep Kumar
7	EEPE24B	Power Plant Instrumentation	3.0	M. P. R. Prasad

Sr. No.	Subject Code	Subject Title	Subject Credit	Course Coordinators (Dr./Mrs./Ms./Mr.)
8	EEPE24C	Power System Compensation	3.0	Ratna Dahiya
9	EEPC30	Control Systems Lab-I	1.0	A. Swarup
4th Semester (Old Scheme)				
1	ET-202	Signals & Systems	3.5	Modi Pandu Ranga Prasad
2	ET-204	Electrical Machines-II	4.5	Ratna Dahiya
3	ET-206	Power Electronics-I	3.5	Shivam
4	ET-208	Digital Electronics	3.5	Rupanshi Batra
5	ET-210	Field & Wave	3.5	Lillie Dewan
6	ET-212	Power Generation & Control	3.5	Anil Kumar Dahiya
7	ET-214	Electrical Machines-II Lab	1.5	Rahul Sharma
8	ET-216	Power Electronics-I Lab	1.0	Shivam
9	ET-218	Digital Electronics Lab	1.0	Sathans
5th Semester (New Scheme)				
1.	EEPC31	Power Engineering-III	4.0	Ashwani Kumar Sharma
2.	EEPC33	Microprocessor and Microcontrollers	4.0	G. L. Pahuja
3.	EEPC35	Control Systems -II	4.0	Lillie Dewan
4.	EEPC37	Special Machines & Drives	4.0	K. S. Sandhu
5.	EEPE31A	Power System Restructuring	3.0	Pradeep Kumar
6.	EEPE31B	High Voltage Engineering	3.0	Atma Ram Gupta
7.	EEPE33A	Power Quality	3.0	Shashi Bhushan Singh
8.	EEPE33B	Distributed Generation	3.0	Rahul Sharma
9.	EELR31	Power Engineering-III Lab	1.0	Ashwani Kumar Sharma
10.	EELR33	Microprocessor and Microcontrollers Lab	1.0	G. L. Pahuja
11.	EELR35	Special Machines & Drives Lab	1.0	K. K. Sharma
5th Semester (Old Scheme)				
1.	ET-301	Networks Analysis and Synthesis	4.5	Modi Pandu Ranga Prasad
2.	ET-303	Power Electronics-II	3.5	Shivam
3.	ET-305	Power Systems Analysis	3.5	Ashwani Kumar Sharma
4.	ET-307	Materials, Components and Processes	2.5	Shashi Bhushan Singh
5.	ET-309	Control Systems	4.5	G. L. Pahuja
6.	ET-311	Power Electronics-II Lab	1.5	Ratna Dahiya
7.	ET-313	Control Systems Lab	1.5	Sathans
8.	ET-315	Signal Systems Lab	1.0	Monika Mittal
9.	ET-317	Electrical Workshop	1.0	Sandeep Kakran
6th Semester				
1	ET-302	Electric Drives	3.5	Pradeep Kumar
2	ET-304	Microprocessors & Microcontrollers	4.5	G. L. Pahuja
3	ET-306	Analog & =Digital Communication	3.5	Shivam
4	ET-308	Switchgear & Protection	3.5	Sandeep Kakran
5	ET-310	Advanced Programming & Software Engg.	4.5	J. S. Lather

Sr. No.	Subject Code	Subject Title	Subject Credit	Course Coordinators (Dr./Mrs./Ms./Mr.)
6	ET-312	Measurement & Instrumentation-II	3.5	Jyoti Ohri
7	ET-314	Microprocessor Lab	1.0	L. M. Saini
8	ET-316	Power Systems Lab	1.0	Shelly Vadhera
9	ET-318	Electric Drives Lab	1.5	Rahul Sharma
10	ET-320	Measurement & Instrumentation-II Lab	1.0	Jyoti Ohri
11	ET-324	Control System (PIE)	---	Bhanu Pratap
12	ET-326	Control System Lab (PIE)	---	Lillie Dewan
7th Semester				
1.	ET-401	Computer Methods in Power Systems	3.5	Shelly Vadhera
2.	ET-403	Digital Signal Processing	3.5	Monika Mittal
3.	ET-413	Control Theory (E1; E2; E3)	3.5	Jyoti Ohri
4.	ET-415	Computer Organization and Architecture (E7; E8)	3.5	Amadeep Kaur
5.	ET-417	Information Technology (E4; E5; E6)	3.5	Gaurav Sharma
6.	ET-421	Electrical Machines Design (E1; E2; E3)	3.5	Shivam
7.	ET-423	Problem Solving, Data- Structure and Algorithms (E7; E8)	3.5	Kulbir Singh
8.	ET-425	Digital and Non-Linear Control Systems (E4; E5; E6)	3.5	Bhanu Pratap
9.	ET-461	Non Conventional Energy Sources	3.5	Amit Kumar
10.	ET-465	Fault Tolerance & Reliability Engg.	3.5	Sunita Chauhan
11.	ET- 467	Illumination Engg.	3.5	Gaurav Sharma
12.	ET-469	Microprocessor Applications (***Reappear Only***)	3.5	Gaurav Sharma
13.	ET-405	Seminar-I	1.0	Sathans
14.	ET-407	Advanced Programming & Software Engineering Lab	1.5	J. S. Lather
15.	ET-409	Computer Methods in Power System Lab	1.5	Shelly Vadhera
16.	ET-411	Minor Project	4.5	Rupanshi Batra
17.	ET-429	Design Project - I (E1; E2; E3)	4.5	Sandeep Kakran
18.	ET-433	Design Project –I (E4; E5; E6)	4.5	Lillie Dewan
19.	ET-431	Design Project - I (E7; E8)	4.5	Pradeep Kumar
20.	ET-436	Major Project (E1; E2; E3)	4.5	Ratna Dahiya
21.	ET-440	Major Project (E4; E5; E6)	4.5	L. M. Saini
22.	ET-438	Major Project (E7; E8)	4.5	A. Swarup
8th Semester				
1	ET-402	System Engg. & Reliability	3.5	Sunita Chuahan
2	ET-404	High Voltage Engg./ Extra High Voltage	3.5	Atma Ram Gupta
3	ET-412	Utilization of Electric Energy & Electric Traction (E1-E3)	3.5	Anil Kumar Dahiya
4	ET-414	Systems Analysis & Data Base Management (E7-E8)	3.5	Kiran Kumar Jaladi
5	ET-416	Data Communication Networks (E4-E6)	3.5	Sathans
6	ET-420	Electrical Machines-III (E1-E3)	3.5	K. S. Sandhu
7	ET-422	Advances in Computers (E7-E8)	3.5	Gaurav Sharma

Sr. No.	Subject Code	Subject Title	Subject Credit	Course Coordinators (Dr./Mrs./Ms./Mr.)
8	ET-424	Optimal & Industrial Control (E4-E6)	3.5	Bhanu Pratap
9	ET-406	Seminar-II	1.0	Shelly Vadhera
10	ET-408	High Voltage Lab	1.0	Ashwani Kumar Sharma
11	ET-410	Reliability Engineering Lab	1.0	Rupanshi Batra
12	ET-428	Design Project-II (E1-E3)	4.5	Shelly Vadhera
13	ET-430	Design Project-II (E4-E6)	4.5	Amit Kumar
14	ET-432	Design Project-II (E7-E8)	4.5	Saurabh Chanana
15	ET-436	Major Project (E1-E3)	12.0	K. S. Sandhu
16	ET-440	Major Project (E4-E6)	12.0	A. Swarup
17	ET-438	Major Project (E7-E8)	12.0	L. M. Saini
18	ET-446	General Fitness & Professional Aptitude	3.0	Ratna Dahiya
M.Tech. 1st Semester (New Scheme)				
1.	MEE1C01	Linear System Theory	3.0	Bhanu Pratap
	MEE3C01	Modeling Of Electrical Machines	3.0	K. K. Sharma
2.	MEE2C01	Advanced Power System Analysis	3.0	Ratna Dahiya
3.	MEE1C03	Digital Control System	3.0	Lillie Dewan
	MEE2C03	Power System Stability & Control	3.0	Ratna Dahiya
4.	MEE3C03	Power Conversion Techniques	3.0	L. M. Saini
	MEE1E45	Guidance and Control	3.0	Modi Pandu Ranga Prasad
5.	MEE1C05	Optimal Control and Applications	3.0	Jyoti Ohri
	MEE2C05	Power System Operation & Economics	3.0	Saurabh Chanana
	MEE3C05	Electric Drives	3.0	K. S. Sandhu
6.	MEE1E37	Reliability Engineering	3.0	G. L. Pahuja
	MEE2E31	EHVAC Transmission	3.0	Ashwani Kumar
	MEE3E19	Design and Analysis of Power Converters	3.0	Rahul Sharma
7.	MEE1E31	Intelligent Control	3.0	Sathans
	MEE2E33	Power System Deregulation and Pricing	3.0	Pradeep Kumar
	MEE3E13	Advanced Theory of Electrical Machines	3.0	K. S. Sandhu
8.	MEE1E33	Control System Design	3.0	A. Swarup
	MEE2E39	Design & Testing of High Voltage Apparatus	3.0	Atma Ram Gupta
9.	MEE1E43	Optimization Theory	3.0	Sunita Chauhan
	MEE2E41	Solar Energy in Power Systems	3.0	Shelly Vadhera
10.	MEE1E47	Introduction to Machine Learning	3.0	J. S. Lather
11.	MEE1E35	Mathematical Structure in System and Control	3.0	Monika Mittal
	MEE2E37	Energy Auditing & Management	3.0	Anil Kumar Dahiya
12.	MEE1L01	Modeling & Simulation LAB	2.0	A. Swarup
13.	MEE1S01	Seminar (CS)	---	J. S. Lather
14.	MEE2L01	Advanced Power System Lab	2.0	Ashwani Kumar
15.	MEE3L01	Power Electronics Lab	2.0	L. M. Saini
16.	MEE3L03	Machine and Drives Lab	2.0	K. S. Sandhu

Sr. No.	Subject Code	Subject Title	Subject Credit	Course Coordinators (Dr./Mrs./Ms./Mr.)
M.Tech. 1st Semester (Old Scheme)				
1.	EE-501T	Linear Systems Theory (CS)*	3.0	J. S. Lather
	EE-561T	DC Convertors & Drives (PED)*	3.0	K. K. Sharma
2.	EE-503T	Digital Control Systems (CS*,PED#,PS#)	3.0	Lillie Dewan
	EE-533T	EHV AC Transmission (PS)*	3.0	Shelly Vadhera
3.	EE-509T	Optimization Theory (CS#,PED#,PS#)	3.0	Sunita Chuahan
	EE-537T	Power System Planning (PED#,PS#)	3.0	Saurabh Chanana
4.	EE-513T	Reliability Engineering (CS#,PED#,PS#)	3.0	G. L. Pahuja
5.	EE-507T	Control Systems Design (CS)#	3.0	Bhanu Pratap
6.	EE-531T	Advanced Power Systems Analysis (PED#,PS*)	3.0	Ratna Dahiya
7.	EE-535T	Power Systems-Dynamics & Stability (PS)*	3.0	Ratna Dahiya
	EE-565T	PLC & Micro-controllers (CS#,PED*)	3.0	L. M. Saini
8.	EE-505T	Identification and Estimation (CS)*	3.0	A. Swarup
	EE-563T	Advanced Theory of Elec. Machinery (PED*,PS#)	3.0	K. S. Sandhu
	EE-543T	Power System operation in Restructured Environment (PS)#	3.0	Ashwani Kumar Shamra
9.	EE-569P	Electrical Machines & Drives Lab. (PED)	2.0	K. S. Sandhu
10.	EE-571P	Seminar-I (PED)	2.0	Yash Pal
11.	EE-523P	Simulation Lab (CS)	2.0	J. S. Lather
12.	EE-525P	Seminar-I (CS)	1.0	Jyoti Ohri
13.	EE-545P	Power System Lab (PS)	1.0	Ashwani Kumar Shamra
14.	EE-547P	Programming Lab-I (PS)	1.0	Saurabh Chanana
15.	EE-549P	Seminar-I (PS)	1.0	Ratna Dahiya
M.Tech. 2nd Semester				
1.	EE-502T	Nonlinear & Adaptive Control (CS*)	3.0	Lillie Dewan
	EE-542T	HVDC Transmission (PS#, PED#)	3.0	Saurabh Chanana
2.	EE-534T	Reactive Power Control & FACTS Devices (PS*, PED#)	3.0	Ratna Dahiya
	EE-504T	Optimal & Robust Control (CS*)	3.0	G. L. Pahuja
3.	EE-532T	Power Systems Operation & Control (PS*,PED#)	3.0	Saurabh Chanana
4.	EE-562T	Modeling & Control of AC Motors (PED*)	3.0	K. K. Sharma
	EE-506T	Robotics (CS#)	3.0	Jyoti Ohri
5.	EE-528T	Consensus & Control of Multi-Agent Systems (CS#)	3.0	J. S. Lather
	EE-570T	Wind Energy in Power Systems (PS#, PED#,CS#)	3.0	K. S. Sandhu
6.	EE-526T	Cyber Physical Systems (CS#)	3.0	A. Swarup
	EE-568T	Renewable Energy Resources (PS#, PED#,CS#)	3.0	Anil Dahiya
	EE-536T	Advance Power Systems Protection (PS#)	3.0	Shelly Vadhera
7.	EE-564T	AC Convertors (PED*)	3.0	L.M. Saini

Sr. No.	Subject Code	Subject Title	Subject Credit	Course Coordinators (Dr./Mrs./Ms./Mr.)
8.	EE-508T	Intelligent Control (CS#,PED#)	3.0	Sathans
9.	EE-574P	Power Electronics Lab (PED)	2.0	K. S. Sandhu
10.	EE-528P	Control Systems Lab (CS)	2.0	Lillie Dewan
11.	EE-548P	Programming Lab (PS)	1.0	Saurabh Chanana
12.	EE-550P	Software Lab (PS)	1.0	Ashwani Kumar Sharma
13.	EE-530P	Seminar-II (CS)	1.0	Sunita Chauhan
14.	EE-552P	Seminar-II (PS)	1.0	Ratna Dahiya
15.	EE-576P	Seminar-II (PED)	2.0	Yash Pal

** Core Subject* *# Elective Subject*

08/11/19

Head of Department

8/11

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8/11

8/11

Prof. I/C (Examination)

Copy to:

1 IIMS Convenor

ANNEXURE – III A

eedoffice . <eedoffice@nitkkr.ac.in>

Regardin Mid term evaluation through 'SKYPE'

1 message

Mahesh Kumar <mk.mk199637@gmail.com> Thu, Nov 7, 2019 at 10:48 AM
To: eedoffice@nitkkr.ac.in
Cc: ratna_dahiya@yahoo.co.in, Ashwani Kumar <ashwaks@gmail.com>

Hello sir,

Good morning

This is Mahesh Kumar Choudhary from M.Tech 2nd year, power system (31804207).

Sir, According the notice the mid term evaluation of power system students has been scheduled on 7th nov. 2019. But currently I am doing internship at KPIT in pune.so I can not able to make arrangements to travel in college in short time.

so you are requested to allow me mid term evaluation presentation via 'SKYPE'.

I would be grateful to you.

Thanks and Regards,

Mahesh Kumar Choudhary

M.Tech 2nd year

Power System

31804207

eedoffice . <eedoffice@nitkkr.ac.in>

Mid term evaluation through Skype

1 message

Jitendra Mahawar <jitendra_31804205@nitkkr.ac.in> Thu, Nov 7, 2019 at 10:36 AM
To: eedoffice@nitkkr.ac.in
Cc: ratna_dahiya@yahoo.co.in, anildau@yahoo.co.in

sir

I am jitendra kumar mahawar (31804205) m tech 2nd year, power system student. According the notice the mid term evaluation of power system students has been scheduled on 7th nov. 2019. But currently I am doing internship at KPIT in pune.so I can not able to make arrangements to travel in college in short time.

so you are requested to allow me mid term evaluation presentation via 'SKYPE'.

I would be grateful to you.

Thanks and Regards

Jitendra Kumar Mahawar

31804205

M tech power system

100

PRADEEP KUMAR <pk@nitkkr.ac.in>

Regarding M.tech project mid sem review

1 message

Gangireddy Nagarjuna Reddy <gangireddy_31804101@nitkkr.ac.in> Wed, Nov 6, 2019 at 10:10 AM
To: pk@nitkkr.ac.in
Cc: eedoffice@nitkkr.ac.in

Sir

This is Nagarjuna from M.Tech(PED) second year. I joined internship in KPIT technologies located in Bangalore. According to the notification dated 05.11.2019 regarding M. Tech mid sem review, the reviews will be conducted by respective committes on or before 11.11.2019. As we are now residing in Bangalore and unable to come in this short notice. And air fares are too expensive. So I request you to conduct this review on Skype if possible. And if not possible please reschedule the review date after 10 days at any time and intimate us soon so that we can arrange all the things accordingly. Please consider our request and do the needful.

Thanks & Regards

G. Nagarjuna Reddy

31804101(M.tech PED)

Recommended & forwarded

6/11/19

HOD(EED)

101

lmsaini . <lmsaini@nitkkr.ac.in>

Request to postpone Mid-Sem Review dates

08aahanasharma96 <08aahanasharma96@gmail.com> Tue, Nov 5, 2019 at 2:24 PM
To lmsaini <lmsaini@nitkkr.ac.in>

Sir,

I am interning at KPIT Technologies Ltd.,Pune Today we got to know regarding Mid-sem review of M. Tech. 2nd year Control Systems which is to be done before 11th November. Sir, today is 5th and in just 3 working days we need to report college which leaves us no option apart from taking flights We have a very low stipend and flight charges for coming 3 days are quite high. It will take ₹12,000 which is unaffordable

Sir, i request you to kindly postpone the review dates for 1 more week (atleast for the students who are on internship) It is very early as we need to book tickets and also have to apply leave in the company

Thanks and Regards
Sakshi Sharma
M. Tech. Control Systems

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lmsaini . <lmsaini@nitkkr.ac.in>

Regarding mid term review

Narender Dharavath <narender_31804315@nitkkr.ac.in> Tue, Nov 5, 2019 at 7:10 PM
To: lmsaini@nitkkr.ac.in
Cc: kjssandhu@rediffmail.com

Hi Sir,
This is Narender from M.Tech(PED) second year. I joined internship in KPIT technologies located in Bangalore According to the notification dated 05.11.2019 regarding M. Tech mid sem review, the reviews will be conducted by respective committes on or before 11.11.2019. As we are far from the college and it will take at least 45 to 50 hours by train for coming to college from Bangalore. And air fares are too expensive. So I request you to conduct this review on Skype if possible. And if not possible please postpone the review date and please intimate us at least before 10days so that we can arrange all the things accordingly Please consider our request and do the needful.

Thanks & Regards
D Narender
31804315(M.tech PED)

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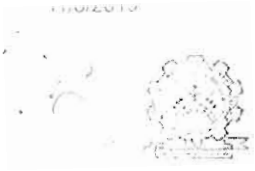

lmsaini . <lmsaini@nitkkr.ac.in>

Mid term evaluation through skype

Arundhatti bezbaruah <arundhatti_31807101@nitkkr.ac.in> Tue, Nov 5, 2019 at 5:10 PM
To: lmsaini@nitkkr.ac.in
Cc: nikhil_31804111@nitkkr.ac.in, aayush_31804104@nitkkr.ac.in, ashish_31804108@nitkkr.ac.in, sakshi_31804102@nitkkr.ac.in, saikiran_31804107@nitkkr.ac.in

Sir,

As discussed on call, M.Tech. Control Systems students who are interning at various organisations for their thesis work at Pune, Bangalore and Goa, want to put forth a request to allow our mid term evaluation presentation via 'SKYPE'. Since, we can not make arrangements to travel to college in coming three working days.

We would be grateful to you if you do so.

Thanks and Regards,
Arundhatti Bezbaruah
M. Tech. Control Systems

lmsaini . <lmsaini@nitkkr.ac.in>

Regarding extension of mid sem evaluation dates

pentakota saikiran <pentakotasaikiran@gmail.com> Tue, Nov 5, 2019 at 4:21 PM
To. lmsaini@nitkkr.ac.in
Cc aswarup@nitkkr.ac.in

Sir,

This is p. Sai Kiran. I am doing my dissertation work at National institute of oceanograpy, Goa
Today we got to know regarding Mid-sem evaluation of M. Tech 2nd year Control Systems which is to be done before 11th November Sir, today is 5th and in just 3 working days we need to report college which leaves us no option apart from taking flights Flights are also not available.

Sir, I request you to kindly postpone the review dates for atleast 1 week It is very early as we need to book ticket

Thanks and Regards
Pentakota Sai kiran

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lmsaini . <lmsaini@nitkkr.ac.in>

Regarding evaluation of M.tech dissertation work.

Abhishek Saini <abhishek_31804319@nitkkr.ac.in> Tue, Nov 5, 2019 at 4:12 PM
To: eedofficenit@gmail.com, lmsaini@nitkkr.ac.in

Respected sir,

I Abhishek Saini student of M.tech 2nd year is doing an internship at Toshiba Software India pvt ltd located in Bengalore.
As I have read the notice about evaluation of m.tech dissertation work, which will be done before 11 November 2019
But due to issues in availability of train tickets and 45 hours of travel time, it is very difficult to come in this much short notice period.
So, I request you to postpone this mid semester evaluation near to 20 November 2019

Kindly consider my request and do the needful at the earliest. Thanking you

Yours sincerely
Abhishek Saini
Roll no - 31804319
Power electronics and drives

S 37.06 **To consider and approve the proposal for new M.Tech. programme in Physics Department by merging two existing programmes, M.Tech. in Material Science & Technology and M.Tech. in Nanotechnology.**

The Senate in its 36th meeting held on 21.9.2019 vide item no. S 36.03 decided that M.Tech. programmes of Nanotechnology and Material Science & Technology should be merged into M.Tech. programme from academic year 2020-21 with sanctioned strength of 25 seats. For this, HoD, Physics was requested to prepare the proposal for the new M.Tech. programme with appropriate nomenclature and curriculum. Proposal for new M.Tech. programme as received from HoD, Physics is enclosed as Annexure S 37.06 from pages 108 to 137.

The Senate may consider and approval the proposal.

DEPARTMENT OF PHYSICS
NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA

Date: 20.11.2019

No. Ph./2019/ 196

As proposed during in 36th meeting of senate held on 26th November, 2019 the merging of **M.Tech (Material Science & Technology) and M.Tech (Nanotechnology)**.

An Interactive workshop was also organized on date 09.11.2019, to discuss the new M.Tech Program. In which, the external experts from Academia and Industry, Alumni and Students participated. The outcome of the workshop is to be put before Board of Studies (BOS) of the department which is proposed for 26th Nov. 2019.

As agenda item for the next senate meeting is proposed for the same as follows:

The proposed name of the new M.Tech Program is to be approved,

"M.Tech (Material Science & Nanotechnology)"

Tthe revised curriculum and syllabus are also to be approved by the senate for implementation w e f the next session 2019-20

Chauhan
Prof. R.P. Chauhan
HOD, Physics

Dean(Academic)

DEPARTMENT OF PHYSICS
NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA

No. Phy/2019/147 **Dated: 28.11.2019**

As proposed during in 36th meeting of senate held on 26th November, 2019 the merging of **M.Tech (Materials Science & Technology) and M.Tech (Nanotechnology)**. Please find enclosed new M.Tech program proposed after conducting Interactive workshop on 09.11.2019 and BOS meeting on 26.11.2019. We have already sent the suggestion for the improvement of admissions in M.Tech program vide letter no. Phy/2019/143 dated 27.11.2019. The scheme and syllabus of the proposed **M.Tech (Nanomaterials and Nanotechnology)** is enclosed for putting in the next meeting senate.

List of attached document:

1. **Copy of the minutes of the workshop**
2. **Copy of the BOS**
3. **Scheme and Syllabus**

Khachan 29.11.2019
HOD, Physics

Dean (Academic)

Copy to: Sr. Secretary to Director for kind information of the Director

DEPARTMENT OF PHYSICS
NATIONAL INSTITUTE OF TECHNOLOGY,
KURUKSHETRA

No. Ph/2019/

A meeting of the following member was held on 09.11.2019 to discuss the issue regarding Admissions in M.Tech (Instrumentation, Nanotechnology and Material Science & Technology).

1.	Prof. A.R Kulkarni IIT Bombay	External Academic Expert
2.	Dr. Vinod Karar (Scientist-G) CSIO Chandigarh	External Academic Expert
3.	Prof. Dinesh Rana K.U.Kurukshetra	External Expert
4.	Sh. Hemant Kumar Gupta Industrialist Yamuna Nagar	Industrial Expert
5.	Sh. Amit Goyal MD (GMG Plywoods Pvt. Ltd.) Yamuna Nagar	Industrial Expert
6.	Prof. R. P. Chauhan	Professor & HoD
7.	Prof. Ashavani Kumar	Professor
8.	Prof. Neena Jaggi	Professor
9.	Dr. Anurag Gaur	Assistant Professor
10.	Dr. Ashok Kumar	Assistant Professor
11.	Dr. C.R. Mariappan	Assistant Professor
12.	Dr. Y. Dwivedi	Assistant Professor
13.	Dr. Prakash Chand	Assistant Professor
14.	Dr. Awnish Kumar	Assistant Professor
15.	Ms. Neelima	Alumni (Presently Assistant Professor)
16.	Dr. Sohan Lal	Alumni (Presently Assistant Professor)
17.	Ms. Farha Naaz Mansoorie	Alumni
18.	Mr. Purshotam Kumar	Alumni
19.	Mr. Suresh Panchal	Ph.D Scholar
20.	Ms. Jaya	Ph.D Scholar
21.	Ms. Pooja Dhami	M.Tech Student
22.	Ms. Sayanti Shyom	M.Tech Student

The following suggestions are given to improve the admissions in these M.Tech programs:

1. The eligibility criteria for M.Tech programs should be made wider to attract students from different engineering branches by increasing the eligibility for more deciplines.

2. Awareness regarding M.Tech programs should be made through advertisements/posters /website.

3. As these M.Tech courses are interdisciplinary in nature and GATE exam may not be available in all the disciplines. Hence, relaxation may be given to the meritorious students in admissions.

4. The Alumni should be involved in the admissions and for placement of the students.

5. The Projects assigned to students should be industry based/central labs related.

6. A mandatory industrial visit should be organized every year for M.Tech students.

7. The collaboration with other institutes (IISC, IIT, NIT, Central labs etc.) and with other departments should be encouraged.

Dhanhay
HOD, PHYSICS 9.11.2019

Dean (Academic)

Copy to: Coordinator TEQIP-III

DEPARTMENT OF PHYSICS
NATIONAL INSTITUTE OF TECHNOLOGY,
KURUKSHETRA

No.Ph/2019/ Dated: 26.11.2019

Minutes of the meeting of Board of Studies in Physics

The meeting of the Board of Studies in Physics was held on 26.11.2019 at 09:30am in the office of the undersigned.

Following members were present:

1. Prof. R. P. Chauhan (In Chair)
2. Prof. Neena Jaggi
3. Dr. Anurag Gaur
4. Dr. C.R. Mariappan
5. Dr. Y. Dwivedi (Special invitee)
6. Dr. A. K. Tripathi (Special invitee)
7. Dr. Prakash Chand (Special invitee)
8. Prof. B. R. Mehta (External expert member, IIT, Hauz Khas, New Delhi)
9. Prof. Asima Pradhan (External expert member, IIT, Kanpur)
   Could not attend the meeting, however, the suggestions sent by her through email were considered.

Dr. Ashavani Kumar could not attend the meeting being a leave.

Following items were discussed and approved:

1. BOS discussed the revised Curriculum and syllabus of M.Tech (Nanomaterials and Nanotechnology) and the suggestions were incorporated in the revised syllabus accordingly. It was discussed that the majority of input to M.Tech (Nanotechnology) was from Electrical, Electronics, Biotechnology, who were opting this course because of nanotechnology component. The suggested name of M.Tech (Nanomaterials and Nanotechnology) makes the course more coherent from the structure point of view and brings important aspects of Material Science and Nanotechnology.
2. The following suggestions were given for the improvement of admissions in M.Tech Programs of the department.
   i) The eligibility criteria for M.Tech programs should be made wider to attract students from different engineering branches by increasing the eligibility for more deciplines.
   ii) As these M.Tech courses are interdisciplinary in nature and GATE exam may not be available in all the disciplines. Hence, relaxation may be given to the meritorious students in admissions (maximum 5 seats).
   iii) Awareness regarding M.Tech programs should be made through advertisements/posters /website.
   iv) The Alumni should be involved in the admissions and for placement of the students.
   v) A mandatory industrial visit should be organized every year for M.Tech students.
   vi) The collaboration with other institutes (IISC, IIT, NIT, Central labs etc.) and with other departments should be encouraged.

B.R. Mehta (External expert) 26.11.2019	(Neena Jaggi) Member	(Anurag Gaur) Member	(C.R. Mariappan) Member
(Y. Dwivedi) Special invitee	(A.K. Tripathi) Special invitee	(Prakash Chand) Special invitee	(R.P. Chauhan) HOD 26.11.2019

SCHEME AND SYLLABUS

OF

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

(w.e.f Academic Session 2020-21)

DEPARTMENT OF PHYSICS
NATIONAL INSTITUTE OF TECHNOLOGY KURUKSHETRA

Email: hodphysics@nitkkr.ac.in
http://www.nitkkr.ac.in

Phone: 01744-233494

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VISION OF THE INSTITUTE

To be a role-model in technical education and research, responsive to global challenges.

MISSION OF THE INSTITUTE

- To impart quality technical education that develops innovative professionals and entrepreneurs.
- To undertake research that generates cutting-edge technologies and futuristic knowledge, focusing on the socio-economic needs.

VISION OF THE DEPARTMENT

To impart quality education and focus on the state-of-art research in Physics, Materials Science, Nanotechnology, and Instrumentation to meet the dynamic global challenges.

MISSION OF THE DEPARTMENT

To develop the understanding of fundamentals of Physics essential for engineering graduates and integration of research in Materials, Nanotechnology and Instrumentation to make the Nation scientifically and technologically self- sustained.

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

VISION OF THE PROGRAMME

To disseminate state-of-the-art education to develop competent professionals in nanomaterials & nanotechnology to serve the society.

MISSION OF THE PROGRAMME

To educate and train manpower engaged in cutting-edge research by offering latest in the field of nanomaterials & nanotechnology for the sustainable development.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

The PG programme in NANOMATERIALS & NANOTECHNOLOGY will produce post graduates that, within a few years of graduation:

• will acquire and exhibit competence to cater to the development of nanomaterials at the global level. **(PEO1)**
• shall be able to utilize domain knowledge required for analyzing and resolving practical problems. **(PEO2)**
• will be capable to develop advanced materials and utilize them for device applications pertaining to nanotechnology. **(PEO3)**
• will be sensitive to the needs of society, honouring social commitments and industries requirements. **(PEO4)**
• shall be equipped with theoretical knowledge and practical skills to investigate and undertake complex projects of high impact and of inter-disciplinary nature. **(PEO5)**

PROGRAMME OUTCOMES (POs)

Graduates of the Programme:

• shall be able to utilize domain knowledge required for analyzing and resolving field problems of nanomaterials based technology. **(PO1)**
• shall have the ability to write and present a substantial technical report of the comprehended problem and its recommended solution. **(PO2)**
• shall demonstrate the comprehension and analysis in materials research and nanotechnological development. **(PO3)**
• shall be equipped with theoretical and practical skills to investigate and undertake complex projects of inter-disciplinary nature with wide societal impact. **(PO4)**
• shall imbibe social and environmental ethics, readily adapting to ever changing and transforming technical requirements and working towards sustainable development of the society. **(PO5)**

DEPARTMENT OF PHYSICS
NATIONAL INSTITUTE OF TECHNOLOGY KURUKSHETRA

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)
SCHEME OF EXAMINATION (w.e.f. 2020-21)

FIRST SEMESTER

Course No.	Course Title	Lecture	Tutorial	Practical	Credits
	Core				
MPH2C01	Foundations of Nanoscience & Technology	3	-	-	3
MPH2C03	Materials Science	3	-	-	3
MPH2C05	Synthesis and characterization Techniques for Nanomaterials	3	-	-	3
	Elective - 1	3	-	-	3
MPH2E41	Thin Film Physics and Applications				
MPH2E43	Nanoionics				
MPH2E45	Nanomaterials and Carbon Allotropes				
	Elective - 2	3	-	-	3
MPH2E47	Nanophotonics				
MPH2E49	Advanced Analytical Tools				
MPH1E33	Computational Techniques				
	Seminar				
MPH2S07	Seminar	-	-	2	1
	Laboratory				
MPH2L09	Nanomaterials Synthesis Lab-I	-	-	4	2
Total		15	-	6	**18**
Total Contact Hours		**21**			

Note: Mandatory Industrial visit/Academia-Industry Interaction workshop during winter vacation.

SECOND SEMESTER

Course No.	Course Name	Lecture	Tutorial	Practical	Credits
	Core				
MPH2C02	Electronic & Optical Properties of Materials	3	-	-	3
MPH2C04	Polymers, Ceramics and Composite Materials	3	-	-	3
	Elective - 3	3	-	-	3
MPH2E42	NEMS & MEMS				
MPH2E44	Nanoscale Magnetic Materials and Devices				
MPH2E46	Technology for Medical Diagnostics and Therapy				
	Elective - 4	3	-	-	3
MPH2E48	Advanced Sensors and Actuators				
MPH2E50	Nanoelectronics & Devices				
MPH1E34	Vacuum Science and Technology				
	Open Elective	3	-	-	3
MPH2O74	Energy Materials and Devices				
MEC1O72	Sensors Technology				
MSR1O58	Waste Management & Energy Generation Technology				
MSR1O60	Bio-Energy Technology				
	Seminar				
MPH2S06	Seminar/Project work	-	-	2	1
	Laboratory				
MPH2L08	Nanomaterials Characterization Lab-II	-	-	4	2
Total		15	-	6	**18**
Total Contact Hours		**21**			

Note: Mandatory lectures/workshop on research methodology will be conducted during summer vacation. The experts will be invited from IISc/IITs/NITs/R&D labs and Industries.

THIRD SEMESTER

Course No.	Course Name	Contact Hours	Credits
MPH2D11	Dissertation Part -I	28	14

FORTH SEMESTER

Course No.	Course Name	Contact Hours	Credits
MPH2D12	Dissertation Part -II	28	14

Total Credits = 18+18+14+14= 64

CORE - 1
MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

1st – SEMESTER
FOUNDATIONS OF NANOSCIENCE & TECHNOLOGY

Course No. MPH2C01

L	T	P
3	0	0

Duration of Exam: 3h

Credits:	03
Sessional:	50
End Sem. Exam:	50
Total:	100

Course Educational Objectives:

COE1 To familiarize the students about the foundation of nanomaterials and nanotechnology.

COE2 To develop understanding of fundamentals of Physics of nanomaterials.

COE3 To understand and realize the different applications of nanotechnology.

UNIT I: BACKGROUND TO NANOSCIENCE: Definition of Nano, Scientific revolution-Atomic Structure and atomic size, emergence and challenges of nanoscience and nanotechnology, carbon age-nano form of carbon (CNT to Graphene), influence of nano over micro/macro, large surface to volume ration, surface effects on the properties, Nanotechnology in agriculture, Nanomedicine, Application of nanotechnology in remediation of pollution.

UNIT II: PHYSICS OF NANOMATERIALS: Types of solid materials, Crystal system, classification of crystal system, translation vector, unit cell, space lattice, Miller indices, reciprocal lattice, simple crystal structures, bonds in solids. Electronic properties of atoms and solids, isolated atom, bonding between atoms, giant molecular solids, free electron model and energy bands, band theory, periodic potential, quantization and Size effects in nanomaterials.

UNIT III: NANOSTRUCTURES AND PROPERTIES: One dimensional, Two dimensional and Three dimensional nanostructured materials, Quantum confinement, electronic density of states for 1D, 2D and 3D materials, exciton, confining the exciton, quantum well, quantum wire and quantum dot, shell structures, metal oxides, semiconductors, composites, mechanical-physical-chemical properties.

UNIT IV: METALLIC NANOPARTICLES: Main characteristics of nanoparticles (MNP), local density of state in MNPs, optical properties of MNPs: effect of size and shape, surface plasmon resonance in MNPs, preparation of gold and silver nanoparticles, bimetallic nanoparticles. Application of MNPs, Effects of inhaled nanosized particles.

Reference Books

1. **Introduction to Solid State Physics,** C. Kittel
2. **Solid State Physics,** A.J. Dekker
3. **Nanotechnology,** Rebecca L Johnson, Lerner Publications.
4. **Introduction to Nanotechnology,** Charles P. Poole Jr., Chapman and Hall/CRS
5. **Nanostructured Materials and Nanotechnology,** S.Mathur and M. Singh, Willey, 2008.

Course Outcomes:

CO1 Students will be able to understand fundamentals of Nanoscale Science and Technology.

CO2 Students will be able to analyze the physics of nanoscale properties of materials.

CO3 Students will be able to learn importance of nanotechnology through their applications.

CORE – 2
MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

1st – SEMESTER
MATERIALS SCIENCE

Course No. MPH2C03

L	T	P
3	0	0

Duration of Exam: 3h

Credits:	03
Sessional:	50
End Sem. Exam:	50
Total:	100

Course Educational Objectives :

CEO1: To impart knowledge in the field of nanomaterial and their applications in engineering.
CEO2. To understand origin of mechanical and thermal properties of materials.
CEO3. To prepare the students to take up the future challenges related to advanced nanomaterials for developing futuristic devices.

UNIT I: INTRODUCTION: Historical perspective of Materials Science, Classification of materials, Structure property relationship in material, multiphase materials, Advance materials- polymers, ceramics and composites, Crystallinity and its effect on physical properties, metal, ceramic, polymers, Future materials and modern materials, Materials and environment.

UNIT II: DIFFUSION IN SOLIDS: Introduction, Mechanisms of diffusion, Types of diffusion, Fick's law of diffusion, Concept of different types of diffusion coefficients, Factors affecting diffusion coefficient, Temperature dependence of diffusion coefficient, The Kirkendall effect, Darken analysis, Applications of diffusion.

UNIT III: MECHANICAL PROPERTIES: Introduction, elastic deformation- Stress-strain response of materials; yield and tensile strength, modulus of elasticity, toughness, Elastic Properties of Materials; plastic deformation- fatigue, creep and fracture; Tensile Properties, True Stress and Strain, Elastic recovery after plastic deformation, Compressive, Shear, and Torsional deformation, Hardness, Variability of material properties.

UNIT IV: THERMAL PROPERTIES : Introduction, specific heat, thermal conductivity, Thermal expansion, thermal stress, thermal stability, Thermal radiation, emissivity, Relationship between structure and thermal properties of materials, Phase Transition, Experimental methods for thermal analysis of materials, Thermoelectric properties.

REFERENCE BOOKS:

1. **Material Science and Engineering,** V. Raghavan
2. **Materials Science and Engineering,** William D. Callister, Jr. David G. Rethwisch
3. **Introduction to Materials Science for Engineers ,** James F. Shackelford
4. **Diffusion in Solids,** P. Shewmon

Course Outcomes:

CO1 Students will be able to understand different types of nanomaterials for various applications.
CO2 Students will be able to understand thermal properties of materials.
CO3 Students will be able to develop futuristic devices.

CORE - 3

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

1st – SEMESTER

SYNTHESIS AND CHARACTERIZATION TECHNIQUES FOR NANOMATERIALS

Course No. MPH2C05

L	T	P
3	0	0

Duration of Exam: 3h

Credits:	03
Sessional:	50
End Sem. Exam:	50
Total:	100

Course Educational Objectives:-

CEO1: To provide an overview of contemporary fabrication techniques along with different physical and chemical approaches used for the synthesis of nanomaterials.

CEO2: To familiarize the students with different lithographic methods for nanostructure materials fabrications.

CEO3 To impart knowledge and develop the understanding about various characterization techniques involved in nanomaterials.

UNIT I: PHYSICAL AND CHEMICAL SYNTHESIS METHODS: Thermal evaporation, e-beam evaporation, Sputtering techniques, Pulse Laser Deposition, Atomic Layer Deposition, Molecular beam epitaxy, Chemical Vapor Deposition (CVD), Sol-gels techniques, Co-precipitation, Hydrothermal, Microwave, Electroplating, Liquid Phase Epitaxy, Langmuir Blodgett, Spin and Dip coating techniques and Spray pyrolysis.

UNIT II: LITHOGRAPHIC METHODS: Etching technologies: wet and dry etching, Photolithography, Drawbacks of optical lithography for nanofabrication, Electron beam lithography, Ion beam lithography, Dip-Pen nanolithography, X-ray lithography

UNIT III: STRUCTURAL AND OPTICAL CHARACTERIZATION TECHNIQUES: X-ray absorption and diffraction, Scattering factors (Atomic scattering factor and geometrical scattering factor), Reciprocal lattice, Methods of analysis: Powder and Laue. UV-Vis-NIR Spectroscopy, FTIR Spectroscopy, FTIR spectra of nanomaterials, Steady State and Time dependent Photoluminescence Spectroscopy.

UNIT IV: THERMAL CHARACTERIZATION TECHNIQUES: Thermo gravimetric analysis; Differential thermal analysis, Differential scanning calorimetry, Dilatometry, Dynamic mechanical analysis, Thermo mechanical analysis, Dielectric thermal analysis, Thermo-optical analysis.

Reference Books

1. M.A. Shah and T. Ahmad, Principle of Nanoscience & Nanotechnology, Narosa, 2010.
2. G. Timp, Nanotechnology, Springer, 2008.
3. G.W. Hanson, Fundamentals of Nanoelectronics, Pearson, 2009.
4. M. Ratner and D. Ratner, Nanotechnology: A Gentle Introduction to the Next Big Idea, Pearson, 2009.
5. C.P. Poole and F.J. Owens, Introduction to Nanotechnology, Wiley, 2009.

Course Outcomes:

CO1 Student will be able to know about the fabrication techniques for Nanoscale materials.

CO2 Student will able to utilize lithographic methods to fabricate nanostructure materials.

CO3 Students will be able to use the experimental techniques in their research work and industry.

Awais

Elective – 1 (i)

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

1ST – SEMESTER

THIN FILM PHYSICS AND APPLICATIONS

Course No. MPH2E41

L	T	P
3	0	0

Duration of Exam: 3h

Credits:	03
Sessional:	50
End Sem. Exam:	50
Total:	100

Course Educational objectives:-

COE1: Student will gain fundamental knowledge of thin film growth processes and techniques.
COE2: Student will be able to understand basic physics behind various thin film growth techniques.
COE3: Student will learn the hybrid thin film growth approaches and design thin film based devices.

UNIT I: Introduction: Nucleation and growth mechanisms, critical radius of nuclei, microstructure evolution; Film growth by evaporation, sputtering, Chemical vapour deposition, atomic layer epitaxy, sol-gel technique.

UNIT II: Fabrication techniques: Experimental techniques to study surfaces, kinetics of surface processes –impingement of atoms, scattering, adsorption, sticking coefficient; Hume-Rothery rules, High vacuum pumping dynamics.

UNIT III: Characterization techniques: Thin film characterization techniques; Absorption and Scattering Spectrophotometers, X-ray photoelectron spectrometer, Auger spectrometer, Ultra-violet spectrometer, Atomic force microscope, and Scanning electron microscope.

UNIT IV: Quantitative models and Applications: Quantitative models for film deposition rate and thickness profiles, Ion-induced secondary electron emission coefficient; Optical, electrical, magnetic and mechanical properties of thin films and their applications; Applications of thin films in various devices, Solar cells, Nano-assembled bulk thermoelectrics and other energy devices.

Reference books:

1. John E. Mahan, Physical vapour deposition of thin films (John Wiley & Sons, 2000)
2. Milton Ohring, Materials science of thin films: Deposition and structure (Elsevier, Inc., 2002)
3. K. L. Chopra, Thin film phenomena (McGraw-Hill, New York, 1969)

Course outcomes:

CO1: Students will have knowledge of the physics of various thin film growth approaches.
CO2: Students will be able to analyze practical problems on various thin film growth techniques.
CO3: Students will be able to design thin film based devices.

Elective 1 (ii)

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

1ST – SEMESTER

NANOIONICS

Course No. MPH2E43

L	T	P
3	0	0

Duration of Exam: 3h

Credits:	03
Sessional:	50
End Sem. Exam:	50
Total:	100

Course Educational Objectives:

CEO1: To familiarize with ionic conductors and their role in electrochemical devices.
CEO2: To understand the ion transport mechanism of nanoscale ionic conductors.
CEO3: To impart knowledge about various characterization techniques involved in nanomaterials.

UNIT – I:SOILD STATE IONICS: Introduction, solid state ionics vis-à-vis solid state electronics, Principles of ionic conduction in ordered and disordered nanostructures; Superionic materials classification – Crystalline anionic and cationic conductors, mixed ionic and electronic conductors, structural factors responsible for high ionic conductivity.

UNIT –II: ION TRANSPORT MODELS: AC impedance spectroscopy; Transport properties and Ion dynamics; Ion transport in homogeneous and heterogeneous medium – Ion conducting glasses, ceramics, polymers and composites; Ion Transport Models Phenomenological models, Free volume theory, Configurational entropy model, Jump relaxation and Ion hopping model, Bond percolation model and Effective medium theory; Concepts and feasibility of ion conducting polymer nanocomposites and nanocrystalline ceramics.

UNIT-III: FABRICATION OF ELECTROCHEMICAL DEVICES: Design of fabrication of primary and secondary batteries. Solid State Lithium Battery, Li-air battery, Li-water battery, Sodium ion batteries, Sulphur batteries, potassium ion battery, Electric double layer supercapacitors, Electrochemical pseduocapacitors, Fuel Cells (PEM Fuel cell, SOFC), Electrochromic display devices.

UNIT IV: DEVICE CHARACTERIZATION TECHNIQUES: Electrochemical impedance spectroscopy, cyclic voltammetry, galvanostats charging-discharging methods, Performances of devices and electrode kinetics. Double layer and other polarization effects at solid /solid interface.

REFERENCE BOOKS

1. Superionic Solids: Principles and Applications, S. Chandra, North Holland, 1981
2. Solid State Ionics, T. Kudu and K. Fueki, Kodanasha-VCH, 1990
3. Energy Storage, R. A. Huggins, Springer, 2010.
4. Fuel Cell Technology, Nigel Sammes (ed.), 1st edition, Springer, 2006
5. Fuel Cell Engines, Matthew M. Mench, John Wiley & Sons, 2008.

Course Outcomes:

CO1: Graduates will be able to understand with the ionic transport mechanism in ionic conductors.
CO2: Graduates will be able to utilize, design and engineer the electrochemical devices.
CO3: Graduates will be able to imply the design and fabrication of nanoionic devices for futuristic applications.

Elective –I (iii)

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

1ST – SEMESTER

NANOMATERIALS AND CARBON ALLOTROPES

Course No. MPH2E45

L	T	P
3	0	0

Duration of Exam: 3h

Credits:	03
Sessional:	50
End Sem. Exam:	50
Total:	100

Course Educational Objectives:

COE1 To understand the properties of nanomaterials and their utilizations.
COE2 To understand the physical properties of CNTs
COE3 To understand the structural and physiochemical properties of graphene.

Unit I: 1D and 2D nanomaterials: Vapor phase and solution based growth of nanowires, Growth control and integration, Elemental nanowires, Metal oxide nanowires, Metal Nitride nanowire, Metal carbide nanowire, semiconductors nanowires, Useful properties and potential applications, Nanosheets-Fabrication, structure and characterizations

Unit II: Carbon Allotropes: Structures and types of carbon allotropes, Carbon Nano allotropes and technological applications.

Unit III: Carbon Nanotubes: Single and Multiwalled CNTs, Vertically aligned CNTs, Chemically modified nanotubes, CNTs composites, Dispersible CNT, CNT array based smart materials, Electrical, Mechanical, Optical and Thermal properties of CNTs, Spectroscopic analysis, Applications of CNTs, Inorganic nanotubes.

Unit IV: Graphene: Synthesis and structure of graphene different forms and physicochemical properties of grapheme. Graphene based nanomaterials and their applications.

Reference Books

1. Physical properties of Carbon Nanotube- R Satio
2. Carbon Nanotubes: Properties and Applications- Michael J. O'Connell
3. Nanotubes and Nanowires- CNR Rao and A Govindaraj, RCS Publishing

Course Outcomes:

CO1: The students will be able to understand the properties of nano-scale materials for developing futuristic devices.
CO2: Students will be able to understand physiochemical properties of carbon allotropes.
CO3: Their understanding will improve regarding carbon based nanomaterials.

Elective II (i)

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

1ST – SEMESTER

NANOPHOTONICS

Course No. MPH2E47

L	T	P
3	0	0

Duration of Exam: 3h

Credits:	03
Sessional:	50
End Sem. Exam:	50
Total:	100

Course Educational Objectives:

CEO1: To develop the understanding nanophotonics, nonlinear optics, and optical sources.
CEO2: To understand the concept and application of Plasmonics and its applications.
CEO3: To familiarized photonic crystals and fibers, and based sensors for research and industrial application.

Unit I: Introduction to Photonics: Properties of Light, Geometrical optics: Basics and limitations, Wave Optics: Maxwell's equations and wave equation, Polarization, Interference, Diffraction, Gaussian Beam, Nonlinear Optics: Nonlinear Polarization and Susceptibilities, Nonlinear Processes: second order and Third order

Unit II: Quantum confined Materials and optical Sources: Quantum confinement effects, Nanoscale Optical Interactions, Quantum Structures: Well, Wires, Dot, Ring, Superlative, Core-shell Quantum Dot, Nano-composite waveguide, Electroluminescence, Light emitting diode, Laser: Concept, cavity, amplification methods (Q-switch, Mode locking), Nanolaser, Random Laser.

Unit III: Plasmonic: Metallic Nanomaterials, Localized surface plasmons, Local field enhancement, Sub wavelength Aperture Plasmonic, Plasmonic Wave Guiding, Plasmon enhanced dye sensitized solar cell, and Applications of Metallic Nanostructures.

Unit IV: Photonic Crystals: Basic Concepts, Photonic Bandgap Structures, Features of Photonic Crystals, Method of Fabrication, Photonic crystal optical circuitry, Nonlinear Photonic Crystals, Photonic Crystal Fibers, Photonic crystal Sensors.

Reference Book

1. Plasmonics:Theory & Applications, T.V.Shahbazyan, M.I.Stockman, 15, Springer
2. Plasmonics: fundamentals and applications, STEFAN A. MAIER, Springer
3. Nanophotonics, Paras. N. Prasad, Wiley-Interscience,
4. Nishihara, Hiroshi, Masamitsu Haruna, and Toshiaki Suhara. "Optical integrated circuits."New York (1989)

Course Outcomes:

CO1: Graduates will be able to apply various optical theories to a range of problems.
CO2: Graduates will be able to define and explain the physics governing plasmonic behaviour and light matter interaction.
CO3: Graduates will be able determine properties and design photonic crystals and lasers.

Elective II (ii)

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

1ST – SEMESTER

ADVANCED ANALYTICAL TOOLS

Course No. MPH2E49

L	T	P		
3	0	0	Credits:	03
			Sessional:	50
Duration of Exam: 3h			End Sem. Exam:	50
			Total:	100

Course Educational Objectives:

CEO1: To familiarize with various advanced experimental characterization tools.
CEO2: To understand the principles of spectroscopic and structural techniques.
CEO3: To understand and realize the use of various advanced experimental tools for nanomaterials characterization.

UNITI: SPECTROSCOPIC TECHNIQUES: Raman spectroscopy: Principle and analysis of spectra, Confocal Raman spectroscopy, Metal enhanced Raman spectroscopy, X-ray photoelectron spectroscopy (XPS):Principle and analysis of spectra, ultraviolet photoelectron spectroscopy (UPS):Principle and analysis of spectra.

UNIT II: ELECTRON MICROSCOPY TECHNIQUES:-Scanning Electron Microscopy; Construction, operation, sample preparation techniques; image analysis, Wavelength Dispersive Spectroscopy, Energy Dispersive Spectroscopy, Electron Probe Micro Analysis technique. Transmission Electron Microscopy (TEM); Construction, modes of operation, sample preparation techniques, image analysis, High resolution-TEM.

UNIT III: STRUCTURAL CHARACTERIZATION TECHNIQUES:- Small Angle X-Ray Scattering (SAXS) – application in macro-texture, crystal structure and residual stress determination. Surface area and pore structure analysis via N_2 adsorption-desorption, BET. Scanning Probe Microscopy: Atomic Force Microscopy, Magnetic Force Microscopy, ScanningTunneling Microscopy: Instrumentation and principle, Kelvin force microscopy.

UNIT IV:ELECTRIC AND MAGNETIC CHARACTERIZATION: Van der pauw four probe method, Hall coefficient measurement, vibrating sample magnetometry, SQUID. Mossbauer spectroscopy, Nuclear magnetic resonance spectroscopy.

Reference Books:

1. Nanostructures and Nanomaterials-Synthesis, Properties and Applications, Guozhong Cao, Imperial College Press
2. Handbook of Nanophase and Nanomaterials(Vol I and II), ZhongLinWang,Springer
3. Encyclopedia of Materials Characterization, C.R.Brundle,C.A.EvansJr.,and S.Wilson (eds), Butterworth-Heinemann,Stoneham,
4. Surface Analysis: The Principle Techniques, J.C.Vickerman,John Wiley and Sons
5. Introductory Raman spectroscopy (Academic Press) J R Ferraro and K Nakamoto

Course Outcomes:

CO1: Graduates will be able to utilize suitable techniques for specific materials characterization.
CO2: Graduates will be able to understand and operate sophisticated instruments and techniques of characterization.
CO3: Graduates will be able to analyze spectra/data obtained by various instruments.

Elective II (iii)

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

1ST – SEMESTER

COMPUTATIONAL TECHNIQUES

Course No. MPH1E33

L	T	P
3	0	0

Duration of Exam: 3h

Credits:	03
Sessional:	50
End Sem. Exam:	50
Total:	100

Course Educational Objectives:

CEO1: To gain fundamental knowledge about Computer Architecture and Programming.

CEO2: To gain hand on training on real scientific programming problems in C language.

CEO3: To understand the fundamentals of modeling and simulation.

UNIT I: Computer Architecture: Introduction to Operating Systems, Multiprogramming, time-sharing, distributed systems, real time system; overview of pipelining, array processing, multiprocessing, SISD, SIMD, MISD, MIMD architecture.

UNIT II: C Programming: Constants, variables, data types; input-output statements, loops; case structure; I-d and 2-d arrays; functions; Program Loops, Programming Arithmetic and Logic Operations, programming using above statements.

UNIT III: Introduction to modeling and simulation: Fundamentals and techniques of modeling and simulation, Terminology in modeling, Analyze modeling and simulation of specific industries, Modeling and optimization algorithm, Simulation through Material Studio and COMSOL Softwares.

UNIT IV: Error Analysis and Curve fitting: Accuracy and Precision, Standard deviation, Relative standard deviation, Methods of reporting analytical data, Error analysis: Absolute, relative and systematic error. Type of errors in experimental data, Statistical evaluation of data-indeterminate errors, confidence interval, Sampling Distributions and Statistical Tests: The "Students" t-Test, The χ^2-test, Linear Regression, Curve fitting Methods.

Reference Books

1. Operating System Concepts –Silberschatz& Galvin, Addison Wesley.
2. Programming with C – B.S Gottfried, Schaum Series, TMH
3. Computer Architecture & Parallel Processing – Hwang & Briggs.
4. Computer system architecture, M. Morris Mano- PHI.

Course Outcomes:

CO1 Graduates will be able to learn basic knowledge about Computer Architecture and Programming.

CO2 Graduates will be able to solve real scientific programming problems in C language.

CO3 Graduates will be able to perform simulation in Material Studio software.

1st SEMESTER

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

NANOMATERIALS SYNTHESIS LAB-I

Course No. MPH2L09

L	T	P
0	0	2

Duration of Exam: 3h

Credits:	02
Sessional:	60
End Sem. Exam:	40
Total:	100

Course Educational Objectives:

CEO1: To develop the practical knowledge on electrical properties of nanomaterials.
CEO2: To provide hands on training to explore the optical properties of nanomaterials.
CEO3: To develop the practical knowledge on dielectric and magnetic properties of nanomaterials.

S. No.	List of Experiments
1.	Find the type of charge carriers and their concentration for semiconductors using Hall effect.
2.	Determination of Planck's constant through photoelectric effect.
3.	Find the electrical resistivity and activation energy of semiconducting thin film by four probe method
4.	To understand the microstructural features of ceramics/metals by optical microscopy
5.	Study the effect of temperature on luminescence phenomena.
6.	Complex impedance spectroscopy for electronic property evaluation (e.g., on $BaTiO_3$).
7.	Determination of magneto resistance for the given semiconductor.
8.	Investigate the electrical polarization properties of a given compound by tracing its P-E curve.
9	Synthesis of metal oxide nanoparticles through hydrothermal approach.
10.	Determination of band gap energy of metal-oxide nanoparticles using UV Spectrophotometer
11.	Optimization of thickness and quality of thin film by spin coating method.
12.	Study the surface morphology of thin film using non-destructive scanning probe microscopic (SPM) technique.
13.	Study of surface morphology of thin film by destructive scanning electron microscopy (SEM) technique.

Course Outcomes:

CO1 Student will develop the experimental skills about basic experiments related to electrical characterizations.
CO2 Student will be able to perform the experiment about optical properties of materials.
CO3 Student will be able to use nanoparticles synthesis methods and able to explore dielectric and magnetic properties of nanomaterials.

Awnish

Core 1

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

2nd – SEMESTER

ELECTRONIC & OPTICAL PROPERTIES OF MATERIALS

Course No. MPH2C02

L	T	P
3	0	0

Duration of Exam: 3h

Credits: 03
Sessional: 50
End Sem. Exam: 50
Total: 100

Course Educational Objectives:

CEO1: To understand the electronic and optical properties of low dimensional materials.

CEO2: To develop the understanding of linear and nonlinear optical properties on nanomaterials.

CEO3: To familiarize with optoelectronic mechanism in various devices.

UNIT I: INTRODUCTION: An overview of quantum mechanical concepts related to low-dimensional systems, quantum mechanical trapping, Quantum mechanical tunneling, Variation of energy bands with alloy composition and its exploitation for devices, Lattice matching, coupling between Quantum wells, Superlattices.

UNIT II: CLASSIFICATION OF QUANTUM CONFINED SYSTEMS, QUANTUM PHENOMENA: Quantum Confinement, quantum dots, colloidal quantum dots. Electrons and holes in Quantum wells. Surface to volume ratio in quantum confined systems, Spherical cluster approximation, Exterior surface area, Interior surface area, Electronic properties of 1D, 2D and 3D systems, Single Electron Effects: Coulomb Blockade, Coulomb Staircase, Coulomb Oscillations, Single electron transistors.

UNIT III: LINEAR OPTICAL PROPERTIES OF MATERIALS: Luminescence, Fluorescence, Phosphoresence, Electroluminescence, Excitons: Weekly bound excitons, tightly bound excitons, excitons in molecular crystals and in nanostructures. Optoelectronic mechanisms in light emitting diodes, solar cells, optical sensors operation

UNIT IV: NON-LINEAR OPTICAL PROPERTIES OF MATERIALS- Non-linear optical susceptibilities, Second and Third order Harmonic Generation (SHG &THG). Multiple photon excitation, Stimulated Raman Scattering, Stimulated Brillouin Scattering.

REFERENCE BOOKS:

1. Concept of Modern Physics, Arthur Beiser, Tata McGraw Hill publication, 2003.
2. Optical Properties of Solids, Mark Fox, Oxford University Press, 2001.
3. Band Theory and Electronic Properties of Solids, John Singleton, Oxford University Press, 2001.
4. The Physics of Low-dimensional Semiconductors: An Introduction, John H. Davies, Oxford University Press, 1997.

Course Outcomes:

CO1: Graduates will be able to understand the electronic and optical properties of the nanoscale materials.

CO2: Graduates will be able to utilize the knowledge for modeling the solid state optoelectronic devices.

CO3: Graduates will be able to deal the band-gap engineering of materials for optoelectronic devices.

Core 2

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

2nd – SEMESTER

POLYMERS, CERAMICS AND COMPOSITE MATERIALS

Course No. MPH2C04

L	T	P		
3	0	0	Credits:	03
			Sessional:	50
Duration of Exam: 3h			End Sem. Exam:	50
			Total:	100

Course Educational Objectives:

CEO1: To impart fundamental knowledge about polymer, ceramic and composite materials.

CEO2: To understand processing techniques of polymer and ceramics.

CEO3: To prepare the students to develop the advanced materials through composite materials.

Unit-I: Polymers and Chemical Bonding: Polymerization mechanism, Addition and Condensation polymerization, Molecular weights and their distribution, Simple and hindered rotation, Crystallinity and melting, Glass transition, Thermosetting and Thermoplastic Polymers, Conducting polymers and their types, Doping and De-doping of conjugated polymers, Solatron and polaron formation in conducting polymers.

Unit-II: Composite Materials: Introduction and overview, Types of Composite Materials, Carbon based Reinforcements, Matrix materials, Factors affecting mechanical and electronic properties, Property Enhancement, case studies of composite materials for defense applications.

Unit-III: Ceramics and Polymers Matrix Composites: Bonding and crystal structure; Defects in Ceramics, Diffusion and Electrical conductivity of ceramic materials. Synthesis of ceramic powder and nanoparticles and their consolidation; Processing of ceramics and polymers matrix composites, Interfaces and properties of ceramics matrix composites, Thermal shock resistance, Biodegradable Polymer Composites, Applications.

Unit-IV: Metal-Matrix Composites: Aluminium and Magnesium based Matrix Composites; Titanium based Matrix Composites, Fabrication and Applications.

Reference Books:

1. Polymer Science, V.R. Gowariker, N.V. Viswanathan and JayadevSreedhar, Halsted Press, John Wiley & Sons, New York.
2. Principles of Polymerization, George Odian, John Wiley & Sons. 4th Ed.
3. Introduction to Ceramics, W.D. Kingery, H.K. Bowen and D.R. Uhlmann.
4. Fundamentals of ceramics, W.M. Barsoum.
5. Composite Materials Science and Engineering, Krishnan K. Chawla, Springer (2012)

Course Outcomes:

CO1. Students will be able to understand different types of materials for various applications.

CO2. Their understanding will improve regarding mechanical properties of materials.

CO3. The students will be able to understand the properties of new materials useful for developing futuristic devices.

Elective -3 (i)

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

2nd – SEMESTER

MICRO-ELECTRO MECHANICAL SYSTEM (MEMS) & NANO-ELECTRO MECHANICAL SYSTEMS (NEMS)

Course No. MPH2E42

L	T	P		
3	0	0	Credits:	03
			Sessional:	50
Duration of Exam: 3h			End Sem. Exam:	50
			Total:	100

Course Educational Objectives:

CEO1: To provide scope and recent development of the science and technology of micro & nanosystems.
CEO2: To gain physical knowledge underlying the operation principles and design of MEMS & NEMS.
CEO3: To learn some typical or potentially applicable micro- and nano-systems at the frontier of the development of the field.

UNIT I: MICRO-AND NANO SMART SYSTEMS:-Introduction and overview, MEMS and NEMS definitions, Taxonamy of Nano-and Microsystems-Synthesis and Design, Biological analogies, and design–Biomimetics Fundamentals, Biomimetics for NEMS and MEMS, Nano-ICs and Nanocomputer architectures, Biomimetics and nervous systems.MEM/NEM structures and systems in industrial and automotive applications.

UNIT II: MICROMACHINING TECHNOLOGIES:- Si Micromachining, Etching, Dry etching based on physical, -chemical, -reactive ion and -deep reactive ions. Thin film deposition. Diffusion and ion implantation of dopants, Advance micromachining processes via wafer bonding and dissolved wafer processes.

UNIT III: MODELING OF MICRO-AND NANOSCALE ELECTROMECHANICAL SYSTEMS: Introduction to modeling, analysis and simulation, basic electro-magnetic with application to MEMS and NEMS, modeling developments of micro-and nanoactuators, energy conversion in NEMS and MEMS.

UNIT IV: DESIGN AND FABRICATION OF MEMS & NEMS: Microfabrication of microcoils/windings through copper, nickel and aluminum electro deposition for micromotors. NEM Switches, NEM memory, NEM sensors.

REFERENCE BOOKS:

1. **Micro and Smart Systems (Technology and Modelling)**, G.K. Ananthasuresh, K.J. Vinoy, S. Gopalakrishnan, K.N. Bhat, V.K. Aatre, John Wiley Publication (2012)
2. **Nanoscale silicon devices,**Shunri Oda and David K. Ferry, CRC Press (2016).
3. **Micro and Nano Fabrication Tools and Processes,** Hans H. Gatzen, Volker Saile, Jürg Leuthold, Springer-Verlag Berlin Heidelberg (2015).
4. **Nanomaterials: Synthesis, Properties and Applications** A. S. Edelstein and R.C.Cammarata (edits), Institute of Physics.

Course Outcomes:

CO1: Graduates will be able to deal with the miniaturization of electromechanical devices.
CO2: Graduates will be able to utilize, design and model the micro/nano-scale engineering systems.
CO3: Graduates will be able to imply the design and fabrication of micro and nano devices for futuristic applications.

Elective -3 (ii)

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

2nd – SEMESTER

NANOSCALE MAGNETIC MATERIALS AND DEVICES

Course No. MPH2E44

L	T	P
3	0	0

Duration of Exam: 3h

Credits:	03
Sessional:	50
End Sem. Exam:	50
Total:	100

Course Educational Objectives:

COE1: To understand the fundamentals of magnetic properties at nanoscale.
COE2: To understand the phenomenon of magnetoresistance alongwith magnetic recording.
COE3: To understand the applications of magnetic materials for various applications.

UNIT I: FUNDAMENTALS: Magnetic quantities and units, indirect exchange interaction, magnetic anisotropy, magnetization and magnetic materials, domains, domain walls, demagnetizing field, magnetization process. Magnetism in small structures, Single domain particles, superparamagnetism, Blocking temperature.

UNIT II: MAGNETORESISTANCE: Giant Magneto Resistance(GMR), spin dependent scattering of electrons, exchange biasing, spin valves, quantum tunneling, tunneling magnetoresistance (TMR), magnetic oxides and phase transformations: colossal magnetoresistance (CMR), Magnetic semiconductors, Spinvalves, Multiferroics.

UNIT III: MAGNETIC RECORDING: Overview, recording medium, particulate recording media, thin film recording materials, longitudinal versus perpendicular recording, write heads, read heads, magnetic random access memory (MRAM), Magnetic data Storage Devices

UNIT IV: APPLICATIONS: Materials for biomagnetism, functionalization of magnetic nanoparticles, magnetic separation, manipulation of magnetic particles in fluids, drug and gene delivery, targeting drug delivery, hyperthermia, magnetic biosensors, lab on-a-chip concept.

Reference Books

1. Modern magnetic materials, Robert C. O'Handley, John Wiley & Sons Inc., 2000.
2. Introduction to magnetic materials, Cullity and Graham, John Wiley & Sons Inc., 2009.
3. Introduction to magnetism and magnetic materials, D. Jiles, Chapman and Hall pub., 1991.
4. Fundamentals of Magnetism, Mathias Getzlaff, Springer, 2008.
5. Spin Electronics, M. Ziese and M.Thornton (Eds.), Springer, 2001. 6) Advanced Magnetic Nanostructures, Sellmyer and Skomski (Eds.), Springer, 2006.

Course Outcomes:

CO1 Graduates will be able to understand the magnetic properties of materials at nanoscale.
CO2 Graduates will be able to understand the phenomenon of magnetoresistance along with updates in the field.
CO3 Graduates will be able to understand the principles of magnetic recording and magnetic data storage.

Awnish

Elective-3 (iii)

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

2nd – SEMESTER

TECHNOLOGY FOR MEDICAL DIAGNOSTICS & THERAPY

Course No. MPH2E46

L	T	P		
3	0	0	Credits:	03
			Sessional:	50
Duration of Exam: 3h			End Sem. Exam:	50
			Total:	100

Course Educational Objectives :

CEO1: To make graduates understand the use of nanotechnology in health care as medicines or Medical monitoring systems.

CEO2:To comprehend the utilization of different types of biomedical instruments for diagnostic and therapy purposes.

CEO3: Application of nanomaterials and nanosystems in medical diagnostics and therapeutics.

UNIT-1: NANOTECHNOLOGY IN MEDICINE AND HEALTH: Introduction to Nanomedicine, Overview of nanotechnology from medical perspective, different types of nano biomaterials and their biomedical applications, and cell nanostructure interactions.

UNIT-2: NANOTECHNOLOGY FOR DIAGNOSTIC DETECTION AND THERAPY: Optical diagnostic techniques; electrical diagnostic techniques, imaging diagnostics; immunoassays, nanoscale cantilevers for sensitive detection of cancer-related molecules, molecular tools for early diagnosis of cancer. Different forms of therapy, chemotherapy, radiation therapy, Photo dynamic therapy, hyperthermia, radiotherapy.

UNIT-3: NANOTECHNOLOGY FOR DRUG DELIVERY: Nanotechnology for Drug Targeting, controlled drug release; exploiting novel delivery routes using nanoparticles; Nanostructures for use as antibiotics, Nanoparticles in cancer targeting and treatment, treating cardiovascular diseases and diabetes, Types of nanoparticles in targeting and treatment, Carbon nanotube-based vectors for delivering immune therapeutics and drugs, Hydrogels for drug delivery, Nano carriers for drug delivery applications.

UNIT-4: NANOTECHNOLOGY FOR IMAGING: Nanotech based imaging techniques: Conventional imaging, magnetic resonance imaging (MRI), Computed tomography (CT), Positron emission tomography (PET), Single photon emission computed tomography (SPECT), Florescence imaging, Ultrasound imaging, Photoacoustic imaging, Dual modality imaging.

Reference Books

1. Nanomaterials for medical diagnosis and therapy by C. Kumar, Wiley –VCH, 2007, USA
2. Nanotechnology in Biology and Medicine: Methods, Devices, and Applications by TVDinh, CRC press, 2017.
3. The handbook of Nanomedicine by Kewal K. Jain, Humana Press, 2008, ISBN: 978-1-60327-319-0.
4. Medical Nanotechnology and Nanomedicine by Harry F. Tibbals, CRC Press

Course Outcomes:

CO1 Graduates will be technically skilled to comprehend the principles behind nanomedicine, Drug Carries, Drug Delivery.

CO2 To gain a broad understanding of concepts and applications of nanomedicine and Drug Delivery

CO3 To impart the knowledge to apply nano drug delivery systems for diagnosis and therapy.

ELECTIVE – 4 (i)

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

2nd – SEMESTER

ADVANCED SENSORS AND ACTUATORS

Course No. MPH2E48

L	T	P
3	0	0

Duration of Exam: 3h

Credits:	03
Sessional:	50
End Sem. Exam:	50
Total:	100

Course Educational Objectives:

CEO1 To gain knowledge about sensors utilized in materials characterization techniques.

CEO2 To get familiarize with advanced sensor's technological development.

CEO3 To understand and realize the different applications of advanced sensor based technology.

Unit I: PRINCIPLES OF PHYSICAL AND CHEMICAL SENSORS: General concepts & terminology, Transducers,Fundamentals of nano sensors, sensors and actuators, Static and dynamic characteristic of measurement systems, Sensing mechanism of Mechanical, Electrical, Thermal, Magnetic, Optical, Chemical and Biological Sensors. Fabrication methods: Sensor configurations and geometries, Use of nano-materials in sensors, Thin/thick film formation techniques (physical, chemical and Langmuir-Blodgett film formation techniques),

Unit II: RESISTIVE AND ELECTROMAGNETIC SENSORS: Strain gauges, Resistive temperature detectors, Thermistors, Magneto resistors, Light dependent resistors, resistive hygrometers, Capacitive sensors, inductive sensors, reluctance-variation sensors, eddy current sensors, linear variable differential transformers, magneto elastic sensors, Hall effect sensors.

Unit III: NANOTRANSDUCERS: Design of nanotransducers, nano-mechanical, Chemical and magnetic transducers,Thermoelectric sensors, Piezoelectric sensors, Pyroelectric sensors, Photovoltaic sensors, optical sensors,Carbon Nanotube Sensors.

Unit IV: NANOACTUATERS: Integration of sensor with actuators and electronic circuitry, Cantilever sensors, Nano structured optical actuators, Multiferroic materials and their applications as sensors and actuators.

Reference Books:

1. J. Fraden, Handbook of Modern Sensors:Phys., Designs, and Appl. AIP Press, Springer
2. D. Patranabis, Sensors and Transducers, PHI Publication, New Delhi
3. Mechatronics, Ganesh S. Hegde, Published by University Science Press.
4. Solid State Gas Sensors', (eds. P.T. Moseley, et al.), 1987, Bristol, Adam Hilger.
5. Carbon Nanotubes Science and Applications, M. Meyyapapn (Ed.), CRC Press.
6. Sensors and Transducers (Usher M.J: Macmillan)

Course Outcomes:

CO1 Students will be skilled to design and develop sensors Technology.

CO2 Students will be able to apply the sensors technology for the society.

CO3 Students will be able to understand the importance of sensor technology through their applications.

Elective -4 (ii)

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

2nd – SEMESTER
NANOELECTRONICS & DEVICES

Course No. MPH2E50

L	T	P
3	0	0

Duration of Exam: 3h

Credits:	03
Sessional:	50
End Sem. Exam:	50
Total:	100

Course Educational Objectives:

CEO1: To provide the recent advancement of solid-state electronics.
CEO2: To understand the underlying mechanisms of nanoelectronics devices.
CEO3: To understand and familiarize molecular electronics.

UNIT I: Fundamental of Nanoelectronics: Mesoscopic length concept and properties, quantum mechanical coherence and interference, Transport in semiconductors: Parallel transport and Perpendicular transport, Ballistic Mobility, concept of Quantum Corrals and Quantum Mirages, Quantum transport in nanostructures: Landauer formula, Coulomb blockade, Electrical contacts

UNIT II: Nanostructured Devices: High Electron Mobility Transistors; Quantum Interference Transistors; Nanowire transistors, Carbon Nanotube Transistors; Tunnelling diode, Resonant tunnelling diode and transistor, Applications of Resonant tunnelling diode, Single electron Transistor: Coulomb Staircase and coulomb diamond, Applications of Single electron Transistor, Superlattices and properties; MOSFET and Nano-FET,

UNIT III: Spin Tunneling Devices - Magnetic tunnel junctions- Tunneling spin polarization, Tunnel-based spin injectors - Spin injection and spin transport in hybrid nanostructures.

UNIT IV: Molecular Electronics: Concept and trends in molecular electronics, charge transport in molecular electronics, Molecular Switches, construction and working of Molecular diode and Transistors.

Reference Books:

1. Microelectronics to nanoelectronics Materials, Devices & manufacturability, Anupama b. Kaul, CRC press.
2. Nanotechnology for microelectronics and optoelectronics, Elsevier, J.M. Martínez-Duart, R.J. Martín-Palma, F. Agulló-Rueda (2006)
3. Molecular Electronic Devices: F.L.Carter et al(Ed);New York:North Holland
4. Nanoelectronics and Nanosystems: From Transistors to Molecular and Quantum Devices, Karl Goser, Peter Glösekötter, Jan Dienstuhl, Springer (2004).

Course Outcomes:

CO1 Graduates will be able to understand the advanced concepts of nanoelectronic devices and sensors.
CO2 Graduates will be able to utilize the electronic and optical properties for nanoelectronic devices.
CO3 Graduates will be able to imply the strategies for fabrication of Molecular electronics.

ELECTIVE –4 (iii)
MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

2nd – SEMESTER
VACUUM SCIENCE AND TECHNOLOGY

Course No. MPH1E34

L	T	P
3	0	0

Duration of Exam: 3h

Credits:	03
Sessional:	50
End Sem. Exam:	50
Total:	100

Course Educational Objectives :

CEO1 To develop the understanding of fundamentals of vacuum technology.
CEO2 To learn operational principles of different vacuum pumps.
CEO3 To design and develop vacuum systems.

UNIT-I: VACUUM FUNDAMENTALS: Kinetic theory of gases, mean free path, gas throughput, conductance, mass flow, pumping speed; Gas release from Solids: Vaporization, thermal desorption, virtual leaks, Materials used in vacuum systems, Importance of Vacuum.

UNIT-II: VACUUM PRODUCTION: Mechanical pumps: Rotary pump, Roots pump &Turbomolecularpump,vapour jet and vapour diffusion pumps, their design Principles, construction, operational characteristics and use. Sorption of gases, gettering and getter-ion pumps, degassing of surfaces. Sputter- ion-pumps, Cryogenic pumps.

UNIT-III: VACUUM MEASUREMENT: McLeod gauge, thermal conductivity gauges, spin rotor gauge, Ionization gauges, hot cathode, cold cathode gauges; Flow Meters and Residual Gas Analyzer, Leak Detection.

UNIT-IV:APPLICATIONS: Concept of Clean room, Applications of high vacuum: Vacuum impregnation, freeze drying, PCB designing and IC fabrication using vacuum technology. Various vacuum based Instruments e.g. Scanning Electron Microscope (SEM), Vacuum Coating Units, Vacuum Furnaces, etc.

Reference Books

1. Vacuum Science and Engineering by CM Van Atta
2. Vacuum Technology by Andrew Guthrie
3. Vacuum Technology – An introduction by LG Carpenter
4. Vacuum deposition of Thin Films by L. Holland
5. High Vacuum Engineering by Alfred E. Barrington
6. Vacuum Technology by A. Roth

Course Outcomes:

CO1: Graduates will be able to understand the fundamentals of vacuum.
CO2: Graduates will be able to learn working of working of different vacuum pumps.
CO3: Graduates will be able to design and develop vacuum systems.

Open Elective -1 (i)

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

2nd – SEMESTER

ENERGY MATERIALS AND DEVICES

Course No. MPH2O74

L	T	P
3	0	0

Duration of Exam: 3h

Credits:	03
Sessional:	50
End Sem. Exam:	50
Total:	100

Course Educational Objectives :

CEO1: To make graduates understand the use of nanomaterials in energy generation and storage.

CEO2: To exhibit understanding of the sources of energy and the methods of energy conversion in Nanotechnology.

CEO3: To gain the knowledge solar energy, electrochemical storage of energy and fuel cells.

UNIT-1: INTRODUCTION: Energy challenges, Energy consummation, Current sources of energy, Status of energy map, Energy policies, Conservation of energy, Alternative energy sources, Development and implementation of renewable energy technologies, role of renewable energy sources, Energy transport, conversion and storage, Sustainable Energy

UNIT-2: SOLAR ENERGY: Fundamentals of solar cells, Types of solar cells, Photovoltaic effect, Semiconducting materials bandgap theory, Band gap engineering, Solar cell properties and design, p-n junction, Photodiodes, electron and hole transports, charge carrier generation, recombination, I-V characteristics, Tandem structure, Single junction and triple-junction, solar panels, thin film solar cells, solar cell applications, solar cell manufacturing process.

UNIT-3: ELECTROCHEMICAL ENERGY STORAGE DEVICES: Thermodynamics of electrochemical reaction Li- ion batteries, Nanostructured materials for Li-ion batteries, Principle of supercapacitor, Advanced supercapacitor technology,. Basics of Fuel cells - working principle of fuel cells and related thermodynamics, Fuel cell electrochemistry, Fuel cell types ; SOFC, MCFC, PAFC, PEFC, Water management in PEFCs-Current issues in PEFCs.

UNIT-IV: THERMOELECTRIC AND PIEZOELECTRIC ENERGY: Thermoelectric and Pizoelectric materials, Fabrication and characterization of thermoelectric devices, Bulk thermoelectric materials performance, Thermoelectric modules, Piezoelectric harvester design, Micro and nanoscale energy harvesting, Fabrication and characterization of piezoelectric devices, Strategies for optimizing efficiency, Future directions

Reference Books

1. Energy for a sustainable world by L. Freris, D. Infield, Wiley, 2008.
2. Nanomaterials for Sustainable Energy by Quan (Ed.), Springer, 2016.
3. Nanomaterials in Energy Devices by Jun Hieng Kait CRC Press, 2017.
4. Advanced nanomaterials and their applications in renewable energy by J. Louise, L. S. Bashir, 2015.

Course Outcomes:

CO1 Graduates will be technically skilled to comprehend the principles behind energy storage mechanism.

CO2 To gain a broad understanding of concepts and applications of batteries and super capacitors.

CO3 Graduates will be able to design and fabricate solar cells, electrochemical storage devices and fuel cells.

2nd – SEMESTER

MASTER OF TECHNOLOGY (NANOMATERIALS & NANOTECHNOLOGY)

NANOMATERIALS CHARACTERIZATION LAB-II

Course No. MPH2L08

L	T	P
0	0	4

Duration of Exam: 3h

Credits:	02
Sessional:	60
End Sem. Exam:	40
Total:	100

Course Educational Objectives:

CEO1: To develop the practical skills on structural and optical properties of materials via advanced characterization techniques.

CEO2: To understand the thin film techniques for device fabrications.

CEO3: To develop the experimental skills on magnetic and thermal properties of nanostructured materials.

S. No.	List of Experiments
1.	Determine the crystallite size of nanomaterial using Debye Scherer method.
2.	Synthesize the nanomaterial and determine their by band gap through Photoluminescence spectroscopy.
3.	Study the photocatalytic activity of nanomaterials.
4.	Study the ferroelectric behaviour of the nanomaterial.
5.	Study the elemental analysis of the soil sample using XRF technique.
6.	Study the acetone gas sensing mechanism by MEMS cantilever based platform.
7.	Fabrication of thin film via physical and chemical vapor deposition methods.
8.	Solar cell performance evaluation.
9.	EDXA (SEM based): EDXA of a multicomponent sample.
10	Nanofluid thermal conductivity measurements
11	FTIR study of an inorganic compounds
12.	FTIR study of an organic compounds
13.	Investigation of photoexcitation and photoluminescence for semiconducting nanoparticles.
14.	Study the ethanol gas sensing characteristics (response time, recovery time, sensitivity) using MEMS cantilever based sensor
15.	To study the I-V characteristics of nanowires using probe station and source meter.

Course Outcomes:

CO1: Student will gain motivation for experiments initiates and pursues the research activities in areas related to nanotechnology and nanoscale phenomena.

CO2: Student will be able to utilize various synthesis techniques for nanoparticles and fabrication of thin films.

CO3: Student will get trained about the structural characterization tools at nanoscale.

S 37.07 **To consider the proposal to award Ph.D. and M.Tech. Degree according to specialization in Physics Deptt..**

The School of Materials Science & Technology has been merged into the Department of Physics w.e.f. academic year 2019-20. The Department of Physics through letter no. Ph./2019/104 dated 13.11.2019 and DRC meeting vide letter no Ph./2019 dated 30.5.2019 has made the following recommendations for Ph.D. students registered in the School of Materials Science & Technology:

Sr. No	Name of Ph.D. Scholar	Registration No.	Date of admission	PG Qualification of Scholar	Ph.D.Degree requeste
1	Ms. Vijay Luxmi	2K17/NITK/Ph.D./ 6170059	23.1.2017	M.Sc, Physics	Physics
2	Ms. Mandakini	2K16/NITK/Ph.D./ 6160036	4.2.2016	M.Sc, Physics	Physics
3	Ms. Saloni Goyal	2K16/NITK/Ph.D./ 6160032	3.2.2016	M.Tech. in Materials Science & Nanotechnology	Materials Science & Nanotechnology
4	Ms. Ritu Garg	2K17/NITK/Ph.D./ 6170059	23.1.2017	M.Tech. in Materials Science & Nanotechnology	Materials Science & Nanotechnology
5	Mr. Amit Kumar	2K17/NITK/Ph.D./ 6170040	19.1.2017	M.Tech. in Materials Science & Nanotechnology	Materials Science & Nanotechnology
6	Mr. Vikash Gajraj	2K17/NITK/Ph.D./ 6170056	23.1.2017	M.Tech. in Materials Science & Nanotechnology	Materials Science & Nanotechnology

Further, the Department of Physics through letter no. Ph./2019/103 dated 13.11.2019 and DAC meeting held on 1.10.2019 vide letter no. Ph./2019 dated 1.10.2019 recommended that:

1. For M.Tech. in Instrumentation, the degree certificate should mention: "*M.Tech. in Instrumentation*" from Physics Department
2. For M.Tech. in Nanotechnology, the degree certificate should mention: "*M.Tech. in Nanotechnology*" from Physics Department
3. For M.Tech. in Material Science and Technology, the degree certificate should mention: "*M.Tech. in Material Science and Technology*" from Physics Department.

The minutes of DRC and DAC of Physics Department are attached as Annexure S 37.07 from page 139 to page 142.

The Senate may consider and decide.

DEPARTMENT OF PHYSICS
NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA

No. Ph./2019/ 104 Dated: 13.11.2019

The School of Materials Science & Technology has been merged into the Department of Physics. The following Ph.D. students have requested for Ph.D. degree in **'Physics'**:

1 Ms. Vijay Luxmi, Date of admission: 23.01.2017
(Reg.no. -2k17/NITK/Ph.D./6170059)
2 Ms. Mandakini, Date of admission: 04.02.2016
(Reg.no. -2k16/NITK/Ph.D./6160036)

The above students are M.Sc. in Physics and are eligible for Ph.D. degree in **'Physics'** so their case may be considered for awarding Ph.D. degree in Physics.
The following students of Ph.D. have requested their degree in **'Materials Science and Nanotechnology'**:

1 Ms. Saloni Goyal, Date of admission: 03.02.2016
(Reg. No. – 2K16/NITK/Ph.D./6160032)
2 Ms. Ritu Garg, Date of admission: 23.01.2017
(Reg. No. – 2K17/NITK/Ph.D./6170058)
3 Mr. Amit Kumar, Date of admission: 19.01.2017
(Reg. No. – 2K17/NITK/Ph.D./6170040)
4 Mr. Vikash Gajraj, Date of admission: 23.01.2017
(Reg. No. – 2K17/NITK/Ph.D/6170056)

The above students are M.Tech in Materials Science & Nanotechnology and are eligible for Ph.D. in **'Materials Science and Nanotechnology'**.

The above cases were discussed in the DRC meeting held on 30.05.2019. DRC is of the view that the request may be considered in the benefit of the students

It is submitted for your approval, please

HOD, Physics

Dean (Academic)

DEPARTMENT OF PHYSICS
NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA

No. Ph./2019/ Dated: 30.05.2019

MINUTES OF DEPARTMENTAL RESEARCH COMMITTEE MEETING

The meeting of the Department Research Committee was held on **30.05.2019** at **11:30 AM** in the office of the Head.

The following DRC members were present:

1.	Dr. R. P. Chauhan	Chairperson
2	Dr Ashavani Kumar	Member
3	Dr. Neena Jaggi	Member

The following points were discussed

1. The case of extension of tenure for Ph D of Mr Piyush Joshi was discussed and it was decided that it will be sent to Dean (Academic) for consideration
2. The case of Ms Sharmila was discussed and it was decided to send the details to Dean (Academic) for consideration.
3. The applications of Ph.D students under the School of Material Science and Technology were considered and sent it for approval to Director through Dean (Academic).
4. The case was considered and it was decided that the candidate should register in the School of Renewable Energy and Efficiency and the case is forwarded to Dean (Academic) and Coordinator School of Renewable Energy and Efficiency

(Ashavani Kumar)
Professor

(Neena Jaggi)
Professor

30-05-2019
(R. P. Chauhan)
Chairperson, DRC

DEPARTMENT OF PHYSICS
NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA

No. Ph./2019/103 Dated: 13.11.2019

It is the requirement of applied science subjects that the M.Tech degree received by the students should highlight the name of that M.Tech discipline. In light of this the matter was discussed in DAC meeting held on 01.10.2019. It was proposed that:

1 For M Tech in Instrumentation the degree certificate should menion;

"M.tech in Instrumentation" from Physics Department

2 For M.Tech in Nanotechnology the degree certificate should mention;

"M.Tech in Nanotechnology" from Physics Department

3. For M Tech in Materials Science and Technology the degree certificate should mention;

"M.Tech in Materials Science and Technology" from Physics Department

It is submitted for your approval please

Chauhan
HOD, Physics

Dean (Academic)

14.11.19

P/S (Acad) 14.11.2019

MS-Madhu

DEPARTMENT OF PHYSICS
NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA

No. Ph./2019/ Dated: 01.10.2019

MINUTES OF DEPARTMENTAL ADVISORY COMMITTEE MEETING

The meeting of the Departmental Advisory Committee was held on 01.10.2019 at 03:30 PM in the office of the undersigned.

The following members were present:

1 Dr. R.P. Chauhan, HOD, Chairman
2 Dr. Ashavani Kumar
3 Dr. Neena Jaggi
4 Dr. Anurag Gaur
5 Dr. Ashok Kumar
6 Dr. Y. Dwivedi
7 Dr. C.R. Mariappan
8 Dr. Prakash Chand

Dr. A. K. Tripathi could not attend the meeting due to the B.Tech 1st-semester class.

The following items were discussed:

1. The merging of M.Tech (Nanotechnology) and M.Tech (Material Science & Technology) w.e.f. 2020-21 Session was discussed and it was decided that, to finalize the curriculum and name of the M.Tech Program,an interactive workshop with Academia-Industry- Alumini be organized in the 1st Week of Nov 2019 and BOS meeting in 2nd week of Nov 2019
2. For the Ph.D. admission in Nov/Dec of session 2019-20, The Specialization will be Experimental Physics.
3. For the STC proposed to be organized from 19-23 Oct. 2019, it was discussed that it should be extended by one day (up to 24 Oct 2019) due to Assembly elections on 21st Oct 2019.
4. One National Conference (NCNIT-2020) and a Short Term Course (STC) are proposed to be Organised in the months of January and February-2020.
5. The issue of degree Certificates to M.tech (Instrumentation) and M.tech (Nanotechnology) was discussed. It was suggested that **M.Tech in Instrumentation from Physics Department** and **M.Tech in Nanotechnology from Physics Department** should be written on the Degree Certificates as per past practice.

(Ashavani Kumar) (Neena Jaggi) (Anurag Gaur) (Ashok Kumar)

(Y. Dwivedi) (C.R. Mariappan) (Prakash Chand) (R.P. Chauhan)

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S 37.08 **To consider and approve the proposal for proportionate transfer of credits for online courses.**

As per notification no. Dean (Acad.)/864 dated 31.7.2019, all Part-time Ph.D. research scholars admitted under TEQIP-III were allowed to opt online courses. However, total credit requirement is to be fulfilled as per the Clause R-8 of Ph.D. ordinance. Also, SCSA in its 57th meeting held on 3.5.2019 vide item no. SCSA 57.03 approved that few online UG courses of NPTEL/SWAYAM may be opted as electives in all departments.

Presently, 12 Ph.D. research scholars registered under TEQIP-III have under taken online courses. The credits of many online courses do not match with the credits offered in our Ph.D. scheme.

It is proposed to transfer proportionate credits for the online courses studied by UG, PG & Ph.D students provided the course contents of the online course broadly matches the course contents offered in our curriculum.

The relevant documents are attached as Annexure S 37.08 from page 144 to 146

The Senate may consider and decide.

If there are two internal supervisors and one of them resign, retire or expires, then automatically other will be the main supervisor.

R-7.5

At no point of time, there shall be more than eight research scholars including scholars from outside NIT Kurukshetra being supervised by any faculty member. This number excludes the Ph. D. scholars who have submitted the Ph. D. thesis. Faculty members are required to seek the permission of Dean (Academic) for supervising the scholars registered outside the institute.

R-8

COURSES AND CREDITS

A research scholar will be required to pass at least four PG courses (minimum 13 credits) with a minimum CGPA of 7.0 out of maximum 10.0. The scholar can register for these courses after the approval of the research supervisor(s) only. The course of research methodology (with four credits) will be compulsory for all research scholars.

CGPA shall be computed on the basis of letter grades obtained in PG courses only.

The part time scholars shall have to complete the course work as full time resident scholar.

The course work is required to be completed before the comprehensive examination.

R-9

EVALUATION OF COMPREHENSIVE EXAMINATION

R-9.1

Every scholar is required to submit his research plan proposal. The research plan proposal should include a brief account of the related work already reported in the literature. In the plan, the scholar should clearly spell out the investigation/work he/she intends to carry out and justify the need of the same. Subsequently, the research work should be carried out in accordance with the approved research plan. Any change in research plan can be indicated by research scholar in semester progress reports.

The following procedure is followed for conducting the comprehensive evaluation of the Ph.D. scholars.

(a) Every scholar is required to take comprehensive examination, which will test his readiness in his/her broad field of research, and his/her academic preparation and potential to carry out the research. The comprehensive examination shall be based on a presentation in front of DRC/SRC.
(b) Every scholar must pass the comprehensive examination within 12-18 months of his initial registration. He/she should apply at least one month in advance for comprehensive examination through his/her supervisors. In case of any justified delay beyond the specified period, candidate may request to Dean (Academic) through DRC/SRC for an extension of comprehensive examination. Such extension may be allowed for a maximum period of six months only.
(c) Candidate should request at least one month in advance for comprehensive presentation.

6/6/19 6/6/19

NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA

No Dean (Acad)/ 864 Dated: 31.7 2019

As per approval of the Competent Authority, all part-time Ph.D. research scholars admitted under TEQIP-III, may complete the course work by opting on line courses (preferably from NPTEL) However, total credit requirement is to be fulfilled as per the Clause R-8 Ph D. Ordinance Research Mehodology with 4 credit points is mandatory.

This is for kind information and further necessary action please

31.7.2019
Dean (Academic)

All HoDs/Coordinators of School

Copy to:

1. Sr. Secretary to Registrar
2. Sr. Secretary to Director for kind information of the Director.

SCSA 57.03 To consider the proposal for starting online courses/programmes.

The relevant letters as received from MHRD were placed before the SCSA and it was decided that at present only few online UG courses of NPTEL/SWAYAM may be opted as electives in all departments.

The SCSA minutes of item were confirmed in the meeting itself

No other item was taken up in the meeting.

The meeting ended with a vote of thanks to the Chair.

Registrar I/C & Secretary, SCSA

9.5.2019

Dean (Academic)

Director

10/5/19

S 37.09 **To consider and approve the proposal of Establishment of 'NITKAA 2nd Best Innovative Project Award' by RECK-66 Alumni Trust.**

The Senate in its 36th meeting held on 21.9.2019 vide item no. S 36.13 approved 'NITKAA Best Innovative Project Award' by Alumni Association from 2016-20 batch onwards. The Best Innovative Project will be selected from the B.Tech. final year projects receiving Best Project Award of each branch. The award will include cheque of Rs. 50,000/- and a citation. This award will be executed from Rs. 10 lakh fund already received from Alumni of 1993-97 batch. The Senate approved the following Committee for selecting the 'NITKAA Best Innovative Project Award':

1.	Dean (R&C)	Chairman
2.	One HoD (to be nominated by Hon'ble Director)	Member
3.	President NITKAA or his representative	Member
4.	Two representatives from 1993-97 batch	Member

Now, the Secretary, NIT Kurukshetra Alumni Association (NITKAA) requested the Dean (I&IR) vide letter ref.no. NITKAA/2019/127 dated 23.11.2019 regarding Establishment of NITKAA 2nd Best Innovative Award (copy enclosed). The award will be established by RECK-66 Alumni Trust. The award will include a cheque of Rs. 30,000/- and a citation and will be presented during the annual convocation of the respective batch. The same procedure as for NITKAA Best Innovation Project Award will be followed.

The relevant papers are enclosed as Annexure S 37.09 from page 148 to 150.

The Senate consider and approve the proposal of Establishment of 'NITKAA 2nd Best Innovative Project Award' by RECK-66 Alumni Trust.

NIT Kurukshetra Alumni Association

First Floor | Senate Hall | Near Old Administrative Bldg
National Institute of Technology Kurukshetra
Kurukshetra | 136119 | Haryana | INDIA
Phone: +91 1744 233304 (O) | +91 98960 74922
nitkaaoffice@gmail.com | www.nitkkraa.org

No. NITKAA/2019/127 Dated: 23.11.2019

Subject: Establishment of NITKAA 2nd Best Innovative Project Award regarding;

Dear Sir:

This is in reference to the letter no. Acad./2019/1219 dated 18.11.2019 and as per Senate decision in its 36th meeting held on 21.09.2019; the senate approved the establishment of *'NITKAA Best Innovative Project Award'* for the final year students of the institute. The best Innovative Project will be selected from the B.Tech. Final Projects receiving best project award of each branch. The award includes a cheque of **Rs. 50,000/- and a citation**. The award will be executed from Rs. 10 Lakhs fund already received from alumni of 1993-97 batch. The composition of the committee responsible for selecting the aforesaid award was also approved. NITKAA places on record its appreciation to the Senate and the institute for establishing the same.

Further, considering the request vide letter dated 20.11.2019 (copy attached) from RECK 66 Alumni Trust and further detailed deliberations with the representatives of 1966 batch alumni; NITKAA now proposes to establish the **2nd best innovative project award** to be christened it as **'NITKAA 2nd Best Innovative Project Award'** from the academic session 2019-20 (effective from 2016-20 batch). Pertinent to mention that same procedure can be followed for this award also. The award will include a cheque of Rs. **30,000/- and a citation** and will be presented during the annual convocation of the respective batch.

Nikesh Jain

(Nikesh Jain)
Secretary | NITKAA

Dean [I&IR) for kind approval to put up the agenda in the forthcoming Senate Meeting.

Pankaj 23/11/19

23/11/19 DIRECTOR

27/11/19

Dean [I&IR)

Office of Dean (I&IR)
Diary No. NITKAA/2019/127
Dated 23/11/19 27/11/19

Requested to place the aforementioned agenda in the forthcoming senate Meeting

Pankaj 27/11/19

Dean (Academic)

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Gmail

Pankaj Chandna <presidentnitkaa@gmail.com>

Letter of request

1 message

Dushyant Nagpal <dunamatic@gmail.com> Fri, Nov 22, 2019 at 6:58 PM
To: Prof Pankaj Chandna Reck <presidentnitkaa@gmail.com>
Cc: Pankaj Chandna <pchandna08@gmail.com>

Pankaj D 23/11
Secy, NITKAA for n.o.

Dear Sir,

As per telephonic discussion attached is the request letter for Innovation award (Runner up) addressed to the director.

Please modify if required.

Thanks and regards

Dushyant Nagpal
+919810000655

innovation request.docx
193K

RECK66 ALUMNI TRUS
C- 164 Defence Colony, New Delhi -1100
Tel: +91 11 2433131

RECK66:trust:dn :2019

20th November 2019

To,
The Director
National Institute of Technology
Kurukshetra 560037
Haryana

Subject: **Institution of "RECK-66 Alumni Innovation Award"**

Dear Sir,

First I on behalf of the RECK 66 Alumni Trust. would like to thank you and all those who made the institution of the "RECK 66 Alumni trust Scholarship" possible. As you may be aware the same has been distributed to the needy students.

During our discussion with Prof Chandna and others we suggested that we would like to give another award for the best innovation for the students of the final year.

We were however informed that this award is already in existence. Accordingly we offered to give an award of Rs. 30,000.00 (Rupees Thirty Thousand only)to the runner up project innovation.

We would request you to look into the possibility of instituting this award from this year itself, which will help the students to put in their best effort to make a innovative project as well have some fund to make samples for later production if possible.

Looking forward to your favourable response.

Truly yours,
for RECK 66 ALUMNI TRUST

(DUSHYANT NAGPAL)
Managing Trustee