List of Awardees of PhD Degree at AcSIR

Sl. NO.	Sl. No. for Award of	Sl. No. of Thesis	Registration No.	Name	Institute	Date of Award of Degree
1.	524	333	10BB11J37007	Anup Singh Pathania	CSIR-IIIM, Jammu	02.12.2016
2.	525	562	10BB12A10002	Sailender Singh	CSIR-CIMAP, Lucknow	02.12.2016
3.	526	595	10CC11J26077	Prabhu D	CSIR-NCL, Pune	02.12.2016
4.	527	580	10BB12A04016	Dhanvantri	CSIR-CDRI, Lucknow	02.12.2016
5.	528	449	10CC11J26090	Jugal K Kumawat	CSIR-NCL, Pune	03.12.2016
6.	529	594	10CC12A05006	Sankararao Mutyala	CSIR-CECRI, Karaikudi	03.12.2016
7.	530	543	10CC12J19001	Aamir Hanif	CSIR-IIP, Dehradun	03.12.2016
8.	531	630	10CC11J18095	Pritha Agarwalla	CSIR-IICT, Hyderabad	19.12.2016
9.	532	645	10BB12A02027	Manika Vij	CSIR-IGIB, New Delhi	19.12.2016
10.	533	516	10CC12J19002	Arvind Kumar	CSIR-IIP, Dehradun	19.12.2016
11.	534	590	10CC11J33022	Sushila Sharma	CSIR-IHBT, Palampur	19.12.2016
12.	535	593	10BB13J04007	Swati Jaiswal	CSIR-CDRI, Lucknow	19.12.2016
13.	536	661	10BB11J33012	Sunny Dhir	CSIR-IHBT, Palampur	19.12.2016
14.	537	660	10BB11J33015	Pooja Bhardwaj	CSIR-IHBT, Palampur	19.12.2016
15.	538	652	10BB12J22014	Prachi Tewari	CSIR-IITR, Lucknow	19.12.2016
16.	539	338	10CC11J37039	Srinivas Maheshuni	CSIR-IIIM, Jammu	26.12.2016
17.	540	419	10CC12J26004	Debasish Ghosh	CSIR-NCL, Pune	26.12.2016
18.	541	642	10PP11A32004	Deepak Chhikara	CSIR-NPL, New Delhi	26.12.2016
19.	542	619	10CC13J12009	Indranil Mondal	CSIR-CMERI, Durgapur	26.12.2016
20.	543	497	10BB11J26121	Ketan Dinkar Sarode	CSIR-NCL, Pune	26.12.2016
21.	544	527	10CC11J26053	Mohan Raj Mani	CSIR-NCL, Pune	26.12.2016
22.	545	588	10PP11J29005	Lalita Baragi	CSIR-NIO, Goa	26.12.2016
23.	546	373	10CC11J26009	R. Lenin	CSIR-NCL, Pune	26.12.2016
24.	547	426	10PP11A29001	Anshika Singh	CSIR-NIO, Goa	26.12.2016
25.	548	564	10CC11A26026	Sreedhala S	CSIR-NCL, Pune	26.12.2016
26.	549	430	10BB11J26112	Ruby Singh	CSIR-NCL, Pune	26.12.2016
27.	550	655	10BB14J08029	Priya Kumari	CSIR-CFTRI, Mysore	26.12.2016

List of Awardees of PhD Degree at AcSIR

Sl. NO.	Sl. No. for Award of	Sl. No. of Thesis	Registration No.	Name	Institute	Date of Award of Degree
28.	551	526	10CC11J18045	Birakishore Padhi	CSIR-IICT, Hyderabad	26.12.2016
29.	552	669	10BB13A04001	Abhilasha Saxena	CSIR-CDRI, Lucknow	27.12.2016
30.	553	628	10BB13J02011	Santosh Yadav	CSIR-IGIB, New Delhi	27.12.2016
31.	554	731	10BB12A02026	Latika Matai	CSIR-IGIB, New Delhi	27.12.2016
32.	555	505	10BB11J26123	Deepak Chand	CSIR- NCL, Pune	29.12.2016
33.	556	539	10CC11J26094	Gajanan N Raut	CSIR-NCL, Pune	29.12.2016
34.	557	490	10PP12A27004	Sarita Tiwari	CSIR-NEERI, Nagpur	11.01.2017
35.	558	514	10CC11J18091	Bolagam Ravi	CSIR-IICT, Hyderabad	11.01.2017
36.	559	577	10CC11J26082	Swapnil Sonawane	CSIR-NCL, Pune	11.01.2017
37.	560	609	10CC11A26021	Remya Ramesh	CSIR-NCL, Pune	11.01.2017
38.	561	406	10BB11J37010	Chitra Rani	CSIR-IIIM, Jammu	23.01.2017
39.	562	405	10BB11J37013	Rashmi Sharma	CSIR-IIIM, Jammu	23.01.2017
40.	563	444	10BB11A37002	Vikrant Singh Rajput	CSIR-IIIM, Jammu	23.01.2017
41.	564	581	10BB11J22021	Saroj Kumar Amar	CSIR-IITR, Lucknow	23.01.2017
42.	565	724	10BB12J08008	Ramya Visvanathan	CSIR-CFTRI, Mysore	23.01.2017
43.	566	547	10BB12A04005	Ankur Omer	CSIR-CDRI, Lucknow	23.01.2017
44.	567	710	10CC13J16010	Manoj Kumar Choudhary	CSIR-CSMCRI, Bhavnagar	23.01.2017
45.	568	612	10CC11A18001	M Rajashekhar Reddy	CSIR-IICT, Hyderabad	23.01.2017
46.	569	552	10CC13J33010	Mayanka	CSIR-IHBT, Palampur	23.01.2017
47.	570	450	10CC11J37019	Narsaiah Battini	CSIR-IIIM, Jammu	24.01.2017
48.	571	510	10CC11A26030	Anjani Dubey	CSIR-NCL, Pune	24.01.2017
49.	572	509	10CC13J26016	Nivedita Bhattacharya	CSIR-NCL, Pune	25.01.2017
50.	573	686	10BB12A02034	Rituparna Chaudhuri	CSIR-IGIB, New Delhi	25.01.2017
51.	574	726	10BB12A02010	Aditya Kumar Sharma	CSIR-IGIB, New Delhi	25.01.2017
52.	575	627	10BB12A22006	Akansha Sharma	CSIR-IITR, Lucknow	25.01.2017
53.	576	663	10BB13A04012	Pankaj Kumar Singh	CSIR-CDRI, Lucknow	25.01.2017
54.	577	703	10BB12J33006	Preeti Arya	CSIR-IHBT, Palampur	25.01.2017

List of Awardees of PhD Degree at AcSIR

Sl. NO.	Sl. No. for Award of	Sl. No. of Thesis	Registration No.	Name	Institute	Date of Award of Degree
55.	578	600	10CC11J26040	Saumya Singh	CSIR-NCL, Pune	01.02.2017
56.	579	646	10CC11J26035	Saibal Bhaumik	CSIR-NCL, Pune	01.02.2017
57.	580	674	10CC14J04013	Vikas Bajpai	CSIR-CDRI, Lucknow	01.02.2017
58.	581	658	10CC12J16005	Jashobanta Sahoo	CSIR-CSMCRI, Bhavnagar	01.02.2017
59.	582	690	20EE12A31001	Randhir Singh	CSIR-NML,Jamshedpur	01.02.2017
60.	583	377	10CC12A26017	Ashish Chinchansure	CSIR-NCL, Pune	07.02.2017
61.	584	623	10CC12J19007	Subhash Kumar	CSIR-IIP, Dehradun	07.02.2017
62.	585	557	10BB11A39008	Karthik Narayan	CSIR-NIIST, Thiruvananthapuram	07.02.2017
63.	586	582	10BB12J22003	Shruti Goyal	CSIR-IITR, Lucknow	07.02.2017
64.	587	643	10BB11J22011	Anushruti Ashok	CSIR-IITR, Lucknow	07.02.2017
65.	588	585	10CC12J10012	Furkan Ahmed	CSIR-CIMAP, Lucknow	15.02.2017
66.	589	548	10CC12A26034	Archana Nalawade	CSIR-NCL, Pune	15.02.2017
67.	590	638	10CC11J37023	Desaboini Nageswararao	CSIR-IIIM, Jammu	15.02.2017
68.	591	648	10CC12J26008	Harshitha B.A	CSIR-NCL, Pune	15.02.2017
69.	592	561	10CC11J18033	Hyder Irfan	CSIR-IICT, Hyderabad	15.02.2017
70.	593	599	10CC12A26046	Narendraprasad Reddy B	CSIR-NCL, Pune	15.02.2017
71.	594	640	10CC11A26032	Satish Chandra Pilkhana	CSIR-NCL, Pune	15.02.2017
72.	595	480	10CC13J32008	Chanchal Gupta	CSIR-NPL, New Delhi	15.02.2017
73.	596	576	10CC11A39004	Baiju T.V	CSIR-NIIST, Thiruvananthapuram	15.02.2017
74.	597	596	10CC13A26030	Rounak Ashok Naphade	CSIR-NCL, Pune	15.02.2017
75.	598	625	10CC12A04037	Kapil Dev	CSIR-CDRI, Lucknow	15.02.2017
76.	599	613	10CC11A39003	Harsha N	CSIR-NIIST, Thiruvananthapuram	15.02.2017
77.	600	592	10CC11J18098	Ch. Gurumurthy	CSIR-IICT, Hyderabad	15.02.2017
78.	601	606	10CC11J18097	Marrapu Balakrushna	CSIR-IICT, Hyderabad	15.02.2017
79.	602	717	10BB12A02012	Anil Kumar	CSIR-IGIB, New Delhi	22.02.2017
80.	603	395	10BB11J25009	Paras Pandey	CSIR-NBRI, Lucknow	22.02.2017

List of Awardees of PhD Degree at AcSIR

Sl. NO.	Sl. No. for Award of	Sl. No. of Thesis	Registration No.	Name	Institute	Date of Award of Degree
81.	604	569	10BB11J10005	Ruby	CSIR-CIMAP, Lucknow	22.02.2017
82.	605	532	10BB13A25011	Sameer Dixit	CSIR-NBRI, Lucknow	22.02.2017
83.	606	644	10CC11J18082	Balaiah Shanigaram	CSIR-IICT, Hyderabad	22.02.2017
84.	607	657	10BB12A02024	Kriti Kaushik	CSIR-IGIB, New Delhi	22.02.2017
85.	608	636	10BB11J18109	Lakshmi Bahrgavi P	CSIR-IICT, Hyderabad	22.02.2017
86.	609	688	10CC12A04043	Preeti Chandra	CSIR-CDRI, Lucknow	22.02.2017
87.	610	560	10BB11J26117	Aseem Palande	CSIR-NCL, Pune	07.03.2017
88.	611	725	10BB12A08002	Bavisetty Sri Charan Bindu	CSIR-CFTRI, Mysore	07.03.2017
89.	612	694	10PP11A32006	Vishal Bharti	CSIR-NPL, New Delhi	07.03.2017
90.	613	678	10BB12J22007	Pallavi Singh	CSIR-IITR, Lucknow	07.03.2017
91.	614	768	10BB12A02019	Shashank Shivaji Kamble	CSIR-IGIB, New Delhi	07.03.2017
92.	615	699	10BB13A04011	Neetu Singh	CSIR-CDRI, Lucknow	07.03.2017
93.	616	720	10BB13A04018	Seema Singh	CSIR-CDRI, Lucknow	07.03.2017
94.	617	682	10CC12J19005	Rajib Kumar Singha	CSIR-IIP, Dehradun	08.03.2017
95.	618	701	10CC12J26001	Kishore Handore	CSIR-NCL, Pune	08.03.2017
96.	619	622	10CC11J36008	Kamal Kanta Nanda	CSIR-IMMT, Bhubaneswar	08.03.2017
97.	620	586	10BB11A33001	Parul Goel	CSIR-IHBT, Palampur	08.03.2017
98.	621	670	32EE12A01003	Anindya pain	CSIR-CBRI, Roorkee	08.03.2017
99.	622	608	10BB12J25018	Aarti Kumari	CSIR-NBRI, Lucknow	10.03.2017
100.	623	751	10BB11A22001	Girish Rai	CSIR-IITR, Lucknow	10.03.2017
101.	624	639	10CC12A18014	Tejaswi Jella	CSIR-IICT, Hyderabad	16.03.2017
102.	625	651	10CC11A26044	Seetharamsing Balamkundu	CSIR-NCL, Pune	16.03.2017
103.	626	689	10CC12J05008	Vinesh T.V	CSIR-CECRI, Karaikudi	16.03.2017
104.	627	559	10CC12J26034	Hridesh Agarwalla	CSIR-NCL, Pune	16.03.2017
105.	628	554	10CC13J26025	Sandip Govind Agalave	CSIR-NCL, Pune	16.03.2017
106.	629	687	10BB12A02033	Ritika Grover	CSIR-IGIB, New Delhi	16.03.2017
107.	630	650	10CC11J18068	Swetha Alladi	CSIR-IICT, Hyderabad	16.03.2017

List of Awardees of PhD Degree at AcSIR

Sl. NO.	Sl. No. for Award of	Sl. No. of Thesis	Registration No.	Name	Institute	Date of Award of Degree
108.	631	614	10CC11J26084	Nagnath Patil	CSIR-NCL, Pune	16.03.2017
109.	632	727	10BB12A02014	Anupam Kumar Mondal	CSIR-IGIB, New Delhi	16.03.2017
110.	633	706	10CC13J16009	Jai Prakash Chaudhary	CSIR-CSMCRI, Bhavnagar	16.03.2017
111.	634	754	10CC13J16008	Chumki Charan	CSIR-CSMCRI, Bhavnagar	16.03.2017
112.	635	799	10BB12J04013	Sharat Chandra	CSIR-CDRI, Lucknow	16.03.2017
113.	636	634	10BB11J26111	Dimpal Amol Nyayanit	CSIR-NCL, Pune	20.03.2017
114.	637	654	10CC11J26096	Chayanika Das	CSIR-NCL, Pune	20.03.2017
115.	638	618	10BB13A26040	Uma Kumari	CSIR-NCL, Pune	20.03.2017
116.	639	659	10CC11A26038	Nookaraju Ummidisetti	CSIR-NCL, Pune	20.03.2017
117.	640	732	10PP13J32005	Munu Borah	CSIR-NPL, New Delhi	20.03.2017
118.	641	733	10CC13A26021	Satyawan D. Nagane	CSIR-NCL, Pune	20.03.2017
119.	642	753	10PP14A32013	Pradip Sambyal	CSIR-NPL, New Delhi	20.03.2017
120.	643	591	10BB12A18065	C Nagandrenatha Reddy	CSIR-IICT, Hyderabad	01.06.2017
121.	644	536	10CC11J37017	Anil Kumar Pagadala	CSIR-IIIM, Jammu	23.03.2017
122.	645	120	10CC12A26035	Sonali Bhosale	CSIR-NCL, Pune	23.03.2017
123.	646	761	10CC12A39008	Bejoy Mohan Das K.S.	CSIR-NIIST, Thiruvananthapuram	23.03.2017
124.	647	763	10CC11A39006	George T. M	CSIR-NIIST, Thiruvananthapuram	23.03.2017
125.	648	762	10CC11A39001	Usha Gangan	CSIR-NIIST, Thiruvananthapuram	23.03.2017
126.	649	700	10CC11A33012	Saima	CSIR-CDRI, Lucknow	23.03.2017
127.	650	756	10PP12J32007	Ompal Singh	CSIR-NPL, New Delhi	27.03.2017
128.	651	565	10BB12A36004	Jyotsnarani Jena	CSIR-IMMT, Bhubaneswar	27.03.2017
129.	652	742	10PP13A06001	Sandeep Kumar Vyas	CSIR-CEERI, Pilani	27.03.2017
130.	653	785	10PP13J28005	Rajeev Kumar Yadav	CSIR-NGRI, Hyderabad	27.03.2017
131.	654	702	10CC13J16004	Chandrakant Mukesh	CSIR-CSMCRI, Bhavnagar	31.03.2017
132.	655	601	32EE12J19012	Anand Mohit	CSIR-IIP, Dehradun	31.03.2017
133.	656	533	10BB12J22002	Sushma	CSIR-IITR, Lucknow	31.03.2017

List of Awardees of PhD Degree at AcSIR

Sl. NO.	Sl. No. for Award of	Sl. No. of Thesis	Registration No.	Name	Institute	Date of Award of Degree
134.	657	398	10CC11J26062	Anand Bhaskar	CSIR-NCL, Pune	11.04.2017
135.	658	578	10CC11J26088	Sandeep G. Yenchawar	CSIR-NCL, Pune	11.04.2017
136.	659	574	10BB11J26114	Chandrashekhar Sharan	CSIR-NCL, Pune	11.04.2017
137.	660	662	10CC11A26007	Vysakh A b	CSIR-NCL, Pune	11.04.2017
138.	661	604	10CC11J18002	D. Vasudeva Reddy	CSIR-IICT, Hyderabad	11.04.2017
139.	662	637	10CC11J18029	Nagesh Guguloth	CSIR-IICT, Hyderabad	11.04.2017
140.	663	773	10CC12J39007	Gorantla Jaggaiah Naidu	CSIR-NIIST, Thiruvananthapuram	11.04.2017
141.	664	739	10BB13A25004	Deepika Lakhwani	CSIR-NBRI, Lucknow	11.04.2017
142.	665	615	10CC11J37042	Thanusha Thatikonda	CSIR-IIIM, Jammu	13.04.2017
143.	666	445	10CC11A37010	Anil Kumar K	CSIR-IIIM, Jammu	24.04.2017
144.	667	237	10CC12A37032	Jaideep Bibhishan Bharate	CSIR-IIIM,Jammu	25.04.2017
145.	668	631	10CC11J26075	Jhumur Seth	CSIR-NCL, Pune	25.04.2017
146.	669	666	10CC14A26027	Aniruddha Basu	CSIR-NCL, Pune	25.04.2017
147.	670	765	10PP13A05015	S. Selva Chandrasekharan	CSIR-CECRI, Karaikudi	25.04.2017
148.	671	540	10CC11A26005	Bishnu Prasad Biswal	CSIR-NCL, Pune	25.04.2017
149.	672	541	10CC11A26008	Sharath kadambeth	CSIR-NCL, Pune	25.04.2017
150.	673	598	10CC11J26099	Perumal Devaraji	CSIR-NCL, Pune	25.04.2017
151.	674	767	10CC14A26031	Atreyee Banerjee	CSIR-NCL, Pune	25.04.2017
152.	675	735	10CC12J16006	Rajeev Gupta	CSIR-CSMCRI, Bhavnagar	25.04.2017
153.	676	798	10PP13J28002	Padma Rao Bommoju	CSIR-NGRI, Hyderabad	25.04.2017
154.	677	736	10CC12A05011	P. Sivasakhti	CSIR-CECRI, Karaikudi	25.04.2017
155.	678	755	10CC12A18033	Kamanatham Narayanaswamy	CSIR-IICT, Hyderabad	25.04.2017
156.	679	570	10BB11J26109	Amey J. Bhide	CSIR-NCL, Pune	27.04.2017
157.	680	607	10BB13J02026	Rakshinda Rehman	CSIR-IGIB, New Delhi	28.04.2017
158.	681	738	10BB11J25019	Vikash Kumar Yadav	CSIR-NBRI, Lucknow	28.04.2017
159.	682	759	20EE11A08008	P. Karthik	CSIR-CFTRI, Mysore	28.04.2017
160.	683	792	32EE12A15013	Manoj Kumar Patel	CSIR-CSIO, Chandigarh	28.04.2017

List of Awardees of PhD Degree at AcSIR

Sl. NO.	Sl. No. for Award of	Sl. No. of Thesis	Registration No.	Name	Institute	Date of Award of Degree
161.	684	641	20BE012A18063	Nikhil Gauravarapu Navlur	CSIR-IICT, Hyderabad	28.04.2017
162.	685	558	10CC11J37034	Rajni Sharma	CSIR-IIIM, Jammu	02.05.2017
163.	686	786	10CC12J18020	Nagarjuna Puvvala	CSIR-IICT, Hyderabad	02.05.2017
164.	687	673	10CC11A26043	Malik Abdul Wahid	CSIR-NCL, Pune	02.05.2017
165.	688	679	10CC13J16011	Debashis Sahu	CSIR-CSMCRI, Bhavnagar	02.05.2017
166.	689	620	10BB11J36001	Namrata Misra	CSIR-IMMT, Bhubaneshwar	02.05.2017
167.	690	734	10CC11A33010	Ntin Hauserao Andhare	CSIR-CDRI, Lucknow	02.05.2017
168.	691	728	10CC12J39015	Shereema R.M	CSIR-NIIST, Thiruvananthapuram	02.05.2017
169.	692	624	10BB11J22013	Vandana Sharma	CSIR-IITR, Lucknow	02.05.2017
170.	693	719	10CC1218007	Chirke Sahdev Srihari	CSIR-IICT, Hyderabad	02.05.2017
171.	694	647	10BB13J33006	Shalika Rana	CSIR-IHBT, Palampur	05.05.2017
172.	695	551	10BB11J26110	Priyanka Singh	CSIR-NCL, Pune	05.05.2017
173.	696	621	10BB12J16013	Chetan Paliwal	CSIR-CSMCRI, Bhavnagar	05.05.2017
174.	697	760	10BB13A25012	Archana Bhardwaj	CSIR-NBRI, Lucknow	05.05.2017
175.	698	718	10PP12A28001	Chinmay Haldar	CSIR-NGRI, Hyderabad	16.05.2017
176.	699	587	10CC11A26045	Xavier Prasanna	CSIR-NCL, Pune	16.05.2017
177.	700	740	10BB12J16015	Rahulkumar Rambax Maurya	CSIR-CSMCRI, Bhavnagar	16.05.2017
178.	701	807	10CC11J26066	Rajeshwari Gour	CSIR-NCL, Pune	16.05.2017
179.	702	629	20EE11A15004	Vanish Kumar	CSIR-CSIO, Chandigarh	16.05.2017
180.	703	677	10CC12J26003	Sunil Sekhar A.C	CSIR-NCL, Pune	16.05.2017
181.	704	681	10CC14J05006	M Raja	CSIR-CECRI, Karaikudi	16.05.2017
182.	705	782	10CC12J18026	Rajaka Lingaiah	CSIR-IICT, Hyderabad	16.05.2017
183.	706	748	10CC12A18009	K. Ratnakar Reddy	CSIR-IICT, Hyderabad	16.05.2017
184.	707	769	10BB13J25005	Astha Gupta	CSIR-NBRI, Lucknow	16.05.2017
185.	708	783	10CC12A16008	Abul Kalam Biswas	CSIR-CSMCRI, Bhavnagar	16.05.2017
186.	709	840	10BB12A25008	Tapsi Shukla	CSIR-NBRI, Lucknow	16.05.2017
187.	710	537	32EE12J06004	S Santosh Kumar	CSIR-CEERI, Pilani	16.05.2017

List of Awardees of PhD Degree at AcSIR

Sl. NO.	Sl. No. for Award of	Sl. No. of Thesis	Registration No.	Name	Institute	Date of Award of Degree
188.	711	737	10CC12A05001	A. Muthurasu	CSIR-CECRI, Karaikudi	16.05.2017
189.	712	833	10CC11J18096	Nagaraj Goud Ireni	CSIR-IICT, Hyderabad	16.05.2017
190.	713	704	10CC13J11008	E Varathan	CSIR-CLRI, Chennai	16.05.2017
191.	714	714	10CC11A14001	Rajni Dhyani	CSIR-CRRI, New Delhi	16.05.2017
192.	715	483	10CP11A29011	Praveen PJ	CSIR-NIO, Goa	18.05.2017
193.	716	820	10PP13A32010	Ranoo Bhargav	CSIR-NPL, New Delhi	18.05.2017
194.	717	589	10BB13J10003	Shilpa Mohanty	CSIR-CIMAP, Lucknow	25.05.2017
195.	718	744	10CC12A26047	C. P. Jijil	CSIR-NCL, Pune	25.05.2017
196.	719	698	10CC11J33021	Yogesh Abaso Thopate	CSIR-CDRI, Lucknow	25.05.2017
197.	720	530	10BC12J18043	Sudip Mukherjee	CSIR-IICT, Hyderabad	25.05.2017
198.	721	974	10CC12J39002	Viji M	CSIR-NIIST, Thiruvananthapuram	25.05.2017
199.	722	800	10CC11A33009	Sandeep Kumar	CSIR-IHBT, Palampur	25.05.2017
200.	723	915	10BB14J17005	Ashok Mandala	CSIR-IICB, Kolkata	31.05.2017
201.	724	809	10BB12J04008	Monika Mittal	CSIR-CDRI, Lucknow	31.05.2017
202.	725	665	10CC12A37035	Ramesh Deshidi	CSIR-IIIM, Jammu	01.06.2017
203.	726	667	10CC12A37034	Shekaraiah Devari	CSIR-IIIM, Jammu	01.06.2017
204.	727	632	10CC11J26001	Anjali K	CSIR-NCL, Pune	01.06.2017
205.	728	830	10CC11J18087	Mahesh Kumar Rao Y	CSIR-IICT, Hyderabad	02.06.2017
206.	729	829	10CC12J39013	Nagaraj Nayak	CSIR-NIIST, Thiruvananthapuram	02.06.2017
207.	730	691	10CC11J39014	Divya susan Philips	CSIR-NIIST, Thiruvananthapuram	02.06.2017
208.	731	692	10CC11J39008	Vedhanarayanan B	CSIR-NIIST, Thiruvananthapuram	02.06.2017
209.	732	856	10BB11A33006	Rishu Thakur	CSIR-IHBT, Palampur	05.06.2017
210.	733	772	10BB11A04003	Shome Shankar Bhunia	CSIR-CDRI, Lucknow	05.06.2017
211.	734	805	10BB12A04011	Shweta Kaushik	CSIR-CDRI, Lucknow	06.06.2017
212.	735	708	10BB11A26054	Priyanka Govind Buddhiwant	CSIR-NCL, Pune	07.06.2017
213.	736	722	10BB12J16016	Raj Kumar Sardar	CSIR-CSMCRI, Bhavnagar	08.06.2017

List of Awardees of PhD Degree at AcSIR

Sl. NO.	Sl. No. for Award of	Sl. No. of Thesis	Registration No.	Name	Institute	Date of Award of Degree
214.	737	789	10PP11A15002	Rajnish Kaur	CSIR-CSIO, Chandigarh	14.06.2017
215.	738	429	10BB11J27002	Jitendra K. Sharma	CSIR-NEERI, Nagpur	14.06.2017
216.	739	721	10BB12A22008	Yogesh Kumar Dhuriya	CSIR-IITR, Lucknow	14.06.2017
217.	740	778	10CC12J05004	Bongu Chandrasekhar	CSIR-CECRI, Karaikudi	14.06.2017
218.	741	811	10BB14J02010	Shamsudheen K. Vellarikkal	CSIR-IGIB, New Delhi	14.06.2017
219.	742	866	10BB12J22016	Deepali Singh	CSIR-IITR, Lucknow	14.06.2017
220.	743	771	10CC11A26050	Ashok Kumar V.	CSIR-NCL, Pune	15.06.2017
221.	744	774	10CC11A18002	T. Naveen Reddy	CSIR-IICT, Hyderabad	15.06.2017
222.	745	542	10BC12J18039	Ayan Kumar Barui	CSIR-IICT, Hyderabad	15.06.2017
223.	746	766	10CC11A37013	Shaik Rasheed Basha	CSIR-IIIM, Jammu	15.06.2017
224.	747	711	10CC13A32014	Mohammed Farukh	CSIR-NPL, New Delhi	15.06.2017
225.	748	693	10CC11J39004	Rahul Dev Mukopadhyay	CSIR-NIIST, Thiruvananthapuram	15.06.2017
226.	749	775	10CC12J36012	Aneeya Kumar Samantara	CSIR-IMMT,Bhubaneswar	15.06.2017
227.	750	834	10CC13A36025	Deepak Kumar padhi	CSIR-IMMT, Bhubaneswar	15.06.2017
228.	751	896	10BB11J18127	R. Gajendra Reddy	CSIR-IICT, Hyderabad	16.06.2017
229.	752	895	10BB11A18023	Bhanu Chandra K	CSIR-IICT, Hyderabad	16.06.2017
230.	753	845	10BB14A18014	Karnewar Santosh	CSIR-IICT, Hyderabad	16.06.2017
231.	754	668	10BB11J22012	Nagendra Kumar Rai	CSIR-IITR, Lucknow	16.06.2017
232.	755	743	20EE12J41004	K. Lakshmi	CSIR-SERC, Chennai	20.06.2017
233.	756	803	10PP13A36026	Swatirupa Pani	CSIR-IMMT,Bhubaneswar	20.06.2017
234.	757	823	10PP13A32003	Mansi Sharma	CSIR-NPL, New Delhi	28.06.2017
235.	758	723	20EE12A08010	Pravin Vasantrao Gadkari	CSIR-CFTRI, Mysore	29.06.2017
236.	759	716	20EE12A08012	Shashidhar	CSIR-CFTRI, Mysore	29.06.2017
237.	760	814	10CC11J18094	Javed Sardar Patel	CSIR-IICT, Hyderabad	29.06.2017
238.	761	788	10CC11J26079	Kilingaru I. Shivakumar	CSIR-NCL, Pune	30.06.2017
239.	762	664	10CC11A37011	Umed Singh	CSIR-IIIM, Jammu	30.06.2017
240.	763	502	10BB11A26047	Parul Dubey	CSIR-NCL, Pune	30.06.2017

List of Awardees of PhD Degree at AcSIR

Sl. NO.	Sl. No. for Award of	Sl. No. of Thesis	Registration No.	Name	Institute	Date of Award of Degree
241.	764	715	10CC12A26012	Sudip Sasmal	CSIR-NCL, Pune	30.06.2017
242.	765	821	10CC12A26007	Turbasu Sengupta	CSIR-NCL, Pune	30.06.2017
243.	766	818	10CC12J18087	Vudhgiri Srikanth	CSIR-IICT, Hyderabad	30.06.2017
244.	767	828	10CC11J18072	Sukanya Bhunia	CSIR-IICT, Hyderabad	30.06.2017
245.	768	939	10BB12A33007	Surender Kumar	CSIR-IHBT, Palampur	22.06.2017
246.	769	568	10BB13J10005	Pallavi Pandey	CSIR-CIMAP, Lucknow	03.07.2017
247.	770	764	10BB13A25006	Ridhi Goel	CSIR-NBRI, Lucknow	03.07.2017
248.	771	877	10BB13A25009	Shashank Mishra	CSIR-NBRI, Lucknow	04.07.2017
249.	772	750	10BB11J33016	Saurabh Sharma	CSIR-IHBT, Palampur	06.07.2017
250.	773	671	10CC12J01001	Usha Sharma	CSIR-CBRI, Roorkee	06.07.2017
251.	774	713	10CC12A26056	Shekhar Shinde	CSIR-NCL, Pune	07.07.2017
252.	775	746	10BB13J26031	Krithika Ramakrishanan	CSIR-NCL, Pune	07.07.2017
253.	776	675	10BB13J10001	Himanshu Tripathi	CSIR-CIMAP, Lucknow	07.07.2017
254.	777	836	10BB11A26053	Puneet Khandelwal	CSIR-NCL, Pune	07.07.2017
255.	778	813	10CC12J18021	Naganna Narra	CSIR-IICT, Hyderabad	07.07.2017
256.	779	893	10BB14J08023	Pradeep Kumar Yadav	CSIR-CFTRI, Mysore	07.07.2017
257.	780	831	10BB13A26038	Priya Yadav	CSIR-NCL, Pune	13.07.2017
258.	781	916	10BB13A04004	Bhaskar	CSIR-CDRI, Lucknow	13.07.2017
259.	782	776	20EE12A39018	Sree Manu K.M	CSIR-NIIST, Thiruvananthapuram	14.07.2017
260.	783	885	10BB11J26130	Sheon Mary Samji	CSIR-NCL, Pune	18.07.2017
261.	784	864	10BB13J25011	Ankita Srivastava	CSIR-NBRI, Lucknow	18.07.2017
262.	785	467	10CC11J37043	Varma Saikam	CSIR-IIIM, Jammu	21.07.2017
263.	786	842	10CC11A18004	S Pani Babu Vemulapalli	CSIR-IICT, Hyderabad	21.07.2017
264.	787	676	10BB11J36002	Arun Kumar Pradhan	CSIR-IMMT, Bhubaneswar	24.07.2017
265.	788	902	10BB12A04014	Aditi Sharma	CSIR-CDRI, Lucknow	24.07.2017
266.	789	752	10CC11J26074	Sachin Tharwarkar	CSIR-NCL, Pune	26.07.2017
267.	790	825	10BB13J08012	Anindya Basu	CSIR-CFTRI, Mysore	27.07.2017

List of Awardees of PhD Degree at AcSIR

Sl. NO.	Sl. No. for Award of	Sl. No. of Thesis	Registration No.	Name	Institute	Date of Award of Degree
268.	791	779	10CC11A26009	Preeti Padhye	CSIR-NCL, Pune	31.07.2017
269.	792	463	10BB13J26042	Pooja Singh	CSIR-NCL, Pune	01.08.2017
270.	793	635	10BB12A26070	Sana Moeez	CSIR-NCL, Pune	01.08.2017
271.	794	859	10CC12J18006	Chandra Shekhar Madasu	CSIR-IICT, Hyderabad	01.08.2017
272.	795	884	10PP12J32006	Ramar M	CSIR-NPL, New Delhi	09.08.2017
273.	796	857	10BB13J25001	Sweta Bhambani	CSIR-NBRI, Lucknow	09.08.2017
274.	797	696	10BB12J25007	Asmita Gupta	CSIR-NBRI, Lucknow	09.08.2017
275.	798	801	10BB12J25009	Smriti Srivastava	CSIR-NBRI, Lucknow	09.08.2017
276.	799	929	10BB14J04005	Mahendra Shukla	CSIR-CDRI, Lucknow	09.08.2017
277.	800	850	10BB12A51002	Arun Sharma	CSIR-IMTECH, Chandigarh	09.08.2017
278.	801	757	10CC11A36010	Subrat Kumar Padhi	CSIR-IMMT, Bhubaneswar	14.08.2017
279.	802	851	10CC12J39008	Manu Jose	CSIR-NIIST, Thiruvananthapuram	14.08.2017
280.	803	804	10CC12A26044	Vijay Beniwal	CSIR-NCL, Pune	14.08.2017
281.	804	903	10CC13A04027	Ravi Kumar	CSIR-CDRI, Lucknow	14.08.2017
282.	805	730	10BB12A02041	Asher Rajkumar	CSIR-IGIB, New Delhi	14.08.2017
283.	806	835	10CC11A39007	Prakash S.P	CSIR-NIIST, Thiruvananthapuram	14.08.2017
284.	807	824	10PP14J32004	Sucheta Juneja	CSIR-NPL, New Delhi	16.08.2017
285.	808	854	20EE12J31001	B Shivakumar	CSIR-NML,Jamshedpur	16.08.2017
286.	809	802	10BB12A25011	Ameena Siddiqui	CSIR-NBRI, Lucknow	18.08.2017
287.	810	770	10CC11A16002	Sadu Nageswara Rao	CSIR-CSMCRI, Bhavnagar	18.08.2017
288.	811	838	10CC11A16009	Venkatanarayana Pappula	CSIR-CSMCRI, Bhavnagar	18.08.2017
289.	812	806	10CC11J26030	Prajitha K.P	CSIR-NCL, Pune	24.08.2017
290.	813	790	10CC11A26046	Vasudevan N	CSIR-NCL, Pune	24.08.2017
291.	814	846	10CC13J12008	Additi Roy Chowdhury	CSIR-CMERI, Durgapur	24.08.2017
292.	815	827	10BB12J25012	Chandrawati	CSIR-NBRI, Lucknow	24.08.2107
293.	816	837	10CC12A19002	Nikita Singhal	CSIR-IIP, Dehradun	24.08.2017

List of Awardees of PhD Degree at AcSIR

Sl. NO.	Sl. No. for Award of	Sl. No. of Thesis	Registration No.	Name	Institute	Date of Award of Degree
294.	817	794	10CC11J39011	Vishnu S	CSIR-NIIST, Thiruvananthapuram	24.08.2017
295.	818	853	10CC11J18092	Siddiq Pasha Shaik	CSIR-IICT, Hyderabad	24.08.2017
296.	819	860	10BB11A18025	Koteswara Rao Garikapati	CSIR-IICT, Hyderabad	25.08.2017
297.	820	787	10CC12A11001	Samala Murali Mohan Reddy	CSIR-CLRI, Chennai	25.08.2017
298.	821	982	10BB13J04002	Yuvraj Singh	CSIR-CDRI, Lucknow	25.08.2017
299.	822	901	10BB13J04003	Guru Raghvendra Valicherla	CSIR-CDRI, Lucknow	25.08.2017
300.	823	925	10BB12A04020	Sujith Rajan	CSIR-CDRI, Lucknow	25.08.2017
301.	824	871	10BB11A04001	Jyotsana Singh	CSIR-CDRI, Lucknow	25.08.2017
302.	825	904	10CC11J18051	Sankara Rao Neigapula	CSIR-IICT, Hyderabad	29.08.2017
303.	826	793	10CC12A18016	Bhumireddy Sudarshana Reddy	CSIR-IICT, Hyderabad	29.08.2017
304.	827	832	10CC11J18069	P.S. Srikanth	CSIR-IICT, Hyderabad	29.08.2017
305.	828	965	10CC13J05006	P. Subalakshmi	CSIR-CECRI, Karaikudi	29.08.2017
306.	829	957	10CC12J33009	C. Bal Reddy	CSIR-IHBT, Palampur	29.08.2017
307.	830	741	20EE12J06011	Deepak Bansal	CSIR-CEERI, Pilani	29.08.2017
308.	831	653	10CC11J37041	Sunil Kumar	CSIR-IIIM, Jammu	03.09.2017
309.	832	709	10CC11A26027	Anju Susan	CSIR-NCL, Pune	03.09.2017
310.	833	882	10PP12J15001	Maninder Meenu	CSIR-CSIO, Chandigarh	03.09.2017
311.	834	968	10PP14J28006	Thai Ahn Tuan	CSIR-NGRI, Hyderabad	03.09.2017
312.	835	947	10CC14J18050	Rangaswamy Agolu	CSIR-IICT, Hyderabad	03.09.2017
313.	836	946	10CC13A05009	A Sivasankar	CSIR-CECRI, Karaikudi	03.09.2017
314.	837	839	10PP13J36006	Avinna Mishra	CSIR-IMMT, Bhubaneswar	05.09.2017
315.	838	970	10PP12A32007	Kanika Thakural	CSIR-NPL, New Delhi	05.09.2017
316.	839	712	10PP11A27003	Prabhakar Pandit	CSIR-NEERI, Nagpur	05.09.2017
317.	840	808	10CC11A26037	Manoj Kumar	CSIR-NCL, Pune	05.09.2017
318.	841	695	10CC11J26061	Ravi Jangir	CSIR-NCL, Pune	05.09.2017
319.	842	894	10CC11A33011	Manoranjan Kumar	CSIR-IHBT, Palampur	05.09.2017

List of Awardees of PhD Degree at AcSIR

Sl. NO.	Sl. No. for Award of	Sl. No. of Thesis	Registration No.	Name	Institute	Date of Award of Degree
320.	843	937	10CC13J26005	Santosh Kumar Singh	CSIR-NCL, Pune	09.09.2017
321.	844	910	10CC12A16004	Anshu Kumar	CSIR-CSMCRI, Bhavnagar	07.09.2017
322.	845	863	10BB11J26126	Ashish Deshpande	CSIR-NCL, Pune	13.09.2017
323.	846	868	10BB12A38004	Reshita Baruah	CSIR-NEIST, Jorhat	13.09.2017
324.	847	749	10CC11J26012	Deepika Dhaware	CSIR-NCL, Pune	14.09.2017
325.	848	879	10BB12J18041	Neha R. Dhoke	CSIR-IICT, Hyderabad	14.09.2017
326.	849	1002	10BB13J08006	Chinnu Salim	CSIR-CFTRI, Mysore	14.09.2017
327.	850	1020	10BB12A04012	Ankita Srivastava	CSIR-CDRI, Lucknow	14.09.2017
328.	851	865	10CC12J18014	Goutham Kommuru	CSIR-IICT, Hyderabad	15.09.2017
329.	852	810	10BB13J08011	Divyashri G	CSIR-CFTRI, Mysore	15.09.2017
330.	853	918	10CC12A19004	Reena Goyal	CSIR-IIP, Dehradun	15.09.2017
331.	854	874	10CC11J39002	Sandeep C	CSIR-NIIST, Thiruvananthapuram	15.09.2017
332.	855	897	32EE12J19010	Diptarka Dasgupta	CSIR-IIP, Dehradun	19.09.2017
333.	856	905	10CC13J33011	Richa Bharti	CSIR-IHBT, Palampur	19.09.2017
334.	857	924	10CC12A39005	Shaiju P	CSIR-NIIST, Thiruvananthapuram	19.09.2017
335.	858	579	10BB12J27002	Pulavarty Anusha	CSIR-NEERI, Nagpur	21.09.2017
336.	859	867	10BB11A08005	Chandana Thimme Gowda	CSIR-CFTRI, Mysore	21.09.2017
337.	860	981	10BB12J04002	Shyam Sundar Pal China	CSIR-CDRI, Lucknow	26.09.2017
338.	861	955	10BB12J18044	Tanmoy Mondal	CSIR-IICT, Hyderabad	03.10.2017
339.	862	912	10BB12A18067	G. Ramasatyavei	CSIR-IICT, Hyderabad	03.10.2017
340.	863	1036	10BB13J17011	Vinod Kumar Gupta	CSIR-IICB, Kolkata	03.10.2017
341.	864	958	10PP13J32001	Jeevan Jyoti	CSIR-NPL, New Delhi	06.10.2017
342.	865	816	10CC12A26022	Preeti Jain	CSIR-NCL, Pune	06.10.2017
343.	866	680	10CC11J37025	Hariprasad Aruri	CSIR-IIM, Jammu	06.10.2017
344.	867	747	10CB12A05008	P. Dhandapani	CSIR-CECRI, Karaikudi	06.10.2017

List of Students in M.Tech 2015-17 Batch

S. No.	Enrollment No.	Name	Lab Name	CGPA
1	30EE15A01001	Ashish Kumar Gupta	CSIR-CBRI	8.57
2	30EE15A01002	Anujay Rawat	CSIR-CBRI	9.55
3	30EE15A01003	Annapareddy Venkata Siva R	CSIR-CBRI	9.02
4	30EE15A01004	Aastha Singh	CSIR-CBRI	9.08
5	30EE15A01005	A Bhawani	CSIR-CBRI	7.94
6	30EE15A09001	Sukanya Kundu	CSIR-CGCRI	9.09
7	30EE15A09002	Sakthi Prasad S	CSIR-CGCRI	9.12
8	30EE15A14001	Anik Gupta	CSIR-CRRI	8.34
9	30EE15A14002	Krushna Chandra Sethi	CSIR-CRRI	7.24
10	30EE15A14003	Mukul Rathore	CSIR-CRRI	8.10
11	30EE15A15001	Priyanshu Goel	CSIR-CSIO	Not received
12	30EE15A15002	Vishavpreet Singh	CSIR-CSIO	from the Lab
13	30EE15A06001	Om Prakash Thakur	CSIR-CEERI	8.69
14	30EE15A06003	Shyam Sunder Prasad	CSIR-CEERI	8.28
15	30EE15A06004	Vikas Kumar Tiwari	CSIR-CEERI	8.19
16	30EE15A06005	Gaikwad Bipin Jairaj	CSIR-CEERI	8.5
17	30EE15A06006	Shivanshu Mishra	CSIR-CEERI	8.57
18	30EE15A06007	Tarun Goel	CSIR-CEERI	8.68
19	30EE15A06008	Vikash Kumar Jangir	CSIR-CEERI	8.68
20	30EE15A06009	Vipul Pandey	CSIR-CEERI	8.65
21	30EE15A06011	Piyush Goyal	CSIR-CEERI	8.54
22	30EE15A06012	Varun	CSIR-CEERI	8.25
23	30EE15A41001	Anurag Madhusudhanan	CSIR-SERC	8.76
24	30EE15A41005	S Hari Prasad	CSIR-SERC	9.19
25	30EE15A41006	Chandan	CSIR-SERC	8.61
26	30EE15A41007	Sourav Kanti Maiti	CSIR-SERC	8.77
27	30EE15A41008	Ravi Kumar	CSIR-SERC	7.52
28	30EE15A41009	Rakesh Kumar	CSIR-SERC	7.81
29	30EE15A41010	Sheshadri Shekhar Rauth	CSIR-SERC	9.14
30	30EE15A41012	Rajani Kant Rao	CSIR-SERC	8.48
31	30EE15A41013	Sourav Garai	CSIR-SERC	7.63
32	30EE15A27001	Vikash Gupta	CSIR-NEERI	9.01
33	30EE15A27002	N. Niketha	CSIR-NEERI	Result not received as she is on leave due to health issue

The Summary of the result and the enclosed grade card marks are approved!

13/10/17.

Dean Eng. Sci AcSIR

Summary Sheet _M.Tech results (2015-17)

Prof. (Dr.) Rajender S. Sangwan
Chairman Senate
Academy of Scientific & Innovative Research (AcSIR)
CSIR-HRDC Campus, Sector-19, Kamla Nehru Nagar,
Ghaziabad-201002, U.P., India

AcSYR

वैज्ञानिक तथा नवीकृत अनुसंधान अकादमी
नई दिल्ली, भारत
**ACADEMY OF SCIENTIFIC AND
INNOVATIVE RESEARCH
NEW DELHI, INDIA**

SEMESTER GRADE REPORT

Name of the Student	: **ANUJAY RAWAT**
Course	: Building Engineering & Disaster Mitigation (BEDM)
Roll No	: 30EE15A01002
Year of Joining	: 2015
Year of completion	:

Semester	I	II	III	IV	Cumulative
Credits	16	18	15		49
GPA	9.375	9.33	10		9.55

M. Tech

SEM	SUB CODE	SUBJECT TITLE	CR	GR
I	ENG(CBRI)1-1101	Numerical Methods	3	A
	ENG(CBRI)1-1103	Advanced Geotechnical & Foundation Engineering	3	A+
	ENG(CBRI)1-1105	Engineering Materials for Infrastructure	3	B+
	ENG(CBRI)1-1107	Analysis of Building Structure	3	A+
	ENG(CBRI)1-0001	Research Methodology	1	A
	ENG(CBRI)1-1111	Laboratory I (Geotechnical Engineering, Materials & Environmental Science & Technology)	2	A+
	ENG(CBRI)1-1113	Seminar - I	1	A+
		Training Programme on 'Research Methodology and Communication' -HRDC		
II	ENG(CBRI)1-1102	Design of Building Structures	3	A+
	ENG(CBRI)1-1104	Disaster Resistant Building System - I	3	A
	ENG(CBRI)1-1120	Concrete Technology	3	A
	PHY/ENG(CBRI)1-1138	Rock Mechanics	3	A
	ENG(CBRI)1-1126	Repair, Rehabilitation & Retrofitting of Building Structure	3	A
	ENG(CBRI)1-1106	Laboratory – II (Structural & Fire Engineering)	2	A+
	ENG(CBRI)1-1108	Seminar-II	1	A+
III	ENG(CBRI)1-1115	Disaster Resistant Building System - II	3	A+
	ENG(CBRI)1-1117	Dissertation - I	12	A+
IV				

Project Title: Use of E-waste in Materials for Corrosion Mitigation of RC Structures

Credits: 49

CGPA: 9.55

Date of Issue: 27/02/2017

Lab Coordinator (CSIR-CBRI)

AcSIR

वैज्ञानिक तथा नवीकृत अनुसंधान अकादमी
नई दिल्ली, भारत

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH
NEW DELHI, INDIA

SEMESTER GRADE REPORT

Name of the Student	: AASTHA SINGH
Course	: Building Engineering & Disaster Mitigation (BEDM)
Roll No	: 30EE15A01004
Year of Joining	: 2015
Year of completion	:

Semester	I	II	III	IV	Cumulative
Credits	16	18	15		49
GPA	9.125	8.44	9.8		9.08

M. Tech

SEM	SUB CODE	SUBJECT TITLE	CR	GR
I	ENG(CBRI)1-1101	Numerical Methods	3	B
	ENG(CBRI)1-1103	Advanced Geotechnical & Foundation Engineering	3	A+
	ENG(CBRI)1-1105	Engineering Materials for Infrastructure	3	A
	ENG(CBRI)1-1107	Analysis of Building Structure	3	A+
	ENG(CBRI)1-0001	Research Methodology	1	A
	ENG(CBRI)1-1111	Laboratory I (Geotechnical Engineering, Materials & Environmental Science & Technology)	2	A+
	ENG(CBRI)1-1113	Seminar - I	1	A
		Training Programme on 'Research Methodology and Communication' -HRDC		
II	ENG(CBRI)1-1102	Design of Building Structures	3	B+
	ENG(CBRI)1-1104	Disaster Resistant Building System - I	3	B+
	ENG(CBRI)1-1120	Concrete Technology	3	B+
	PHY/ENG(CBRI)1-1138	Rock Mechanics	3	B+
	ENG(CBRI)1-1126	Repair, Rehabilitation & Retrofitting of Building Structure	3	A
	ENG(CBRI)1-1106	Laboratory – II (Structural & Fire Engineering)	2	A+
	ENG(CBRI)1-1108	Seminar-II	1	A
III	ENG(CBRI)1-1115	Disaster Resistant Building System - II	3	A
	ENG(CBRI)1-1117	Dissertation - I	12	A+
IV				

Project Title: Development of Newer Cementitious Binder using Lime Sludge

Credits: 49

CGPA: 9.08

Date of Issue: 27|02|2017

Lab Coordinator (CSIR-CBRI)

AcSIR

वैज्ञानिक तथा नवीकृत अनुसंधान अकादमी
नई दिल्ली, भारत
**ACADEMY OF SCIENTIFIC AND
INNOVATIVE RESEARCH
NEW DELHI, INDIA**

SEMESTER GRADE REPORT

Name of the Student	: A. BHAWANI
Course	: Building Engineering & Disaster Mitigation (BEDM)
Roll No	: 30EE15A01005
Year of Joining	: 2015
Year of completion	:

Semester	I	II	III	IV	Cumulative
Credits	16	18	15		49
GPA	7.125	7.28	9.6		7.94

M. Tech

SEM	SUB CODE	SUBJECT TITLE	CR	GR
I	ENG(CBRI)1-1101	Numerical Methods	3	C+
	ENG(CBRI)1-1103	Advanced Geotechnical & Foundation Engineering	3	C+
	ENG(CBRI)1-1105	Engineering Materials for Infrastructure	3	B
	ENG(CBRI)1-1107	Analysis of Building Structure	3	B
	ENG(CBRI)1-0001	Research Methodology	1	B+
	ENG(CBRI)1-1111	Laboratory I (Geotechnical Engineering, Materials & Environmental Science & Technology)	2	A+
	ENG(CBRI)1-1113	Seminar - I	1	B+
		Training Programme on 'Research Methodology and Communication' -HRDC		
II	ENG(CBRI)1-1102	Design of Building Structures	3	B+
	ENG(CBRI)1-1104	Disaster Resistant Building System - I	3	B
	ENG(CBRI)1-1120	Concrete Technology	3	C+
	PHY/ENG(CBRI)1-1138	Rock Mechanics	3	C+
	ENG(CBRI)1-1126	Repair, Rehabilitation & Retrofitting of Building Structure	3	B
	ENG(CBRI)1-1106	Laboratory – II (Structural & Fire Engineering)	2	A+
	ENG(CBRI)1-1108	Seminar-II	1	A
III	ENG(CBRI)1-1115	Disaster Resistant Building System - II	3	B+
	ENG(CBRI)1-1117	Dissertation - I	12	A+
IV				

Project Title: Utilisation of Sugarcane Bagasse Ash as a Supplementary Cementitious Material

Credits: 49   **CGPA: 7.94**

Date of Issue: 27|02|2017

Lab Coordinator (CSIR-CBRI)

AcSYR

बैज्ञानिक तथा नवीकृत अनुसंधान अकादमी
नई दिल्ली, भारत

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH
NEW DELHI, INDIA

SEMESTER GRADE REPORT

Name of the Student	: ASHISH KUMAR GUPTA
Course	: Building Engineering & Disaster Mitigation (BEDM)
Roll No	: 30EE15A01001
Year of Joining	: 2015
Year of completion	:

Semester	I	II	III	IV	Cumulative
Credits	16	18	15		49
GPA	8.31	7.78	9.8		8.57

M. Tech

SEM	SUB CODE	SUBJECT TITLE	CR	GR
I	ENG(CBRI)1-1101	Numerical Methods	3	B
	ENG(CBRI)1-1103	Advanced Geotechnical & Foundation Engineering	3	A
	ENG(CBRI)1-1105	Engineering Materials for Infrastructure	3	B+
	ENG(CBRI)1-1107	Analysis of Building Structure	3	B+
	ENG(CBRI)1-0001	Research Methodology	1	A
	ENG(CBRI)1-1111	Laboratory I (Geotechnical Engineering, Materials & Environmental Science & Technology)	2	A+
	ENG(CBRI)1-1113	Seminar - I	1	B+
		Training Programme on 'Research Methodology and Communication' -HRDC		
II	ENG(CBRI)1-1102	Design of Building Structures	3	B+
	ENG(CBRI)1-1104	Disaster Resistant Building System - I	3	B
	ENG(CBRI)1-1120	Concrete Technology	3	B
	PHY/ENG(CBRI)1-1138	Rock Mechanics	3	B
	ENG(CBRI)1-1126	Repair, Rehabilitation & Retrofitting of Building Structure	3	B+
	ENG(CBRI)1-1106	Laboratory – II (Structural & Fire Engineering)	2	A+
	ENG(CBRI)1-1108	Seminar-II	1	A
III	ENG(CBRI)1-1115	Disaster Resistant Building System - II	3	A
	ENG(CBRI)1-1117	Dissertation - I	12	A+
IV				

Project Title: Development of an Efficient Anchorage Mechanism for Beam-Column Joints

Credits: 49   **CGPA: 8.57**

Date of Issue: 27|02|2017

Lab Coordinator (CSIR-CBRI)

वैज्ञानिक तथा नवीकृत अनुसंधान अकादमी
नई दिल्ली, भारत
**ACADEMY OF SCIENTIFIC AND
INNOVATIVE RESEARCH
NEW DELHI, INDIA**

SEMESTER GRADE REPORT

Name of the Student	: AVS RAMAKRISHNA
Course	: Building Engineering & Disaster Mitigation (BEDM)
Roll No	: 30EE15A01003
Year of Joining	: 2015
Year of completion	:

Semester	I	II	III	IV	Cumulative
Credits	16	18	15		49
GPA	8.75	8.44	10		9.02

M. Tech

SEM	SUB CODE	SUBJECT TITLE	CR	GR
I	ENG(CBRI)1-1101	Numerical Methods	3	B+
	ENG(CBRI)1-1103	Advanced Geotechnical & Foundation Engineering	3	A
	ENG(CBRI)1-1105	Engineering Materials for Infrastructure	3	B
	ENG(CBRI)1-1107	Analysis of Building Structure	3	A+
	ENG(CBRI)1-0001	Research Methodology	1	A
	ENG(CBRI)1-1111	Laboratory I (Geotechnical Engineering, Materials & Environmental Science & Technology)	2	A+
	ENG(CBRI)1-1113	Seminar - I	1	A
		Training Programme on 'Research Methodology and Communication' -HRDC		
II	ENG(CBRI)1-1102	Design of Building Structures	3	A+
	ENG(CBRI)1-1104	Disaster Resistant Building System - I	3	B+
	ENG(CBRI)1-1120	Concrete Technology	3	B
	PHY/ENG(CBRI)1-1138	Rock Mechanics	3	A
	ENG(CBRI)1-1126	Repair, Rehabilitation & Retrofitting of Building Structure	3	B
	ENG(CBRI)1-1106	Laboratory – II (Structural & Fire Engineering)	2	A+
	ENG(CBRI)1-1108	Seminar-II	1	A
III	ENG(CBRI)1-1115	Disaster Resistant Building System - II	3	A+
	ENG(CBRI)1-1117	Dissertation - I	12	A+
IV				

Project Title: A Study on Seismic Stability of MSW Landfills

Credits: 49

CGPA: 9.02

Date of Issue: 27|02|2017

Lab Coordinator (CSIR-CBRI)

AcSIR
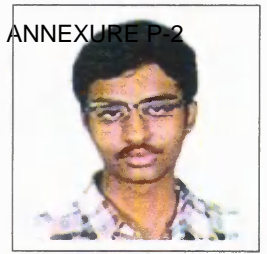
Name of the Student	: Mr Sakthi Prasad S
Specialization	: Glass and Ceramic Engineering
Roll No	: 30EE15A09002
Year of Joining	: August 2015
Year of completion	: July 2017

Semester	I	II	III	IV	Cumulative
Credits	17	17	21	20	
GPA	8.29	8.76	9.33	9.90	9.12

M.Tech: 2015-17

SEM	SUB CODE	SUBJECT TITLE	CR	GR
I	ENG-CGCRI-1-1701	Introduction to Materials Engineering	4	B+
	ENG-CGCRI-1-1702	Materials Characterization - I	4	A
	ENG-CGCRI-1-1703	Fundamentals of Glass and Ceramics	4	B+
	ENG-CGCRI-1-1704	Research Methodology and Applied Statistical Techniques for Materials Engineering	4	B+
	ENG-CGCRI-1-1705	Laboratory Safety Practice	1	A
		Training programme on "Research Methodology and Communication"- HRDC		
II	ENG-CGCRI-2-1701	Processing of Glass and Ceramics	4	A
	ENG-CGCRI-2-1702	Materials Characterization - II	4	A
	ENG-CGCRI-3-1703	Structural and Functional Coatings	4	A
	ENG-CGCRI-3-1706	Bioceramic Prosthesis and Implants	4	B+
	ENG-CGCRI-2-1703	Technical Communication	1	A
III	ENG-CGCRI-2-1704	Transport Phenomena in Materials Processing	4	B
	ENG-CGCRI-2-1705	Term Paper	1	B+
		Project Work		
	ENG-CGCRI-3-1709	Project and Thesis – I	16	A+
IV	ENG-CGCRI-3-1710	Project and Thesis - II	16	A+
	ENG-CGCRI-2-1706	Seminar	2	A+
	ENG-CGCRI-2-1707	Comprehensive Viva	2	A

Project Title: Bioactivity and Antibacterial Property of Bismuth Oxide (Bi_2O_3) and Boron Oxide (B_2O_3) Modified Bioactive Glasses

Credits: 75

CGPA: 9.12

Lab Coordinator
15/6/2017
ड. के अन्नपूर्णा **Dr. K. Annapurna**
मुख्य वैज्ञानिक / Principal Scientist
प्रयोगशाला समन्वयक / Lab-coordinator, AcSIR
सि.एस.आई.आर- सि.जि.सि.आर.आई / CSIR-CGCRI
वैज्ञानिक एवं तकनिकी मंत्रालय, भारत सरकार
Ministry of Sci. & Tech., GOI
कलकाता-७०० ०३२, भारत / Kol.- 700 032, India

Director
21/6/17
के. मुरलीधरन/ K. MURALEEDHARAN
निदेशक/Director
केन्द्रीय कांच एवं सिरामिक अनुसंधान संस्थान
CENTRAL GLASS & CERAMIC RESEARCH INSTITUTE
कोलकाता/ KOLKATA-700 032

AcSYR

Name of the Student	: Ms Sukanya Kundu
Specialization	: Glass and Ceramic Engineering
Roll No	: 30EE15A09001
Year of Joining	: August 2015
Year of completion	: July 2017

Semester	I	II	III	IV	Cumulative
Credits	17	17	21	20	
GPA	8.47	8.76	9.76	9.20	9.09

M.Tech: 2015-17
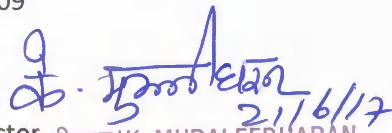
SEM	SUB CODE	SUBJECT TITLE	CR	GR
I	ENG-CGCRI-1-1701	Introduction to Materials Engineering	4	A
	ENG-CGCRI-1-1702	Materials Characterization - I	4	A+
	ENG-CGCRI-1-1703	Fundamentals of Glass and Ceramics	4	B+
	ENG-CGCRI-1-1704	Research Methodology and Applied Statistical Techniques for Materials Engineering	4	B
	ENG-CGCRI-1-1705	Laboratory Safety Practice	1	B+
		Training programme on "Research Methodology and Communication"- HRDC		
II	ENG-CGCRI-2-1701	Processing of Glass and Ceramics	4	A
	ENG-CGCRI-2-1702	Materials Characterization - II	4	A
	ENG-CGCRI-3-1703	Structural and Functional Coatings	4	A
	ENG-CGCRI-3-1706	Bioceramic Prosthesis and Implants	4	B+
	ENG-CGCRI-2-1703	Technical Communication	1	A
III	ENG-CGCRI-2-1704	Transport Phenomena in Materials Processing	4	A
	ENG-CGCRI-2-1705	Term Paper	1	A
		Project Work		
	ENG-CGCRI-3-1709	Project and Thesis – I	16	A+
IV	ENG-CGCRI-3-1710	Project and Thesis - II	16	A
	ENG-CGCRI-2-1706	Seminar	2	A+
	ENG-CGCRI-2-1707	Comprehensive Viva	2	A+

Project Title: Alumina and Alumina Based Porous Materials for Environmental Applications

Credits: 75   CGPA: 9.09

Lab Coordinator 15/6/2017

डॉ. के अन्नपूर्णा Dr. K. Annapurna
मुख्य वैज्ञानिक / Principal Scientist
प्रयोगशाला समन्वयक / Lab-coordinator, AcSIR
सि.एस.आई.आर- सि.जि.सि.आर.आई / CSIR-CGCRI
वैज्ञानिक एवं तकनिकी मंत्रालय, भारत सरकार
Ministry of Sci. &
कलकाता-७०० ०३२, भारत / Kol.- 700 032, India

Director 2/6/17

के. मुरलीधरन/ K. MURALEEDHARAN
निदेशक/Director
केन्द्रीय कांच एवं सिरामिक अनुसधान संस्थान
CENTRAL GLASS & CERAMIC RESEARCH INSTITUTE
कोलकाता/ KOLKATA-700 032

AcSIR

Name of the Student	Anik Gupta
Specialization	Transportation Engineering
Roll No	30EE15A14001
Year of Joining	2015
Year of completion	2017

Semester	I	II	III	IV	Cumulative
Credits	17	18	17	18	70
GPA	8.000	7.611	9.647	8.167	8.343

M.Tech: 2015-17

SEM	SUB CODE	SUBJECT TITLE	CR	GR
I	ENG(CRRI)1-451	Statistical Methods in Engineering	3	A
	ENG(CRRI)1-453	Traffic Engineering and Road Safety	3	B+
	ENG(CRRI)1-455	Advanced Highway Engineering Materials	3	C+
	ENG(CRRI)1-457	Advanced Geotechnical Engineering	3	B+
	ENG(CRRI)1-459	Research Methodology	2	A
	ENG(CRRI)1-461	Laboratory-I (Traffic, Geotechnical, Engineering and Highway Materials)	2	B+
	ENG(CRRI)1-463	Seminar-I	1	A
II	ENG(CRRI)1-452	Design and Construction of Pavements	3	B
	ENG(CRRI)1-454	Transportation Planning	3	B
	ENG(CRRI)2-456	Public Transportation System	3	C+
	ENG(CRRI)1-464	Economic Evaluation of Highway Projects	3	A
	ENG(CRRI)1-468	Soft Computing Techniques in Transportation Engineering	3	A
	ENG(CRRI)1-456	Laboratory –II (Pavement & Transportation Laboratory)	2	B
	ENG(CRRI)1-458	Seminar-II	1	A
III	ENG(CRRI)2-451	Pavement evaluation techniques and management system	3	B+
	ENG(CRRI)2-453	Dissertation-I	14	A+
IV	ENG(CRRI)2-452	Dissertation-II	15	B+
		Viva-voce	3	A

Project Title: Impact of One Time Damage from Single Heavy Axle w.r.t ESAL'S

Credits: 70

CGPA: 8.343

Date: 27.06.2017

B. Kanapadura

Program Coordinator

AcSIR

Name of the Student	Mukul Rathore
Specialization	Transportation Engineering
Roll No	30EE15A14003
Year of Joining	2015
Year of completion	2017

Semester	I	II	III	IV	Cumulative
Credits	17	18	17	18	70
GPA	8.118	7.389	9.647	7.333	8.100

M.Tech: 2015-17

SEM	SUB CODE	SUBJECT TITLE	CR	GR
I	ENG(CRRI)1-451	Statistical Methods in Engineering	3	B+
	ENG(CRRI)1-453	Traffic Engineering and Road Safety	3	B+
	ENG(CRRI)1-455	Advanced Highway Engineering Materials	3	B
	ENG(CRRI)1-457	Advanced Geotechnical Engineering	3	B+
	ENG(CRRI)1-459	Research Methodology	2	A
	ENG(CRRI)1-461	Laboratory-I (Traffic, Geotechnical, Engineering and Highway Materials)	2	A
	ENG(CRRI)1-463	Seminar-I	1	A
II	ENG(CRRI)1-452	Design and Construction of Pavements	3	B
	ENG(CRRI)1-454	Transportation Planning	3	B
	ENG(CRRI)2-456	Public Transportation System	3	C+
	ENG(CRRI)1-464	Economic Evaluation of Highway Projects	3	A
	ENG(CRRI)1-468	Soft Computing Techniques in Transportation Engineering	3	B+
	ENG(CRRI)1-456	Laboratory –II (Pavement & Transportation Laboratory)	2	B
	ENG(CRRI)1-458	Seminar-II	1	B+
III	ENG(CRRI)2-451	Pavement evaluation techniques and management system	3	B+
	ENG(CRRI)2-453	Dissertation-I	14	A+
IV	ENG(CRRI)2-452	Dissertation-II	15	B
		Viva-voce	3	A

Project Title: Laboratory Performance Oriented Optimization of Warm Mix Additive for Reclaimed Asphalt Material

Credits: 70

CGPA: 8.100

Date: 27.06.2017

Program Coordinator

AcSYR

Name of the Student	Krushna Chandra Sethi		Semester	I	II	III	IV	Cumulative
Specialization	Transportation Engineering		Credits	17	18	17	18	70
Roll No	30EE15A14002		GPA	6.824	6.556	8.471	7.167	7.243
Year of Joining	2015							
Year of completion	2017							

M.Tech: 2015-17

SEM	SUB CODE	SUBJECT TITLE	CR	GR
I	ENG(CRRI)1-451	Statistical Methods in Engineering	3	B
	ENG(CRRI)1-453	Traffic Engineering and Road Safety	3	B
	ENG(CRRI)1-455	Advanced Highway Engineering Materials	3	C+
	ENG(CRRI)1-457	Advanced Geotechnical Engineering	3	C+
	ENG(CRRI)1-459	Research Methodology	2	B
	ENG(CRRI)1-461	Laboratory-I (Traffic, Geotechnical, Engineering and Highway Materials)	2	B+
	ENG(CRRI)1-463	Seminar-I	1	B+
II	ENG(CRRI)1-452	Design and Construction of Pavements	3	C+
	ENG(CRRI)1-454	Transportation Planning	3	C+
	ENG(CRRI)2-456	Public Transportation System	3	C+
	ENG(CRRI)1-464	Economic Evaluation of Highway Projects	3	B
	ENG(CRRI)1-468	Soft Computing Techniques in Transportation Engineering	3	B
	ENG(CRRI)1-456	Laboratory –II (Pavement & Transportation Laboratory)	2	B
	ENG(CRRI)1-458	Seminar-II	1	B+
III	ENG(CRRI)2-451	Pavement evaluation techniques and management system	3	C+
	ENG(CRRI)2-453	Dissertation-I	14	A
IV	ENG(CRRI)2-452	Dissertation-II	15	B
		Viva-voce	3	B+

Project Title: Performance Evaluation of Bituminous Paving Mixes Containing Polymer and Fly Ash Composite Admixtures

Credits: 70

CGPA: 7.243

Program Coordinator

Date: 27.06.2017

AcSIR

Name of the Student	Om Prakash Thakur		Semester	I	II	III	IV	Cumulative
Course	Advanced Electronic Systems		Credits	17	16	19	18	70
Roll No.	30EE15A06001		GPA	9.18	8.69	8.84	9.00	8.69
Year of Joining	2015							
Year of Completion	2017							

PROVISIONAL CONSOLIDATED MARKSHEET : MTech : 2015-2017

SEM	SUBJ CODE	SUBJECT TITLE	CR	GR
I	ENG(CEERI) 2-1554	Platforms and Techniques for Process Control	2	A
	ENG(CEERI) 2-1513	Lab : Process Control Techniques and Platforms	1	A
	ENG(CEERI) 2-1505	Digital Systems Engineering	2	B+
	ENG(CEERI) 2-1511	Lab - Digital Systems Engineering	1	A+
	ENG(CEERI) 2-1606	Intelligent Instrumentation	2	B+
	ENG(CEERI) 2-1512	Lab - Intelligent Instrumentation	1	B
	ENG(CEERI) 2-1607	Signal and Image Processing-I	2	B+
	ENG(CEERI) 2-1513	Lab - Signal and Image Processing-I	1	A
	ENG(CEERI) 2-1508	Power Electronics	2	B+
	ENG(CEERI) 2-1514	Lab - Power Electronics	1	B+
	ENG(CEERI) 1-1602	Technical Communication	2	B
		"Research Orientation" Programme at CSIR-HRDC Ghaziabad		
II	ENG(CEERI) 2-1509	Real-time Embedded System Design	1	A
	ENG(CEERI) 2-1515	Lab : Real-time Embedded System Design	2	A+
	ENG(CEERI) 3-1502	Advances in Process Control	2	A
	ENG(CEERI) 3-1505	Lab - Advances in Process Control	1	A+
	ENG(CEERI) 3-1503	Signal and Image Processing-II	2	B+
	ENG(CEERI) 3-1506	Lab - Signal and Image Processing-II	1	A
	ENG(CEERI) 3-1504	Applications of Power Electronics	2	B+
	ENG(CEERI) 3-1507	Lab : Applications of Power Electronics	1	A
	ENG(CEERI) 2-1503	Project Management	2	B
III	ENG(CEERI) 2-1518	CMOS Digital VLSI Design	2	B+
	ENG(CEERI) 2-1521	Lab - CMOS-based Physical Design	2	A
		Project Work		
III	ENG(CEERI) 2-1501	MTech Dissertation-I	14	A
IV	ENG(CEERI) 2-1502	MTech Dissertation-II	18	A

Project Title: Development and implementation of optimized hardware interface for a high speed vision system.

Credits: 70   Checked   CGPA: 8.69

11.07.2017

SICHANDAN PAL

Academy of Scientific and Innovative Research
CSIR-CEERI, Pilani-333031

AcSIR

Name of the Student	Shyam Sunder Prasad		Semester	I	II	III	IV	Cumulative
Course	Advanced Electronic Systems		Credits	17	16	19	18	70
Roll No.	30EE15A06005		GPA	7.47	7.81	8.74	9.00	3.29
Year of Joining	2015							
Year of Completion	2017							

PROVISIONAL CONSOLIDATED MARKSHEET : MTech : 2015-2017

SEM	SUBJ CODE	SUBJECT TITLE	CR	GR
I	ENG(CEERI) 2-1504	Platforms and Techniques for Process Control	2	A
	ENG(CEERI) 2-1510	Lab : Process Control Techniques and Platforms	1	A
	ENG(CEERI) 2-1505	Digital Systems Engineering	2	B
	ENG(CEERI) 2-1511	Lab : Digital Systems Engineering	1	A
	ENG(CEERI) 2-1506	Intelligent Instrumentation	2	C+
	ENG(CEERI) 2-1512	Lab : Intelligent Instrumentation	1	B+
	ENG(CEERI) 2-1507	Signal and Image Processing-I	2	C+
	ENG(CEERI) 2-1513	Lab : Signal and Image Processing-I	1	B
	ENG(CEERI) 2-1508	Power Electronics	2	B+
	ENG(CEERI) 2-1514	Lab : Power Electronics	1	B+
	ENG(CEERI) 1-1502	Technical Communication	2	B
		"Research Orientation" Programme at CSIR-HRDC, Ghaziabad		
II	ENG(CEERI) 2-1509	Real-time Embedded System Design	2	B+
	ENG(CEERI) 2-1515	Lab : Real-time Embedded System Design	2	A
	ENG(CEERI) 3-1502	Advances in Process Control	2	B+
	ENG(CEERI) 3-1505	Lab : Advances in Process Control	1	A
	ENG(CEERI) 3-1503	Signal and Image Processing-II	2	B
	ENG(CEERI) 3-1506	Lab : Signal and Image Processing-II	1	B+
	ENG(CEERI) 3-1504	Applications of Power Electronics	2	B
	ENG(CEERI) 3-1507	Lab : Applications of Power Electronics	1	B+
	ENG(CEERI) 2-1503	Project Management	2	B
III	ENG(CEERI) 2-1519	CMOS Digital VLSI Design	3	B+
	ENG(CEERI) 2-1521	Lab : CMOS-based Physical Design	2	B+
		Project Work		
III	ENG(CEERI) 2-1601	MTech Dissertation-I	14	A
IV	ENG(CEERI) 2-1602	MTech Dissertation-II	18	A

Project Title : "Development of fabric defect detection system and its testing."

Credits: 70   Checked   CGPA: 3.29

03.02 2017

SI/TAMMOAH Raj
Contoller
Academy of Scientific and Innovative Research
CSIR-CEERI, Pilani-333 031

AcSIR

Name of the Student	Vikas Kumar Tiwari		Semester	I	II	III	IV	Cumulative
Course	Advanced Electronic Systems		Credits	17	18	19	16	70
Roll No.	30EE15A06004		GPA	7.88	7.65	8.11	9.00	8.19
Year of Joining	2015							
Year of Completion	2017							

PROVISIONAL CONSOLIDATED MARKSHEET (MTech) 2015-2017

SEM	SUBJ CODE	SUBJECT TITLE	CR	GR
I	ENG(CEERI) 3-1504	Platforms and Techniques for Process Control	3	A
	ENG(CEERI) 2-1510	Lab : Process Control Techniques and Platforms	1	A
	ENG(CEERI) 2-1505	Digital Systems Engineering	2	B
	ENG(CEERI) 2-1511	Lab : Digital Systems Engineering	1	A
	ENG(CEERI) 2-1506	Intelligent Instrumentation	2	B+
	ENG(CEERI) 2-1512	Lab : Intelligent Instrumentation	1	B+
	ENG(CEERI) 2-1507	Signal and Image Processing-I	2	C+
	ENG(CEERI) 2-1513	Lab : Signal and Image Processing-I	1	B
	ENG(CEERI) 2-1508	Power Electronics	2	A
	ENG(CEERI) 2-1514	Lab : Power Electronics	1	A
	ENG(CEERI) 1-1502	Technical Communication	2	B
		"Research Orientation" Programme at CSIR-HRDC, Ghaziabad		
II	ENG(CEERI) 2-1509	Real-time Embedded System Design	5	B+
	ENG(CEERI) 2-1515	Lab : Real-time Embedded System Design	2	A
	ENG(CEERI) 3-1502	Advances in Process Control	2	B+
	ENG(CEERI) 5-1505	Lab : Process	1	B
	ENG(CEERI) 3-1503	Signal and Image Processing-II	2	B
	ENG(CEERI) 5-1506	Lab : Signal and Image Processing-II	1	B+
	ENG(CEERI) 3-1504	Applications of Power Electronics	2	B
	ENG(CEERI) 3-1507	Lab : Applications of Power Electronics	1	B+
	ENG(CEERI) 2-1503	Project Management	2	C+
III	ENG(CEERI) 2-1519	CMOS Digital VLSI Design	3	B+
	ENG(CEERI) 2-1521	Lab : CMOS-based Physical Design	2	A
		Project Work		
II	ENG(CEERI) 2-1531	MTech Dissertation-I	14	B+
IV	ENG(CEERI) 2-1602	MTech Dissertation-II	16	A

Project Title: "Design and development of microcontroller based impedance analyzer."

Credits: 70

Checked

CGPA: 8.19

Date:

AcSIR

Name of the Student	Gaikwad Bipin Jairaj	Semester	I	II	III	IV	Cumulative
Course	Advanced Semiconductor Electronics	Credits	16	17	17	18	66
Roll No.	30EE15A06005	GPA	7.56	9.59	9.76	9.00	8.50
Year of Joining	2015						
Year of Completion	2017						

PROVISIONAL CONSOLIDATED MARKSHEET : MTech : 2015-2017

SEM	SUBJ CODE	SUBJECT TITLE	CR	GR
I	ENG(CEERI) 2-1516	Physics of Semiconductor Materials and Devices	4	B
	ENG(CEERI) 2-1517	Unit Processes in Semiconductor Technologies	3	B+
	ENG(CEERI) 2-1520	Lab: Semiconductor Processing Technologies	2	A
	ENG(CEERI) 2-1518	CMOS Digital VLSI Design	3	B
	ENG(CEERI) 2-1521	Lab: CMOS-based Physical Design	2	B
	ENG(CEERI) 1-1502	Technical Communication	2	B+
		"Research Orientation" Programme at CSIR-HRDC, Ghaziabad		
II	ENG(CEERI) 2-1519	Characterization Techniques for Semiconductor Materials Technologies and Devices	3	A
	ENG(CEERI) 2-1522	Lab: Semiconductors Related Characterization and Measurement Techniques	2	A
	ENG(CEERI) 3-1511	CMOS Analog Design	3	B+
	ENG(CEERI) 3-1516	Lab: CMOS Analog Design	2	B+
	ENG(CEERI) 3-1512	Advanced VLSI System Architectures	3	A
	ENG(CEERI) 2-1523	Lab: HDL-based Digital Design	2	A
	ENG(CEERI) 2-1503	Project Management	2	B+
III	ENG(CEERI) 2-1505	Intelligent Instrumentation	2	B
	ENG(CEERI) 2-1512	Lab: Intelligent Instrumentation	1	A
		Project Work		
III	ENG(CEERI) 2-1501	MTech Dissertation-I	14	A
IV	ENG(CEERI) 2-1502	MTech Dissertation-II	18	A

Project Title: 'Design and Implementation of CELP coder'.

Credits: 66

checked

03.08.2017

CGPA: 8.50

SUKHENDU PAL

Academy of Scientific and Innovative Research
CSIR-CEERI, Pilani 333031

AcSIR
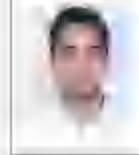
Name of the Student	Shivanshu Mishra	Semester	I	II	III	IV	Cumulative
Course	Advanced Semiconductor Electronics	Credits	16	17	17	18	68
Roll No.	30EE15A06005	GPA	8.00	8.29	8.94	9.00	8.57
Year of Joining	2015						
Year of Completion	2017						

PROVISIONAL CONSOLIDATED MARKSHEET : MTech : 2015-2017

SEM	SUBJ CODE	SUBJECT TITLE	CR	GR
I	ENG(CEERI)-2-1516	Physics of Semiconductor Materials and Devices	4	A
	ENG(CEERI)-2-1517	Unit Processes in Semiconductor Technologies	3	B+
	ENG(CEERI)-2-1520	Lab : Semiconductor Processing Technologies	2	B+
	ENG(CEERI)-2-1518	CMOS Digital VLSI Design	3	B+
	ENG(CEERI)-2-1521	Lab : CMOS-based Physical Design	2	B
	ENG(CEERI)-1-1602	Technical Communication	2	B
		"Research Orientation" Programme at CSIR-HRDC, Ghaziabad		
II	ENG(CEERI)-2-1519	Characterization Techniques for Semiconductor Materials, Technologies and Devices	3	B+
	ENG(CEERI)-2-1522	Lab : Semiconductors Related Characterization and Measurement Techniques	2	B+
	ENG(CEERI)-3-1513	Optoelectronic Materials, Devices and Technologies	3	A
	ENG(CEERI)-3-1519	Lab : Optoelectronic Devices and Technologies	2	A
	ENG(CEERI)-3-1514	Photonic Materials, Devices and Technologies	3	B+
	ENG(CEERI)-3-1520	Lab : Photonic Devices and Technologies	2	A
	ENG(CEERI)-2-1503	Project Management	2	B
III	ENG(CEERI)-2-1506	Intelligent Instrumentation	2	A
	ENG(CEERI)-2-1512	Lab : Intelligent Instrumentation	1	B+
		Project Work		
III	ENG(CEERI)-2-1501	MTech Dissertation-I	14	A
IV	ENG(CEERI)-2-1502	MTech Dissertation-II	18	A

Project Title: "Design and development of 100 Volts GaN HEMT"

Credits 68   Checked   03.08.2017   CGPA 8.57

AcSIR

Name of the Student	Tarun Goel
Course	Advanced Semiconductor Electronics
Roll No.	30EE15A06007
Year of Joining	2015
Year of Completion	2017

Semester	I	II	III	IV	Cumulative
Credits	18	17	17	16	68
GPA	8.19	8.53	9.00	9.00	8.68

PROVISIONAL CONSOLIDATED MARKSHEET : MTech : 2015-2017

SEM	SUBJ CODE	SUBJECT TITLE	CR	GR
I	ENG(CEERI) 2-1516	Physics of Semiconductor Materials and Devices	4	A
	ENG(CEERI) 2-1517	Unit Processes in Semiconductor Technologies	3	B+
	ENG(CEERI) 2-1520	Lab : Semiconductor Processing Technologies	2	B+
	ENG(CEERI) 2-1518	CMOS Digital VLSI Design	3	B+
	ENG(CEERI) 2-1521	Lab : CMOS-based Physical Design	2	B
	ENG(CEERI) 1-1502	Technical Communication	2	B+
		"Research Orientation" Programme at CSIR-HRDC, Ghaziabad		
II	ENG(CEERI) 2-1519	Characterization Techniques for Semiconductor Materials Technologies and Devices	3	A
	ENG(CEERI) 2-1522	Lab : Semiconductors Related Characterization and Measurement Techniques	2	B+
	ENG(CEERI) 3-1511	CMOS Analog Design	3	A
	ENG(CEERI) 3-1518	Lab : CMOS Analog Design	2	B+
	ENG(CEERI) 3-1512	Advanced VLSI System Architectures	3	A
	ENG(CEERI) 2-1523	Lab : HDL-based Digital Design	2	A
	ENG(CEERI) 2-1503	Project Management	2	B
III	ENG(CEERI) 3-1508	Intelligent Instrumentation	3	A
	ENG(CEERI) 2-1512	Lab : Intelligent Instrumentation	1	A
		Project Work		
III	ENG(CEERI) 2-1501	MTech Dissertation-I	14	A
IV	ENG(CEERI) 2-1502	MTech Dissertation-II	16	A

Project Title: "An efficient VLSI architecture for PRESENT block cipher and its FPGA implementation."

Credits: 68   checked   03 APR 2017   CGPA 8.68

AcSIR

Name of the Student	Vikash Kumar Jangir		Semester	I	II	III	IV	Cumulative
Course	Advanced Semiconductor Electronics		Credits	16	17	17	18	68
Roll No.	30EE15A06008		GPA	8.06	8.71	8.88	9.00	8.68
Year of Joining	2015							
Year of Completion	2017							

PROVISIONAL CONSOLIDATED MARKSHEET - MTech : 2015-2017

SEM	SUBJ.CODE	SUBJECT TITLE	CR	GR
I	ENG(CEERI) 2-1516	Physics of Semiconductor Materials and Devices	4	B−
	ENG(CEERI) 2-1517	Unit Processes in Semiconductor Technologies	3	A
	ENG(CEERI) 2-1520	Lab : Semiconductor Processing Technologies	2	B+
	ENG(CEERI) 2-1518	CMOS Digital VLSI Design	3	B+
	ENG(CEERI) 2-1521	Lab : CMOS-based Physical Design	2	B
	ENG(CEERI) 1-1502	Technical Communication	2	B+
		"Research Orientation" Programme at CSIR-HRDC, Ghaziabad		
II	ENG(CEERI) 2-1519	Characterization Techniques for Semiconductor Materials, Technologies and Devices	4	B+
	ENG(CEERI) 2-1522	Lab : Semiconductors Related Characterization and Measurement Techniques	2	A
	ENG(CEERI) 3-1613	Optoelectronic Materials, Devices and Technologies	3	A
	ENG(CEERI) 3-1619	Lab : Optoelectronic Devices and Technologies	2	A
	ENG(CEERI) 3-1614	Photonic Materials, Devices and Technologies	3	A
	ENG(CEERI) 3-1620	Lab : Photonic Devices and Technologies	2	A
	ENG(CEERI) 2-1503	Project Management	2	B+
III	ENG(CEERI) 2-1506	Intelligent Instrumentation	2	B+
	ENG(CEERI) 2-1512	Lab : Intelligent Instrumentation	1	A
		Project Work		
III	ENG(CEERI) 2-1501	MTech Dissertation-I	14	A
IV	ENG(CEERI) 3-1502	MTech Dissertation-II	18	A

Project Title: "Design, fabrication and characterization of GaN-InGaN lateral and vertical solar cell."

Credits: 68

Checked

03.06.2017

CGPA: 8.68

GIRISH WADHWAL
Director
National Academy of Semiconductor Engineers
CSIR-CEERI Pilani-333031

AcSIR

Name of the Student	Vipul Pandey		Semester	I	II	III	IV	Cumulative
Course	Advanced Semiconductor Electronics		Credits	16	17	17	18	68
Roll No.	30EE15A08009		GPA	8.00	8.71	8.82	9.00	8.65
Year of Joining	2015							
Year of Completion	2017							

PROVISIONAL CONSOLIDATED MARKSHEET : MTech : 2015-2017

SEM	SUBJ CODE	SUBJECT TITLE	CR	GR
I	ENG(CEERI) 2-1516	Physics of Semiconductor Materials and Devices	4	B+
	ENG(CEERI) 2-1517	Unit Processes in Semiconductor Technologies	3	A
	ENG(CEERI) 2-1520	Lab: Semiconductor Processing Technologies	2	B+
	ENG(CEERI) 2-1518	CMOS Digital VLSI Design	2	B
	ENG(CEERI) 2-1521	Lab: CMOS-based Physical Design	2	B
	ENG(CEERI) 1-1502	Technical Communication	2	A
		"Research Orientation" Programme at CSIR-HRDC, Ghaziabad		
	ENG(CEERI) 2-1519	Characterization Techniques for Semiconductor Materials, Technologies and Devices	3	A
	ENG(CEERI) 2-1522	Lab: Semiconductors Related Characterization and Measurement Techniques	2	B+
II	ENG(CEERI) 3-1513	Optoelectronic Materials, Devices and Technologies	3	A
	ENG(CEERI) 3-1519	Lab: Optoelectronic Devices and Technologies	2	A
	ENG(CEERI) 3-1514	Photonic Materials, Devices and Technologies	3	B+
	ENG(CEERI) 3-1520	Lab: Photonic Devices and Technologies	2	A
	ENG(CEERI) 2-1503	Project Management	2	A
III	ENG(CEERI) 2-1506	Intelligent Instrumentation	2	B+
	ENG(CEERI) 2-1512	Lab: Intelligent Instrumentation	1	B+
		Project Work		
III	ENG(CEERI) 3-1501	MTech Dissertation-I	14	A
IV	ENG(CEERI) 2-1502	MTech Dissertation-II	18	A

Project Title: "Improving the efficiency of GaN-InGaN blue LED using plasmonics."

Credits: 68   Checked   03.08.2017   CGPA: 8.65

ANNEXURE P-2

AcSIR

Name of the Student	Piyush Goyal	Semester	I	II	III	IV	Cumulative
Course	High Power Microwave Devices and System Engineering	Credits	16	16	17	18	67
Roll No.	30EE15A08011	GPA	8.56	8.38	8.18	9.00	8.54
Year of Joining	2015						
Year of Completion	2017						

PROVISIONAL CONSOLIDATED MARKSHEET - MTech : 2015-2017

SEM	SUBJ CODE	SUBJECT TITLE	CR	GR
	ENG(CEERI) 2-1524	Electromagnetic Theory and Transmission Lines	3	A
	ENG(CEERI) 2-1525	Microwave Communication	2	B+
	ENG(CEERI) 2-1526	Numerical Analysis and Techniques for Microwave Applications	4	B+
	ENG(CEERI) 2-1526	Lab : Microwave Components Characterization and Tube Processing Techniques	2	A+
	ENG(CEERI) 3-1523	High Power Microwave Systems and Applications	3	B+
	ENG(CEERI) 1-1502	Technical Communication	2	A
		"Research Orientation" Programme at CSIR-HRDC, Ghaziabad		
	ENG(CEERI) 2-1527	Microwave and Millimeter-wave Tube Technologies	3	A
	ENG(CEERI) 3-1521	Slow-wave Devices : Principles and Design	4	B+
II	ENG(CEERI) 3-1522	Fast-wave Devices : Principles and Design	3	A
	ENG(CEERI) 2-1529	Lab : Microwave Devices Characterization and Tube Sub-assembly Fabrication	3	B+
	ENG(CEERI) 3-1526	Lab : CAD of Microwave Tubes	2	B+
	ENG(CEERI) 2-1508	Project Management	2	B+
III	ENG(CEERI) 3-1525	Vacuum Microelectronic Devices	3	A
		Project Work		
III	ENG(CEERI) 2-1501	MTech Dissertation-I	14	B+
IV	ENG(CEERI) 2-1502	MTech Dissertation-II	18	A

Project Title: "Design and study of mode converters for high power high frequency gyrotron."

Credits: 67   Checked   CGPA: 8.54

13.08.2017

SUCHANDAN PAL

AcSIR

Name of the Student	Varun
Course	High Power Microwave Devices and System Engineering
Roll No.	30EE15A08012
Year of Joining	2015
Year of Completion	2017

Semester	I	II	III	IV	Cumulative
Credits	16	16	17	18	67
GPA	7.25	7.63	9.00	9.00	8.25

PROVISIONAL CONSOLIDATED MARKSHEET - MTech 2015-2017

SEM	SUBJ CODE	SUBJECT TITLE	CR	GR
I	ENG(CEERI) 2-1524	Electromagnetic Theory and Transmission Lines	3	B
	ENG(CEERI) 2-1525	Microwave Communication	2	B+
	ENG(CEERI) 2-1526	Numerical Analysis and Techniques for Microwave Applications	4	B
	ENG(CEERI) 2-1528	Lab : Microwave Components Characterization and Tube Processing Techniques	2	B+
	ENG(CEERI) 3-1523	High Power Microwave Systems and Applications	3	B
	ENG(CEERI) 1-1502	Technical Communication	2	B
		"Research Orientation" Programme at CSIR-HRDC, Ghaziabad		
II	ENG(CEERI) 2-1527	Microwave and Millimeter-wave Tube Technologies	3	B+
	ENG(CEERI) 3-1521	Slow-wave Devices : Principles and Design	4	B
	ENG(CEERI) 3-1522	Fast-wave Devices : Principles and Design	3	B+
	ENG(CEERI) 2-1529	Lab : Microwave Devices Characterization and Tube Sub-assembly Fabrication	2	A
	ENG(CEERI) 2-1525	Lab : CAD of Microwave Tubes	2	B+
	ENG(CEERI) 2-1503	Project Management	2	C+
III	ENG(CEERI) 3-1524	Plasma-filled Microwave Sources	3	A
		Project Work		
III	ENG(CEERI) 2-1501	MTech Dissertation-I	14	A
IV	ENG(CEERI) 2-1502	MTech Dissertation-II	18	A

Project Title: 'Study on pseudospark discharge based electron beam suitable for extreme ultraviolet (EUV)/ soft X-ray radiations.'

Credits: 67   Checked   CGPA: 8.25
05-08-2017
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Academy of Scientific &Innovative Research

AnusandhanBhawan, CSIR HQ, 2 Rafi Marg,
New Delhi-110 001

Name of the Student	: Anurag Madhusudhanan	Semester	I	II	III	iV	Cumulative
Specialization	: Engineering of Structures	Credits	16	13	18	20	67
Roll No	: 30EE15A41001	GPA	8.56	8.3	9.0	9.0	8.76
Year of Joining	: 2015						
Year of Completion	: 2017						

Cumulative Grade Report

M.Tech: 2015-17

SEM	SUB CODE	Course Description	CR	GR
I	ENG(SERC)1-4701	Instrumentation & Sensors for Structural Response Measurement	4	B+
	ENG(SERC)1-4702	Advanced Mechanics of Materials	3	B+
	ENG(SERC)1-4703	Computational Methods	3	A
	ENG(SERC)1-4704	Advanced Engineering Mathematics	3	A
	ENG(SERC)2-4701	Dynamics of Structures	3	A
II	ENG(SERC)1-4706	Non-Destructive Testing - Lab	1	A
	ENG(SERC)2-4702	RCC & Prestressed Concrete Structures	3	A
	ENG(SERC)2-4703	Finite Element Technology-I	3	B+
	ENG(SERC)2-4710	Wind Engineering	3	A
	ENG(SERC)3-4701	Metal Structure Behaviour and Design	3	B
III	ENG(SERC)2-4705	Plates & Shell Structures	3	A
	ENG(SERC)2-4706	Earthquake Engineering	3	A
	ENG(SERC)2-4711	Thesis Work and Seminar	12	A
IV	ENG(SERC)2-4712	Dissertation Seminar	6	A
	ENG(SERC)2-4713	Dissertation Report and Viva-voce	14	A

Project Title: Behaviour of Prestressed Concrete Girders with Corrugated Steel Web

Credits: 67

CGPA: 8.76

Program Coordinator

Date: 11.09.2017

डॉ. पी. हरिकृष्णा / **Dr. P. Harikrishna**
वरिष्ठ प्रधान वैज्ञानिक & एसीएसआईआर समन्वयक
Senior Principal Scientist & AcSIR Coordinator
सीएसआईआर-संरचनात्मक अभियांत्रिकी अनुसंधान केन्द्र
CSIR-Structural Engineering Research Centre
सी एस आई आर रोड, तरमणी, चेन्नै–600 113
CSIR Road, Taramani, Chennai-600 113

AcSIR

Academy of Scientific &Innovative Research

AnusandhanBhawan, CSIR HQ, 2 Rafi Marg,
New Delhi-110 001

Name of the Student	: Hariprasad S.	Semester	I	II	III	iV	Cumulative
Specialization	: Engineering of Structures	Credits	16	13	18	20	67
Roll No	: 30EE15A41005	GPA	8.375	8.3	9.66	10.0	9.19
Year of Joining	: 2015						
Year of Completion	: 2017						

Cumulative Grade Report

M.Tech: 2015-17

SEM	SUB CODE	Course Description	CR	GR
I	ENG(SERC)1-4701	Instrumentation & Sensors for Structural Response Measurement	4	B+
	ENG(SERC)1-4702	Advanced Mechanics of Materials	3	A
	ENG(SERC)1-4703	Computational Methods	3	B+
	ENG(SERC)1-4704	Advanced Engineering Mathematics	3	B+
	ENG(SERC)2-4701	Dynamics of Structures	3	A
II	ENG(SERC)1-4706	Non-Destructive Testing - Lab	1	A
	ENG(SERC)2-4702	RCC & Prestressed Concrete Structures	3	A+
	ENG(SERC)2-4703	Finite Element Technology-I	3	B
	ENG(SERC)2-4710	Wind Engineering	3	A
	ENG(SERC)3-4701	Metal Structure Behaviour and Design	3	B
III	ENG(SERC)2-4705	Plates & Shell Structures	3	A
	ENG(SERC)2-4706	Earthquake Engineering	3	A
	ENG(SERC)2-4711	Thesis Work and Seminar	12	A+
IV	ENG(SERC)2-4712	Dissertation Seminar	6	A+
	ENG(SERC)2-4713	Dissertation Report and Viva-voce	14	A+

Project Title: Dynamic Wind Load Effects on a 1:4:7 Rectangular Building

Credits: 67

CGPA: 9.19

P. Hari Krishna.

Program Coordinator

Date: 11.09.2017

डॉ. पी. हरिकृष्णा / Dr. P. Harikrishna
वरिष्ठ प्रधान वैज्ञानिक & एसीएसआईआर समन्वयक
Senior Principal Scientist & AcSIR Coordinator
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CSIR-Structural Engineering Research Centre
सी एस आई आर रोड तरमणि, चेन्नै–600 113
CSIR Road Taramani, Chennai-600 113

CSIR-SERC
Specializaiton: Renewable Energy
Batch: 2015-17

			Candidate's Name->	Chandan		Sourav Kanti Maiti		Ravi Kumar	
			Enrolment No.->	30EE15A41006		30EE15A41007		30EE15A41008	
			Father's Name->	Sachida Nand Pandey		Prabhat Kumar Maity		Ashok Kumar Choudhary	
			Supervisor	Dr. Bala Pesala		Dr. K. Ramesha		Dr. Akhila Kumar Sahu	
SEM	SUB CODE	SUBJECT TITLE	CR	GR	GP	GR	GP	GR	GP
I	ENG (SERC): 2-4771	Renewable Energy Sources for a Sustainable Future	2	A	9	A	9	A+	10
	ENG (SERC): 2-4772	Harnessing the Power of Sun: Science and Technology of Solar Photovoltaics	4	B+	8	A	9	B+	8
	ENG (SERC): 2-4773	Energy Storage and Conversion: Science and Technology	4	A	9	A	9	B+	8
	ENG (SERC): 1-4772	Mathematics for Engineers	3	B+	8	A+	10	A	9
	ENG (SERC): 2-4774	"View from the TOP" seminar series I	1	A+	10	A+	10	A+	10
								NC	0
								NC	0
	SGPA I		14		8.57		9.29		8.64
			14		8.57		9.29		8.64
II	ENG (SERC): 2-4775	Design and Engineering for Sustainability	2	A	9	B+	8	B	7
	ENG (SERC): 3-4770	Solar Thermal Technologies	4	B	7	B	7	B	7
	ENG (SERC): 3-4772	Advanced course on Lithium-Ion Batteries	4			B+	8	S	
	ENG (SERC): 4-4703	CSIR 800/Industrial Training (Report and Presentation)	1	B	7	A	9	C+	6
	ENG (SERC): 2-4776	"View from the TOP" seminar series II	1	A+	10	A+	10	A+	10
	ENG (SERC): 3-4773	Design of Structures for Renewable Energy	4	B	7			C+	6
	ENG (SERC): 3-4771	Solar Photovoltaics: Power Electronics, Power Transmission and Energy Monitoring	4						
	SGPA II		12		7.58		7.92		6.83
			12		7.58		7.92		6.83
	CGPA II		26		8.12		8.65		7.81
	ENG (SERC): 3-4775	Self-study course on Advanced topics in Renewable Energy	4	B+	8	A	9	C+	6

			Credits						
III		**Project Work**							
	ENG (SERC): 3-4777	Dissertation (Seminars and report)	8	A	9	B+	8	B	7
	SGPA III		12		8.67		8.33		6.67
			12		8.67		8.33		6.67
	CGPA IIII		38		8.29		8.55		7.45
	ENG (SERC): 3-4776	4 week Solar Energy Workshop for High-school students (Organizing and Mentoring	1	A+	10	A+	10	A+	10
	ENG (SERC): 1-4771	Effective Presentation Skills and Dissertation Writing	1	A+	10	A+	10	B+	8
		Project Work							
	ENG(SERC): 3-4778	Dissertation seminars	6	A	9	A	9	A	9
	ENG(SERC): 3-4779	Dissertation report and Viva-Voce	18	A	9	A	9	B	7
	SGPA IV		26		9.08		9.08		7.62
			26		9.08		9.08		7.62
	CGPA IV		**64**		**8.61**		**8.77**		**7.52**
			64		8.61		8.77		7.52

Project Title:		**Design and Development of Steam Generator using Non-Imaging Solar concentrator**	**FIRST-PRINCIPLES INVESTIGATION OF ATOMIC AND ELECTRONIC STRUCTURE CHANGES UPON DELITHIATION OF $LiNi_yCo_{1-y}O_2$ AND $LiAl_yCo_{1-y}O_2$**	**STUDIES ON FLOW FIELD DESIGN FOR OPEN AIR CATHODE POLYMER ELECTROLYTE MEMBRANE FUEL CELL**

CSIR-SERC
Specializaiton: Renewable Energy
Batch: 2015-17

SEM	SUB CODE	SUBJECT TITLE	Rakesh Kumar 30EE15A41009 Sumant Singh Dr. S.D. Bhat GR	GP	Sheshadri Shekhar Rauth 30EE15A41010 Nakul Chandra Rauth Shri Kota Srinivas GR	GP	Rajanikant Rao 30EE15A41012 Rishi Kant Rao Dr. Saptarshi Sasmal GR	GP	Sourav Garai 30EE15A41013 Nikhil Kumar Garai Shri K. Srinivas GR	GP
I	ENG (SERC): 2-4771	Renewable Energy Sources for a Sustainable Future	B+	8	B+	8	B+	8	B	7
	ENG (SERC): 2-4772	Harnessing the Power of Sun: Science and Technology of Solar Photovoltaics	B+	8	B+	8	B+	8	B	7
	ENG (SERC): 2-4773	Energy Storage and Conversion: Science and Technology	B+	8	A+	10	B+	8	B+	8
	ENG (SERC): 1-4772	Mathematics for Engineers	B	7	B+	8	B+	8	B	7
	ENG (SERC): 2-4774	"View from the TOP" seminar series I	A+	10	A+	10	A+	10	A+	10
	SGPA I			7.93		8.71		8.14		7.50
				7.93		8.71		8.14		7.50
II	ENG (SERC): 2-4775	Design and Engineering for Sustainability	C+	6	A+	10	A	9	B	7
	ENG (SERC): 3-4770	Solar Thermal Technologies	B	7			B	7	C+	6
	ENG (SERC): 3-4772	Advanced course on Lithium-Ion Batteries			B+	8			B	7
	ENG (SERC): 4-4703	CSIR 800/Industrial Training (Report and Presentation)	C+	6	B+	8	C+	6	C+	6
	ENG (SERC): 2-4776	"View from the TOP" seminar series II	A+	10	A+	10	A+	10	A+	10
	ENG (SERC): 3-4773	Design of Structures for Renewable Energy	C+	6			B	7		
	ENG (SERC): 3-4771	Solar Photovoltaics: Power Electronics, Power Transmission and Energy Monitoring			A	9				
	SGPA II			6.67		8.83		7.50		6.83
				6.67		8.83		7.50		6.83
	CGPA II			7.35		8.77		7.85		7.19
	ENG (SERC): 3-4775	Self-study course on Advanced topics in Renewable Energy	B	7	B+	8	B+	8	B	7

III		Project Work								
	ENG (SERC): 3-4777	Dissertation (Seminars and report)	B+	8	A	9	A	9	B	7
	SGPA III			7.67		8.67		8.67		7.00
				7.67		8.67		8.67		7.00
	CGPA IIII			7.45		8.74		8.11		7.13
	ENG (SERC): 3-4776	4 week Solar Energy Workshop for High-school students (Organizing and Mentoring	A+	10	A+	10	A+	10	A+	10
	ENG (SERC): 1-4771	Effective Presentation Skills and Dissertation Writing	A	9	A	9	A	9	A	9
		Project Work								
	ENG(SERC): 3-4778	Dissertation seminars	A	9	A	9	A	9	A	9
	ENG(SERC): 3-4779	Dissertation report and Viva-Voce	B+	8	A+	10	A	9	B+	8
	SGPA IV			8.35		9.73		9.04		8.35
				8.35		9.73		9.04		8.35
	CGPA IV			7.81		9.14		8.48		7.63
				7.81		9.14		8.48		7.63
	Project Title:		Numerical studies on fuel starvation in proton exchange		Design and Development of 0.3 kW Grid Connected Solar Photovoltaic System		Evaluation of wave characteristic in concrete embeddedanchor system		PERFORMANCE ANALYSIS OF A SOLAR PHOTOVOLTAIC AND THERMAL SYSTEM WITH NEW HEAT EXCHANGER	

AcSIR

Name of the Student	: Vikash Gupta
Specialization	: Environmental Systems Engineering and Modeling
Roll No	: 30EE15A27001

Semester	I	II	III	IV	Cumulative
Credits	17	18	19	16	70
GPA	8.65	8.67	8.84	10	9.01
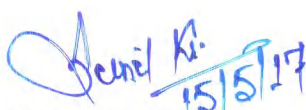
M.Tech: 2015-17
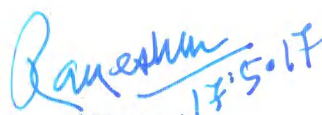
SEM	SUB CODE	SUBJECT TITLE	CR	GR
I	ENG(NEERI)-2-0001	Research Methodology, Ethics, Communication Skills, Lab Safety	2	A
	ENG(NEERI)-2-3816	Advanced Engineering Mathematics and Numerical Techniques	3	A
	ENG(NEERI)-2-0002	Optimization Techniques	3	B+
	ENG(NEERI)-2-3817	GIS & Remote Sensing Techniques	3	A
	ENG(NEERI)-2-3818	Basic Principles of Environmental Systems	3	B+
	ENG(NEERI)-2-3819	Environmental Chemistry & Microbiology	3	A
	Training Programme on "Research Methodology and Communication"-HRDC			S
II	ENG(NEERI)-2-3820	Ecosystems Dynamics	3	A+
	ENG(NEERI)-2-3821	Air and Noise Quality Control Management	3	A
	ENG(NEERI)-2-3822	Design of Water and Wastewater System	3	B+
	ENG(NEERI)-2-3823	Solid and Hazardous Waste Management	3	B+
	ENG(NEERI)-2-3824	Environmental Impact and Risk Assessment (Field visit)	3	B+
	ENG(NEERI)-2-3825	Environmental Systems Modelling & Optimization	3	A
III	ENG(NEERI)-2-3830	Data Analysis and Parameter Estimation	3	B+
		Project Work		
III	ENG(NEERI)-2-3827	M.Tech. Thesis/Dissertation Part I	16	A
IV	ENG(NEERI)-2-3828	M.Tech. Thesis/Dissertation Viva Voce	16	A+

Project Title: Hydrodynamic and water quality simulation for rejuvenation of Nag River, Nagpur

Credits: 70   **CGPA: 9.01**

(Coordinator) 15/5/17
CSIR-NEERI, Nagpur

(Director) 17.5.17
CSIR-NEERI, Nagpur

Indian Institute of Public Health, Delhi
Integrated MSc & PhD in Clinical Research, August 2015 Session

MSc Clinical Research: 2015-17
SEMESTER 2 RESULTS

Course Name			MD106 Basics in Data Management (2-1-2-4)					MD201 Medical Writing - Proposal, Protocol Development & Report Writing (1-1-2-3)					MD202 Pharmacovigilance & Drug Regulation (2-1-0-3)					MD206 Systematic Reviews & Meta Analysis (1-1-2-3)					MD208 Genetic Epidemiology (2-1-0-3)					Credits X Points	Semester Grade Point Average (out of 10)		Credits earned in Sem 2	Cumulative Grade Point Average (out of 10)				
Course credit			4					3					3					3					3													
Student No.	AcSIR Enrollment No.	Student name	CE (60)	Exam (40)	Total (100)	Letter Grade	Numeric Grade	CE (60)	Exam (40)	Total (100)	Letter Grade	Numeric Grade	CE (60)	Exam (40)	Total (100)	Letter Grade	Numeric Grade	CE (60)	Exam (40)	Total (100)	Letter Grade	Numeric Grade	CE (60)	Exam (40)	Total (100)	Letter Grade	Numeric Grade		SGPA	Performance	16	Credits earned in Sem 1 & Sem 2	Sem 1 Credits X Points	Sem 2 Credits X Points	Total credits X Points	CGPA
1	50BB15A61001	Tripti Agarwal	51.8	34.0	85.8	A	9.0	54.2	32.0	86.2	A	9.0	44.5	31.6	76.1	B+	8.0	53.0	32.8	85.8	A	9.0	50.6	33.2	83.8	A	9.0	141.0	8.81	Very Good	16	32	149.0	141.0	290.0	9.06
2	50BB15A61002	Anjana Agarwal	51.8	25.4	77.2	B+	8.0	49.0	32.0	81.0	A	9.0	49.2	32.0	81.2	A	9.0	45.3	33.6	78.9	B+	8.0	50.4	29.2	79.6	B+	8.0	134.0	8.38	Very Good	16	32	138.0	134.0	272.0	8.50
3	50BB15A61004	Archana	48.0	10.6	58.6	C+	6.0	43.5	22.5	66.0	B	7.0	37.6	24.4	62.0	B	7.0	46.9	28.0	74.9	B+	8.0	44.4	29.0	73.4	B+	8.0	114.0	7.13	Good	16	32	108.0	114.0	222.0	6.94
4	50BB15A61005	Sudeshna Bakshi	48.8	16.4	65.2	B	7.0	53.0	28.5	81.5	A	9.0	48.5	17.2	71.7	B+	8.0	46.0	25.6	71.6	B+	8.0	20.8	33.4	64.2	B	7.0	124.0	7.75	Good	16	32	117.0	124.0	241.0	7.53
5	50BB15A61006	Ruchita Jalal	48.3	34.0	82.3	A	9.0	50.2	31.0	81.2	A	9.0	46.7	31.4	78.1	B+	8.0	51.0	33.6	84.6	A	9.0	51.9	30.0	81.9	A	9.0	141.0	8.81	Very Good	16	32	150.0	141.0	291.0	9.09
6	50BB15A61007	Himanshi	48.0	21.0	69.0	B	7.0	47.0	28.5	75.5	B+	8.0	44.7	29.2	73.9	B-	8.0	44.0	32.0	76.0	B+	8.0	49.1	28.4	77.5	B+	8.0	124.0	7.75	Good	16	32	115.0	124.0	239.0	7.47
7	50BB15A61008	Prakriti Snehil	54.46	15.8	70.3	B+	8.0	50.5	24.5	75.0	B+	8.0	44.6	28.8	74.4	B+	8.0	47.3	29.6	76.9	B+	8.0	27.4	43.4	65.8	B	7.0	125.0	7.81	Good	16	32	128.0	125.0	253.0	7.91

Candidate Serial No 7 was not a part of Medical Writing WS under MD201 due to medical condition and been evaluated for 80%
Candidate Serial No 4 was not a part of Internal Assessment under MD202 due to medical condition and been evaluated for 80%
Candidate Serial No 4 and 7 were not a part of Internal Assessment under MD208 due to medical condition and been evaluated for 70%

Date: August 26, 2016

Dr. Niveditha Devasenapathy
Course Coordinator, MSc CR
Indian Institute of Public Health, Delhi

Prof. Sanjay Zodpey
Director
Indian Institute of Public Health, Delhi

Approved
C. Chattopadhyay
19/9/16

AcSIR
Prof. Amitabha Chattopadhyay
Dean, Biological Sciences
Academy of Scientific & Innovative Research
CSIR-CCMB, Hyderabad 500 007
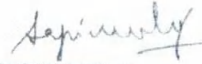
Indian Institute of Public Health, Delhi
Integrated MSc & PhD in Clinical Research, August 2015 Session
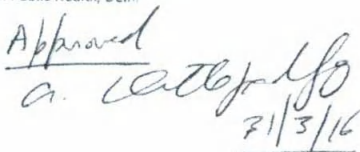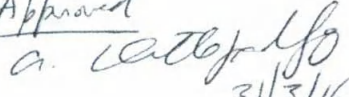
MSc Clinical Research: 2015-17
SEMESTER 1 RESULTS

Student No.	AcSIR Enrollment No.	Student name	MD101 Basics in Epidemiology (3-1-0-4) CE (60)	Exam (40)	Total (100)	Letter Grade	Numeric Grade	MD102 Basic Bio Statistics (3-0-2-4) CE (60)	Exam (40)	Total (100)	Letter Grade	Numeric Grade	MD103 Clinical Trials-Design and Analysis (2-1-0-3) CE (60)	Exam (40)	Total (100)	Letter Grade	Numeric Grade	MD104 Clinical Trials-Conduct and Operational Issues (2-1-0-3) CE (60)	Exam (40)	Total (100)	Letter Grade	Numeric Grade	MD105 Bio-Ethics and Regulatory Affairs (1-1-0-2) CE (60)	Exam (40)	Total (100)	Letter Grade	Numeric Grade	Credits X Points	SGPA	Performance	Total credits earned
		Course credit	4					4					3					3					2						(out of 10)		16
1	50BB15A61001	Tripti Agarwal	53.4	34.5	87.9	A	9.0	53.8	35.3	89.2	A	9.0	53.6	36.4	90.0	A+	10.0	49.8	33.1	82.9	A	9.0	58.0	36.4	94.4	A+	10.0	149.0	9.31	Excellent	16
2	50BB15A61002	Anjana Agarwal	45.9	34.0	79.9	B+	8.0	49.6	26.5	76.1	B+	8.0	54.2	29.4	83.6	A	9.0	52.8	30.4	83.2	A	9.0	56.0	36.8	92.8	A+	10.0	138.0	8.63	Very Good	16
3	50BB15A61004	Archana	39.8	22.5	62.3	B	7.0	38.8	21.3	60.1	B	7.0	32.1	26.0	58.1	C+	6.0	32.6	17.6	50.2	C+	6.0	50.0	25.6	75.6	B+	8.0	108.0	6.75	Average	16
4	50BB15A61005	Sudeshna Bakshi	39.1	27.5	66.6	B	7.0	45.4	25.5	70.8	B+	8.0	38.4	25.6	64.0	B	7.0	37.0	22.4	59.4	C+	6.0	54.0	32.0	86.0	A	9.0	117.0	7.31	Good	16
5	50BB15A61006	Ruchita Jalal	48.6	34.5	83.1	A	9.0	54.7	35.32	90.0	A+	10.0	55.8	30.8	86.6	A	9.0	51.6	34.7	86.3	A	9.0	53.5	36.8	90.3	A+	10.0	150.0	9.38	Excellent	16
6	50BB15A61007	Himanshi	41.8	27.5	69.3	B	7.0	35.0	24.94	59.9	C+	6.0	42.6	22.8	65.4	B	7.0	45.6	25.6	71.2	B+	8.0	56.0	28.4	84.4	A	9.0	115.0	7.19	Good	16
7	50BB15A61008	Prakriti Snehil	41.1	31.5	72.6	B+	8.0	39.4	23.9	63.3	B	7.0	48.4	28.0	76.4	B+	8.0	45.4	27.2	72.6	B+	8.0	58.0	34.8	92.8	A+	10.0	128.0	8.00	Very Good	16

Date:- March 14, 2016

Dr. Niveditha Devasenapathy
Course Coordinator, MSc CR
Indian Institute of Public Health, Delhi

Prof. Sanjay Zodpey
Director
Indian Institute of Public Health, Delhi

Approved
a.
31/3/16

AcSIR
Prof. Amitabha Chattopadhyay
Dean, Biological Sciences
Academy of Scientific & Innovative Research
CSIR-CCMB, Hyderabad 500 007

IIPH - Delhi

Indian Institute of Public Health, Delhi
Integrated MSc & PhD in Clinical Research, August 2015 Session
MSc Clinical Research: 2015-17
SEMESTER 3 RESULTS

Student No	ACSIR Enrollment No	Student name	MD105 Drug Discovery (3-0-0-3) — credit 3					MD204 Advance Statistics (1-1-2-3) — credit 3					MD110 Project Management and Communication (2-1-0-3) — credit 3					MD205 Drug Development (2-2-0-4) — credit 4					MD209 Economic Evaluation (1-1-2-3) — credit 3					Credits X Points	SGPA (out of 10)	Performance	Credits earned in Sem 3	Credits earned in Sem 1,2 & 3	Sem 1 Credits X Points	Sem 2 Credits X Points	Sem 3 Credits X Points	Total credits X Points	CGPA (out of 10)
			CE (60)	Exam (40)	Total (100)	Letter Grade	Numeric Grade	CE (60)	Exam (40)	Total (100)	Letter Grade	Numeric Grade	CE (60)	Exam (40)	Total (100)	Letter Grade	Numeric Grade	CE (60)	Exam (40)	Total (100)	Letter Grade	Numeric Grade	CE (60)	Exam (40)	Total (100)	Letter Grade	Numeric Grade										
1	50BB15A61001	Tripti Agarwal	47.7	35.5	83.2	A	9.0	54.0	34.4	88.4	A	9.0	48.5	30.8	79.3	B+	8.0	49.6	37.2	86.8	A	9.0	40.0	30.0	70.0	B+	8.0	138.0	8.63	Very Good	16	48	149.0	141.0	138.0	428.0	8.92
2	50BB15A61002	Anjana Agarwal	45.2	34.5	79.7	B+	8.0	48.2	31.6	79.8	B-	8.0	48.8	30.6	79.3	B+	6.0	49.0	25.2	74.2	B+	8.0	42.4	28.0	70.4	B+	8.0	128.0	8.00	Very Good	16	48	138.0	134.0	128.0	400.0	8.33
3	50BB15A61004	Archana	44.2	21.5	65.7	B	7.0	48.0	17.3	55.3	C+	6.0	47.3	22.8	70.1	B+	8.0	41.6	22.8	64.4	B	7.0	35.0	28.0	63.0	B	7.0	112.0	7.00	Good	16	48	108.0	114.0	112.0	334.0	6.96
4	50BB15A61005	Sudeshna Bakshi	40.7	30.5	71.2	B+	8.0	47.6	24.8	71.4	B+	8.0	48.5	28.2	76.7	B+	8.0	43.2	20.0	63.2	B	7.0	38.0	30.0	68.0	B	7.0	121.0	7.56	Good	16	48	117.0	124.0	121.0	362.0	7.54
5	50BB15A61006	Ruchita Jalal	42.8	31.5	74.3	B+	8.0	51.5	24.4	85.9	A	9.0	48.1	26.5	76.6	B+	8.0	48.2	35.6	83.8	A	9.0	38.3	32.0	70.5	B+	8.0	135.0	8.44	Very Good	16	48	150.0	141.0	135.0	426.0	8.88
6	50BB15A61007	Himanshi	42.4	20.5	62.9	B	7.0	45.8	22.8	68.6	B	7.0	49.0	27.1	76.1	B+	8.0	42.8	24.0	66.8	B	7.0	36.0	30.0	66.0	B	7.0	115.0	7.19	Good	16	48	115.0	124.0	115.0	354.0	7.38
7	50BB15A61008	Prakriti Snehi	39.2	31.5	70.7	B+	8.0	40.5	25.2	82.9	A	9.0	45.3	28.4	73.7	B+	8.0	44.6	24.8	69.4	B	8.0	36.0	28.0	64.0	B	7.0	124.0	7.75	Good	16	48	128.0	125.0	124.0	377.0	7.85

Candidate Serial No 3 appeared for a Re-sit exam for MD205 Drug Development

Date: July 24, 2017

Results compiled by:
Vaibhav Asthana
Senior Officer
Indian Institute of Public Health, Delhi

Dr. Nivedita Devasenapathy
Course Coordinator, MSc CR
Indian Institute of Public Health, Delhi

Prof. Sanjay Zodpey
Director
Indian Institute of Public Health, Delhi

Approved:
Shanta Gupta

IIPH – Delhi

Indian Institute of Public Health, Delhi
Integrated MSc & PhD in Clinical Research, August 2015 Session

MSc Clinical Research: 2015-17
SEMESTER 4 RESULTS

Student No.	AcSIR Enrollment No.	Student name	Course Name / Project Work — Course credit 16					Sem 4 Credits X Points	Semester Grade Point Average (out of 10)		Total Credits earned in Sem 4 — 16	Cumulative Grade Point Average (out of 10)						
			Internal Assessment (30)	External Assessment by TEC (70)	Total (100)	Letter Grade	Numeric Grade		SGPA	Performance	Credits earned in Sem 1, 2, 3 & 4	Sem 1 Credits X Points	Sem 2 Credits X Points	Sem 3 Credits X Points	Sem 4 Credits X Points	Total credits X Points	CGPA
1	50BB15A61001	Tripti Agarwal	27.0	62.3	89.3	A	9.0	144.0	9.00	Excellent	16	64	149.0	141.0	138.0	144.0	572.0	8.94
2	50BB15A61002	Anjana Agarwal	26.0	52.5	78.5	B+	8.0	128.0	8.00	Very Good	16	64	138.0	134.0	128.0	128.0	528.0	8.25
3	50BB15A61004	Archana	26.0	50.8	76.8	B+	8.0	128.0	8.00	Very Good	16	64	108.0	114.0	112.0	128.0	462.0	7.22
4	50BB15A61005	Sudeshna Bakshi	25.0	56.7	81.7	A	9.0	144.0	9.00	Excellent	16	64	117.0	124.0	121.0	144.0	506.0	7.91
5	50BB15A61006	Ruchita Jalal	27.0	61.6	88.6	A	9.0	144.0	9.00	Excellent	16	64	150.0	141.0	135.0	144.0	570.0	8.91
6	50BB15A61007	Himanshi	25.0	51.5	76.5	B+	8.0	128.0	8.00	Very Good	16	64	115.0	124.0	115.0	128.0	482.0	7.53
7	50BB15A61008	Prakriti Snehil	27.0	54.3	81.3	A	9.0	144.0	9.00	Excellent	16	64	128.0	125.0	124.0	144.0	521.0	8.14

Date:- August 9, 2017

Result compiled by:

Mr. Vaibhav Asthana
Senior Officer
Indian Institute of Public Health, Delhi

Dr. Niveditha Devasenapathy
Associate Professor
Indian Institute of Public Health, Delhi

Prof. Sanjay Zodpey
Director
Indian Institute of Public Health, Delhi

Approved:
Shantanu Sengupta
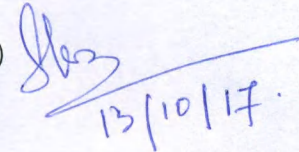
Prof. (Dr.) Rajender S. Sangwan
Chairman Senate
Academy of Scientific & Innovative Research (AcSIR)
CSIR-HRDC Campus, Sector-19, Kamla Nehru Nagar,
Ghaziabad-201002, U.P., India

List of Students of PG Diploma (CSIR-CMERI)

Sl. No.	Registration Number	Name of the Student	Course	CGPA
1	60EE12A12011	Atish Samanta	Industrial Maintenance Engineering	9.62
2	60EE12A12012	Debarghya Das		9.00
3	60EE12A12013	Xavier Wilson		8.79
4	60EE12A12010	Shanu Mondal	Advanced Manufacturing Technology	9.74
5	60EE12A12008	Rahul Chakraborty		9.91
6	60EE12A12009	Indranil Mallick		9.91
7	60EE12A12007	Gautam Kumar		9.47
8	60EE12A12002	Puja Banerjee	Robotics	8.99
9	60EE12A12003	Poulami Ghatak		7.82
10	60EE12A12005	Gourab Kumar Bagchi		9.47
11	60EE12A12001	Sayanti Hazra		7.73

(Prof. Suman K Mishra)
Dean, Engineering

13/10/17.

AcSIR

वैज्ञानिक और नवीकृत अनुसंधान अकादमी
Academy of Scientific and Innovative Research, India
Headquarters: AcSIR, Training and Development Complex, CSIR Campus, CSIR Road, Taramani, Chennai – 600 113
Coordination Office: AcSIR, CSIR-Human Resource Development Centre, Sector 19, Kamla Nehru Nagar, Ghaziabad, UP 201002, INDIA
****

CSIR-CENTRAL MECHANICAL ENGINEERING RESEARCH INSTITUTE
Provisional Grade Report
Post Graduate Diploma in Industrial Maintenance Engineering (PGDIME)

Name of the Student	Atish Samanta
Course	Industrial Maintenance Engineering
Enrollment No	60EE12A12011
Year of Joining	2016
Year of completion	2017

Semester	I	II	Cumulative
Credits	17	17	34
SGPA	9.35	9.88	9.62
CGPA	9.35	9.62	

SEM	SUB CODE	SUBJECT TITLE	Credits	Grade
I	ENG-CMERI-1-2133	Introduction to Vibration and Reliability	2	A
	ENG-CMERI-1-2134	Bearing and Machinery Lubrication	3	A
	ENG-CMERI-1-2135	Diagnostic Maintenance and Condition Monitoring	4	A
	ENG-CMERI-1-2136	Damage Assessment	3	A+
	ENG-CMERI-1-2137	Instrumentation and Control	2	A+
	ENG-CMERI-1-2138	Materials Characterization	2	A
	ENG-CMERI-1-2149	Seminar	1	A+
II	ENG-CMERI-1-2139	Corrosion and Corrosion protection	2	A+
	ENG-CMERI-1-2140	Maintenance Management	2	A
	ENG-CMERI-1-2141	Practical Training	3	A+
	ENG-CMERI-1-2150	Project Work and Viva-voce	10	A+

Date: 31.08.2017

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Letter Grade	Performance	Numerical Value	Letter Grade	Performance	Numerical Value
A+	Outstanding	10	S	Satisfactory	Not Applicable
A	Excellent	9	X	Unsatisfactory	Not Applicable
B+	Very Good	8			
B	Good	7	**Maximum CGPA**		**10.0**
C+	Fair	6	**Minimum CGPA for the Degree**		**6.5**
C	Poor	4	**No Class or Division is awarded**		
F	Very poor	2	**Prepared by**		
I	Incomplete	0			

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Coordination Office: AcSIR, CSIR-Human Resource Development Centre, Sector 19, Kamla Nehru Nagar, Ghaziabad, UP 201002, INDIA

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CSIR-CENTRAL MECHANICAL ENGINEERING RESEARCH INSTITUTE
Provisional Grade Report
Post Graduate Diploma in Industrial Maintenance Engineering (PGDIME)

Name of the Student	Debarghya Das
Course	Industrial Maintenance Engineering
Enrollment No	60EE12A12012
Year of Joining	2016
Year of completion	2017

Semester	I	II	Cumulative
Credits	17	17	34
SGPA	8.88	9.12	9.00
CGPA	8.88	9.00	

SEM	SUB CODE	SUBJECT TITLE	Credits	Grade
I	ENG-CMERI-1-2133	Introduction to Vibration and Reliability	2	A
	ENG-CMERI-1-2134	Bearing and Machinery Lubrication	3	B+
	ENG-CMERI-1-2135	Diagnostic Maintenance and Condition Monitoring	4	A
	ENG-CMERI-1-2136	Damage Assessment	3	A+
	ENG-CMERI-1-2137	Instrumentation and Control	2	A
	ENG-CMERI-1-2138	Materials Characterization	2	B+
	ENG-CMERI-1-2149	Seminar	1	A
II	ENG-CMERI-1-2139	Corrosion and Corrosion protection	2	A+
	ENG-CMERI-1-2140	Maintenance Management	2	A
	ENG-CMERI-1-2141	Practical Training	3	A
	ENG-CMERI-1-2150	Project Work and Viva-voce	10	A

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Date: 31.08.2017

Letter Grade	Performance	Numerical Value	Letter Grade	Performance	Numerical Value
A+	Outstanding	10	S	Satisfactory	Not Applicable
A	Excellent	9	X	Unsatisfactory	Not Applicable
B+	Very Good	8			
B	Good	7	Maximum CGPA		10.0
C+	Fair	6	Minimum CGPA for the Degree		6.5
C	Poor	4	No Class or Division is awarded		
F	Very poor	2	Prepared by		
I	Incomplete	0			

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CSIR-CENTRAL MECHANICAL ENGINEERING RESEARCH INSTITUTE
Provisional Grade Report
Post Graduate Diploma in Industrial Maintenance Engineering (PGDIME)

Name of the Student	Xavier Wilson
Course	Industrial Maintenance Engineering
Enrollment No	60EE12A12013
Year of Joining	2016
Year of completion	2017

Semester	I	II	Cumulative
Credits	17	17	34
SGPA	8.59	9.0	8.79
CGPA	8.59	8.79	

SEM	SUB CODE	SUBJECT TITLE	Credits	Grade
I	ENG-CMERI-1-2133	Introduction to Vibration and Reliability	2	B+
	ENG-CMERI-1-2134	Bearing and Machinery Lubrication	3	B+
	ENG-CMERI-1-2135	Diagnostic Maintenance and Condition Monitoring	4	B+
	ENG-CMERI-1-2136	Damage Assessment	3	A+
	ENG-CMERI-1-2137	Instrumentation and Control	2	A+
	ENG-CMERI-1-2138	Materials Characterization	2	B+
	ENG-CMERI-1-2149	Seminar	1	B+
II	ENG-CMERI-1-2139	Corrosion and Corrosion protection	2	A+
	ENG-CMERI-1-2140	Maintenance Management	2	B+
	ENG-CMERI-1-2141	Practical Training	3	A
	ENG-CMERI-1-2150	Project Work and Viva-voce	10	A

Date: 31.08.2017

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Letter Grade	Performance	Numerical Value	Letter Grade	Performance	Numerical Value
A+	Outstanding	10	S	Satisfactory	Not Applicable
A	Excellent	9	X	Unsatisfactory	Not Applicable
B+	Very Good	8			
B	Good	7	**Maximum CGPA**		10.0
C+	Fair	6	**Minimum CGPA for the Degree**		6.5
C	Poor	4	**No Class or Division is awarded**		
F	Very poor	2	**Prepared by**		
I	Incomplete	0			

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CSIR-CENTRAL MECHANICAL ENGINEERING RESEARCH INSTITUTE
Provisional Grade Report
Post Graduate Diploma in Advanced Manufacturing Technology (PGDAMT)

Name of the Student	Shanu Mondal
Course	Advanced Manufacturing Technology
Enrollment No	60EE12A12010
Year of Joining	2016
Year of completion	2017

Semester	I	II	Cumulative
Credits	16	18	34
SGPA	9.44	10.0	9.74
CGPA	9.44	9.74	

SEM	SUB CODE	SUBJECT TITLE	Credits	Grade
I	ENG-CMERI-1-2120	Theory Manufacturing Processes & Systems	3	A
	ENG-CMERI-1-2121	Near-net-shape Manufacturing	3	A+
	ENG-CMERI-1-2122	Precision Measurement & Quality Assurance	3	A+
	ENG-CMERI-1-2123	CAD / CAM	3	A
	ENG-CMERI-1-2124	Additive and Micro Manufacturing	3	A
	ENG-CMERI-1-2149	Seminar	1	A+
II	ENG-CMERI-1-2125	Prototype Assembly and Maintenance	8	A+
	ENG-CMERI-1-2150	Project Work and Viva-voce	10	A+

Date: 31.08.2017

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Letter Grade	Performance	Numerical Value	Letter Grade	Performance	Numerical Value
A+	Outstanding	10	S	Satisfactory	Not Applicable
A	Excellent	9	X	Unsatisfactory	Not Applicable
B+	Very Good	8			
B	Good	7	**Maximum CGPA**		10.0
C+	Fair	6	**Minimum CGPA for the Degree**		6.5
C	Poor	4	**No Class or Division is awarded**		
F	Very poor	2	**Prepared by**		
I	Incomplete	0			

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CSIR-CENTRAL MECHANICAL ENGINEERING RESEARCH INSTITUTE
Provisional Grade Report
Post Graduate Diploma in Advanced Manufacturing Technology (PGDAMT)

Name of the Student	Rahul Chakraborty
Course	Advanced Manufacturing Technology
Enrollment No	60EE12A12008
Year of Joining	2016
Year of completion	2017

Semester	I	II	Cumulative
Credits	16	18	34
SGPA	9.81	10.0	9.91
CGPA	9.81	9.91	

SEM	SUB CODE	SUBJECT TITLE	Credits	Grade
I	ENG-CMERI-1-2120	Theory Manufacturing Processes & Systems	3	A+
	ENG-CMERI-1-2121	Near-net-shape Manufacturing	3	A+
	ENG-CMERI-1-2122	Precision Measurement & Quality Assurance	3	A+
	ENG-CMERI-1-2123	CAD / CAM	3	A+
	ENG-CMERI-1-2124	Additive and Micro Manufacturing	3	A
	ENG-CMERI-1-2149	Seminar	1	A+
II	ENG-CMERI-1-2125	Prototype Assembly and Maintenance	8	A+
	ENG-CMERI-1-2150	Project Work and Viva-voce	10	A+

Date: 31.08.2017

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Letter Grade	Performance	Numerical Value	Letter Grade	Performance	Numerical Value
A+	Outstanding	10	S	Satisfactory	Not Applicable
A	Excellent	9	X	Unsatisfactory	Not Applicable
B+	Very Good	8			
B	Good	7	Maximum CGPA		10.0
C+	Fair	6	Minimum CGPA for the Degree		6.5
C	Poor	4	No Class or Division is awarded		
F	Very poor	2	Prepared by		_Sudip Samanta_
I	Incomplete	0			

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CSIR-CENTRAL MECHANICAL ENGINEERING RESEARCH INSTITUTE
Provisional Grade Report
Post Graduate Diploma in Advanced Manufacturing Technology (PGDAMT)

Name of the Student	Indranil Mallick
Course	Advanced Manufacturing Technology
Enrollment No	60EE12A12009
Year of Joining	2016
Year of completion	2017

Semester	I	II	Cumulative
Credits	16	18	34
SGPA	9.81	10	9.91
CGPA	9.81	9.91	

SEM	SUB CODE	SUBJECT TITLE	Credits	Grade
I	ENG-CMERI-1-2120	Theory Manufacturing Processes & Systems	3	A+
	ENG-CMERI-1-2121	Near-net-shape Manufacturing	3	A+
	ENG-CMERI-1-2122	Precision Measurement & Quality Assurance	3	A+
	ENG-CMERI-1-2123	CAD / CAM	3	A
	ENG-CMERI-1-2124	Additive and Micro Manufacturing	3	A+
	ENG-CMERI-1-2149	Seminar	1	A+
II	ENG-CMERI-1-2125	Prototype Assembly and Maintenance	8	A+
	ENG-CMERI-1-2150	Project Work and Viva-voce	10	A+

Date: 31.08.2017

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Letter Grade	Performance	Numerical Value	Letter Grade	Performance	Numerical Value
A+	Outstanding	10	S	Satisfactory	Not Applicable
A	Excellent	9	X	Unsatisfactory	Not Applicable
B+	Very Good	8			
B	Good	7	**Maximum CGPA**		**10.0**
C+	Fair	6	**Minimum CGPA for the Degree**		**6.5**
C	Poor	4	**No Class or Division is awarded**		
F	Very poor	2	**Prepared by**		*Sudip Santra*
I	Incomplete	0			

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Centre, Sector 19, Kamla Nehru Nagar, Ghaziabad, UP 201002, INDIA
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CSIR-CENTRAL MECHANICAL ENGINEERING RESEARCH INSTITUTE
Provisional Grade Report
Post Graduate Diploma in Advanced Manufacturing Technology (PGDAMT)

Name of the Student	Gautam Kumar
Course	Advanced Manufacturing Technology
Enrollment No	60EE12A12007
Year of Joining	2016
Year of completion	2017

Semester	I	II	Cumulative
Credits	16	18	34
SGPA	8.88	10	9.47
CGPA	8.88	9.47	

SEM	SUB CODE	SUBJECT TITLE	Credits	Grade
I	ENG-CMERI-1-2120	Theory Manufacturing Processes & Systems	3	A
	ENG-CMERI-1-2121	Near-net-shape Manufacturing	3	A
	ENG-CMERI-1-2122	Precision Measurement & Quality Assurance	3	A
	ENG-CMERI-1-2123	CAD / CAM	3	B+
	ENG-CMERI-1-2124	Additive and Micro Manufacturing	3	A
	ENG-CMERI-1-2149	Seminar	1	A+
II	ENG-CMERI-1-2125	Prototype Assembly and Maintenance	8	A+
	ENG-CMERI-1-2150	Project Work and Viva-voce	10	A+

Date: 31.08.2017

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Letter Grade	Performance	Numerical Value	Letter Grade	Performance	Numerical Value
A+	Outstanding	10	S	Satisfactory	Not Applicable
A	Excellent	9	X	Unsatisfactory	Not Applicable
B+	Very Good	8			
B	Good	7	**Maximum CGPA**		10.0
C+	Fair	6	**Minimum CGPA for the Degree**		6.5
C	Poor	4	**No Class or Division is awarded**		
F	Very poor	2	**Prepared by**		*Sudip Santa*
I	Incomplete	0			

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CSIR-CENTRAL MECHANICAL ENGINEERING RESEARCH INSTITUTE
Provisional Grade Report
Post Graduate Diploma in Robotics (PGDR)

Name of the Student	Puja Banerjee
Course	Robotics
Enrollment No	60EE12A12002
Year of Joining	2016
Year of completion	2017

Semester	I	II	Cumulative
Credits	16	18	34
SGPA	9.06	8.94	8.99
CGPA	9.06	8.99	

SEM	SUB CODE	SUBJECT TITLE	Credits	Grade
I	ENG-CMERI-1-2126	Fundamentals of Computer Programming & Robot Programming	3	A+
	ENG-CMERI-1-2127	Introduction to CAD, 3-D Modelling and Robot Mechanics	3	A
	ENG-CMERI-1-2128	Embedded System and Digital Signal Processing (DSP)	3	B+
	ENG-CMERI-1-2129	Sensor and Actuators	3	B+
	ENG-CMERI-1-2130	Mobile robotics systems and Industrial robots	3	A+
	ENG-CMERI-1-2149	Seminar	1	A+
II	ENG-CMERI-1-2131	Robot Control	3	B
	ENG-CMERI-1-2132	Robotic Case Studies	5	A+
	ENG-CMERI-1-2150	Project Work and Viva-voce	10	A

Date: 31.08.2017

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Letter Grade	Performance	Numerical Value	Letter Grade	Performance	Numerical Value
A+	Outstanding	10	S	Satisfactory	Not Applicable
A	Excellent	9	X	Unsatisfactory	Not Applicable
B+	Very Good	8			
B	Good	7	**Maximum CGPA**		**10.0**
C+	Fair	6	**Minimum CGPA for the Degree**		**6.5**
C	Poor	4	**No Class or Division is awarded**		
F	Very poor	2	**Prepared by**		
I	Incomplete	0			

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CSIR-CENTRAL MECHANICAL ENGINEERING RESEARCH INSTITUTE
Provisional Grade Report
Post Graduate Diploma in Robotics (PGDR)

Name of the Student	Poulami Ghatak
Course	Robotics
Enrollment No	60EE12A12003
Year of Joining	2016
Year of completion	2017

Semester	I	II	Cumulative
Credits	16	18	34
SGPA	7.69	7.94	7.82
CGPA	7.69	7.82	

SEM	SUB CODE	SUBJECT TITLE	Credits	Grade
I	ENG-CMERI-1-2126	Fundamentals of Computer Programming & Robot Programming	3	B+
	ENG-CMERI-1-2127	Introduction to CAD, 3-D Modelling and Robot Mechanics	3	B
	ENG-CMERI-1-2128	Embedded System and Digital Signal Processing (DSP)	3	B
	ENG-CMERI-1-2129	Sensor and Actuators	3	B
	ENG-CMERI-1-2130	Mobile robotics systems and Industrial robots	3	A
	ENG-CMERI-1-2149	Seminar	1	A
II	ENG-CMERI-1-2131	Robot Control	3	C+
	ENG-CMERI-1-2132	Robotic Case Studies	5	A
	ENG-CMERI-1-2150	Project Work and Viva-voce	10	B+

Date: 31.08.2017

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Letter Grade	Performance	Numerical Value	Letter Grade	Performance	Numerical Value
A+	Outstanding	10	S	Satisfactory	Not Applicable
A	Excellent	9	X	Unsatisfactory	Not Applicable
B+	Very Good	8			
B	Good	7	**Maximum CGPA**		**10.0**
C+	Fair	6	**Minimum CGPA for the Degree**		**6.5**
C	Poor	4	**No Class or Division is awarded**		
F	Very poor	2	**Prepared by**		
I	Incomplete	0			

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CSIR-CENTRAL MECHANICAL ENGINEERING RESEARCH INSTITUTE
Provisional Grade Report
Post Graduate Diploma in Robotics (PGDR)

Name of the Student	Gourab Kumar Bagchi
Course	Robotics
Enrollment No	60EE12A12005
Year of Joining	2016
Year of completion	2017

Semester	I	II	Cumulative
Credits	16	18	34
SGPA	9.25	9.67	9.47
CGPA	9.25	9.47	

SEM	SUB CODE	SUBJECT TITLE	Credits	Grade
I	ENG-CMERI-1-2126	Fundamentals of Computer Programming & Robot Programming	3	A+
	ENG-CMERI-1-2127	Introduction to CAD, 3-D Modelling and Robot Mechanics	3	B
	ENG-CMERI-1-2128	Embedded System and Digital Signal Processing (DSP)	3	A+
	ENG-CMERI-1-2129	Sensor and Actuators	3	A
	ENG-CMERI-1-2130	Mobile robotics systems and Industrial robots	3	A+
	ENG-CMERI-1-2149	Seminar	1	A+
II	ENG-CMERI-1-2131	Robot Control	3	B+
	ENG-CMERI-1-2132	Robotic Case Studies	5	A+
	ENG-CMERI-1-2150	Project Work and Viva-voce	10	A+

Date: 31.08.2017

Coordinator-AcSIR
CSIR-CMERI

Director
CSIR-CMERI

Letter Grade	Performance	Numerical Value	Letter Grade	Performance	Numerical Value
A+	Outstanding	10	S	Satisfactory	Not Applicable
A	Excellent	9	X	Unsatisfactory	Not Applicable
B+	Very Good	8			
B	Good	7	**Maximum CGPA**		**10.0**
C+	Fair	6	**Minimum CGPA for the Degree**		**6.5**
C	Poor	4	**No Class or Division is awarded**		
F	Very poor	2	**Prepared by**		
I	Incomplete	0			

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CSIR-CENTRAL MECHANICAL ENGINEERING RESEARCH INSTITUTE
Provisional Grade Report
Post Graduate Diploma in Robotics (PGDR)

Name of the Student	Sayanti Hazra
Course	Robotics
Enrollment No	60EE12A12001
Year of Joining	2016
Year of completion	2017

Semester	I	II	Cumulative
Credits	16	18	34
SGPA	7.5	7.94	7.73
CGPA	7.5	7.73	

SEM	SUB CODE	SUBJECT TITLE	Credits	Grade
I	ENG-CMERI-1-2126	Fundamentals of Computer Programming & Robot Programming	3	B
	ENG-CMERI-1-2127	Introduction to CAD, 3-D Modelling and Robot Mechanics	3	B+
	ENG-CMERI-1-2128	Embedded System and Digital Signal Processing (DSP)	3	B
	ENG-CMERI-1-2129	Sensor and Actuators	3	B+
	ENG-CMERI-1-2130	Mobile robotics systems and Industrial robots	3	B
	ENG-CMERI-1-2149	Seminar	1	A
II	ENG-CMERI-1-2131	Robot Control	3	C+
	ENG-CMERI-1-2132	Robotic Case Studies	5	A
	ENG-CMERI-1-2150	Project Work and Viva-voce	10	B+

Date: 31.08.2017

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Letter Grade	Performance	Numerical Value	Letter Grade	Performance	Numerical Value
A+	Outstanding	10	S	Satisfactory	Not Applicable
A	Excellent	9	X	Unsatisfactory	Not Applicable
B+	Very Good	8			
B	Good	7	**Maximum CGPA**		**10.0**
C+	Fair	6	**Minimum CGPA for the Degree**		**6.5**
C	Poor	4	**No Class or Division is awarded**		
F	Very poor	2	**Prepared by**		
I	Incomplete	0			

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Associate Dean Biological Science <associatedean.biosci@acsir.res.in>

Regarding new courses at CCMB

ACADEMIC CCMB <academic@ccmb.res.in>   Thu, Apr 6, 2017 at 5:55 PM
To: Associate Dean Biological Science <associatedean.biosci@acsir.res.in>
Cc: Jyotsna Dhawan <jdhawan@ccmb.res.in>, ACADEMIC CCMB <academic@ccmb.res.in>

Dear Ms Priyanka,

I am writing on behalf of Dr Jyotsna Dhawan.

After seeing the remarks made by Associate Dean, Biological Sciences , we agree with the recommendations suggested by him for the new courses,
1. Bio-safety and 2. Gene regulation and genome organization

I would like to request you to kindly process it further and send the course codes.

*Sorry for the delayed response.

Thanks & regards,

Anitha
Academic cell - CCMB
[Quoted text hidden]

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Coordination Office
CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P.O.,New Delhi–110 025

Name of Lab: CCMB

Course Title: Bio-safety

Faculty (BS/CS/ES/PS/MIS)	BS
Course Nomenclature	BIO- CCMB -2- 1212
L-T-P-C	(1-0-0-1) 0.5 - 0 - 1 - 1
Name of Teachers:	1. Prof. R Sankaranarayanan 2. Prof. Ramesh V Sonti 3. Asst Prof. Raghunand R Tirumalai

Course Content details:

I   Introduction to Biosafety
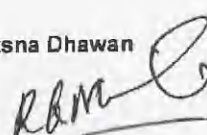
- General principles of Biosafety, Recombinant DNA Technology
- Biosafety and Pathogen handling
- Safe Laboratory Practices

II   Regulatory Issues with GM Plants

III   Radiation Safety - Theory

   Radiation Safety - Practical Session

Proposed for: 18 Meeting of Senate

Coordinator AcSIR-CCMB: Prof. Jyotsna Dhawan

Date: 10/8/2016

Lab Director: Prof. Rakesh K Mishra

Date: 10/8/2016

Checked By: Dr. Shantanu Sengupta (Associate Dean)

Date: _____

Approved By: Prof. Amitabha Chattopadhyay (Dean)

Date: _____

Approved with suggested revision.
Shantau Sengupta 26/7/17

L-T-P-C needs revision.
Since there are practical sessions.
Suggested 0.5-0-1-1
Shantau Sengupta

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AcSIR

Headquarters
Training & Development Complex, CSIR Campus, CSIR Road, Taramani,Chennai– 600 113

Coordination Office
CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P O.,New Delhi–110 025

Name of Lab: CCMB

Course Title: Gene Regulation and Genome Organization

Faculty (BS/CS/ES/PS/MIS)	BS
Course Nomenclature	BIO – CCMB – 2 – 1213
L-T-P-C	1-0-0-1 2-0-0-2
Name of Teachers:	1. Prof. Rakesh K Mishra
	2. Prof. Jyotsna Dhawan
	3. Prof. Purnima Bhargava

Course Content details:

Prof. Rakesh K Mishra

1. Introduction to Genome Organization and Overview of genomes
-Defining the Genome
-The new science of genomics - major questions and potential

2. Genome structure and function
-Genes and genomes
-The rest and the most of the genome - search of function

3. Packaging of genome

-Structural and functional domains in genome

-Chromosome territories

-Nuclear architecture and genomic packaging

High throughput techniques and tools in analysis of genome organization

4. Epigenetic regulation

-Chromosomal position effect and heterochromatin
- Structural basis of epigenetic cellular memory
-Coordinated regulation of gene clusters

Prof. Purnima Bhargava

I.   Details of the process of transcription in eukaryotes (2 lectures)

(1) The eukaryotic transcription machinery
(i) Promoter structure and function: the role of cis-regulatory elements that affect gene function
(ii) The general transcription factors and RNA polymerases: structure, function, and Regulation
(2) Transcriptional initiation, elongation, termination and activation
(i) New surprises from Genome-wide approaches ·
(ii) Pervasive vs non-specific transcription

II.   Epigenetic Regulatory Mechanisms (2 lectures)
(1) Transcriptional repression/anti-repression mechanisms
(2) Chromatin organization
(i) Nucleosome structure and Chromatin Assembly
(ii) Nucleosome landscape of species
(iii) Nucleosome positioning: Genome-wide studies
(3) Epigenetic Mechanisms
(i) Chromatin remodeling
(ii) Histone Code: covalent modifications
(iii) Cross-talk between transcription and chromatin

Prof. Jyotsna Dhawan

1. Mapping structural and functional compartments of the nucleus

   - Nuclear Matrix, Interchromatin granule compartments, Nucleolus, Nuclear Pore

2. The cell biology of the genome-visualizing nuclear events

   Establishing temporal and spatial location

3. Post-transcriptional control

   Splicing, Processing, Editing, Surveillance, silencing

4. mRNA transport and localization

   Nulcear Pore and visualizing transport
   Export and import
   Zipcodes and postmen

Proposed for: ___18___ Meeting of Senate

Coordinator AcSIR-CCMB: Prof. Jyotsna Dhawan   Date: 18/8/16

Lab Director: Prof. Rakesh K Mishra   Date: 8/8/2016

Checked By: Dr. Shantanu Sengupta (Associate Dean)   Date: _____

Approved By: Prof. Amitabha Chattopadhyay (Dean)   Date: _____

*I feel it should be a 2 credit Couce
Shantan Sengupta.*

*Approved as agreed by CCHR to 1 to 2.
after the credit for 1 to 2.
Shanta [signature] 16/2/17*

Fwd: FW: FW: FW: IICB Chemistry course content

Dean Chemical Science <dean.chemsci@acsir.res.in>   Wed, Sep 27, 2017 at 7:36 PM
To: Kanya AcSIR <kanya@acsir.res.in>
Cc: Coordinator CSIR-IICB <coordinator.iicb@acsir.res.in>, Arpita AcSIR <arpita.acsir@acsir.res.in>, Ashwini AcSIR <ashwini@acsir.res.in>

Dear All

The Course Content is approved.

With regards
Subbu
[Quoted text hidden]

CSIR-IICB PhD Programme
Course Catalogue : Chemical Sciences

BIO/CHE-IICB-1-001, BIO/CHE-IICB-1-002 BIO/CHE-IICB-1-004 and BIO/CHE -IICB-2-2801 courses are common to Biology and Chemistry students .

Level 100: Compulsory : Total 4 Credits

BIO/CHE-IICB-1-001: Biostatistics: 1-0-0-1

Summarization of Data: measures of center, dispersion, skewness Dependence of variables: correlation, linear regression, logistic regression.
Basic probability distributions: Binomial, Normal, Chi-squares.
Estimation of parameters: method of moments, maximum likelihood Testing of hypotheses:
(a) parametric tests: t-test, z-test, chi-squares test, ANOVA
(b) non-parametric tests: Mann-Whitney, Kruskal Wallis, Kolmogorov-Smirnov

BIO/CHE-IICB-1-002: Computation/bioinformatics: 1-0-0-1

Computers: introduction, evolution and classification of computers. Fundamentals of computing. Bit and Byte, introduction to types of Hardware and Software. Components of computer, introduction to operating systems, introduction to Computer Viruses.
Network: introduction, network structure and architecture, hierarchical networks, ethernet and TCP/IP family of protocols, transport protocol design, types of network, topologies of network, router, switch, data communication, concept of wireless networking, LAN, WAN, MAN, security of the network, fire-walls, network applications.
Information Technology: concepts of client server architecture, concept of search engine, database search engines, introduction to Internet.
Introduction to Word, Powerpoint and Excel.
Introduction to Bioinformatics: history of Bioinformatics, genome sequencing projects, Human Genome Project, applications of Bioinformatics.
Introduction to databases: type and kind of databases, applications and limitations.
Literature Search Databases, nucleic acid and protein databases, animal and plant databases, Ensembl Genome project TIGR database, biotechnological databases, motifs and pattern databases, databases for species identification and classification, structural databases, database retrieval and deposition systems.
Web tools and resources for sequence analysis: pairwise and multiple sequence alignment, sequence similarity search: BLAST, pattern recognition, motif and family prediction, restriction map analysis, primer design, gene prediction, phylogenetic tree, protein structure prediction and visualization.

BIO/CHE-IICB-1-004: Research Methodology, Communication/Ethics/Safety: 1-0-0-1

(Lecture and workshop based)
Philosophy and structure of scientific thoughts, objective and motivation of research, meaning of the research, what constitutes a research topic? how to select a research topic?
Importance of literature review, selection of appropriate methodology, collection of data, interpretation of data, writing research paper, paper presentation in scientific conference,

statistical methods, importance of documentation, procedure for Hypothesis Testing, values and ethical problems, criteria of Good Research.
Good lab practices: Record keeping, organizing data, organizing the lab space.
Chemical, Radioactive and Biological safety: Possible hazards and precautionary measures; do and don'ts upon exposure.
What is ethics, the different interpretations & historical instances of unethical science, Case studies: Data fraud/ plagiarism and Human Ethics violation.

CHE-IICB-1-106: Introduction to Chemical Biology: 1-0-0-1

Cell structure and Function: Overview of prokaryotic and eukaryotic cells, mammalian cell types, subcellular organelles and their functions.
Macromolecular Structure: Protein, DNA, RNA, lipid, polysaccharide structures; detection, quantification and stability of the molecules and their interactions.
Cell Communication and Signaling: ligand-receptor interaction, autocrine and paracrine modes of signaling, communication through adherens junctions.
Enzymes Overview & Enzyme Kinetics: enzyme structure and functions, substrate recognition, mechanism and inhibitions, Kinetics of enzyme reactions, types of inhibitions, allostericity and regulation.
Nucleic Acids & Protein Synthesis: DNA replication, transcription (mRNA synthesis) and translation (protein synthesis).
Metabolic Pathways: protein, lipid and carbohydrate metabolism, amino acid and nucleotide metabolism.
Basic Techniques in Molecular Biology: concept of plasmid, PCR technology, sequencing, site directed mutagenesis, cloning.
Drug Discovery: drugs from nature and their interaction.

Level 200: Total 4 Credits

BIO/CHE -IICB-2-2801 : Biotechniques and Instrumentation: 2-0-0-2

Chromatography : different chromatographic techniques, HPLC.

Centrifugation: principles and uses, application in modern biology.

Electrophoresis: theory and hypothesis, SDS-PAGE, Western Blot, 2D gel electrophoresis.

Mass spectrometry and Protein identification: principles and theory, application in Proteomics.

Colorimetry : ITC, DSC, determination of protein stability, analysis of binding Properties.

Surface Plasmon resonance: Techniques and its use in biology.

Optical spectroscopy: absorption, fluorescence, FT-IR, Raman and other techniques.

FACS: principles and application.

Imaging: Electron microscopy, Confocal microscopy, Atomic force microscopy, In vivo imaging.

NMR: 1D NMR, 2D NMR and application in structural biology.

X-Ray crystallography: Basic theory and its application in structural biology.

CHE-IICB-2-004: Advanced Analytical Chemistry: 2-0-0-2

Chemical Techniques: chromatography- general principles, classification of chromatographic techniques, normal and reversed phase, bonded phase, separation mechanisms, short-column chromatography, flash chromatography, vacuum liquid chromatography (VLC), medium pressure liquid chromatography, high pressure liquid chromatography (HPLC), TLC, HPTLC. X-RD analysis and its applications.

Basic Principles of Mass Spectrometry: methods of ionization (EI, CI, FAB/LSIMS, ESI, MALDI,DART, DESI) and high resolution MS; application of MS in structure elucidation of organic molecules; basic principles and applications of GC-MS, LC-MS and high resolution MS.

CHE-IICB-2-203: Advanced Organic Chemistry : 2-0-0-2

Stereoselective C-C bond formation: nucleophilic addition to C=X (X=C, O, S, N), pericyclic reaction–asymmetric induction in [3+2] and [2+2] cycloaddition, streoselective hydroformylation, streoselective carbene addition, chirality transfer in sigmatropic rearrangements.

Named Reactions and Rearrangements: Strecker, Mannich, Biginelli, Passerini, and Ugi reactions. Baker-Venkataramana, Curtius, Schmidt, Wolf, Hofmann, and Brook rearrangements.

Lactonization: Yamaguchi, Corey-Nicolaou, Heck, Masamune, Mitsunobu, and Yamamoto's Macrolactonizations. Mukaiyama Esterification.

Ring-closing metathesis (RCM) using Grubbs and Schrock catalyst, Buchwald-Hartwig C-N bond and C-O bond formations, BaylisHillman Reaction, Evans aldol reaction, Ugi-reaction, Click reaction, Corey-Bakshi-Shibata (CBS) reduction, Corey-Kim oxidation, Nozaki-Hiyama-Kishi Reaction, Payne rearrangement, Prins reaction, Japp-Klingmann reaction.

CHE-IICB-2-215: Recent Developments in Asymmetric Catalysis: 2-0-0-2

Stereochemistry: history, introduction, and various projection formulae & notations.
Asymmetric Catalysts in Organic synthesis: stereoselective catalytic reductionhomogeneous hydrogenation, Stereoselective heterogeneous hydrogenation, transfer hydrogenation, hydrosilylation, hydricynation, stereoselective oxidation, self replication of chirality- catalytic self-replicating molecules, control of chirality memory, P-stacking effect, selectivity and mechanism of catalytic asymmetric synthesis.
Determination of Enantiomeric Purity: various tools, chiral derivatising agents, chiral shift reagents, chiral solvating agents.
Asymmetric Methodologies: a symmetric aldol, epoxidation, allylation, propargylation and alkylation reactions.

CHE-IICB-2-219 : Advances in Nanoscience and Nanotechnology: 2-0-0-2

Importance of materials, properties at nano scales, advantages & disadvantages, application in comparison with bulk materials, processing of nanomaterials- basic fabrication techniquesand various chemico physical methods, nano particles– preparation and characterization.

Nano tubes: introduction, single walled, multi-walled nanotubes, synthetic procedures (solid & gaseous carbon source based production techniques etc.), growth mechanism of carbon nanotubes – properties of carbon nano tubes – characterization – applications, nano composites-introduction-synthesis procedures-various systems (metal-polymer, metal-ceramics andpolymer-ceramics). Applications of nanomaterials.

CHE-IICB-2-226: Green Chemistry: 2-0-0-2

Basic principles and applications of green chemistry: basic understanding, scope and interdisciplinary nature of green chemistry; environmental factors, carbon credit, energy efficiency and atom economy, designing green synthesis, green reagents, green catalysts, phase transfer catalysis in green synthesis, microwave-induced green synthesis ultrasound-assisted green synthesis, aqueous phase reactions, ionic liquid and water as green reaction media, enzyme mediated reactions.

Level 300: Total 4 Credits

BIO/CHE-IICB-3-2801: Seminar & Critical Appraisal: 1-0-0-1

This will be a course based on current literature survey and its critical appreciation.

CHE-IICB-3-312: Supramolecular Chemistry: 1-0-0-1

Classical and non-classical H-bonding, importance of non-covalent interactions in molecular recognition, introduction of QSAR, drug - receptor interactions, physiochemical empirical and non-empirical parameters, 2D-QSAR approaches, 3D-QSAR approaches, 4D-QSAR and higher approaches, statistical methods in modeling, model validation, application of QSAR in drug discovery.

CHE-IICB-3-313: Total Synthesis: 2-0-0-2

General concepts on various types of cycloaddition reactions, application of cycloaddition reactions in the synthesis of chiral compounds and industrially important molecules.
Synthesis of complex organic molecules – planning and execution; concepts of retrosynthetic analysis; total synthesis of natural products: retrosynthesis, disconnection, synthons, linear and convergent synthesis.

CHE-IICB-3-352: NMR Spectroscopy: 2-0-0-2

Principles of NMR Theory: density matrix, Liouville von Neuman Equation, vector model product operators, representation, relaxation process, spin decoupling.
NMR Instrumentation: basic probe architechture, probe tuning and matching, shimming, block representation of NMR spectrometer.
NMR Application in Organic Chemistry: data acquisition, processing of NMR data, ID NMR of 1H scalar coupling, 2D/3D NMR, HSQC, HMQC, HMBC of common nuclei, NOESY, ROESY, DOSY, structure elucidation of small molecules.
Protein NMR Spectroscopy: expression of isotope labeled protein from recombinant sources, multidimension NMR, assignment strategies and pulse sequences, structure determination of small peptides and small proteins, spin-state selective polarization transfer & TROSY optimization for larger proteins.
Solid State NMR: introduction, line-broadening in solid-state NMR, magicangle spinning, cross-polarisation, prospects and unique applications to membrane proteins and amyloid fibrils.

CHE-IICB-3-356: Natural Products and Drug Discovery: 2-0-0-2

Occurance, isolation, chemistry and biosynthesis of mono-, sesqui- and di-terpenoids, flavonoids and alkaloids.

Free radicals and Antioxidants: important free radicals in living systems, sources, chemistry and reactivity of important free radicals in biological systems, natural antioxidants of different classes.

In vitro Methods: free radical determination by ESR methods, impact of singlet and triplet oxygen (importance of reactive oxygen species) in radical formation in biological systems.

Steroids & Saponins: sources, biological significance and structure elucidation of saponins; and of steroids – ergosterol, stigmasterol, β- sitosterol and diosgenin, squalene biosynthesis.

BIO/CHE-IICB-3-2808: Chemical Biology: 1-0-0-1

[both biology and chemistry students can opt this course]

An overview of Chemical Biology

Protein-protein interactions and its inhibitors

Ligands for protein surfaces

Ligands for Nucleic Acid surfaces

Chemical Genetics

Synthetic and semi synthetic proteins

Applications of chemical biology, enzyme based biosensors, catalytic antibody

New courses for approval

Dean Physical Science <dean.physci@acsir.res.in>   Tue, Sep 19, 2017 at 12:01 PM
To: Kanya AcSIR <kanya@acsir.res.in>
Cc: Gopalakrishnarao Parthasarathy <drg.parthasarathy@gmail.com>, Arpita AcSIR <arpita.acsir@acsir.res.in>, Ashwini
AcSIR <ashwini@acsir.res.in>

Approved
with best Regards,
G. Parthasarathy

[Quoted text hidden]

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

Name of Lab: CSIR- National Institute of Oceanography, Dona Paula, Goa.

Course Title: Plankton Ecology

Faculty (BS/CS/ES/PS/MIS)	PS
Course Nomenclature	
L-T-P-C	1-0-0-1
Name of Teachers:	1. Veronica Fernandes 2. Haimanti Biswas

Course Content details:

Zooplankton diversity, functional biology, reproduction and life cycle strategies; History of zooplankton studies in the Indian Ocean; Spatial and vertical distribution of zooplankton with special reference to the Indian Ocean; Impacts of pollution on zooplankton; General morphology, anatomy, feeding and digestive mechanisms of copepods.

Evolution of marine phytoplankton, their distribution in global oceans under changing climate, phyto-zooplankton interaction, role of marine phytoplankton in global carbon cycle and distribution of phytoplankton in the Indian coastal waters.

**May attach a separate sheet if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(NIO) _____ Date: 12/09/2017

Lab Director: _____ Date: 14/09/2017

Checked By: _____ (Associate Dean) Date: _____

Approved By: _____ (Dean) Date: _____

Total lecture: 12 and practical 2:

Course coordinators: Dr. Veronica Fernandes & Dr. Haimanti Biswas

Lectures

1) Zooplankton diversity and functional biology in the marine environment
2) Zooplankton reproduction and life cycle strategies.
3) History of zooplankton studies in the Indian Ocean
4) Spatial and vertical distribution of zooplankton with special reference to the Indian Ocean
5) Impacts of pollution on zooplankton
6) General morphology and anatomy of copepods
7) Feeding and digestive mechanisms of copepods
8) Evolution of marine primary producers
9) Distribution of marine phytoplankton in the contemporary oceans
10) Marine phytoplankton under changing climate
11) Marine phytoplankton and global carbon cycle: contribution of different taxonomic groups
12) Distribution of phytoplankton in the Indian coastal waters

Practical:

13) Taxonomic identification of copepods from coastal waters of India
14) Phyto-Zooplankton interaction studies

Recommended books:

Harris, R.P., Wiebe, P.H., Lenz, J.H, Skjoldal R, Huntley M (eds) 2000. ICES zooplankton methodology manual. Academic Press. San Diego.

Rao TSS 1979. Zoogeography of the Indian Ocean. In: Van der Spoel S and Pierrot-Bults (eds) Zoogeography and diversity in plankton. Bunge Scientific Publishers, Utrecht 254-292

Steidinger KA and Walker LM (eds)1984. Marine plankton life cycle strategies. CRC Press, Inc., Boca Raton, Florida

Zeitzschel B and Gerlach SA (eds) 1973. The biology of the Indian Ocean. Springer-Verlag, Berlin.

Suthers, IM, Rissik D (eds) 2009. Plankton: A guide to their ecology and monitoring for water quality. CSIRO Pub, Collingwood, Australia.

Raymont, JEG. (eds) 1983. Plankton and productivity in the oceans Vol 2, 2nd edition Pergamon Press. Oxford UK.

Spoel, S.V.D.: Pierrot-Bults, A.C. (eds.) 1979. Zoogeography and diversity of plankton. Edward Arnold, London, UK.

Corner EDS and O'hara SCM (eds) 1986. The biological chemistry of Marine copepods. Clarendon Press, Oxford.

Kasturirangan LR (1963) A key for the identification of the more common planktonic Copepoda of Indian coastal waters. Indian National Committee on Oceanic Research. Panikkar NK (ed). Council of Scientific and Industrial Research. New Delhi Publication No 2, pp 1-87.

Paul G. Falkowski and Andrew H. Knoll (Eds) 2007. Evolution of Primary Producers in the Sea. ISBN: 978-0-12-370518-1

Paul G. Falkowski & John A. Raven (2007). Aquatic Photosynthesis. Second Edition. ISBN: 9780691115511

Kanya AcSIR <kanya@acsir.res.in>

New courses for approval

SumanKMishra <suman@nmlindia.org>   Mon, Sep 11, 2017 at 5:46 PM
To: kanya@acsir.res.in
Cc: Associate Science <associatedean.engsci@acsir.res.in>

Approved
S.K. Mishra

-------- Original Message --------
From: **Associate Dean Engineering Science** <associatedean.engsci@acsir.res.in>
Date: Sep 11, 2017 10:20:13 AM
Subject: Fwd: New courses for approval
To: SumanKMishra <suman@nmlindia.org>

Dear Dr Mishra,

I recommend approval.

Regards,
Chetan
[Quoted text hidden]

--
Dr. Mrs S. K. Mishra, Chief Scientist (Advanced Material Processing) and Head, Human Resource Group (HRG),
Dean Eng. Sc. and Adjunct Prof. AcSIR,
CSIR-National Metallurgical Laboratory, Jamshedpur, Jharkhand, India.831007,
Email: suman@nmlindia.org, suman.nml@gmail.com; skm_smp@yahoo.co.in
Ph. 91-657-234-5122, 5256, Fax:916572345213 mobile:09801341664

📄 **New course Advanced Structural Mechanics.pdf**
592K

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

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Headquarters
Training & Development Complex, CSIR Campus, CSIR Road, Taramani, Chennai– 600 113

Coordination Office
CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P.O., New Delhi–110 025

Name of Lab: CSIR- Central Building Research Institute, Roorkee

Course Title: Advanced Structural Mechanics

Faculty (BS/CS/ES/PS/MIS)	Engineering Sciences
Course Nomenclature	ENG-CBRI-3-1115
L-T-P-C	3-0-0-3
Name of Teachers:	1. Prof. N. Gopalakrishnan

Course Content details:

Fundamentals of structural mechanics: Definition of stress, strain, constitutive relationships; Strain Energy principles; Navier-Bernoulli elementary bending theory of beams, Flexural and shear stresses. Concept of shear center, Deep Beams. Torsion - St Venant torsion and distortion.

Computer methods of structural analysis: Introduction to stiffness and flexibility methods. Matrix methods of structural analysis. Strain energy methods of deriving the stiffness matrix. Analysis of redundant structures. Special structures

Introduction to structural stability: Stability of structural systems. Euler buckling loads and approximate methods of critical load evaluation.

Mechanics of thin plates: Thin plate theory, Imposition of boundary conditions, Kirchoff shear and corner lift up of rectangular plates. Methods of Navier and Levy solutions.

Mechanics of Shells: Types of shells, Shells of translation and rotation. Membrane theory of shells. Cylindrical and spherical shells.

Bibliography

1. Crandall, S. H. An Introduction to Mechanics of Solids. Tata McGraw-Hill Education, 2012.

2. Popov E. P. Engineering Mechanics of Solids, Prentice Hall, 1998

3. Timoshenko, S. P., and Woinowsky-Krieger, S. Theory of Plates and Shells. McGraw-Hill, 2010

**May attach a separate sheet if required

CSIR-CBRI

Coordinator AcSIR-(Lab Name) _____

Lab Director: _____

Checked By: _____ (Associate Dean)

Approved By: _____ (Dean)

Proposed for: _____ Meeting of Senate

Date: 28/08/2017

Date: 30/08/17

Date: _____

Date: _____

New/ modified courses for approval

SumanKMishra <suman@nmlindia.org>　　　　　　　　Tue, Aug 29, 2017 at 10:15 AM
To: Associate Dean Engineering Science <associatedean.engsci@acsir.res.in>, Ashwini AcSIR <ashwini@acsir.res.in>
Cc: Arpita Mam <arpita.acsir@acsir.res.in>, Kanya AcSIR <kanya@acsir.res.in>, Dean Engineering Science <dean.engsci@acsir.res.in>

Each lab can have their own research course as far I know. There is more or less similarity but may be some deviations.
Three faculty for one course, credit 1, is not recommended. They should stick to 1 . if someone giving one or two lecture for the course they are not considered for faculty for that course normally.
For courses having credit 3 or 4, maximum faculty can be 3 in normal circumstances.

The courses of CBRI and CECRI is approved
S. K. Mishra
[Quoted text hidden]
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Dr. Mrs S. K. Mishra, Chief Scientist (Advanced Material Processing) and Head, Human Resource Group (HRG),
Dean Eng. Sc. and Adjunct Prof. AcSIR,
CSIR-National Metallurgical Laboratory, Jamshedpur, Jharkhand, India.831007,
Email: suman@nmlindia.org, suman.nml@gmail.com; skm_smp@yahoo.co.in
Ph. 91-657-234-5122, 5256, Fax:916572345213 mobile:09801341664

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

AcSIR

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Coordination Office
CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P.O.,New Delhi–110 025

Name of Lab: **CSIR-CENTRAL ELECTROCHEMICAL RESEARCH INSTITUTE**

Course Title: **Research Methodology (Core course)**

Faculty (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	CHE/PHY/ENG - CECRI - 1 - 1401
L-T-P-C	1 - 0 - 0 - 1
Name of Teachers:	1. Dr. D. Velayutham

Course Content details:

Good laboratory practices, Safety in the laboratory, First Aid in the laboratory, Maintenance of laboratory records, Scientific literature management, Communication skills (scientific writing and presentation), Intellectual property management & planning, Ethics in Science, Computer applications and tools, Statistical methods & Data analysis

Proposed for: 19th Meeting of Senate

Coordinator AcSIR-(CECRI) Dr. B. Ramesh Babu   Date: 06.10.2017

Lab Director: _____
निदेशक / DIRECTOR
सीएसआईआर-केंद्रीय विद्युतरसायन अनुसंधान संस्थान
CSIR-Central Electrochemical Research Institute
कारैकुडी / Karaikudi - 630006
Date: 6-10-17

Checked By: _____ (Associate Dean)Date: _____

Approved By: _____ (Dean) Date: _____

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

AcSIR

Headquarters
Training & Development Complex, CSIR Campus, CSIR Road, Taramani,Chennai– 600 113

Coordination Office
CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P.O.,New Delhi–110 025

Name of Lab: **CSIR-CENTRAL ELECTROCHEMICAL RESEARCH INSTITUTE**

Course Title: **Basic Mathematics & Numerical Methods (Core course)**

Faculty (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	CHE/PHY/ENG - CECRI - 1 - 1403
L-T-P-C	1 - 0 - 0 - 1
Name of Teachers:	1. Dr. P. Murugan

Course Content details:

Determinants and Matrices, Complex Variables, Vector analysis, Infinite Series, Special Functions, Differential Equations, Interpolation and Approximation, Numerical differentiation and Integration, Basic Linux, Introduction to Algorithms, basic programming, Shell and Shell Scripting, Network Computing and Parallel Computing, Matlab/Scilab/Octave/Gnuplot

Proposed for: 19th Meeting of Senate

Coordinator AcSIR-(CECRI) Dr. B. Ramesh Babu   Date: 06.10.2017

Lab Director: निदेशक / DIRECTOR   Date: 6-10-17
सीएसआईआर-केंद्रीय विद्युतरसायन अनुसंधान संस्थान
CSIR-Central Electrochemical Research Institute
कारैकुडी / Karaikudi - 630006

Checked By: _____ (Associate Dean)Date: _____

Approved By: _____ (Dean) Date: _____

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

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Headquarters
Training & Development Complex, CSIR Campus, CSIR Road, Taramani,Chennai– 600 113

Coordination Office
CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P.O.,New Delhi–110 025

Name of Lab: CSIR- CENTRAL ELECTROCHEMICAL RESEARCH INSTITUTE

Course Title: Advances in Nanoscience and technology (Core course)

Faculty (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	CHE/ENG - CECRI - 2 - 1407
L-T-P-C	2 - 0 - 0 - 2
Name of Teachers:	Dr. N. Lakshminarasimhan

Course Content details:

Low-dimensional structures: Quantum wells, Quantum wires, and Quantum dots, Nano clusters & Nano crystals, fullerenes, carbon nano tubes and graphene, Nano Composites, synthesis and characterization techniques, Properties at Nano Scales and comparison with bulk materials, fabrication techniques, general applications, nanomaterials in biology.

Proposed for: 19th Meeting of Senate

Coordinator AcSIR-(CECRI) Dr. B. Ramesh Babu   Date: 20. 02. 2017

Lab Director: Date: 23 FEB 2017

Checked By: _____   (Associate Dean)Date: _____

Approved By: _____   (Dean) Date: _____

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

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Headquarters
Training & Development Complex, CSIR Campus, CSIR Road, Taramani,Chennai– 600 113

Coordination Office
CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P.O.,New Delhi–110 025

Name of Lab: **CSIR-CENTRAL ELECTROCHEMICAL RESEARCH INSTITUTE**

Course Title: **Advanced Materials Characterization Techniques (Core course)**

Faculty (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	CHE/PHY/ENG - CECRI - 2 - 1401
L-T-P-C	2 - 0 - 0 - 2
Name of Teachers:	Dr. R. H. Suresh Bapu

Course Content details:

Optical Microscopy, Electron microscopy: TEM, HRTEM, SEM, STEM, EDX, FIB, e-beam lithography, Scanning probe microscopy: AFM, STM, MFM, confocal, etc, Raman spectroscopy/microscopy, Thermal analysis techniques, Magnetic measurements, Electrical measurements, Spectroscopic ellipsometry.

Proposed for: 19th Meeting of Senate

B. Ramesh Babu.

Coordinator AcSIR-(CECRI) Dr. B. Ramesh Babu   Date: 20.02.2017

Lab Director: _____   Date: _____

Checked By: _____   (Associate Dean)Date: _____

Approved By: _____   (Dean) Date: _____

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

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Headquarters
Training & Development Complex, CSIR Campus, CSIR Road, Taramani,Chennai– 600 113

Coordination Office
CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P.O.,New Delhi–110 025

Name of Lab: **CSIR-CENTRAL ELECTROCHEMICAL RESEARCH INSTITUTE**

Course Title: **Advanced Electrochemistry (Core course)**

Faculty (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	CHE/ENG - CECRI - 2 - 1403
L-T-P-C	2 - 0 - 0 - 2
Name of Teachers:	Dr. V. Ganesh

Course Content details:

Basic electrochemistry concepts, Reference electrodes, Electrochemical Thermodynamics, Kinetics of electron transfer, the Taft equation, Diffusion, Double Layers, electrode Kinetics, the Gibbs adsorption isotherm, the Lippmann equation, infinitely dilute solutions and thermal balance, Electro capillary phenomena, Faradaic vs. capacitive currents, transport properties, potential theory, Electrochemical Techniques, Voltammetry, Reversible and irreversible reactions, Mass transport by convection, rotating electrodes, Equivalent circuits, A.C. voltammetry, Electrolysis methods, Adsorption, Thin layer cells, Electrochemistry of polymers and inorganic solids, Spectroelectrochemistry, Applications.

Proposed for: 19th Meeting of Senate

B. Ramesh Babu

Coordinator AcSIR-(CECRI) Dr. B. Ramesh Babu   Date: 20.02.2017

Lab Director: Date: 20 FEB 2017

Checked By: _____   (Associate Dean)Date: _____

Approved By: _____   (Dean) Date: _____

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

AcSYR

Headquarters
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Coordination Office
CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P.O.,New Delhi–110 025

Name of Lab: CSIR-CENTRAL ELECTROCHEMICAL RESEARCH INSTITUTE

Course Title: Advanced Materials Science (Core course)

Faculty (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	CHE/ENG - CECRI - 2 - 1404
L-T-P-C	2 - 0 - 0 - 2
Name of Teachers:	Dr. N. Lakshminarasimhan

Course Content details:

Crystal systems and space groups, Close packing and various simple structure types like AB, AB2, AB3 and complex structural types ABX3, AB2X4, etc. Factors affecting crystal structures, Common preparative methods; X-ray diffraction and Electron microscopy, Defect structures, colour centers, reciprocal lattices, Properties of solids – Band theory, metals, insulators, semiconductors, dielectric and ferroelectric properties, magnetic properties, optical properties, ionic conduction; structure-processing-property correlations.

Proposed for: 19th Meeting of Senate

Coordinator AcSIR-(CECRI) Dr. B. Ramesh Babu   Date: 20.02.2017

Lab Director: Date: 20 FEB 2017

Checked By: _____ (Associate Dean)Date: _____

Approved By: _____ (Dean) Date: _____

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Name of Lab: **CSIR-CENTRAL ELECTROCHEMICAL RESEARCH INSTITUTE**

Course Title: **Materials Science & Engineering (Core course)**

Faculty (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	ENG-CECRI-3-1433
L-T-P-C	3 – 0 – 0 - 3
Name of Teachers:	Dr. Deepak Kumar Pattanayak

Course Content details:

Unit 1:Introduction to materials science and engineering, atomic structure and bonding in materials. Crystal structure of materials, crystal systems, unit cells and space lattices, determination of structures of simple crystals by x-ray diffraction, miller indices of planes and directions, packing geometry in metallic, ionic and covalent solids. Concept of amorphous, single and polycrystalline structures and their effect on properties of materials.Crystal growth techniques.Imperfections in crystalline solids and their role in influencing various properties.

Unit 2: Physical and Chemical properties of metals and alloys. Synthesis, characterisation and applications of metal matrix nanocomposites.

Unit 3: Physical and Chemical properties of Ceramics: Structure, properties, processing and applications of traditional and advanced ceramics, ceramic matrix nanocomposites.

Unit 4: Physical and Chemical properties of Polymers, classification, polymerization, additives for polymer products, processing and applications, polymer matrix nanocomposites.

Unit 5:Materials in medicine: Fundamentals of biomaterials & their applications, metals, ceramics and polymer biomaterials and their interaction in biological environment.

Proposed for: 19th Meeting of Senate

B. Ramesh Babu

Coordinator AcSIR-(CECRI) Dr. B. Ramesh Babu   Date: 20.02.2017

Lab Director: _____   Date: _____

Checked By: _____   (Associate Dean)Date: _____

Approved By: _____   (Dean) Date: _____

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Name of Lab: CSIR-CENTRAL ELECTROCHEMICAL RESEARCH INSTITUTE

Course Title: Environmental Engineering (Core course)

Faculty (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	ENG-CECRI-3-1434
L-T-P-C	3 – 0 – 0 - 3
Name of Teachers:	1. Dr. B. Ramesh Babu 2. Dr. S. Udaya Bhanu

Course Content details:

Unit 1:Environmental chemistry- atmospheric chemistry,environmental chemicals; Environmental Microbiology - classification and characteristics of Microorganisms-microbes and nutrient cycles-pathogens in wastewater- Microbiology of biological treatment processes – aerobic and anaerobic, a-oxidation, β-oxidation, nitrification and denitrification, eutrophication.Factors influencing toxicity. Effects – acute, chronic, concentration response relationships. Test organisms – toxicity testing, Bioconcentration–Bioaccumulation, Biomagnifications,Bioassay, biomonitoring, bioleaching.

Unit 2:Pollution in waste water – physical and chemicaltreatment of water and waste water- Biological treatment of water and wastewater–sludge treatment and disposal. Airpollution and control-solid and hazardous waste management-waste characterization and waste reduction

Unit 3:Industrial wastewater management, treatment & disposal-Industrial pollution prevention & waste minimization-Wastewater reuse and residual management- -heavy metal removal-aerobic and anaerobic biological treatment -chemical oxidation-ozonation-photocatalysis-carbon adsorption-wet air oxidation

Unit 4:Nanoporous materials their synthesis/preparation and structure, post-synthetic modification, characterization and use in various applications like adsorption/separation, catalysis etc,Adsorption and desorption isotherms

Unit 5: Advanced treatment process- role of electro chemistry in water and waste water treatment

Reference Books:
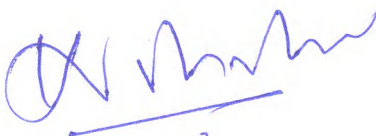
1.Weber, W.J., Physicochemical processes for water quality control, John Wiley and sons, Newyork, 1983.

2.Peavy, H.S., Rowe, D.R. and Tchobanoglous, G. Environmental Engineering, McGraw Hills, New York 1985.

3.Metcalf and Eddy, Wastewater Engineering, Treatmentand Reuse, Tata McGraw- Hill Publication, New Delhi, 2003

4.Water& Waste Water Engineering by Fair and Gayer.
5.C.A.Sastry, Water Treatment Plants, Narosa Publishing House, Bombay, 1996.

Proposed for: 19th Meeting of Senate

B. Ramesh Babu.

Coordinator AcSIR-(CECRI) Dr. B. Ramesh Babu   Date: 20.02.2017

Lab Director: Date: _____

Checked By: _____   (Associate Dean)Date: _____

Approved By: _____   (Dean) Date: _____

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Name of Lab: **CSIR-CENTRAL ELECTROCHEMICAL RESEARCH INSTITUTE**

Course Title: **Functional Materials (Elective course)**

Faculty (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	CHE/PHY/ENG - CECRI - 3 - 1405
L-T-P-C	2 – 0 – 0 - 2
Name of Teachers:	Dr. D. Jeyakumar

Course Content details:

Introduction - surface properties and functionalization - nanomaterials – design of functional materials – characterization techniques – functional materials for energy applications – biomaterials - materials for solar energy - magnetic materials– thermoelectric materials - smart materials - organic materials for electronics application - computational materials science - modelling of nanomaterials -electronic and band structures

Proposed for: 19th Meeting of Senate

B. Ramesh Babu

Coordinator AcSIR-(CECRI) Dr. B. Ramesh Babu   **Date:** 20.02.2017

Lab Director: **Date:** _____

Checked By: _____   **(Associate Dean)Date:** _____

Approved By: _____   **(Dean) Date:** _____

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Name of Lab: **CSIR-CENTRAL ELECTROCHEMICAL RESEARCH INSTITUTE**

Course Title: **Industrial & Applied Microbiology (Elective course)**

Faculty (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	BIO/ENG - CECRI - 3 - 1401
L-T-P-C	3-0-0-3
Name of Teachers:	1. Dr. S. Maruthamuthu 2. Dr. M. Eashwar 3. Dr. G. Sreedhar

Course Content details:

Introduction Industrial and environmental microbiology; Intermediate microbial metabolism for exploitation of microbes; Microbial enzymology and kinetics, Intermediate microbial metabolism; Microbial transformations; Immobilization and applications; Microbial processes for waste water management; Microbial processes for Air pollution management; Anaerobic digestion of organic solids Microbial solid waste management; Microbial fermentation; Microbial Energy Engineering; Microbial energy engineering and Biorefinery.

Proposed for: 19th Meeting of Senate

B. Ramesh Babu

Coordinator AcSIR-(CECRI) Dr. B. Ramesh Babu   Date: 20.02.2017

Lab Director: _____   Date: _____

Checked By: _____   (Associate Dean)Date: _____

Approved By: _____   (Dean) Date: _____

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Coordination Office
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Name of Lab: **CSIR-CENTRAL ELECTROCHEMICAL RESEARCH INSTITUTE**

Course Title: **Electrochemical Technologies (Elective course)**

Faculty (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	CHE/ENG - CECRI - 3 - 1416
L-T-P-C	2 – 0 – 0 - 2
Name of Teachers:	Dr. M. Anbukulandainathan

Course Content details:

Electrochemical process engineering and optimization of electrochemical parameters - technologies on electrochemicals including processes developed at CSIR-CECRI - metal finishing technologies - corrosion control processes - electrometallurgy includes aqueous - non-aqueous and high temperature metallurgical processes

Proposed for: 19th Meeting of Senate

Coordinator AcSIR-(CECRI) Dr. B. Ramesh Babu   Date: 20. 02. 2017

Lab Director: Date: _____

Checked By: _____   (Associate Dean)Date: _____

Approved By: _____   (Dean) Date: _____

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Name of Lab: **CSIR-CENTRAL ELECTROCHEMICAL RESEARCH INSTITUTE**

Course Title: **Corrosion Engineering (Core course)**

Faculty (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	ENG-CECRI-3-1421
L-T-P-C	2 – 0 – 0 - 2
Name of Teachers:	Dr. S. Sathiyanarayanan

Course Content details:

Basic aspects, Forms of corrosion, Atmospheric corrosion and protective coatings, Immersion corrosion and electrochemical protection, Corrosion monitoring, impedence spectroscopy, harmonics and NDT techniques.

Proposed for: 19th Meeting of Senate

B. Ramesh Babu

Coordinator AcSIR-(CECRI) Dr. B. Ramesh Babu   Date: 20.02.2017

Lab Director: _____   Date: 20 FEB 2017

Checked By: _____   (Associate Dean) Date: _____

Approved By: _____   (Dean) Date: _____

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Name of Lab: **CSIR-CENTRAL ELECTROCHEMICAL RESEARCH INSTITUTE**

Course Title: Electrochemical Power Sources (Core course)

Faculty (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	CHE/PHY/BIO/ENG - CECRI - 3 - 1406
L-T-P-C	2 – 0 – 0 - 2
Name of Teachers:	Dr. P. Periyasamy

Course Content details:

Energy scenario, emissions and global warming, fuel cells, Thermodynamic potentials, electrochemical processes and electrode kinetics, Proton exchange membranes, proton conducting mechanisms, recent advances, Operating conditions, overview of characterization techniques, technical aspects, advantages, materials, significances and challenges, Materials for supercapacitor applications, recent advances in the system development, battery vs. supercapacitor, modern technologies, challenges and prospects.

Proposed for: 19th Meeting of Senate

B. Ramesh Babu
Coordinator AcSIR-(CECRI) Dr. B. Ramesh Babu   Date: 20.02.2017

Lab Director: Date: 20 FEB 2017

Checked By: _____ (Associate Dean) Date: _____

Approved By: _____ (Dean) Date: _____

ANNEXURE P-5

Ashwini AcSIR <ashwini@acsir.res.in>

April 2017: Window open (from April 15-30) for Introduction/ Modification of Course(s)

Coordinator CSIR-CMERI <coordinator.cmeri@acsir.res.in>   Fri, Aug 11, 2017 at 6:08 PM
To: SumanKMishra <suman@nmlindia.org>
Cc: Associate Science <associatedean.engsci@acsir.res.in>, Arpita AcSIR <arpita.acsir@acsir.res.in>, Ashwini AcSIR <ashwini@acsir.res.in>, SN Shome <snshome@cmeri.res.in>

Dear Madam/ Sir,
Thank you very much for approving the modification, withdrawal and new courses pertaining to the Eng. Science Section (MTech/PhD and PGD).
We shall take care the issues as pointed out while preparing the updated brochure for M.Tech/PhD (Engg) and PGD program while incorporating the
the modification, withdrawal and new courses.

Thanks and best regards..
S. Nandy

On Fri, Aug 11, 2017 at 4:41 AM, SumanKMishra <suman@nmlindia.org> wrote:
Dear Dr. Nandy

The Eng.science section modification, withdrawal and new courses are approved.

Please follow few essential and concern as per mail below for some courses. The faculty for one course can't be more than 3 in normal cases. Otherwise it gets diluted. It must be followed.
In some modified courses are somewhere more content is added but credit has remained same. The content given must be covered during the classes.
Regards
S.K. Mishra

-------- Original Message --------
From: **Associate Dean Engineering Science** <associatedean.engsci@acsir.res.in>
Date: Aug 10, 2017 12:33:06 PM
Subject: Fwd: April 2017: Window open (from April 15-30) for Introduction/ Modification of Course(s)
To: Dean Engineering Science <dean.engsci@acsir.res.in>, SumanKMishra <suman@nmlindia.org>

Dear Dr Mishra,

Please find my comments on the proposed course addition/withdrawal/modifications below:

2-2108: Credits are same but content is greatly increased. How is this possible?

1-2104: Same query: content is same but lecture hours are reduced; Tutorial/Practical hours added.

1-2113: Same query, content is same but now there are 2 hours for practical. Which part of the theory will not be covered given the 33% reduction in lecture hours?

2-2102: Recommend approval

"New courses" 1-2120, 1-2135, 1-2136 2-2108 are already part of other programs and if already approved do not require fresh approval.

3-2118: Recommend approval

3-2119: Recommend approval (note that there is a typo in the numbering of instructors)

1-2120 modification: Number of instructors is too high. Suggest maximum four, since there were five previously, and the number of practical hours proposed is half that in the existing course.

ANNEXURE P-5

1-2124 recommend approval of request to withdraw
1-2126 recommend approval of request to withdraw
1-2131: recommend approval of request to withdraw

1-2127: Too many instructors

1-2130: Recommend approval of modification

Regards,
Chetan

---------- Forwarded message ----------
From: **Coordinator CSIR-CMERI** <coordinator.cmeri@acsir.res.in>
Date: Tue, Aug 8, 2017 at 5:29 PM
Subject: Fwd: April 2017: Window open (from April 15-30) for Introduction/ Modification of Course(s)
[Quoted text hidden]

--
**Dr. Mrs S. K. Mishra, Chief Scientist (Advanced Material Processing) and Head, Human Resource Group (HRG),
Dean Eng. Sc. and Adjunct Prof. AcSIR,
CSIR-National Metallurgical Laboratory, Jamshedpur, Jharkhand, India.831007,
E**mail: skm_smp@yahoo.co.in**, s**uman@nmlindia.org**, suman.nml@gmail.com
Ph. 91-657-234-5122, 5256, Fax:916572345213 mobile:09801341664**

--
Dr. S.Nandy
Sr. Principal Scientist
Robotics & Automation Group, CSIR-CMERI
Coordinator, AcSIR-CMERI
Durgapur

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

Name of Lab: **CSIR-Central Mechanical Engineering Research Institute**

Course Title: THEORY OF MANUFACTURING PROCESSES AND SYSTEMS

Faculty : _ES_ **(BS/CS/ES/PS/MIS)**	**Faculty (Course cluster):** _ES_ **BS/CS/ES/PS/MIS**
Course Nomenclature	ENG-CMERI-1-2120
L-T-P-C	2-0-2-3
Name of Teachers:	1. Dr. Nagahanumaiah 2. Dr. Arup Nandi 3. Dr. Ranjan Sen 4. Dr. Samik Dutta

Course Content Details:

Introduction: Overview of Machining Technology, Theory of Chip Formation in Metal Machining, cutting tools and materials.

Conventional Manufacturing Processes: Different types of material removal processes, Joining & Forming processes, Machine tools & and their structure.

Non Conventional Manufacturing: Electrical Discharge Machining, Electo Chemical Machining, Laser Assisted Machining, Forming and joining.

Finishing & Polishing Processes: Abrasive assisted grinding & polishing, Ion beam machining, Abrasive jet machining, Texturing, Coating & Deposition and surface Treatment.

Production Planning and Control: Process planning & Scheduling, Inventory Control, Material and Capacity Requirements Planning, Just-In-Time and Lean Production.

Introduction to Micro Machining: Micro-Milling, Micro- EDM and Laser Machining Processes.

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _____ Date: _03/05/17_

Lab Director: _____ Date: _04/05/17_

Checked By: _____ (Associate Dean) Date: _____

Approved By: _____ (Dean) Date: _____

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Name of Lab: _____ CSIR-Central Mechanical Engineering Research Institute ____

Course Title: DIAGNOSTIC MAINTENANCE AND CONDITION MONITORING

Faculty (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	ENG-CMERI-1-2135
L-T-P-C	2-0-2-3
Name of Teachers:	1. Mr. Kamalkishor J Uke 2. Dr. Swarup Kumar Laha 3. Dr. Kalyan Kumar Mistry

Course Content details:

Maintenance Strategies: Predictive, preventive and condition based; cost effectiveness. Balancing- single plane and multi plane, Basic Signal Processing Techniques: time domain, frequency domain. Machinery Vibration Diagnostics: Machine vibration standards, Fault Signature. Advanced Diagnostic Techniques: Gear Diagnostics, Rolling Element Bearing Diagnostics, Rotating Machine Diagnostics

Introduction to industrial electrical machine- Electrical motors, Switch gear, Transformers, generator, alternator etc. Various faults in electrical machine – stator fault, rotor fault, transformer fault, switch gear fault

Method of fault diagnosis or fault detection technique- motor current analysis, motor temperature analysis etc.

Introduction to electrical motor current signature analysis, Various fault detection equipment and industrial instruments

Practical: Single plane and multi plane Balancing

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _Swarup_

Date: _03/05/17_

Lab Director: _Kisan_

Date: _04/05/17_

Checked By: _____ (Associate Dean)   Date: _____

Approved By: _____(Dean)   Date: _____

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

Name of Lab: _____ CSIR-Central Mechanical Engineering Research Institute ____

Course Title: DAMAGE ASSESSMENT

Faculty (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	ENG-CMERI-1-2136
L-T-P-C	2-0-2-3
Name of Teachers:	1. Dr. Debashis Ghosh 2. Dr. Himadri Roy 3. Dr. Atanu Saha

Course Content details:

Damage mechanism of Industrial components: Different damage mechanism of materials: Creep, Fatigue, Erosion, Corrosion, Different characterization methods for damage assessment; Damage assessment through Non Destructive Testing: Visual examination, video imagescopy. Liquid Penetrant Testing, Magnetic Particle Testing, Ultrasonic Testing, Radiography, Acoustic Emission Testing, In-situ metallography and in-situ hardness. Residual life assessment (RLA) and failure analysis of industrial components: Introduction to RLA, Material and damage mechanism, Different techniques for quantitative estimation of residual life, Introduction to fracture mechanics in connection with residual life assessment, Failure analysis of industrial components

Practical: Visual and Video Imagescopy Inspection, Magnetic & amp; Liquid Penetrant Testing, Ultrasonic Testing, Industrial Radiography, In-situ Metallography, Metallographic Techniques, Material characterization using optical microscopy, Material characterization using electron microscopy, Mechanical Testing, Acoustic Emission, Techniques of failure analysis

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _Swansty_____   Date: _03/05/17_

Lab Director: _____   Date: _04/05/17_

Checked By: _____ (Associate Dean)   Date: _____

Approved By: _____(Dean)   Date: _____

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

Name of Lab: **CSIR-Central Mechanical Engineering Research Institute**

Course Title: Experimental methods in Materials processing

Faculty (BS/CS/ES/PS/MIS)	**Engineering Sciences (ES)**
Course Nomenclature	**ENG-CMERI-3-2118**
L-T-P-C	**3-1-0-4**
Name of Teachers:	1. Dr. Prosenjit Das 2. Dr. Shitanshu Shekhar Chakraborty 3. Dr. Nilrudra Mandal

Course Content details:

- Principles of material selection, grades and standards of Al, Mg steel based alloys and composites as per ASM guidelines, Material testing guidelines as per ASTM standards
- Brief overview of common materials processing techniques with focus on choosing appropriate raw materials and desirable mechanical and physical properties in finished parts: Casting, Forming, Welding, Machining
- Set-up design and process planning to perform Gravity die casting; Pressure assisted casting processes: Pressure die casting, Squeeze casting etc.; Compocasting; Semi-solid casting processes: Rheocasting, Thixocasting, Rheo and Thixo-moulding etc.; Centrifugal casting; Vacuum assisted casting
- Defects in sheet metal forming, Experimental methods to asses formability of sheet materials: cup test, forming limit diagram; Techniques to improve formability of sheet materials
- Insight of weld metallurgy; Filler and base material interaction; Quality control of weld; Weld & HAZ microstructure; Mechanical properties like tensile strength (longitudinal and transverse sample), hardness, toughness etc.; Methodology to achieve isotropic properties between filler and base material in welding of similar materials; Effects of process parameters on weld quality in welding processes, viz. TIG, MIG, LBW, EBW, FSW
- Characteristics to judge machinability; Experimental methods to assess machinability; Insight of chip-tool interaction; Methodology to choose work piece-tool combination; Techniques to improve machinability

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _____   Date: 03/05/17

Lab Director: _____   Date: 04/05/17

Checked By: _____ (Associate Dean)   Date: _____

Approved By: _____ (Dean)   Date: _____

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

Name of Lab: **CSIR-Central Mechanical Engineering Research Institute**

Course Title: Manufacturing Process Modelling

Faculty (BS/CS/ES/PS/MIS)	Engineering Sciences (ES)
Course Nomenclature	ENG-CMERI-3-2119
L-T-P-C	3-1-0-4
Name of Teachers:	3. Dr. Shitanshu Shekhar Chakraborty 4. Dr. Prosenjit Das 3. Dr. Nilrudra Mandal

Course Content details:

- Brief overview of common manufacturing processes: Casting, Forming, Powder metallurgy, Welding, Machining
- Introduction to numerical methods (working principle, merits-demerits and applications): FDM, FVM, BEM, FEM
- Introduction to statistical process modelling and analysis
- Transport phenomena during solidification – its implication in casting and welding: governing equations, phase change, two phase flow, initial and boundary conditions
- Analytical method and BEM to solve the heat conduction equation applied to thermal processes like welding and surface hardening
- Different analysis techniques of metal forming processes: slab analysis of rolling process, slip line analysis of punching, FE analysis of deformation behaviour of metals, FE analysis of thermal forming
- Analytical and FE modelling of orthogonal machining
- Application of numerical modelling techniques to powder metallurgy

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _____ Date: 03/05/17

Lab Director: _____ Date: 04/05/17

Checked By: _____ (Associate Dean) Date: _____

Approved By: _____(Dean) Date: _____

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Coordination Office
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Name of Lab: CSIR – Central Food Technological Research Institute, Mysuru
Integrated M.Sc-Ph.D in Nutrition Biology

Existing course	Modified course
Faculty (Course cluster): BS/CS/ES/PS/MIS: BS	Faculty (Course cluster): BS/CS/ES/PS/MIS -BS
Course Title: Food Immunology	Course Title: Food Immunology
Course Nomenclature BIO-CFTRI-2-1622	Course Nomenclature BIO-CFTRI-2-1622
L-T-P-C distribution: 3-0-0-3	L-T-P-C distribution: 2-0-2-3
Name of the Teachers : 1. Dr. Y.P. Venkatesh 2. Dr. Ramaprasad 3. Dr. Prabhashankar 4. Dr. Shylaja M Dharmesh	Name of the Teachers : 1. Dr. Y.P. Venkatesh 2. Dr. Ramaprasad 3. Dr. Prabhashankar
Existing Course Content: Immunoassay has a prominent position in rapid and sensitive detection. As understanding of the application of immunoassay in food safety increases, consumer awareness of hazardous factors in food grows, demand for high sensitive immunoassay techniques will rise remarkably. Food	**Modified Course Content: No.of hours will be adjusted as per the credits and practicals included – as highlighted** Immunoassay has a prominent position in rapid and sensitive detection. As understanding of the application of immunoassay in food safety increases consumer awareness of hazardous factors in food grows, demand for high sensitive immunoassay techniques will rise

1

Immunochemistry and Immunology review the latest development in immunoassay of typical pollutes in foods are included. The first part (relate to the primary knowledge o f various immunoassay techniques and the preparation of immune-molecules including antigen and antibody. The second part, considers the common pollutes in food such as agrochemicals, veterinary drugs, mycotoxins and other emerging contaminants and outlines the latest scientific achievements. Food Immunochemistry ad Immunology will provide professionals and researchers around the globe with a useful hint for health and disease conditions.	remarkably. Food Immunochemistry and Immunology review the latest development in immunoassay of typical pollutes in foods are included. The first part (relate to the primary knowledge o f various immunoassay techniques and the preparation of immune-molecules including antigen and antibody. The second part, considers the common pollutes in food such as agrochemicals, veterinary drugs, mycotoxins and other emerging contaminants and outlines the latest scientific achievements. Food Immunochemistry ad Immunology will provide professionals and researchers around the globe with a useful hint for health and disease conditions. No.of hours will be adjusted as per the credit and Practicals Included **Practicals:** Western Blotting, ELISA, Immunoelectrophoresis, Dot Blot Technique, Inflammation and changes in microbiota during cancer progression; effect of nutraceuticals, Estimation of cytokines

**May attach a separate sheet for content if required

Proposed for: ____19th____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _____

Date: 2·5·2017

CSIR-CFTRI
Lab Director: _____

Date: 2|5|17

Checked By: _____

(Associate Dean) Date: _____

Approved
Shanker Syph 26/2/17

2

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

AcSIR

Headquarters
Training & Development Complex, CSIR Campus, CSIR Road, Taramani, Chennai– 600 113

Coordination Office
CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P.O., New Delhi–110 025

Name of Lab: CSIR – Central Food Technological Research Institute, Mysuru
Integrated M.Sc-Ph.D in Nutrition Biology

Existing course	Modified course
Faculty (Course cluster): BS/CS/ES/PS/MIS: BS	Faculty (Course cluster): BS/CS/ES/PS/MIS -BS
Course Title: Human Physiology	Course Title: Human Physiology
Course Nomenclature BIO-CFTRI-2-1620	Course Nomenclature BIO-CFTRI-2-1620
L-T-P-C distribution: 3-0-0-3	L-T-P-C distribution: 2-0-2-3
Name of the Teachers : 1. Dr. Sudhir, G.K 2. Dr. Gayatri Bora	Name of the Teachers : 1. Dr. Sudhir, G.K 2. Dr. Gayatri Bora
Existing Course Content: Physiology focuses principally at the level of organs and systems. Chemical composition of the body, cell structure and genetic control, cell respiration and metabolism, neurons and membrane potentials, nervous system, muscular system, blood and blood clotting,	Modified Course Content: As highlighted below Physiology focuses principally at the level of organs and systems. Chemical composition of the body, cell structure and genetic control, cell respiration and metabolism, neurons and membrane potentials, nervous system, muscular system, blood and blood clotting, immune

1

immune system, cardiovascular system, respiratory physiology etc.	system, cardiovascular system, respiratory physiology etc. No. of hours will be adjusted as per the credits and **Practicals Included** **Practicals** Demonstration of RBC, WBC counts and HB estimation. Blood grouping, Demonstration of Pulmonary function testing, Observation on ECG, EEG, Dialysis

**May attach a separate sheet for content if required

Proposed for: _____12th_____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _Rahul_

Date: 2. 5. 2017

CSIR-CFTRI

Lab Director: _Rajasekharan_

Date: 2/5/17

Checked By: _____ (Associate Dean)   Date: _____

Approved By: _Shanta Sayyed_ (Dean)   Date: 26/2/18

2

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

AcSIR

Headquarters
Training & Development Complex, CSIR Campus, CSIR Road, Taramani, Chennai– 600 113

Coordination Office
CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P.O., New Delhi–110 025

Name of Lab: CSIR-Institute of Genomics and Integrative Biology

Existing course	Modified course
Faculty (Course cluster): BS BS/CS/ES/PS/MIS:	Faculty (Course cluster): BS BS/CS/ES/PS/MIS
Course Title: Basic Chemistry	Course Title: Basic Chemistry
Course Nomenclature: BIO-IGIB-1-0003	Course Nomenclature: BIO-IGIB-1-0003
L-T-P-C distribution: 1-0-0-1	L-T-P-C distribution: 1-0-0-1
Name of the Teachers : Dr Souvik Maiti, Dr Munia Ganguli	1. Dr Souvik Maiti 2. Dr Munia Ganguli
Course content: Thermodynamics Solutions and Ions Chemical bonding and molecular structure Chemical Kinetics Stereochemistry Introduction to drug discovery (Medicinal chemistry approach) Drug target, discovery and development (forward and reverse approach	Modified Course content: Chemical language of biology Kinetics Thermodynamics Spectroscopy

**May attach a separate sheet for content if required

Coordinator AcSIR-(Lab Name) Dr Chetana Sachidanand (IGIB)

Proposed for: _____ Meeting of Senate

Date:

Lab Director: _____ Date: _____

Checked By: _____ (Associate Dean) Date: _____

Approved By: _____ (Dean) Date: _____

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

AcSIR

Headquarters
Training & Development Complex, CSIR Campus, CSIR Road, Taramani, Chennai– 600 113

Coordination Office
CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P.O., New Delhi–110 025

Name of Lab: CSIR-Institute of Genomics and Integrative Biology

Existing course	Modified course
Faculty (Course cluster): BS BS/CS/ES/PS/MIS:	Faculty (Course cluster): BS BS/CS/ES/PS/MIS
Course Title: Genomics: Information flow in Biological Systems	Course Title: Genomics: Information flow in Biological Systems
Course Nomenclature: BIO-IGIB-2-2601	Course Nomenclature: BIO-IGIB-2-2601
L-T-P-C distribution: 1-1-0-2	L-T-P-C distribution: 1-1-0-2
Name of the Teachers : Dr Mitali Mukerji, Dr Sivaprakash Ramalingam, Dr Debojyoti Chakraborty	Name of the Teachers : Dr Mitali Mukerji, Dr Sivaprakash Ramalingam, Dr Debojyoti Chakraborty
Course content: G. K. Chesterton said: "A building is akin to dogma; it is insolent, like dogma. Whether or no it is permanent, it claims permanence, like a dogma. People ask why we have no typical architecture of the modern world, like impressionism in painting. Surely it is obviously because we have not enough dogmas; we cannot bear to see anything in the sky that is solid and enduring, anything in the sky that does not change like the clouds of the sky." Science moves forward by the demolishing of existing dogmas. Nowhere in biology is it more relevant today than our understanding of the genome and its complexity. The course will chart the changes in our understanding and appreciation of the human, and other, genomes. It will attempt to bring forth the latest concepts in dissecting the genome and revealing functional elements of evolutionary and regulatory importance.	Modified Course content: The course deals with an overview of the science of genomics and the changing paradigms in genetics and biology; introduction to human genome project and the learnings from it, Next Generation Sequencing Technologies and its applications, insights from sequencing of diverse organisms; multi-omic technologies and its role in understanding the structure-function organization of the human genome; genomics in diverse areas of science from basic biology to application, variability in the human genome, methodologies and its role in health and disease, modelling and correction using genome editing tools, Functional annotation of the human genome, overview of the Encode /Epigenome projects and its applications in stem cell therapeutics

**May attach a separate sheet for content if required

Coordinator AcSIR-(Lab Name) Dr Chetana Sachidanand (IGIB)

Proposed for: _____ Meeting of Senate

Date:

Lab Director: _____ Date: _____

Checked By: _____ (Associate Dean) Date: _____

Approved By: _____ (Dean) Date: _____

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

AcSIR

Headquarters
Training & Development Complex, CSIR Campus, CSIR Road, Taramani, Chennai– 600 113
Coordination Office
CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P.O., New Delhi–110 025

Name of Lab: **CSIR-Institute of Genomics and Integrative Biology**

Existing course	Modified course
Faculty (Course cluster): BS BS/CS/ES/PS/MIS:	Faculty (Course cluster): BS BS/CS/ES/PS/MIS
Course Title: Immortality: the everlasting quest	Course Title: Immortality: the everlasting quest
Course Nomenclature: BIO-IGIB-3-2606	Course Nomenclature: BIO-IGIB-3-2606
L-T-P-C distribution: 1-1-0-2	L-T-P-C distribution: 1-1-0-2
Name of the Teachers : Dr Chetana Sachidanandan	1. Dr Chetana Sachidanandan
Course content: The ability to regenerate lost or damaged organs is a dream humans have had since the beginning of civilization. Although humans have very limited capacity for regeneration, there are a many organisms that can regenerate complete organs and at times their whole body. We will explore these magical organisms and distill what we have learnt from studies of such organisms. The discussion course will try to estimate what our challenges will be if stem cell biology has to meet its expectations. We will discuss the latest advances made in the field of stem cell biology and the extent of our present ability to convert somatic cells into stem cells and then lead them down particular pathways of differentiation. The need to understand development and cellular reprogramming to generate tissues of our choice from the pluripotent stem cells.	Modified Course content: 'One has to pay dearly for immortality; one has to die several times while one is still alive.' Friedrich Nietzsche If death cannot be defeated then how to achieve immortality? Perhaps by rejuvenating and regenerating all our worn-out parts? Although humans have very limited capacity for regeneration, there are a many organisms that can regenerate complete organs and at times their whole body. What can these animals teach us about regeneration? If we can learn all there is to know about how stem cells sleep and how we can awaken their stemness would we have cracked the code for immortality? What can embryologists and engineers and physicists and botanists contribute towards putting final pieces together in the puzzle? The course will attempt to address these questions and in the process introduce the guiding principles of stem cell biology and regenerative medicine.

**May attach a separate sheet for content if required

Coordinator AcSIR-(IGIB) *[signature]* 12-4-17

Lab Director: _____

Checked By: _____   (Associate Dean)

Approved By: *[signature]* (Dean)

Proposed for: _____ Meeting of Senate

Date:

Date: _____

Date: _____

Date: _____

Modified courses for approval

Dean Chemical Science <dean.chemsci@acsir.res.in>   Wed, Oct 4, 2017 at 6:20 PM
To: Kanya AcSIR <kanya@acsir.res.in>
Cc: Associate Dean Chemical Science <associatedean.chemsci@acsir.res.in>, Arpita AcSIR <arpita.acsir@acsir.res.in>, Ashwini AcSIR <ashwini@acsir.res.in>

Dear All

The modified course has been approved.

With regards
Subbu
[Quoted text hidden]

CSIR-CMERI, Durgapur-713209

M. Tech / PhD program (Chemical Sciencse)

Modification of Existing Courses

Sl. No	Course Code	Course Title Existing	Course Title Modified	Hours/Week			Credit Points	Remarks
				L	T	P		
1	CHE-CMERI-1-2108	Advanced Surface Science	Same as existing	2	0	0	2	Syllabus is modified. Course code and credit structure will remain the same.

(signature) 03/05/17

Modification of Existing Courses

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

Name of Lab: __CSIR-Central Mechanical Engineering Research Institute_____

Existing course	Modified course
Faculty (Course cluster): BS/CS/ES/PS/MIS: CS	Faculty (Course cluster): BS/CS/ES/PS/MIS: CS
Course Title: Advanced Surface Science	Course Title: Advanced Surface Science
Course Nomenclature: CHE-CMERI-2-2108	Course Nomenclature: CHE-CMERI-2-2108
L-T-P-C distribution: 2-0-0-2	L-T-P-C distribution: 2-0-0-2
Name of the Teachers : DR. RASHMI RANJAN SAHOO	1.DR. RASHMI RANJAN SAHOO
Course content: Introduction to Surface Science - Surface phenomena - Adsorption, Desorption, Adsorption Models, Special properties of surfaces and interfaces, Electronic structure of surfaces, Surface modification and its applications, Nanoscale catalysis and applications, Surface spectroscopy and microscopy tools for nanocatalysis	Modified Course content: Introduction to Surface Science, Surface and Intermolecular forces, Scanning Probe Microscopy, Solid Lubricants and Self-Lubricating Films, Metallic and Ceramic Coatings, Diamond, Diamond-like Carbon and Related Films, Organic Films and Self-assembly, Self-Assembled Monolayers for Controlling Hydrophobicity and/or Friction.

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _____   Date: 03/05/17

Lab Director: _____   Date: 04/05/17

Checked By: _____   (Associate Dean)   Date: _____

Approved By: _____   (Dean)   Date: _____

Ashwini AcSIR <ashwini@acsir.res.in>

Details of PhD (Physical Sci) courses at CSIR-CEERI

KS Krishna <krishna@nio.org>   Fri, May 12, 2017 at 3:11 PM
To: AcSIR-CEERI Coordinator <coordinator.ceeri@acsir.res.in>
Cc: Arpita AcSIR <arpita.acsir@acsir.res.in>, arpita.acsir@gmail.com, Ashwini AcSIR <ashwini@acsir.res.in>

Dear Dr. Suchandran,

I am approving the modified content of courses to be taught at CEERI from next academic year onwards. Also this needs to be approved by the Senate. Please be in contact with Arpita and Ashwini Misra for the Senate approval.

Arpita, you may please consider to put-up this matter for the Senate meeting for its approval.

Thanks & Regards
KS Krishna

-----Original Message-----
From: Coordinator CSIR-CEERI [mailto:coordinator.ceeri@acsir.res.in]
Sent: 11 May 2017 18:54
To: Krishna KS <krishna@nio.org>
Cc: Dean Physical Science <dean.physci@acsir.res.in>; spal@ceeri.res.in; Raj Singh <raj.ceeri@gmail.com>
Subject: Re: Fwd: Details of PhD (Physical Sci) courses at CSIR-CEERI

Dear Sir,

As desired, attached herewith the file containing the details (course
instructor(s) and suggested books) of list of courses for AcSIR-PhD (Phy Sci) at CSIR-CEERI for your kind perusal and approval.

Thanks and regards,

Suchandan.
AcSIR Coordinator at CSIR-CEERI.

-- AcSIR Coordinator at CSIR-CEERI, Pilani

On Thu, May 4, 2017 at 11:32 AM, Krishna KS <krishna@nio.org> wrote:
> Dear Dr. Suchandan,
>
> OK, it is alright. Please submit all the information for the approval
> and for further process.
>
> Thanks & Regards
> KS Krishna
>
>
>
> On 05/04/17 10:39 AM, Coordinator CSIR-CEERI
> <coordinator.ceeri@acsir.res.in> wrote:
>
> Dear Sir,
>
> Yes, most of the courses are modified based on the current theme and
> R&D focus of our lab (CSIR-CEERI) and therefore the course
> nomenclatures are changed. Course coordinators are preparing the
> details at the moment and I was informed (by Prof. Raj Singh, earlier
> Coordinator at CEERI) that the details are required in later stage.
> Anyway, if those are mandatory at this moment, I will ask all course
> coordinators to give details. It may require another 3-4 days. Is that
> Ok!

ANNEXURE P-5

>

> Thanks and regards,

> Suchandan.

>

> -- AcSIR Coordinator at CSIR-CEERI, Pilani

>

>

> On Wed, May 3, 2017 at 10:01 PM, Krishna KS <krishna@nio.org> wrote:

>> Dear Dr. Suchandan,

>>

>> I just wanted to get clarify whether all the courses shown in

>> attachment have been modified. Secondly, you have to add Course

>> Coordinators and suggested books for each course. Please submit with

>> the requested information.

>>

>> Thanks & Regards

>> KS Krishna

>>

>>

>>

>>

>> On 05/03/17 11:12 AM, Coordinator CSIR-CEERI

>> <coordinator.ceeri@acsir.res.in> wrote:

>>

>> Dear Madam,

>>

>> I am forwarding the previous email regarding changes/ modifications

>> in course list for PhD (Phy Sci) at CSIR-CEERI (based on current

>> theme areas and R&D focus of the Lab) for your kind perusal and

>> approval, as I have not received any reply so far.

>>

>> Thanks and regards,

>>

>> Suchandan.

>> -- AcSIR Coordinator at CSIR-CEERI, Pilani

>>

>>

>>

[Quoted text hidden]

📄 **PhD-PhySci-CEERI-2017.pdf**
366K

PhD (Physical Sciences) at CSIR-CEERI, Pilani

List of Courses

S No.	Faculty	Lab Name	Course Nomenclature	Course Name	L	T	P	C	Core/ Elective
1	PHY	CEERI	PHY-CEERI-1-1501	Technical communications	2	0	0	2	Core
2	PHY	CEERI	PHY-CEERI-1-1502	Research methodology	1	1	0	2	Core
3	PHY	CEERI	PHY-CEERI-2-1501	Project management	2	0	0	2	Core
4	PHY	CEERI	PHY-CEERI-2-1511	Advanced engineering mathematics	3	0	0	3	Elective
5	PHY	CEERI	PHY-CEERI-2-1512	Measurement and characterization techniques	3	0	0	3	Core
6	PHY	CEERI	PHY-CEERI-2-1513	Modelling and simulation of electronic systems	3	0	0	3	Core
7	PHY	CEERI	PHY-CEERI-2-1514	Signal processing	3	0	0	3	Elective
8	PHY	CEERI	PHY-CEERI-2-1522	Lab: Measurement and characterization techniques	0	1	2	1	Core
9	PHY	CEERI	PHY-CEERI-2-1523	Lab: Modelling and simulation of electronic systems	0	0	2	1	Core
10	PHY	CEERI	PHY-CEERI-2-1524	Lab: Signal processing	0	0	2	1	Elective
11	PHY	CEERI	PHY-CEERI-2-1531	Electromagnetic theory and transmission lines	3	0	0	3	Elective
12	PHY	CEERI	PHY-CEERI-2-1532	Microwave and satellite communications	2	0	0	2	Elective
13	PHY	CEERI	PHY-CEERI-3-1501	Advanced self-study (special topic)	0	2	4	4	Elective
14	PHY	CEERI	PHY-CEERI-3-1511	Technologies for IoT	3	1	0	3	Elective
15	PHY	CEERI	PHY-CEERI-3-1512	Cyber physical systems	3	1	0	3	Elective
16	PHY	CEERI	PHY-CEERI-3-1513	High-level electronic system design and realization	3	0	0	3	Elective
17	PHY	CEERI	PHY-CEERI-3-1514	Signal processing and machine learning	3	0	0	3	Elective
18	PHY	CEERI	PHY-CEERI-3-1515	Image processing and computer vision	3	2	0	4	Elective
19	PHY	CEERI	PHY-CEERI-3-1516	Cognitive systems	3	2	0	4	Elective
20	PHY	CEERI	PHY-CEERI-3-1517	Smart-grid and renewable energies	3	0	0	3	Elective
21	PHY	CEERI	PHY-CEERI-3-1518	Process control and embedded systems	3	0	0	3	Elective
22	PHY	CEERI	PHY-CEERI-3-1519	Embedded Intelligence	3	0	0	3	Elective
23	PHY	CEERI	PHY-CEERI-3-1523	Lab: High-level electronic system design and realization	0	0	2	1	Elective
24	PHY	CEERI	PHY-CEERI-3-1524	Lab: Signal processing and machine learning	0	0	2	1	Elective

25	PHY	CEERI	PHY-CEERI-3-1527	Lab: Smart-grid and renewable energies	0	0	2	1	Elective
26	PHY	CEERI	PHY-CEERI-3-1528	Lab: Process control and embedded systems	0	0	2	1	Elective
27	PHY	CEERI	PHY-CEERI-3-1531	Micro- and nano-technologies	3	2	0	4	Elective
28	PHY	CEERI	PHY-CEERI-3-1532	Micro-sensors and actuators	3	0	0	3	Elective
29	PHY	CEERI	PHY-CEERI-3-1533	Photonic and optoelectronic devices and technologies	3	0	0	3	Elective
30	PHY	CEERI	PHY-CEERI-3-1534	Non-silicon and flexible materials, devices and technologies	3	2	0	4	Elective
31	PHY	CEERI	PHY-CEERI-3-1541	Lab: Micro- and nano-technologies	0	0	4	2	Elective
32	PHY	CEERI	PHY-CEERI-3-1542	Lab: Micro-sensors and actuators	0	0	4	2	Elective
33	PHY	CEERI	PHY-CEERI-3-1543	Lab: Photonic and optoelectronic devices and technologies	0	0	2	1	Elective
34	PHY	CEERI	PHY-CEERI-3-1551	Principles of high power microwave tubes	3	2	0	4	Elective
35	PHY	CEERI	PHY-CEERI-3-1552	Microwave and mm-wave tube technologies	3	0	0	3	Elective
36	PHY	CEERI	PHY-CEERI-3-1553	Vacuum microelectronic THz devices	2	0	0	2	Elective
37	PHY	CEERI	PHY-CEERI-3-1554	Plasma devices	2	0	0	2	Elective
38	PHY	CEERI	PHY-CEERI-3-1555	Advanced electromagnetic materials	2	0	0	2	Elective
39	PHY	CEERI	PHY-CEERI-3-1556	Numerical analysis and techniques for microwave applications	2	0	0	2	Elective
40	PHY	CEERI	PHY-CEERI-3-1561	Lab: Microwave components and device characterizations	0	1	4	2	Elective
41	PHY	CEERI	PHY-CEERI-4-0001	Project proposal	0	0	4	2	Core
42	PHY	CEERI	PHY-CEERI-4-0002	Review article	0	0	4	2	Core
43	PHY	CEERI	PHY-CEERI-4-0003	CSIR-800 societal programme	0	0	8	4	Core

PHY (CEERI): 1-1501: Technical communications (2-0-0-2)

Role and importance of technical communication; Effective written and oral communication; Ethical issues; Technical report writing; Technical/ R&D proposals; Research paper writing; Letter writing and official correspondence; Emails; Oral communication in meetings and group discussions; Oral presentations; Use of modern aids.

Course-Instructor: Prof. Raj Singh

Suggested books: 1. S. J. Gerson and S. M. Gerson, Technical Communication: Process and Product, Fifth Edition, Pearson, 2007. (Indian Edition); 2. M. Raman and S. Sharma, Technical Communication: Principles and Practices, Second Edition, OUP, 2011. (Indian Edition); 3. M. Raman and S. Sharma, Technical Communication: English Skills for Engineers, Second Edition, OUP, 2009. (Indian Edition); 4. IEEE Transactions on Professional Communication; 5. IEEE Engineering Management Review; 6. General Topics Magazines e.g. IEEE Spectrum, Scientific American, Science, Nature, etc.7. Websites, handout material, technical papers, and example videos of presentations.

PHY (CEERI): 1-1502: Research methodology (1-1-0-2)

Introduction, terminology, and scientific methods; Types of research; Research process and steps; Identifying a research problem; Literature survey, appreciation of existing literature, identification of knowledge gaps; Conception of novel approach to solve the problem; Role of theory, modeling, and simulation; Design of experiments, testing and characterization strategies; Quantitative methods and data analysis; Qualitative analysis; Communicating research results; Thesis writing and oral presentation; Ethics in research.

Course-Instructor: Prof. Raj Singh

Suggested books: 1. R. Kumar, Research Methodology: A Step-by-Step Guide for Beginners, Third Edition, Sage, 2010/2011. (Indian Edition); 2. W. C. Booth, G. G. Colomb and J. M. Williams, The Craft of Research, Third Edition, University of Chicago, 2008; 3. J. W. Creswell, Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, Third Edition, Sage, 2008. (Indian Edition); 4. M. P. Marder, Research Methods for Science, CUP, 2011; 5. Z. O'Leary, The Essential Guide to Doing Your Research Project, Second Edition, Sage, 2009. (Indian Edition); 6. V. Ruggiero, Beyond Feelings : A Guide to Critical Thinking, Ninth Edition, McGraw-Hill, 2011; 7. K. L. Turabian, W. C. Booth, G. G. Colomb, J. M. Williams, A Manual for Writers of Research Papers, Theses, and Dissertations, Seventh Edition, University of Chicago, 2007; 8. C. R. Kothari, Research Methodology: Methods and Techniques, Second Edition, New Age / Wishwa Prakashan, 1990/2005. (Indian Edition)

PHY (CEERI): 2-1501: Project management (2-0-0-2)

Introduction; Project formulation, evaluation and initiation; Project planning and scheduling; Risk management; Project execution and implementation; Project monitoring and control; Project closure; Project documentation; Leadership and teamwork issues; Complex projects; Advances and trends.

Course-Instructor: Prof. Raj Singh

Suggested books: 1. P. Roberts, Effective Project Management, Kogan Page, 2011. (Indian Edition); 2. K.Heldman, Project Management JumpStart, Second Edition, Sybex/Wiley, 2005. (Indian Edition); 3. H. Kerzner, Project Management: A Systems Approach to Planning, Scheduling and Controlling, Tenth Edition, Wiley, 2009; 4. S. J.Mantel, J. R. Meredith, S.M. Shafer and M.M. Sutton (with M. R. Gopalan), Project Management Core Textbook,

Wiley-India, 2007. (Indian Edition); 5. S. E. Portny, Project Management for Dummies, Third Edition, Dummies/Wiley, 2010; 6. R. K. Wysocki, Effective Project Management: Traditional, Agile, Extreme, Fifth Edition,Wiley, 2009. (Indian Edition)

PHY (CEERI): 2-1511: Advanced Engineering Mathematics (3-0-0-3)

First and higher order differential equations; Bernoulli's equation; Euler-Cauchy equation; Practical examples and modelling of differential equations; Laplace transforms; Linear and Matrix algebra; Eigenvalue and eigenvector; Symmetric, Skew-symmetric and orthogonal matrices, Triangularization of matrices; Taylor series; Fourier series; Gradient, divergence and curl; Line, surface and volume integrals; Stokes's theorem; Basic concepts of optimization; Line searches, Gradient based methods, Global optimization methods; Data Representation; Probability; Permutations and Combinations; Random Variables; Probability Distributions.

Course-Instructor: Deepak Bansal

Suggested books: 1. Advanced Engineering Mathematics by Erwin Kreyszig; 2. Advanced Engineering Mathematics by Michael Greenberg; 3. Introduction to linear Algebra by Gilbert Strang; 4. Optimization for Engineering Design: Algorithms and Examples by Kalyanmoy Deb.

PHY (CEERI): 2-1512: Measurement and characterization techniques (3-0-0-3)

Data acquisition; Sensors, signals and systems; Sensor characteristics, Transfer function; Calibration, computation of stimulus, span, calibration error, hysteresis, nonlinearity, saturation, repeatability, dead band, resolution; Noise in sensors and circuits; Measurement of impedance, capacitance, voltage and current; Compensation and drift techniques; Measurement techniques for sheet resistivity, contact resistance, barrier height, carrier and doping concentration, mobility and carrier life time; Characterization of materials and devices; Scattering parameters; Measurement of impedance and characterization of cavities; Dispersion and impedance characterization of RF structures; RF loss measurements; Measurement of frequency, power, gain efficiency of microwave devices; Plasma Devices characterization.

Course-Instructor: Dr S Maurya

Suggested books: 1. Microwave Devices and Circuits, Samuel Y. Liao, Prentice Hall, New Jersey; 2. Microwave Engineering, David M. Pozar, Wiley; 3. Handbook of Modern Sensors, physics, design and applications, Jacob Fraden, 5th edition (springer).

PHY (CEERI): 2-1513: Modelling and simulation of electronic systems (3-0-0-3)

Introduction to modelling: need, types, simulation tools; Basic system modelling overview: electrical, mechanical, thermal; Transfer function; Dynamical system modelling; Frequency response and loop shaping; Modelling of digital systems; Physical modelling with proper material and dimensions; Boundary conditions; Signal excitation; Conversion of physical modelling into numerical modelling; Modelling and simulation on MEMS electrostatic and thermal actuation: spring constant, modal frequency, actuation and displacement, pull-in and pull-out voltages, piezoelectric, resistive and capacitive sensing.

Course-Instructor: Dr Amitavo Roy Chaudhury and Deepak Bansal.

Suggested books: 1. Modeling and Simulation – an application oriented introduction, Hans-Joachim Bungartz, Stefan Zimmer, Martin Buchholz, Dirk Pflüger, Springer-Verlag, 2014; 2. Theory of Modeling and Simulation, 2nd Edition, Bernard Zeigler, Tag Kim, Herbert Praehofer, Academic Press, 2000; 3. System Identification: Theory for the User", 2ed, Lennart LJung, Prentice Hall, 1998; 4. Modern Control Engineering, Katsuhiko Ogata; 5. Digital control and state variable methods, M. Gopal; 6. Foundations of MEMS, Chang Liu; 7. Microsystem design, Stephen D. Senturia.

PHY (CEERI): 2-1514: Signal processing (3-0-0-3)

Time domain and frequency domain characterization of Linear Time Invariant (LTI) Discrete-Time Systems (DTS); Discrete Time Fourier Transform (DTFT), Transfer function, Frequency response; Discrete Fourier Transform (DFT), z-transform; FIR and IIR filter design; Discrete wavelet transform; DSP algorithm implementation issues and finite word length effects; Auto-regressive, Moving average and ARMA processes; Spectral Factorization; Parametric and non-parametric estimation, Detection in Gaussian noise; Linear prediction; Wiener and Kalman filter; Adaptive filters: steepest decent, LMS algorithm, adaptive noise cancellation, recursive least squares (RLS).
Course-Instructor(s): Dr Abhijit Karmakar and Ms Somsukla Maiti
Suggested books: 1. Digital Signal Processing: A Computer-based Approach, By Sanjit Kumar Mitra, Publisher: McGraw-Hill; 2. Statistical Digital Signal Processing and Modeling, By Monson H. Hayes, Publisher: John Wiley & Sons.

PHY (CEERI): 2-1522: Lab: Measurement and characterization techniques (0-1-2-1)

Laboratory practices and safety considerations; Study of sensors, their transfer function and calibration; Design of measurement system for temperature, humidity and gas sensors; Calibration of measuring equipment; I-V and C-V measurements; sheet-resistivity, thickness measurement; Ellipsometry, Raman, IR spectroscopy, STM, AFM and 3-D profiling, SEM, EDX, XRD, photoluminescence, Auger Spectroscopy, ECV profiling, Scanning probe microscopy, Magnetic measurement, LDV, Ellipsometry, Raman IR spectroscopy; Measurement of cold and hot parameters of microwave tubes and plasma devices; High-voltage breakdown testing of microwave tubes and switches; Device characterization using spectrum analyzer, scalar/vector analyzer.
Course-Instructor: Dr S Maurya.
Suggested books: 1. Basic Microwave Techinques and Laboratory Manual, By: ML Sisodia and GS Raghuvanshi , Wiley Eastern Limited; 2. Handbook of Modern Sensors, physics, design and applications, Jacob Fraden, 5th edition (springer).

PHY (CEERI): 2-1523: Lab: Modelling and simulation of electronic systems (0-0-2-1)

Laboratory practices and safety considerations; Passive and active device modelling using MATLAB; Introduction to HFSS and CoventorWare tools; Case study on MEMS actuators using Coventorware tool: pull-in and pull-out voltages, resonant frequency and spring constant. Case studies on electro-mechanical and electro-thermal switches.
Course-Instructor: Dr Amitavo Roy Chaudhury and Deepak Bansal.
Suggested books: 1. Modeling and Simulation – an application oriented introduction, Hans-Joachim Bungartz, Stefan Zimmer, Martin Buchholz, Dirk Pflüger, Springer-Verlag, 2014; 2. Theory of Modeling and Simulation, 2nd Edition, Bernard Zeigler, Tag Kim, Herbert Praehofer, Academic Press,

2000; 3. System Identification: Theory for the User", 2ed, Lennart L Jung, Prentice Hall, 1998; 4. Manuals of MATLAB, Simulink, LabView, CoventorWare, HFSS and CST.

PHY (CEERI): 2-1524: Lab: Signal processing (0-0-2-1)

Laboratory practices and safety considerations; MATLAB experiments on LTI systems in time and frequency domain, transfer function, frequency response; Design of digital FIR and IIR filters, auto-regressive, moving average, ARMA; Experiments on Spectral factorization, Wiener filtering, LMS and RLS algorithms.

Course-Instructor(s): Dr Abhijit Karmakar and Ms Somsukla Maiti

Suggested books: 1. Digital Signal Processing: A Computer-based Approach, By Sanjit Kumar Mitra, Publisher: McGraw-Hill; 2. Statistical Digital Signal Processing and Modeling, By Monson H. Hayes, Publisher: John Wiley & Sons.

PHY (CEERI): 2-1531: Electromagnetic theory and transmission lines (3-0-0-3)

Review of Maxwell's equations, wave equations and their solutions; Boundary conditions and their applications; Electromagnetic energy and power flow; Review of Poynting theorem; Transmission lines; Wave-guide and coaxial components; Scattering matrix representation; Propagation of electromagnetic waves through homogeneous, in-homogeneous, and anisotropic media; Surface resistance and RF resistance; Ferrite devices; Waveguides and resonators; Characteristic and interaction impedances; Quality factor (loss and diffractive). Impedance matching; Measurement of "Q", power, noise figure, S-parameters, dielectric constant and loss tangent, dispersion and impedance characteristics, and loss parameters.

Course-Instructor: Dr SK Ghosh

Suggested books: 1. Electromagnetic theory and beam-wave interaction, BN Basu; 2. Electromagnetic waves and radiating system, EC Jordon and KG Balmain; 3. Electromagnetic theory, JA Straton; 4. Fields and wave in communication electronics, S Ramo, JR whinnary, and TV Duzer; 5. Engineering electromagnetics, WH Hayt, Jr.

PHY (CEERI): 2-1532: Microwave and satellite communications (2-0-0-2)

Ground/surface wave, space-wave, and sky-wave modes of communication; Tropo-spheric Communication; Line-of-sight communication and system performance; Active and passive repeaters and their design; Modes of communication: analog and digital; Mobile communication; Satellite communication system; Earth station design criteria and direct reception system; Satellite transponders and their design criteria; Phase-noise, intra-pulse and inter-pulse noises and their significance.

Course-Instructor: Dr Debasish Pal

Suggested books: 1. Microwave and Wireless Communication Technology, J J Carr, Elsevier; 2. Microwave Engineering, 4th edition, D M Pozar, John Willey & sons; 3. Satellite Communications, T. Pratt, C. W. Bostain and J. E. Allnut, Willey India; 4. Satellite Communications Systems, G Maral and M Bousquet, John Willey & sons; 5. Satellite Communications, D Roddy, McGraw Hill.

PHY (CEERI): 3-1501: Advanced self-study (special topic) (0-0-4-2)

This will involve readings from published literature or books about new frontiers on a specific topic related to the field of electronics under guidance of senior scientist(s). A report needs to be submitted and a seminar on the special topic needs to be presented.
Course-Instructor: NA
Suggested books: Relevant journal papers on selected topic.

PHY (CEERI): 3-1511: Technologies for IoT (3-1-0-3)

Internet in general and Internet of Things (IoT): Technological trends in IoT, Societal benefits of IoT, IoT applications; IoT software technologies: Software architecture, Framework/ platforms, Operating systems; IoT Communication Technologies: Sensor interface and computation considerations; Wireless sensor network (WSN); Embedded Systems: embedded sensors and actuators, Interfacing with PI and Arduino boards, Interfacing camera, UART, ADA, DAV, LCD; IoT Security, privacy and risks; Application case studies.
Course-Instructor: Dr Kota S Raju and Dr Anil Saini
Suggested books: 1. McEwen, Adrian, and Hakim Cassimally. Designing the internet of things. John Wiley & Sons, 2013; 2. Pfister, Cuno. Getting Started with the Internet of Things: Connecting Sensors and Microcontrollers to the Cloud. " O'Reilly Media, Inc.", 2011.

PHY (CEERI): 3-1512: Cyber physical systems (3-1-0-3)

Principles of Cyber Physical System, modelling and design, smart sensors and actuators, feedback control of dynamical systems, embedded computing, real-time considerations, hybrid systems, communication network protocols, advanced analytics, distributed algorithms, machine learning, formal methods for specifications, analysis and verification. Case studies: smart water grid, smart renewable energy systems, environment monitoring and robotics; Lab: Sensor and actuator interfacing, calibration and drift compensation in multi-tank system; Programming embedded systems in Samsung Artik/ Intel Galileo platforms using C/ C++/ JAVA/ Python/ MATLAB; Design and modelling of Cyber-Physical Systems; Data analytics and decision making, current trends.
Course-Instructor: Dr B A Botre
Suggested books: 1. Edward A. Lee and Sanjit A. Seshia, Introduction to Embedded Systems, A Cyber-Physical Systems Approach, Second Edition, 2015; 2. Danda B. Rawat, Joel J.P.C. Rodrigues, Ivan Stojmenovic, Cyber-Physical Systems: From Theory to Practice, CRC press, 2015; 3. Rajeev Alur. Principles of Cyber-Physical Systems. MIT Press. 2015; 4. K. J. Astrom and R. M. Murray. Feedback Systems: An Introduction for Scientists and Engineers. Prince- ton University Press, 2009.

PHY (CEERI): 3-1513: High-level electronic system design and realization (3-0-0-3)

Electronic System-Level (ESL) design; Taxonomy and definitions of ESL, ESL design-flow; System-level design methodologies; System modelling; Models of computation; IP-based design; Platform-centric system design methodology; Specification and architectural synthesis; Area and performance estimation; Techniques for architectural optimization; Data-path synthesis; Control unit synthesis; Scheduling; Resource sharing and binding; System modelling styles using VHDL/Verilog; Basic language elements; Control structures; Sub-programs and packages; Simulation concepts; Design for synthesis; RTL state machine design styles; RTL Modelling techniques; Functional models and test-benches; Mixed HDLs simulation and

synthesis; FPGAs architecture; FPGA-based design methodology; System design tools; System platforms; System performance analysis; IP-based design.
Course-Instructor: Dr JG Pandey
Suggested books: 1. Platform Based Design at the Electronic System Level, Mark Burton, Adam Morawiec Weste; 2.
Embedded System Design Modeling, Synthesis and Verification, Daniel D. Gajski, Samar Abdi, Andreas Gerstlauer, Gunar Schirner; 3. ESL Design and Verification a Prescription for Electronic System-level Methodology, Brian Bailey, Grant Martin, Andrew Piziali; 4. VHDL Coding Styles and Methodologies, Ben Cohen; 5. Verilog HDL: A Guide to Digital Design and Synthesis, Samir Palnitkar

PHY (CEERI): 3-1514: Signal processing and machine learning (3-0-0-3)

Introduction to time series analysis and its description; Classification of time series; Regressive models; Time-domain models; Frequency-domain models; Model building and forecasting methods; Fuzzy set theory, fuzzy logic, fuzzy decision making, approximate reasoning, fuzzy relations, and fuzzy rule based systems; Adaptive neural networks; Supervised learning neural networks; Learning from reinforcement; Unsupervised learning and other neural networks; Neuro-fuzzy modeling and neuro-fuzzy control; Basics of pattern recognition: generative modeling – Gaussian and mixture Gaussian models, hidden Markov models, factor analysis and latent variable models, Clustering methods and decision trees. Feature and model adaptation methods, feature selection methods; Current trends.
Course-Instructor: Dr PC Panchariya
Suggested books: 1. Neuro-Fuzzy and Soft Computing: A Computational Approach to Learning and Machine Intelligence," by J.S.R. Jang, C.T. Sun, and E. Mizutani, Prentice Hall, 1996; 2. Foundations on Neuro-Fuzzy Systems, D. Nauck, F. Klawonn, R. Kruse, Wiley, Chichester, 1997; 3. Fuzzy Logic with Engineering Applications by T.J. Ross, McGraw-Hill Book Company, 1995; 4. Pattern Recognition and Machine Learning, C.M. Bishop, 2nd Edition, Springer, 2011; 5. Deep Learning, I. Goodfellow, Y, Bengio, A. Courville, MIT Press, 2016.

PHY (CEERI): 3-1515: Image processing and computer vision (3-2-0-4)

Digital Image Fundamentals; Electromagnetic Spectrum; Image sensing, sampling and Quantization; Review of linear algebra, 2D representation of digital images and their formats; Intensity transformations; Histogram equalization; Enhancement using arithmetic and logic operations; Image smoothening using frequency domain filters; Wavelet transform; Morphological operations; Point, line and edge detection; Lossy and lossless image compression; Entropy and coding techniques: JPEG; Image and noise restoration filters; Feature extraction in computer vision: local binary pattern and its variant; HoG, Gabor Filter, SURF, SIFT; Feature reduction techniques; Overview of different classification techniques: SVM and its types, Bayesian classifier, Nearest neighbor classifier, neural network classifier; Introduction to deep learning for computer vision; Convolutional neural networks and its applications; Deep learning architectures for object detection.
Course-Instructor: Dr Sanjay Singh
Suggested books: 1. Rafael C.Gonzalez & Richard E.Woods – Digital Image Processing – Pearson Education- 2/e – 2004; 2. Anil.K.Jain – Fundamentals of Digital Image Processing- Pearson Education-2003; 3. Richard O. Duda, Peter E. Hart and David G. Stork, "Pattern Classification", John Wiley & Sons, 2002; 4. Earl Gose, Richard Johnsonbaugh and Steve Jost, "Pattern Recognition and Image Analysis", Prentice Hall, 1999; 5. C. M Bishop, Neural Netwroks and Pattern Recognition, Oxford University Press (Indian Edition), 2003; 6. Mark Nixon & Alberto Aguado, "Feature

Extraction & Image Processing", Second Edition, Academic Press, 2008; 7. Richard Szeliski, "Computer Vision: Algorithms and Applications", Draft copy, 2010; 8. Support Vector Machines for Pattern Classification, Shigeo Abe, Second Edition, Springer; 9. Bouwmans, Thierry, et al. "Handbook on" Background Modeling and Foreground Detection for Video Surveillance"." (2014).

PHY (CEERI): 3-1516: Cognitive systems (3-2-0-4)

Introduction to cognition, Cognitive processes and mechanisms, Emotional cognitive structures, Basic functions of the neural emotional systems, Emotion and decision making, Perception, Attention, Cognitive process modeling, Randomized Algorithms, Complex reasoning, Uncertainty and perturbations, perturbations in data representation level, propagation of uncertainty, learning from data and uncertainty at model level, Passive and active learning, Reinforcement learning, Memory, Visuospatial processing, Perceptual interface, Cognitive load assessment, Cognitive architectures, SOAR, ACT-R/E, BCI/BMI.

Course-Instructor: Dr AS Mandal

Suggested books/ papers: 1. Computational Intelligence- Principles, Techniques and Applications, Amit Konar, Springer; 2. Artificial Cognitive System, David Verson; 3. Principles of Cognitive Computing, Earl Cox; 4. Cognitive Computing and Big Data, Michael Hehenberger; 5. Cognitive Psychology, E. Bruce Goldstein; 6. Cognitive Science, Jose Luis Bermudez, Cambridge University Press; 7. The SOAR Cognitive Architecture, John E. Laird, The MIT Press; 8. Philosophy of Mind, William Bechtel, Psychology Press; 9. Cognitive Computing, Dr. Frank J Furrer (2015 Summer School Lectures); 10. Research Papers

PHY (CEERI): 3-1517: Smart-grids and renewable energies (3-0-0-3)

Renewable energy sources: Photovoltaic, Solar Thermal, Wind, Wave energy systems; Maximum power point tracking; Types of wind mills; Average power in the wind; Converters for renewable energy system: AC-DC, DC-DC, DC-AC converters; Distributed generation; Grid scale energy storage; Power quality issues; Passive/active filtering; Electric Vehicles: charging infrastructure; Vehicle to grid (V2G); Introduction to smart grid: definition, necessity, Working principle of smart grid, applications, Standards, Smart grid components; Smart Grid Communications; Cyber Security Challenges in Smart Grid; Smart grid tools.

Course-Instructor(s): Brijendra Kumar Verma and Sachin Devassy

Suggested books: 1. James Momoh, "Smart Grid: Fundamentals of Design and Analysis," (IEE Power Engineering Series)– Wiley-Blackwell, 2012; 2. Takuro Sato, Daniel M. Kammen,Bin Duan, Martin Macuha, Zhenyu Zhou, and Jun Wu, "Smart Grid Standards: Specifications, Requirements, and Technologies," Wiley-Blackwell, 2015; 3. Janaka Ekanayake, Kithsiri Liyanage, Jianzhong Wu, Akihiko Yokoyama, and Nick Jenkins, "Smart Grid: Technology And Applications," Wiley, New Delhi, 2015; 4. Lars T. Berger and Krzysztof Iniewski, "Smart Grid Applications, Communications, And Security," Wiley, New Delhi, 2015; 5. R. W. Erickson and D. Maksimovic, "Fundamentals of Power Electronics," 2nd edition. Springer 2001; 6. N. Mohan, T. M. Undeland and W. P. Robbins, "Power Electronics, Converters, Applications and Design," Third Edition. Wiley 2003; 7. A. I. Pressman, K. Billings and Taylor Morey, "Switching Power Supply Design," Third Edition. McGraw Hill 2009; 8. Gilbert M Masters, " Renewable and Efficient Electric Power Systems," 2nd edition, Wiley-IEEE Press, 2013; 9. Remus Teodorescu, Marco Liserre, Pedro Rodriguez, "Grid Converters for

Photovoltaic and Wind Power Systems", Wiley-IEEE Press, 2011; 10. Haitham Abu-Rub, Mariusz Malinowski, Kamal Al-Haddad, "Power Electronics for Renewable Energy Systems, Transportation and Industrial Applications" ,Wiley-IEEE Press, June 2014.

PHY (CEERI): 3-1518: Process control and embedded systems

P, PI, PID control analysis; Compensation methods; Stability concept and different methods for analysis; Functional analysis: fundamental of various LTI systems, Laplace and Fourier transform for frequency space analysis, Phase plane analysis, limit cycles and linearization; Large Scale Systems, System reduction, Sliding mode control (continuous and discrete); Robust stability and control using quantitative feedback analysis (QTA); Optimal control; Nonlinear system analysis and control, constrained and optimization based control, Nonlinear and adaptive control; Introduction to embedded systems for process control; 8- and 16-bit PIC microcontroller architecture, programming, I/O, Timer and interfaces, dsPIC architecture overview; ARM processor architecture and programming model.

Course-Instructor(s): Dr JL Raheja, Dr SA Akbar and Dr SS Sadistap

Suggested books: 1. State Space Analysis of Control Systems, K Ogata, Prentice Hall, 1991; 2. State Functions and Linear Control Systems, DG Schulz and JL Melas, McGraw-Hill, 1967; 3. Principles of Control Systems Engineering, Vincent Del Toro, Sydney R. Parker - McGraw-Hill , 1960; 4. Frontiers in Advanced Control Systems, Ginalber Luiz de Oliveira Serra (ed.), InTech, 2012; 5. Distributed Control of Robotic Networks, Francesco Bullo, Jorge Cortes, Sonia Martinez, Princeton University Press, 2009; 6. Advanced Model Predictive Control, Tao Zheng, InTech, 2011; 7. Control Systems Engineering, I.J. Nagrath and Madan Gopal, New Age Int. Publisher, 2017; 8. System Identification and Adaptive Control, Yiannis Boutalis and Dimitrios Theodoridis, Springer, 2014.

PHY (CEERI): 3-1519: Embedded Intelligence (3-0-0-3)

Cognitive processes and mechanism, intelligent mechanisms, learning mechanisms, robustness and performance estimation; Uncertainty and perturbations, propagation of uncertainty, learning from data and uncertainty at model-level; Emotional cognitive structures, automatic and controlled processes, basic functions of emotional neural emotional systems, emotion and decision making; Adaption at the power supply voltage, adaptive sensing and policies, clock synchronization, localization and tracking, adaption at energy harvesting level and application code level; Passive and active learning, change point methods, change detection tests, just-in-time learning framework; Accuracy estimation, probably approximately correct computation, performance verification problem.

Course-Instructor: Dr AS Mandal

Suggested books/ papers: 1. Intelligence for Embedded Systems – A Methodological Approach, Cesare Alippi, Springer; 2. Introduction to Embedded Systems – A Cyber-Physical Systems Approach, Edward Ashford Lee and Sanjit Arunkumar Seshia,; 3. Computational Intelligence- Principles, Techniques and Applications, Amit Konar, Springer; 4. From Internet of Things to Embedded Intelligence, Bin Guo et al; 5. Intelligent Methods for Embedded Systems, Wilfried Elmenreich; 6. Research Papers

PHY (CEERI): 3-1523: Lab: High-level electronic system design and realization (0-0-2-1)

Laboratory practices and safety considerations; FPGA prototyping boards; JTAG Configuration; Downloading design of combinational and sequential building blocks; RTL Design of sub-systems blocks; FPGA implementations of system components; A system design using various hardware components.

Course-Instructor: Dr JG Pandey

Suggested books: 1. Platform Based Design at the Electronic System Level, Mark Burton, Adam Morawiec Weste; 2.

Embedded System Design Modeling, Synthesis and Verification, Daniel D. Gajski, Samar Abdi, Andreas Gerstlauer, Gunar Schirner; 3. ESL Design and Verification a Prescription for Electronic System-level Methodology, Brian Bailey, Grant Martin, Andrew Piziali; 4. VHDL Coding Styles and Methodologies, Ben Cohen; 5. Verilog HDL: A Guide to Digital Design and Synthesis, Samir Palnitkar

PHY (CEERI): 3-1524: Lab: Signal processing and machine learning (0-0-2-1)

Laboratory practices and safety considerations; Implementations of different models including Regressive models; Time-domain models; Frequency-domain models in MATLAB/ Labview/ C++ on different time series data and sensor data.

Course-Instructor: Dr PC Panchariya

Suggested books: 1. Neuro-Fuzzy and Soft Computing: A Computational Approach to Learning and Machine Intelligence," by J.S.R. Jang, C.T. Sun, and E. Mizutani, Prentice Hall, 1996; 2. Foundations on Neuro-Fuzzy Systems, D. Nauck, F. Klawonn, R. Kruse, Wiley, Chichester, 1997; 3. Fuzzy Logic with Engineering Applications by T.J. Ross, McGraw-Hill Book Company, 1995; 4. Pattern Recognition and Machine Learning, C.M. Bishop, 2nd Edition, Springer, 2011; 5. Deep Learning, I. Goodfellow, Y, Bengio, A. Courville, MIT Press, 2016.

PHY (CEERI): 3-1527: Lab: Smart-grids and renewable energies (0-0-2-1)

Modelling of Photovoltaic cell; Simulation of maximum power point tracking algorithms; Simulation of switch-mode converters; Introduction to advanced simulation software: Hardware-in-loop (HIL) simulation and rapid prototyping; Simulation of micro-grid and grid scale energy storage, bi-directional power flow control.

Course-Instructor: Subhash Kumar Ram, Anand Abhishek

Suggested books: 1. Smart Grid: Fundamentals of Design and Analysis, (IEE Power Engineering Series), James Momoh, Wiley-Blackwell, 2012; 2. Power Electronics, Converters, Applications and Design, Third Edition, N. Mohan, T. M. Undeland and W. P. Robbins, Wiley, 2003; 3. Power Electronics: Circuits, Devices and Applications, M.H. Rashid, Prentice Hall of India, Third Edition; 4. Power electronics for renewable energy systems, transportation and industrial applications, Haitham Abu-Rub, Mariusz Malinowski, Kamal Al-Haddad, Wiley-IEEE Press, 2014.

PHY (CEERI): 3-1528: Lab: Process control and embedded systems (0-0-2-1)

Laboratory practices and safety considerations; Identification of transfer function of various sensors and actuators; Implementation of basic and advanced control techniques (P, PI, PID, sliding mode etc.) with different sensors, actuators and microcontrollers.

Course-Instructor(s): Dr SS Sadistap, Santosh Kumar and Satyam

Suggested books: 1. State Space Analysis of Control Systems, K Ogata, Prentice Hall, 1991; 2. Advanced Model Predictive Control, Tao Zheng, InTech, 2011; 3. Control Systems Engineering, I.J. Nagrath and Madan Gopal, New Age Int. Publisher, 2017; 4. System Identification and Adaptive Control, Yiannis Boutalis and Dimitrios Theodoridis, Springer, 2014.

PHY (CEERI): 3-1531: Micro- and nano-technologies (3-2-0-4)

Crystal growth techniques, wafer preparation and shaping, chemical cleaning, thermal oxidation, photolithography, chemical etching (wet and dry), chemical vapor deposition techniques, thermal diffusion, ion implantation, metalization, chemical mechanical polishing, rapid thermal processing; Use of silicon dioxide, polymers, and glass; Advanced processes (thermal, ICP-PECVD, PVD, RTO); Thick-film process steps (for MEMS) and ultra-thin-film process steps (for Nano-structures); Special lithography techniques, front and backside alignment, sub-micron/nano-lithography, EBL; Surface and bulk micro-machining techniques; DRIE and LIGA process; Process integration for structures like comb, cantilever, diaphragm, channel, nano-wire, nano-gaps; Sacrificial materials; Characterization of MEMS and nano-dimensional structures; Wafer-level bonding and packaging techniques; Trends in MEMS and nano-devices technologies, Carbon Nanotubes- Nomenclature, classifications, synthesis, properties, and applications of carbon nanotubes.

Course-Instructor: Pankaj B Agarwal

Suggested books: 1.Silicon VLSI technology: Fundamentals, practice, and modeling, J. D. Plummer, M. D. Deal, & P. B. Griffin (2000). NJ: Prentice Hall; 2.VLSI technology, S. M. Sze, (2003) 2 edition McGraw Hill Education; 3.Wafer Bonding: Applications and Technology, (1998) M. Alexe, U. Gosele, Springer; 4.Silicon Micromachining, (2004), M. Elwenspoek, H. V. Jansen, Cambridge University Press; 5.Micro-Nanofabrication: Technologies and Applications (2006) Z. Cui, Springer; 6.Introduction to Nanotechnology, C. P. Poole, F. J. Owens, Wiley-Interscience (2003); 7.Nanolithography and patterning techniques in microelectronics, By D. G. Bucknall (editor), Woodhead Publishing; 8.EUV Lithography, Edited by V. Bakshi, Wiley Interscience; 9.Carbon Nanotube Electronics, (2009), A. Javey, J. Kong, Springer.

PHY (CEERI): 3-1532: Micro-sensors and actuators (3-0-0-3)

Overview of Micro-sensors and transduction principles; Mechanical properties of materials and essentials of structural mechanics; Electromechanical, magneto-mechanical and piezo-based sensing; Structural elements for MEMS and micro-sensors (Beams, plates, cantilevers, bridges and diaphragms); Electrostatic sensing and actuation (parallel plate and torsional structures, time domain analysis); Micro-fluidics; Scaling laws and miniaturization; Micro-system design principles; MEMS simulation and design Tools; RF MEMS; Reliability issues in micro-sensors; Examples and applications of Micro-sensors and actuators.

Course-Instructor: Dr Ankush Jain

Suggested books: 1) Microsystem Design, S. D. Senturia, Springer; 2) Analysis and Design Principles of MEMS Devices, M. Bao, Elsevier.

PHY (CEERI): 3-1533: Photonic and optoelectronic devices and technologies (3-0-0-3)

Introduction to photonics and optoelectronics; Propagation of electromagnetic waves; Optical waveguides and fibers; Dispersion and losses in optical fiber and waveguide; Basic photonics components, devices; Principle of optical communications; Coupled mode theory in guided wave systems; Fiber- and waveguide gratings; Photonic crystal based structures and devices; Optical sensors and sensing techniques; MOEMS; Optoelectronic materials:

GaAs and GaN-based compound semiconductor; double hetero-structures, quantum-well, modelling and simulation issues; Growth of epitaxial material: MOCVD and MBE; Material characterization: XRD, photoluminescence, Hall-effect measurement, SIMS, ECV profiling; Devices: LEDs, semiconductor LASERs, detectors, solar-cells, HEMT, Compound semiconductor technologies; Fabrication and packaging of photonic and optoelectronic devices; Applications and recent trends.

Course-Instructor(s): Dr Suchandan Pal and Dr Manish Mathew

Suggested books: 1. G Keiser, Optical Fiber Communications, McGraw-Hill, New York, 2010; 2. Clifford Pollock, Fundamentals of Optoelectronics, Richard Irwin Inc., Chicago, 1995; 3. H Nishihara, M Haruna and T Suhara, Optical integrated Circuits, McGraw-hill, 1989; 4. T Tamir, Guided-wave optoelectronics, Springer-verlag, 1990; 5. A Othonos and K Kalli, Fiber Bragg gratings: fundamentals and applications in telecommunication and sensing, Artech House, Boston, 1999; 6. Photonic crystal molding the flow of light, 2nd edition, John D. Joannopoulos, Steven G. Johnson, Joshua N. Winn, Robert D. Meade, Princeton University Press, 2008; 7. R.Williams, Modern GaAs Processing Methods,2nd Ed., Artech House, 1990; 8. S.M.Sze, Semiconductor Devices: Physics and Technology, 2nd Ed., Wiley, 2001; 9. J.Piprek, Optoelectronic Devices: Advanced Simulation and Analysis, Springer, 2005; 10. S.L.Chuang, Physics of Photonic Devices, Wiley, 2009; 11. E. Fred Schubert, Light Emitting Diodes, 2nd ed., Cambridge University Press, 2006; 12. R.F.Davis and M.S.Shur, GaN based Materials and Devices: Growth, Fabrication, Characterization and Performance, World Scientific, 2004; 13. K.Takahashi, A.Yoshikawa and A.Sandhu, Wide Bandgap Semiconductors, Springer, 2007.

PHY (CEERI): 3-1534: Non-silicon and flexible materials, devices and technologies (3-2-0-4)

Flexible substrate: materials and technology; CNT: physics and technology, CNT types; CNT gas sensors: design, technology and characterization; Graphene: physics and technology; SiC: physics and technology; Diamond: physics and technology; Organic Semiconductors and nano-composites; Polymer: Single molecule science; Flexible RF electronics: design and technology; Antenna, Filters, SAW devices; DSSC /Perovskite solar cell: physics and design.

Course-Instructor(s): Dr Jamil Akhtar and Dr Anil Kumar

Suggested books: 1. Printed Electronics: Materials, Technologies and Applications, Zheng Cui, Wiley, 2016; 2. Nanotubes & Nanowires, 2nd Edition, CNR Rao, A. Govindra, Royal Society of Chemistry, 2011; 3. Graphene: An Introduction to the Fundamentals and Industrial Applications, Madhuri Sharon, Maheshwar Sharon, Hisanori Shinohara, Ashutosh Tiwari, Wiley, 2015; 4. Graphene: Synthesis, Properties, and Phenomena, CNR Rao and AK Sood, Wiley, 2012; 5. Yoon Soo Park, SiC Materials and Devices, Semiconductors and Semimetals, Vol. 52, Academic Press, 1998; 6. M.Badila, G. Brezeansu, J. Millan, P. Godignon, V. Banu, Silicon Carbide Schottky and Ohmic contact process depence, Diamond and Related Materials, Vol.11, 2002; 7. Michal Pomorski,Ph.D dissertation, Electronic Properties of Single Crystal CVD Diamond and its Suitability for Particle Detection in Hadron Physics Experiments, Frankfurt, 2008; 8. Chen, Tsai, Lee, Lin, In vitro and in vivo evaluation of ultrananocrystalline diamond (UNCD) as an encapsulation layer for implantable microchips, Acta Biomaterialia 10, 2187–2199, 2014; 9. Dye-Sensitized Solar Cells, Edited by K. Kalyanasundaram, Taylor and Francis; 10. Organic-Inorganic Halide Perovskite Photovoltaics, Edited by Nam-Gyu Park, Michael Gratzel, and Tsutomu Miyasaka, Springer; 11. Recent Journals on related topics.

PHY (CEERI): 3-1541: Lab: Micro- and nano-technologies (0-0-4-2)

Laboratory practices and safety considerations; Wafer preparation and shaping; Chemical cleaning; Thermal oxidation, photo-lithography; Wet chemical etching; Dry etching; Chemical vapor deposition; Thermal diffusion; Ion implantation; Metalization; Wet and Dry Micromachining; LIGA process; Case Study: Micro-cantilever and Membrane realization.
Course-Instructor: S Santosh Kumar
Suggested books: 1.Silicon VLSI technology: Fundamentals, practice, and modeling, J. D. Plummer, M. D. Deal, & P. B. Griffin (2000). NJ: Prentice Hall; 2. VLSI technology, S. M. Sze, 2 edition McGraw Hill Education (2003); 3. Fundamentals of Microfabrication and Nanotechnology, Marc Madou, Third Edition, CRC Press (2012).

PHY (CEERI): 3-1542: Lab: Micro-sensors and actuators (0-0-4-2)
MEMS design tools (CoventorWare/ COMSOL/ ANSYS); Design of micro-cantilever and pressure sensors; Design of gas sensors, acoustic, ultrasonic, micro-resonator and ISFET; RF MEMS design and simulations (switches and phase-shifter).
Course-Instructor: Dr Ankush Jain
Suggested books: 1) Microsystem Design, S. D. Senturia, Springer; 2) Analysis and Design Principles of MEMS Devices, M. Bao, Elsevier.

PHY (CEERI): 3-1543: Lab: Photonic and optoelectronic devices and technologies (0-0-2-1)
Laboratory practices and safety considerations; Design of optical splitter and MUX/DEMUX; Design and simulation of optical fiber/ waveguide gratings and photonic crystal structures; Characterization of optical splitter and Bragg grating; MOCVD system demonstration; Characterization of materials by PL and Hall-effect; Unit Processes for compound semiconductor device fabrication, Characterization of devices in chip/ packaged level: LEDs, solar cells.
Course-Instructor(s): Dr Suchandan Pal and Kuldip Singh
Suggested books: 1. TCAD (APSYS) / SimuLED-SimuLAMP (STR) / BPM-CAD/ OptiGrating / CrystalWave Mannuals (Soft copy); 2. Thomas Swan MOCVD Manual (Soft copy); 3. Accent PL Manual (Soft Copy); 4. Mannuals of relevant equipment/ system.

PHY (CEERI): 3-1551: Principles of high power microwave tubes (3-2-0-4)
Introduction to high power Microwave tubes and their classifications as O-type, M type, slow-wave and fast-wave devices microwave tubes; Electron Beam Dynamics: Different types of electron beam generation, beam focusing and collection techniques. Interaction of Electron beam with electromagnetic wave in slow wave and fast wave devices. Microwave wave coupling mechanism for different microwave tubes. Performance improvement techniques of different devices in terms of power, gain, efficiency, linearity, life, reliability etc.
Course-Instructor: Dr SK Ghosh
Suggested books: 1. Power traveling-wave tubes, JF Giitings, 1965, American Elsevier; 2. Electromagnetic theory and beam-wave interaction, BN Basu; 3. Topics in Electromagnetics, DA Watkins; 4. Microwave tubes, AS Gilmour; 5. Principles of traveling-wave tubes, AS Gilmour; 6. Traveling-wave tubes. JR Pierce; 7. Vacuum tubes, KR Spangenberg; 8. Microwave engineering and applications, Om P Gandhi.

PHY (CEERI): 3-1552: Microwave and mm-wave tube technologies (3-0-0-3)

Fundamentals of vacuum technology; Vacuum generation and measurement, and leak detection; Ultra-high vacuum techniques and vacuum processing of the tubes; Electron-tube grade materials and their characteristics; Design of tools, jigs, and fixtures; Engineering / mechanical design of components; Special micro and precision machining techniques. Vacuum grade different integration techniques like Brazing, TIG welding, furnace and RF brazing, laser welding, resistive welding etc. Physics of electron emission, emission equation; temperature limited and space-charge limited emission; Different types of electron emitters and their fabrication and characterization.
Course-Instructor: Dr Ranjan K Barik
Suggested books: 1. Materials Technology for Electron Tube, Walter H. Kohl, Reinhold Publishing Corporation, USA; 2. Handbook of electron tube and vacuum techniques, Fred Rosebury, Addison-Wesley; 3. Principles of Travelling Wave Tubes, A. S. Gilmour, Hr., Artech House, London; 4. Handbook of Vacuum Technology, Karl Jousten, Wiley-VCH, Verlag GmbH & Co. Second Edition.

PHY (CEERI): 3-1553: Vacuum microelectronic devices (2-0-0-2)
Introduction to THz Vacuum Microelectronic Devices (THz VMDs). Types of THz VMDs and their features. Application of THz VMDs. Design Considerations; Field Emitter Array, Electron Gun with cylindrical beam and sheet beam, Beam Focusing systems, collectors Different types RF structures including rf coupler. Micro fabrication Techniques; Micro EDM, Electrochemical milling, Dicing, Laser Micromachining. Micro fabrication Techniques; DRIE, UV Lithography, X-Ray Lithography.
Course-Instructor: Dr RK Sharma
Suggested books/ Journals: 1. Handbook of Terahertz Technologies: Devices and Applications, Ho-Jin Song and Tadao Nagatsuma; 2. Fundamentals of Micro fabrication and Nanotechnology, Vol I, II, and III, Marc J. Madou; 3. John H. Booske, et.al., Vacuum Electronic High Power Terahertz Sources, IEEE TRANSACTIONS ON TERAHERTZ SCIENCE AND TECHNOLOGY, VOL. 1, NO.1, SEPTEMBER 2011, pp 54-75; 4. arc J. Madou, Fundamentals of Micro fabrication and Nanotechnology, Vol I, II, and III; 5. R.L. Ives, Micro fabrication of High-frequency Vacuum Electron Devices, Trans. IEEE Plasma Science, vol.32, no.3, June 2004, p 1277-1290; 6. Performance characteristics of a Smith Purcell tunable terahertz source, J. Biol. Phys., vol. 29, Jan.2003, p 295-302; 7. H. Guckel, High aspect ratio micro machining via deep X-ray lithography, Proc. IEEE, vol. 86, no.8, Aug. 1998, p 1586-1593.

PHY (CEERI): 3-1554: Plasma devices (2-0-0-2)
Introduction to plasma devices, Physical parameters, Saha equation and its relevance, Debye shielding, Conditions for plasma formation, Plasma as fluid, Waves in plasma, Equilibrium and instabilities, Non-linear effects in plasma, Plasma sheath, Bohm-sheath criteria, types of discharges in gases, hollow cathode discharges and other kinds discharges, general features of electrons emission, control and extraction of electrons and ions from plasma in DC and pulsed-mode conditions, plasma switches, plasma cathode electron gun (PCE-Gun); plasma-filled microwave devices, trends in plasma-filled devices.
Course-Instructor(s): Dr Ram Prakash and Dr Udit N Pal
Suggested books: 1. Francis F. Chen, Introduction to Plasma Physics and Control Fusion, Springer; 2. J Reece Roth, Industrial Plasma Engineering, 1995; 3. Mchael A. Lieberman, Allan J. Lichtenberg, Principles of Plasma Discharges and Materials Processing, John Wiley & Sons Canada, 1994; 4.

Efim Oks, Plasma Cathode Electron Sources, Wiley-VCH, 2006; 5. Rober J. Barker, Edl Schamiloglu, High Power Microwave Sources and Technologies, Artech House; 6. H. Hutchinson, Principles of plasma Diagnostics, Cambridge University Press, New York, 1988; 7. Yuri P. Raizer ,John E. Allen, Gas Discharge Physics, Springer, Ist Edition, 1991; 8. Orlando Auciello, Daniel L. Flamm, Plasma Diagnostics, Academic Press Inc, California, USA; 9. J.M. Meek and J.D. Craggs, Electrical Breakdown of Gases, Oxford (Clarendon Press), 1953.

PHY (CEERI): 3-1555: Advanced electromagnetic materials (2-0-0-2)
Review of Maxwell Equations, Introduction to Metamaterials and Effective Medium Concept, Physics of Negative Permeability and Permittivity, Physics of Photonic Band Gap Structure, FSS, Dispersion Engineering Manipulation of Light Wave, Surface Plasmon, Super Lens, Metamaterial Microwave Antennas and Absorbers, Interaction of Metamaterial with moving electron, Overview of Metamaterial Fabrication.
Course-Instructor: Dr Anirban Bera
Suggested books: 1. Metamaterials: Theory, Design, and Applications, Edited by Tie Jun Cui, David Smith, Ruopeng Liu, Springer Science & Business Media, 2010; 2. Metamaterials Handbook, Editor Filippo Capolino, Taylor & Francis , 2009; 3. Plasmonics: Fundamentals and Applications, Stefan A. Maier, Springer, 2007; 4. Photonic crystal molding the flow of light, 2nd edition, John D. Joannopoulos, Steven G. Johnson, Joshua N. Winn, Robert D. Meade, Princeton University Press, 2008.

PHY (CEERI): 3-1556: Numerical analysis and techniques for microwave applications (2-0-0-2)
Quick overview of programming fundamentals, Numerical differentiation: Taylor's series, Euler's method, Runge-Kutta methods, predictor-corrector method, Picard method, Numerov method, Numerical integration: Trapezoidal rule, Simpson's rule, Romberg method, Numerical solutions of transcendental equations: Bisection method, Secant method, Newton method, Muller method – Solving simultaneous equations: Gauss elimination method, Gauss-Jordan method, Gauss-Seidel method, FDM: Solutions to Partial Differential Equations, Band matrix method and iterative methods, FDTD: Leap frog method, Yee's algorithm, 1D and 2D, Boundary conditions and Excitations – Introduction to PIC, FEM: Discretization, Element Equation, Mapping, Assembling, Boundary Conditions.
Course-Instructor: Dr Ayan Bandyapadhyay
Suggested books: 1. Numerical Methods in Electromagnetism, 1st Edition, M. Chari and Sheppard Salon, Academic Press, 2000; 2. Numerical Methods in Electromagnetics, Volume 13, 1st Edition, Special Volume ,Series Editors: Philippe Ciarlet, W.H.A. Schilders, E.J.W. Termaten, Elsevier, 2005.

PHY (CEERI): 3-1561: Lab: Microwave components and device characterizations (0-1-4-2)
Laboratory practices and safety considerations; Scattering parameters; Measurement of impedance and characterization of cavities; Dispersion and impedance characterization of RF structures; RF loss measurements; UHV techniques; Heat treatment in protective atmosphere; Ceramic-to-metal sealing techniques; Chemical processing of components. Laboratory practices and safety considerations; Device characterization using spectrum analyzer, scalar/vector, analyzer; Break-down tests; X-ray radiography; Hot RF characterization of devices; Metal-to-metal brazing, techniques; Leak detection techniques; TIG/laser welding; Vacuum processing of devices; Cathode fabrication, and testing; Cathode characterization using Auger and thermal emission microscope.

Course-Instructor: Dr Debasish Pal and Dr Amitavo Roy Choudhury
Suggested books: 1. Basic Microwave Techniques and Laboratory Manuals, M. L. Sisodia; 2. Microwave measurement Techniques, N Ida, Springer; 3. Microwave and Radar Engineering, M Kulkarni, Umesh publications; 4. Microwave Devices and Circuits, Samuel Y. Liao.

PHY (CEERI): 4-0001: Project proposal (0-0-4-2)

Definition of a scientific project proposal; Components of a proposal; Need and purpose of the proposal; Aims and objectives; Background and present status; Proposed methodologies and approaches; Scheduling and milestones; Resource allocation; Budgeting; Monitoring and evaluation mechanisms; Referencing and citing; Use of data, graphs, tables, figures; Proposal funding agencies and their formats. Every student needs to submit two proposals – one related to PhD research topic and the second in any field of electronics.
Course-Instructor: NA
Suggested books: NA

PHY (CEERI): 4-0002: Review article (0-0-4-2)

Preparation of one review article on specific research area of the student.
Course-Instructor: NA
Suggested books: Relevant books and Journal papers on selected topic.

PHY (CEERI): 4-0003: CSIR-800 societal programme project (0-0-8-4)

A project needs to be undertaken in rural area for 68 weeks duration aligned to the CSIR800 programme. The theme of the project may be chosen from the CSIR800 document or from any other government department related to benefiting and empowering the economically lower 800 million Indians by way of S&T innovations. The aim is to interact with underprivileged people in the villages and propose solutions in the area of health, agriculture, energy, water, food, education, etc.
Course-Instructor: NA
Suggested books: NA

Modified courses for approval

G.PARTHASARATHY <drg.parthasarathy@gmail.com>   Wed, Oct 4, 2017 at 3:55 PM
To: Kanya AcSIR <kanya@acsir.res.in>
Cc: Dean Physical Science <dean.physci@acsir.res.in>, Arpita AcSIR <arpita.acsir@acsir.res.in>, Ashwini AcSIR <ashwini@acsir.res.in>

Approved
with best Regards,
G. Parthasarathy

Dr G. Parthasarathy, FNA, FRSC
Chief Scientist , Professor , Dean,
Member-Board of Studies ,and Senate,
***Academy of Scientific & Innovative Research* (AcSIR)**
CSIR- National Geophysical Research Institute,
Hyderabad- 500 007
India
Tel : 040- 27012817
http://www.ngri.org.in/
Fax :040-23434651
Member- Deep Carbon Observatory
DCO ID: 11121/3662-6268-7338-6375-CC

[Quoted text hidden]

8/28/2017   Academy of Scientific and Innovative Research Mail - Change of Course Coordinator & Modification of the Course

ANNEXURE P-5

ANNEXURE-A-3
Modified Courses

Change of Course Coordinator & Modification of the Course.

Coordinator CSIR-CSIO <coordinator.csio@acsir.res.in>   Fri, Feb 17, 2017 at 1:04 PM
To: KS Krishna <krishna@nio.org>, Associate Dean Physical Science <associatedean.physci@acsir.res.in>, Dean
Physical Science <dean.physci@acsir.res.in>
Cc: Suneet Csio <suneet.csio@acsir.res.in>, Bipinchandra AcSIR <bipin@acsir.res.in>, Bipinchandra AcSIR
<bipin.acsir@acsir.res.in>, Ashwini AcSIR <ashwini@acsir.res.in>, Ashwini AcSIR <ashwini.acsir@acsir.res.in>

Dear Sir,

**The Modification in the Societal Program in terms of Course Content and Change of Course Coordinator was
proposed for the 18th Senate Meeting. The proceedings was forwarded but the matter was not discussed in
the senate meeting.**

**Dr. S.K. Mittal (Course Coordinator of CSIR-800, now Societal Program) got superannuated on 31st Jan, 2017.
Due to shortfall of Course Coordinator, we are unable to conduct Societal Program. Some to the Students
who are in the urge of completion of their Ph.D. are facing the issue of completing their Societal Program
without Course Coordinator.**

**I am attaching the proceedings of 18th Proposed Senate Meeting in which course was proposed to be
modified. Dr. Sunita Mishra, Associate professor and Principal Scientist, was proposed to be the Course
Coordinator of the Societal Program.**

Kindly approve the same at the earliest.

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With best regards ...

Vinod Karar

Dr. Vinod Karar
Head, Optical Devices & Systems Unit
Coordinator, AcSIR, CSIR-CSIO
CSIR - Central Scientific Instruments Organisation (CSIR-CSIO)
Sector: 30, Chandigarh - 160030 (India)
Ph.+91-172-2672232/2637232
Fax: +91-172-2651808
Mob. +91-9417360044

📄 **Change of Course Coordinator-Societal Program.pdf**
2152K

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

AcSIR

Headquarters
Training & Development Complex, CSIR Campus, CSIR Road, Taramani, Chennai– 600 113

Coordination Office
CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P.O., New Delhi–110 025

Name of Lab: CSIO

Existing course	Modified course
Faculty (Course cluster): BS/CS/ES/PS/MIS: PS/ES	**Faculty (Course cluster):** PS/ES BS/CS/ES/PS/MIS
Course Title: CSIR-800 Societal Program	**Course Title:** Societal Program
Course Nomenclature: PHY/ENG–CSIO–4–2403	**Course Nomenclature:** PHY/ENG–CSIO–4–2403
L-T-P-C distribution:0-0-8-4	**L-T-P-C distribution:**0-0-8-4
Name of the Teachers :	Dr. Sunita Mishra
Course content: The students have to undertake a project in rural area for 6-8 weeks in line with CSIR-800 program which is primarily prepared at empowering 800 million Indians by way of S & T interventions. The theme for the project may be chosen from CSIR-800 document and as per expertise available at individual laboratory. Students will choose the topics in consultation with Doctoral Advisory Committee (DAC). This needs to be completed before submission of thesis. Detailed guidelines are on AcSIR website.	**Modified Course content:** The students have to undertake a project in suitable area/field for 6-8 weeks in line with CSIR societal programs empowering Indian Population by way of S & T interventions. It must include analysis of socio-economic impacts on the society. The theme for the project may be chosen as per expertise available at individual laboratory. Students will choose the topics in consultation with the Course Coordinator and Doctoral Advisory Committee (DAC). Typically, the contact period of 6-8 weeks may be as designed as follows: 1. Diagnosis/ Defining/ a problem in the chosen area/field. 2. Selection and Initiation of the Intervention. 3. Field observations 4. Impact Analysis It should invariably include bifurcations with appropriate intervals.

Proposed for: 18th Meeting of Senate

Coordinator AcSIR-(CSIO) _____ Date: 31/10/16

Lab Director: _____ Date: 1/11/2016

Checked By: _____ (Associate Dean) Date: _____

Approved By: _____ (Dean) Date: _____

New/ modified courses for approval

SumanKMishra <suman@nmlindia.org>   Tue, Aug 29, 2017 at 10:15 AM
To: Associate Dean Engineering Science <associatedean.engsci@acsir.res.in>, Ashwini AcSIR <ashwini@acsir.res.in>
Cc: Arpita Mam <arpita.acsir@acsir.res.in>, Kanya AcSIR <kanya@acsir.res.in>, Dean Engineering Science
<dean.engsci@acsir.res.in>

Each lab can have their own research course as far I know. There is more or less similarity but may be some
deviations.
Three faculty for one course, credit 1, is not recommended. They should stick to 1 . if someone giving one or two
lecture for the course they are not considered for faculty for that course normally.
For courses having credit 3 or 4, maximum faculty can be 3 in normal circumstances.

The courses of CBRI and CECRI is approved
S. K. Mishra
[Quoted text hidden]

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**Dr. Mrs S. K. Mishra, Chief Scientist (Advanced Material Processing) and Head, Human Resource Group (HRG),
Dean Eng. Sc. and Adjunct Prof. AcSIR,
CSIR-National Metallurgical Laboratory, Jamshedpur, Jharkhand, India.831007,
Email: suman@nmlindia.org, suman.nml@gmail.com; skm_smp@yahoo.co.in
Ph. 91-657-234-5122, 5256, Fax:916572345213 mobile:09801341664**

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

AcSIR

Headquarters
Training & Development Complex, CSIR Campus, CSIR Road, Taramani, Chennai– 600 113

Coordination Office
CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P.O., New Delhi–110 025

Name of Lab:_____CSIR-CBRI_____

Existing course	Modified course
Faculty (Course cluster): BS/CS/ES/PS/MIS: Engineering Science	Faculty (Course cluster): Enginerring Science BS/CS/ES/PS/MIS
Course Title: Sustainable Design and Energy Efficient Building Systems	Course Title: Sustainable Design and Energy Efficient Building Systems
Course Nomenclature: ENG- CBRI- 1-1130	Course Nomenclature: ENG- CBRI- 1-1130
L-T-P-C distribution: 3-0-0-3	L-T-P-C distribution: 3-0-0-3
Name of the Teachers : Dr. Ashok Kumar Dr. B. Suman	Dr. Ashok Kumar Dr. Tabish Alam Dr. Anuj Kumar
Course content: Introduction to sustainable and energy efficient building systems, Sustainable design principles, Low carbon building technologies, Climate factors for buildings design, Thermal comfort and insulation, Passive energy building design, Green building rating systems, Energy Conservation Building Code, Application of performance assessment tools, Low energy building materials, Heat repellent, Insulating materials, Heat transfer through building elements. Case Studies: Integrated design process, Green design projects. 1. Godfrey Boyle, Renewable Energy, Oxford University Press, 2004, Reprint 2010. 2. Sharma I C, The Climatic Data Handbook, Tata Mc Graw Hill Pub. Co. Ltd., 1993. 3. Givoni B, Man Climate & Architecture, Elsevier, 1969 4. Arvind Krishnan & et al., Climate Responsive Architecture – A Design Handbook for Energy Efficient Buildings, Tata Mc Graw Hill Pub. Co. Ltd. 5. Gupta C P, Prakesh Rajendra, Engineering Heat Transfer, Nem Chand & Brothers -Roorkee, 1979	**Modified Course content:** Introduction to sustainable and energy efficient building systems, Sustainable design principles, Low carbon building technologies, Climate factors for buildings design, Thermal comfort and insulation, Passive energy building design, Green building rating systems, Energy Conservation Building Code, Application of performance assessment tools, Low energy building materials, Heat repellent, Insulating materials, Heat transfer through building elements. Case Studies: Integrated design process, Green design projects. **Solar Energy Applications:** Introduction of sun and solar radiations, overview of solar thermal applications, Liquid flat-plat collectors, Solar air heaters, Concentrating collectors, Testing procedures, Thermal energy storage: sensible heat storage, latent heat storage and thermo-chemical heat storage, other methods to utilization of solar energy: photovoltaic conversion, solar chimney, solar pond, etc. **Instrumentation:** Sensor and Transducer Fundamentals: Transducer terminology, Design and performance characteristics, criteria for transducer selection, Case Studies – Transducers principles of representative cases with emphasis on special "Electronic Conditioning requirements" of different type of sensors-- Resistive transducer; Inductive transducers; capacitive transducers; piezoelectric transducer; semiconductor and other sensing structures. Reference Books: 1.Godfrey Boyle, Renewable Energy, Oxford University Press, 2004, Reprint 2010. 2. Sharma I C, The Climatic Data Handbook, Tata Mc Graw Hill Pub. Co. Ltd., 1993. 3. Givoni B, Man Climate & Architecture, Elsevier, 1969

	4. Gupta C P, Prakesh Rajendra, Engineering Heat Transfer, Nem Chand & Brothers -Roorkee, 1979 5. Renewable Energy Resources, Second Edition, John Twidell & Tony Weir, Tailer & Fracis-2008 6. Non-Conventional Energy Resources, B.H. Khan, TMH, 2nd Edition-2009 7. Wind and Solar Systems by Mukund Patel, CRC Press, 2011. 8. Measurnments – E. O. Doebelin

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _____   Date: 01/05/2017

CBRI

Lab Director: _____   Date: _____

Checked By: _____ (Associate Dean) Date: _____

Approved By: _____ (Dean)   Date: _____

ANNEXURE P-5

Ashwini AcSIR <ashwini@acsir.res.in>

Details of PhD (Engineering Sci) changed courses at CSIR-CEERI.

SumanKMishra <suman@nmlindia.org>   Wed, May 3, 2017 at 1:10 PM
To: coordinator.ceeri@acsir.res.in
Cc: spal@ceeri.res.in, Ashwini AcSIR <ashwini@acsir.res.in>

The changed Eng course full set is approved.
S.K. Mishra

-------- Original Message --------
From: **Coordinator CSIR-CEERI** <coordinator.ceeri@acsir.res.in>
Date: May 3, 2017 11:14:34 AM
Subject: Fwd: Details of PhD (Engineering Sci) changed courses at CSIR-CEERI.
To: Associate Dean Engineering Science <associatedean.engsci@acsir.res.in>, suman@nmlindia.org
Cc: spal@ceeri.res.in

Dear Madam,

I am forwarding the previous email regarding changes/ modifications in
course list for PhD (Engg Sci) at CSIR-CEERI (based on current theme
areas and R&D focus of the Lab) for your kind perusal and approval, as
I have not received any reply so far.

Thanks and regards,

Suchandan.

-- AcSIR Coordinator at CSIR-CEERI, Pilani

---------- Forwarded message ----------
From: Coordinator CSIR-CEERI <coordinator.ceeri@acsir.res.in>
Date: Fri, Apr 28, 2017 at 9:51 AM
Subject: Details of PhD (Engineering Sci) changed courses at CSIR-CEERI.
To: Associate Dean Engineering Science
<associatedean.engsci@acsir.res.in>, Dean Engineering Science
<dean.engsci@acsir.res.in>
Cc: Ashwini AcSIR <ashwini@acsir.res.in>, Arpita AcSIR
<arpita.acsir@acsir.res.in>, Kunal Ray <kunalray@acsir.res.in>, Raj
Singh <raj.ceeri@gmail.com>, Raj Singh <raj@ceeri.res.in>

Dear Sir / Madam,

Kindly see the attached file for the list of course/course-content for
PhD (Engineering Sciences) at CSIR-CEERI for Aug-2017 session (as per
modified courses formed for the "new" AcSIR-IMP-2017) for your kind
perusal and approval before announcing the same.

Kindly note that the modified courses are aligned to current theme
areas and R&D focus at CSIR-CEERI.

Suchandan.

-- AcSIR Coordinator at CSIR-CEERI, Pilani

--
**Dr. Mrs S. K. Mishra, Chief Scientist (Advanced Material Processing) and Head, Human Resource Group (HRG),
Associate Dean Eng. Sc. and Adjunct Prof. AcSIR,
CSIR-National Metallurgical Laboratory, Jamshedpur, Jharkhand, India.831007,**

ANNEXURE P-5

Email: skm_smp@yahoo.co.in, suman@nmlindia.org, suman.nml@gmail.com
Ph. 91-657-234-5122, 5256, Fax:916572345213 mobile:09801341664

PhD-Engg-Apr2017.docx
35K

19th Senate   CSIR-CEERI   Engineering Sciences

PhD (Engineering Sciences) at CSIR-CEERI, Pilani

List of Courses

S No.	Faculty	Lab Name	Course Nomenclature	Course Name	L	T	P	C
1	ENG	CEERI	ENG-CEERI-1-1501	Technical communications	2	0	0	2
2	ENG	CEERI	ENG-CEERI-1-1502	Research methodology	1	1	0	2
3	ENG	CEERI	ENG-CEERI-2-1501	Project management	2	0	0	2
4	ENG	CEERI	ENG-CEERI-2-1511	Advanced engineering mathematics	3	0	0	3
5	ENG	CEERI	ENG-CEERI-2-1512	Measurement and characterization techniques	3	0	0	3
6	ENG	CEERI	ENG-CEERI-2-1513	Modelling and simulation of electronic systems	3	0	0	3
7	ENG	CEERI	ENG-CEERI-2-1514	Signal processing	3	0	0	3
8	ENG	CEERI	ENG-CEERI-2-1522	Lab: Measurement and characterization techniques	0	1	2	1
9	ENG	CEERI	ENG-CEERI-2-1523	Lab: Modelling and simulation of electronic systems	0	0	2	1
10	ENG	CEERI	ENG-CEERI-2-1524	Lab: Signal processing	0	0	2	1
11	ENG	CEERI	ENG-CEERI-2-1531	Electromagnetic theory and transmission lines	3	0	0	3
12	ENG	CEERI	ENG-CEERI-2-1532	Microwave and satellite communications	2	0	0	2
13	ENG	CEERI	ENG-CEERI-3-0098	MTech Dissertation-I	0	7	14	14
14	ENG	CEERI	ENG-CEERI-3-0099	MTech Dissertation-II	0	9	18	18
15	ENG	CEERI	ENG-CEERI-3-1501	Advanced self-study (special topic)	0	2	4	4
16	ENG	CEERI	ENG-CEERI-3-1511	Technologies for IoT	3	1	0	3
17	ENG	CEERI	ENG-CEERI-3-1512	Cyber physical systems	3	1	0	3
18	ENG	CEERI	ENG-CEERI-3-1513	High-level electronic system design and realization	3	0	0	3
19	ENG	CEERI	ENG-CEERI-3-1514	Signal processing and machine learning	3	0	0	3
20	ENG	CEERI	ENG-CEERI-3-1515	Image processing and computer vision	3	2	0	4
21	ENG	CEERI	ENG-CEERI-3-1516	Cognitive systems	3	2	0	4
22	ENG	CEERI	ENG-CEERI-3-1517	Smart-grid and renewable energies	3	0	0	3
23	ENG	CEERI	ENG-CEERI-3-1518	Process control and embedded systems	3	0	0	3
24	ENG	CEERI	ENG-CEERI-3-1519	Embedded Intelligence	3	0	0	3
25	ENG	CEERI	ENG-CEERI-3-1523	Lab: High-level electronic system design and realization	0	0	2	1

26	ENG	CEERI	ENG-CEERI-3-1524	Lab: Signal processing and machine learning	0	0	2	1
27	ENG	CEERI	ENG-CEERI-3-1527	Lab: Smart-grid and renewable energies	0	0	2	1
28	ENG	CEERI	ENG-CEERI-3-1528	Lab: Process control and embedded systems	0	0	2	1
29	ENG	CEERI	ENG-CEERI-3-1531	Micro- and nano-technologies	3	2	0	4
30	ENG	CEERI	ENG-CEERI-3-1532	Micro-sensors and actuators	3	0	0	3
31	ENG	CEERI	ENG-CEERI-3-1533	Photonic and optoelectronic devices and technologies	3	0	0	3
32	ENG	CEERI	ENG-CEERI-3-1534	Non-silicon and flexible materials, devices and technologies	3	2	0	4
33	ENG	CEERI	ENG-CEERI-3-1541	Lab: Micro- and nano-technologies	0	0	4	2
34	ENG	CEERI	ENG-CEERI-3-1542	Lab: Micro-sensors and actuators	0	0	4	2
35	ENG	CEERI	ENG-CEERI-3-1543	Lab: Photonic and optoelectronic devices and technologies	0	0	2	1
36	ENG	CEERI	ENG-CEERI-3-1551	Principles of high power microwave tubes	3	2	0	4
37	ENG	CEERI	ENG-CEERI-3-1552	Microwave and mm-wave tube technologies	3	0	0	3
38	ENG	CEERI	ENG-CEERI-3-1553	Vacuum microelectronic THz devices	2	0	0	2
39	ENG	CEERI	ENG-CEERI-3-1554	Plasma devices	2	0	0	2
40	ENG	CEERI	ENG-CEERI-3-1555	Advanced electromagnetic materials	2	0	0	2
41	ENG	CEERI	ENG-CEERI-3-1556	Numerical analysis and techniques for microwave applications	2	0	0	2
42	ENG	CEERI	ENG-CEERI-3-1561	Lab: Microwave components and device characterizations	0	1	4	2
43	ENG	CEERI	ENG-CEERI-4-0001	Project proposal	0	0	4	2
44	ENG	CEERI	ENG-CEERI-4-0002	Review article	0	0	4	2
45	ENG	CEERI	ENG-CEERI-4-0003	CSIR-800 societal programme	0	0	8	4

ENG (CEERI): 1-1501: Technical communications (2-0-0-2)

Role and importance of technical communication; Effective written and oral communication; Ethical issues; Technical report writing; Technical/ R&D proposals; Research paper writing; Letter writing and official correspondence; Emails; Oral communication in meetings and group discussions; Oral presentations; Use of modern aids.

ENG (CEERI): 1-1502: Research methodology (1-1-0-2)

Introduction, terminology, and scientific methods; Types of research; Research process and steps; Identifying a research problem; Literature survey, appreciation of existing literature, identification of knowledge gaps; Conception of novel approach to solve the problem; Role of theory, modeling, and
simulation; Design of experiments, testing and characterization strategies; Quantitative methods and data analysis; Qualitative analysis; Communicating research results; Thesis writing and oral presentation; Ethics in research.

ENG (CEERI): 2-1501: Project management (2-0-0-2)

Introduction; Project formulation, evaluation and initiation; Project planning and scheduling; Risk management; Project execution and implementation; Project monitoring and control; Project closure; Project documentation; Leadership and teamwork issues; Complex projects; Advances and trends.

ENG (CEERI): 2-1511: Advanced Engineering Mathematics (3-0-0-3)

First and higher order differential equations; Bernoulli's equation; Euler-Cauchy equation; Practical examples and modelling of differential equations; Laplace transforms; Linear and Matrix algebra; Eigenvalue and eigenvector; Symmetric, Skew-symmetric and orthogonal matrices, Triangularization of matrices; Taylor series; Fourier series; Gradient, divergence and curl; Line, surface and volume integrals; Stokes's theorem; Basic concepts of optimization; Line searches, Gradient based methods, Global optimization methods; Data Representation; Probability; Permutations and Combinations; Random Variables; Probability Distributions.

ENG (CEERI): 2-1512: Measurement and characterization techniques (3-0-0-3)

Data acquisition; Sensors, signals and systems; Sensor characteristics, Transfer function; Calibration, computation of stimulus, span, calibration error, hysteresis, nonlinearity, saturation, repeatability, dead band, resolution; Noise in sensors and circuits; Measurement of impedance, capacitance, voltage and current; Compensation and drift techniques; Measurement techniques for sheet resistivity, contact resistance, barrier height, carrier and doping concentration, mobility and carrier life time; Characterization of materials and devices; Scattering parameters; Measurement of impedance and characterization of cavities; Dispersion and impedance characterization of RF structures; RF loss measurements; Measurement of frequency, power, gain efficiency of microwave devices; Plasma Devices characterization.

ENG (CEERI): 2-1513: Modelling and simulation of electronic systems (3-0-0-3)

Introduction to modelling: need, types, simulation tools; Basic system modelling overview: electrical, mechanical, thermal; Transfer function; Dynamical system modelling; Frequency response and loop shaping; Modelling of digital systems; Physical modelling with proper material and dimensions; Boundary conditions; Signal excitation; Conversion of physical modelling into numerical modelling; Modelling and simulation on MEMS electrostatic and thermal actuation: spring constant, modal frequency, actuation and displacement, pull-in and pull-out voltages, piezoelectric, resistive and capacitive sensing.

ENG (CEERI): 2-1514: Signal processing (3-0-0-3)

Time domain and frequency domain characterization of Linear Time Invariant (LTI) Discrete-Time Systems (DTS); Discrete Time Fourier Transform (DTFT), Transfer function, Frequency response; Discrete Fourier Transform (DFT), z-transform; FIR and IIR filter design; Discrete wavelet transform; DSP algorithm implementation issues and finite word length effects; Auto-regressive, Moving average and ARMA processes; Spectral Factorization; Parametric and non-parametric estimation, Detection in Gaussian noise; Linear prediction; Wiener and Kalman filter; Adaptive filters: steepest decent, LMS algorithm, adaptive noise cancellation, recursive least squares (RLS).

ENG (CEERI): 2-1522: Lab: Measurement and characterization techniques (0-1-2-1)

Laboratory practices and safety considerations; Study of sensors, their transfer function and calibration; Design of measurement system for temperature, humidity and gas sensors; Calibration of measuring equipment; I-V and C-V measurements; sheet-resistivity, thickness measurement;Ellipsometry, Raman, IR spectroscopy, STM, AFM and 3-D profiling,SEM, EDX, XRD, photoluminescence, Auger Spectroscopy, ECV profiling, Scanning probe microscopy, Magnetic measurement, LDV,Ellipsometry, Raman IR spectroscopy;Measurement of cold and hot parameters of microwave tubes and plasma devices; High-voltage breakdown testing of microwave tubes and switches; Device characterization using spectrum analyzer, scalar/vector analyzer;

ENG (CEERI): 2-1523: Lab: Modelling and simulation of electronic systems (0-0-2-1)

Laboratory practices and safety considerations; Passive and active device modelling using MATLAB; Introduction to HFSS and CoventorWare tools; Case study on MEMS actuators using Coventorware tool: pull-in and pull-out voltages, resonant frequency and spring constant. Case studies on electro-mechanical and electro-thermal switches.

ENG (CEERI): 2-1524: Lab: Signal processing (0-0-2-1)

Laboratory practices and safety considerations; MATLAB experiments on LTI systems in time and frequency domain, transfer function, frequency response; Design of digital FIR and IIR filters, auto-regressive, moving average, ARMA; Experiments on Spectral factorization, Wiener filtering, LMS and RLS algorithms

ENG (CEERI): 2-1531: Electromagnetic theory and transmission lines (3-0-0-3)

Review of Maxwell's equations, wave equations and their solutions; Boundary conditions and their applications; Electromagnetic energy and power flow; Review of Poynting theorem; Transmission lines; Wave-guide and coaxial components; Scattering matrix representation; Propagation of electromagnetic waves through homogeneous, in-homogeneous, and anisotropic media; Surface resistance and RF resistance; Ferrite devices; Waveguides and resonators; Characteristic and interaction impedances; Quality factor (loss and diffractive). Impedance matching; Measurement of "Q", power, noise figure, S-parameters, dielectric constant and loss tangent, dispersion and impedance characteristics, and loss parameters.

ENG (CEERI): 2-1532: Microwave and satellite communications (2-0-0-2)
Ground/surface wave, space-wave, and sky-wave modes of communication; Tropo-spheric Communication; Line-of-sight communication and system performance; Active and passive repeaters and their design; Modes of communication: analog and digital; Mobile communication; Satellite communication system; Earth station design criteria and direct reception system; Satellite transponders and their design criteria; Phase-noise, intra-pulse and inter-pulse noises and their significance.

ENG (CEERI): 3-1501: Advanced self-study (special topic) (0-0-4-2)
This will involve readings from published literature or books about new frontiers on a specific topic related to the field of electronics under guidance of senior scientist(s). A report needs to be submitted and a seminar on the special topic needs to be presented.

ENG (CEERI): 3-1511: Technologies for IoT (3-1-0-3)
Internet in general and Internet of Things (IoT):Technological trends in IoT, Societal benefits of IoT, IoT applications; IoT software technologies: Software architecture, Framework/ platforms, Operating systems; IoT Communication Technologies: Sensor interface and computation considerations; Wireless sensor network (WSN);Embedded Systems: embedded sensors and actuators, Interfacing with PI and Arduino boards, Interfacing camera, UART, ADA, DAV, LCD; IoT Security, privacy and risks; Application case studies.

ENG (CEERI): 3-1512: Cyber physical systems (3-1-0-3)
Principles of Cyber Physical System, modelling and design, smart sensors and actuators, feedback control of dynamical systems, embedded computing, real-time considerations, hybrid systems, communication network protocols, advanced analytics, distributed algorithms, machine learning, formal methods for specifications, analysis and verification. Case studies: smart water grid, smart renewable energy systems, environment monitoring and robotics; Lab: Sensor and actuator interfacing, calibration and drift compensation in multi-tank system; Programming embedded systems in Samsung Artik/ Intel Galileo platforms using C/ C++/ JAVA/ Python/ MATLAB; Design and modelling of Cyber-Physical Systems; Data analytics and decision making, current trends.

ENG (CEERI): 3-1513: High-level electronic system design and realization (3-0-0-3)
Electronic System-Level (ESL) design; Taxonomy and definitions of ESL, ESL design-flow; System-level design methodologies; System modelling; Models of computation; IP-based design; Platform-centric system design methodology; Specification and architectural synthesis; Area and

performance estimation; Techniques for architectural optimization; Data-path synthesis; Control unit synthesis; Scheduling; Resource sharing and binding; System modelling styles using VHDL/Verilog; Basic language elements; Control structures; Sub-programs and packages; Simulation concepts; Design for synthesis; RTL state machine design styles; RTL Modelling techniques; Functional models and test-benches; Mixed HDLs simulation and synthesis; FPGAs architecture; FPGA-based design methodology; System design tools; System platforms; System performance analysis; IP-based design.

ENG (CEERI): 3-1514: Signal processing and machine learning (3-0-0-3)
Introduction to time series analysis and its description; Classification of time series; Regressive models; Time-domain models; Frequency-domain models; Model building and forecasting methods; Fuzzy set theory, fuzzy logic, fuzzy decision making, approximate reasoning, fuzzy relations, and fuzzy rule based systems; Adaptive neural networks; Supervised learning neural networks; Learning from reinforcement; Unsupervised learning and other neural networks; Neuro-fuzzy modeling and neuro-fuzzy control; Basics of pattern recognition: generative modeling – Gaussian and mixture Gaussian models, hidden Markov models, factor analysis and latent variable models, Clustering methods and decision trees. Feature and model adaptation methods, feature selection methods; Current trends.

ENG (CEERI): 3-1515: Image processing and computer vision (3-2-0-4)
Digital Image Fundamentals; Electromagnetic Spectrum; Image sensing, sampling and Quantization; Review of linear algebra, 2D representation of digital images and their formats; Intensity transformations; Histogram equalization; Enhancement using arithmetic and logic operations; Image smoothening using frequency domain filters; Wavelet transform; Morphological operations; Point, line and edge detection; Lossy and lossless image compression; Entropy and coding techniques: JPEG; Image and noise restoration filters; Feature extraction in computer vision: local binary pattern and its variant; HoG, Gabor Filter, SURF, SIFT; Feature reduction techniques; Overview of different classification techniques: SVM and its types, Bayesian classifier, Nearest neighbor classifier, neural network classifier; Introduction to deep learning for computer vision; Convolutional neural networks and its applications; Deep learning architectures for object detection.

ENG (CEERI): 3-1516: Cognitive systems (3-2-0-4)
Introduction to cognition, Cognitive processes and mechanisms, Emotional cognitive structures, Basic functions of the neural emotional systems, Emotion and decision making, Perception, Attention, Cognitive process modeling, Randomized Algorithms, Complex reasoning, Uncertainty and perturbations, perturbations in data representation level, propagation of uncertainty, learning from data and uncertainty at model level, Passive and active learning, Reinforcement learning, Memory, Visuospatial processing, Perceptual interface, Cognitive load assessment, Cognitive architectures, SOAR, ACT-R/E, BCI/BMI.

ENG (CEERI): 3-1517: Smart-grids and renewable energies (3-0-0-3)
Renewable energy sources: Photovoltaic, Solar Thermal, Wind, Wave energy systems; Maximum power point tracking; Types of wind mills; Average power in the wind; Converters for renewable energy system: AC-DC, DC-DC,DC-AC converters; Distributed generation; Grid scale energy storage;

Power quality issues; Passive/active filtering; Electric Vehicles: charging infrastructure; Vehicle to grid (V2G); Introduction to smart grid: definition, necessity, Working principle of smart grid, applications, Standards, Smart grid components; Smart Grid Communications; Cyber Security Challenges in Smart Grid; Smart grid tools.

ENG (CEERI): 3-1518: Process control and embedded systems

P, PI, PID control analysis; Compensation methods; Stability concept and different methods for analysis; Functional analysis: fundamental of various LTI systems, Laplace and Fourier transform for frequency space analysis, Phase plane analysis, limit cycles and linearization; Large Scale Systems, System reduction, Sliding mode control (continuous and discrete); Robust stability and control using quantitative feedback analysis (QTA); Optimal control; Nonlinear system analysis and control, constrained and optimization based control, Nonlinear and adaptive control; Introduction to embedded systems for process control; 8- and 16-bit PIC microcontroller architecture, programming, I/O, Timer and interfaces, dsPIC architecture overview; ARM processor architecture and programming model.

ENG (CEERI): 3-1519: Embedded Intelligence (3-0-0-3)

Cognitive processes and mechanism, intelligent mechanisms, learning mechanisms, robustness and performance estimation; Uncertainty and perturbations, propagation of uncertainty, learning from data and uncertainty at model-level; Emotional cognitive structures, automatic and controlled processes, basic functions of emotional neural emotional systems, emotion and decision making; Adaption at the power supply voltage, adaptive sensing and policies, clock synchronization, localization and tracking, adaption at energy harvesting level and application code level; Passive and active learning, change point methods, change detection tests, just-in-time learning framework; Accuracy estimation, probably approximately correct computation, performance verification problem.

ENG (CEERI): 3-1523: Lab: High-level electronic system design and realization (0-0-2-1)

Laboratory practices and safety considerations; FPGA prototyping boards; JTAG Configuration; Downloading design of combinational and sequential building blocks; RTL Design of sub-systems blocks; FPGA implementations of system components; A system design using various hardware components.

ENG (CEERI): 3-1524: Lab: Signal processing and machine learning (0-0-2-1)

Laboratory practices and safety considerations; Implementations of different models including Regressive models; Time-domain models; Frequency-domain models in MATLAB/Labview/C++ on different time series data and sensor data.

ENG (CEERI): 3-1527: Lab: Smart-grids and renewable energies (0-0-2-1)

Modelling of Photovoltaic cell; Simulation of maximum power point tracking algorithms; Simulation of switch-mode converters; Introduction to advanced simulation software: Hardware-in-loop (HIL) simulation and rapid prototyping; Simulation of micro-grid and grid scale energy storage, bi-directional power flow control.

ENG (CEERI): 3-1528: Lab: Process control and embedded systems (0-0-2-1)
Laboratory practices and safety considerations; Identification of transfer function of various sensors and actuators; Implementation of basic and advanced control techniques (P, PI, PID, sliding mode etc.) with different sensors, actuators and microcontrollers.

ENG (CEERI): 3-1531: Micro- and nano-technologies (3-2-0-4)
Crystal growth techniques, wafer preparation and shaping, chemical cleaning, thermal oxidation, photolithography, chemical etching (wet and dry), chemical vapor deposition techniques, thermal diffusion, ion implantation, metalization, chemical mechanical polishing, rapid thermal processing; Use of silicon dioxide, polymers, and glass; Advanced processes (thermal, ICP-PECVD, PVD, RTO); Thick-film process steps (for MEMS) and ultra-thin-film process steps (for Nano-structures); Special lithography techniques, front and backside alignment, sub-micron/nano-lithography, EBL; Surface and bulk micro-machining techniques; DRIE and LIGA process; Process integration for structures like comb, cantilever, diaphragm, channel, nano-wire, nano-gaps; Sacrificial materials; Characterization of MEMS and nano-dimensional structures; Wafer-level bonding and packaging techniques; Trends in MEMS and nano-devices technologies, Carbon Nanotubes- Nomenclature, classifications, synthesis, properties, and applications of carbon nanotubes.

ENG (CEERI): 3-1532: Micro-sensors and actuators (3-0-0-3)
Overview of Micro-sensors and transduction principles; Mechanical properties of materials and essentials of structural mechanics; Electromechanical, magneto-mechanical and piezo-based sensing; Structural elements for MEMS and micro-sensors (Beams, plates, cantilevers, bridges and diaphragms); Electrostatic sensing and actuation (parallel plate and torsional structures, time domain analysis); Micro-fluidics; Scaling laws and miniaturization; Micro-system design principles; MEMS simulation and design Tools; RF MEMS; Reliability issues in micro-sensors; Examples and applications of Micro-sensors and actuators.

ENG (CEERI): 3-1533: Photonic and optoelectronic devices and technologies (3-0-0-3)
Introduction to photonics and optoelectronics; Propagation of electromagnetic waves; Optical waveguides and fibers; Dispersion and losses in optical fiber and waveguide; Basic photonics components, devices; Principle of optical communications; Coupled mode theory in guided wave systems; Fiber- and waveguide gratings; Photonic crystal based structures and devices; Optical sensors and sensing techniques; MOEMS; Optoelectronic materials: GaAs and GaN-based compound semiconductor; double hetero-structures, quantum-well, modelling and simulation issues; Growth of epitaxial material: MOCVD and MBE; Material characterization: XRD, photoluminescence, Hall-effect measurement, SIMS, ECV profiling; Devices: LEDs, semiconductor LASERs, detectors, solar-cells, HEMT, Compound semiconductor technologies; Fabrication and packaging of photonic and optoelectronic devices; Applications and recent trends.

ENG (CEERI): 3-1534: Non-silicon and flexible materials, devices and technologies (3-2-0-4)
Flexible substrate: materials and technology; CNT: physics and technology, CNT types; CNT gas sensors: design, technology and characterization; Graphene: physics and technology; SiC: physics and technology; Diamond: physics and technology; Organic Semiconductors andnano-composites;

Polymer: Single molecule science; Flexible RF electronics: design and technology; Antenna, Filters, SAW devices; DSSC /Perovskite solar cell: physics and design.

ENG (CEERI): 3-1541: Lab: Micro- and nano-technologies (0-0-4-2)
Laboratory practices and safety considerations; Wafer preparation and shaping; Chemical cleaning; Thermal oxidation, photo-lithography; Wet chemical etching; Dry etching; Chemical vapor deposition; Thermal diffusion; Ion implantation; Metalization; Wet and Dry Micromachining; LIGA process; Case Study: Micro-cantilever and Membrane realization.

ENG (CEERI): 3-1542: Lab: Micro-sensors and actuators (0-0-4-2)
MEMS design tools (CoventorWare/ COMSOL/ ANSYS); Design of micro-cantilever and pressure sensors; Design of gas sensors, acoustic, ultrasonic, micro-resonator and ISFET; RF MEMS design and simulations (switches and phase-shifter).

ENG (CEERI): 3-1543: Lab: Photonic and optoelectronic devices and technologies (0-0-2-1)
Laboratory practices and safety considerations; Design of optical splitter and MUX/DEMUX; Design and simulation of optical fiber/ waveguide gratings and photonic crystal structures; Characterization of optical splitter and Bragg grating; MOCVD system demonstration; Characterization of materials by PL and Hall-effect; Unit Processes for compound semiconductor device fabrication, Characterization of devices in chip/ packaged level: LEDs, solar cells.

ENG (CEERI): 3-1551: Principles of high power microwave tubes (3-2-0-4)
Introduction to high power Microwave tubes and their classifications as O-type, M type, slow-wave and fast-wave devices microwave tubes; Electron Beam Dynamics: Different types of electron beam generation, beam focusing and collection techniques. Interaction of Electron beam with electromagnetic wave in slow wave and fast wave devices. Microwave wave coupling mechanism for different microwave tubes. Performance improvement techniques of different devices in terms of power, gain, efficiency, linearity, life, reliability etc.

ENG (CEERI): 3-1552: Microwave and mm-wave tube technologies (3-0-0-3)
Fundamentals of vacuum technology; Vacuum generation and measurement, and leak detection; Ultra-high vacuum techniques and vacuum processing of the tubes; Electron-tube grade materials and their characteristics; Design of tools, jigs, and fixtures; Engineering / mechanical design of components; Special micro and precision machining techniques. Vacuum grade different integration techniques like Brazing, TIG welding, furnace and RF brazing, laser welding, resistive welding etc. Physics of electron emission, emission equation; temperature limited and space-charge limited emission; Different types of electron emitters and their fabrication and characterization.

ENG (CEERI): 3-1553: Vacuum microelectronic devices (2-0-0-2)

Introduction to THz Vacuum Microelectronic Devices (THz VMDs). Types of THz VMDs and their features. Application of THz VMDs. Design Considerations; Field Emitter Array, Electron Gun with cylindrical beam and sheet beam, Beam Focusing systems, collectors Different types RF structures including rf coupler. Micro fabrication Techniques; Micro EDM, Electrochemical milling, Dicing, Laser Micromachining. Micro fabrication Techniques; DRIE, UV Lithography, X-Ray Lithography.

ENG (CEERI): 3-1554: Plasma devices (2-0-0-2)

Introduction to plasma devices, Physical parameters, Saha equation and its relevance, Debye shielding, Conditions for plasma formation, Plasma as fluid, Waves in plasma, Equilibrium and instabilities, Non-linear effects in plasma, Plasma sheath, Bohm-sheath criteria, types of discharges in gases, hollow cathode discharges and other kinds discharges, general features of electrons emission, control and extraction of electrons and ions from plasma in DC and pulsed-mode conditions, plasma switches, plasma cathode electron gun (PCE-Gun); plasma-filled microwave devices, trends in plasma-filled devices.

ENG (CEERI): 3-1555: Advanced electromagnetic materials (2-0-0-2)

Review of Maxwell Equations, Introduction to Metamaterials and Effective Medium Concept, Physics of Negative Permeability and Permittivity, Physics of Photonic Band Gap Structure, FSS, Dispersion Engineering Manipulation of Light Wave, Surface Plasmon, Super Lens, Metamaterial Microwave Antennas and Absorbers, Interaction of Metamaterial with moving electron, Overview of Metamaterial Fabrication.

ENG (CEERI): 3-1556: Numerical analysis and techniques for microwave applications (2-0-0-2)

Quick overview of programming fundamentals, Numerical differentiation: Taylor's series, Euler's method, Runge-Kutta methods, predictor-corrector method, Picard method, Numerov method, Numerical integration: Trapezoidal rule, Simpson's rule, Romberg method, Numerical solutions of transcendental equations: Bisection method, Secant method, Newton method, Muller method – Solving simultaneous equations: Gauss elimination method, Gauss-Jordan method, Gauss-Seidel method, FDM: Solutions to Partial Differential Equations, Band matrix method and iterative methods, FDTD: Leap frog method, Yee's algorithm, 1D and 2D, Boundary conditions and Excitations – Introduction to PIC, FEM: Discretization, Element Equation, Mapping, Assembling, Boundary Conditions.

ENG (CEERI): 3-1561: Lab: Microwave components and device characterizations (0-1-4-2)

Laboratory practices and safety considerations; Scattering parameters; Measurement of impedance and characterization of cavities; Dispersion and impedance characterization of RF structures; RF loss measurements; UHV techniques; Heat treatment in protective atmosphere; Ceramic-to-metal sealing techniques; Chemical processing of components. Laboratory practices and safety considerations; Device characterization using spectrum analyzer, scalar/vector, analyzer; Break-down tests; X-ray radiography; Hot RF characterization of devices; Metal-to-metal brazing, techniques; Leak detection techniques; TIG/laser welding; Vacuum processing of devices; Cathode fabrication, and testing; Cathode characterization using Auger and thermal emission microscope.

ENG (CEERI): 4-0001: Project proposal (0-0-4-2)

Definition of a scientific project proposal; Components of a proposal; Need and purpose of the proposal; Aims and objectives; Background and present status; Proposed methodologies and approaches; Scheduling and milestones; Resource allocation; Budgeting; Monitoring and evaluation mechanisms;

Referencing and citing; Use of data, graphs, tables, figures; Proposal funding agencies and their formats. Every student needs to submit two proposals – one related to PhD research topic and the second in any field of electronics.

ENG (CEERI): 4-0002: Review article (0-0-4-2)

Preparation of one review article on specific research area of the student.

ENG (CEERI): 4-0003: CSIR-800 societal programme project (0-0-8-4)

A project needs to be undertaken in rural area for 68 weeks duration aligned to the CSIR800 programme. The theme of the project may be chosen from the CSIR800 document or from any other government department related to benefiting and empowering the economically lower 800 million Indians by way of S&T innovations. The aim is to interact with underprivileged people in the villages and propose solutions in the area of health, agriculture, energy, water, food, education, etc.

ANNEXURE P-5

Ashwini AcSIR <ashwini@acsir.res.in>

April 2017: Window open (from April 15-30) for Introduction/ Modification of Course(s)

Coordinator CSIR-CMERI <coordinator.cmeri@acsir.res.in>   Fri, Aug 11, 2017 at 6:08 PM
To: SumanKMishra <suman@nmlindia.org>
Cc: Associate Science <associatedean.engsci@acsir.res.in>, Arpita AcSIR <arpita.acsir@acsir.res.in>, Ashwini AcSIR <ashwini@acsir.res.in>, SN Shome <snshome@cmeri.res.in>

Dear Madam/ Sir,
Thank you very much for approving the modification, withdrawal and new courses pertaining to the Eng. Science Section (MTech/PhD and PGD).
We shall take care the issues as pointed out while preparing the updated brochure for M.Tech/PhD (Engg) and PGD program while incorporating the
the modification, withdrawal and new courses.

Thanks and best regards..
S. Nandy

On Fri, Aug 11, 2017 at 4:41 AM, SumanKMishra <suman@nmlindia.org> wrote:
Dear Dr. Nandy

The Eng.science section modification, withdrawal and new courses are approved.

Please follow few essential and concern as per mail below for some courses. The faculty for one course can't be more than 3 in normal cases. Otherwise it gets diluted. It must be followed.
In some modified courses are somewhere more content is added but credit has remained same. The content given must be covered during the classes.
Regards
S.K. Mishra

-------- Original Message --------
From: **Associate Dean Engineering Science** <associatedean.engsci@acsir.res.in>
Date: Aug 10, 2017 12:33:06 PM
Subject: Fwd: April 2017: Window open (from April 15-30) for Introduction/ Modification of Course(s)
To: Dean Engineering Science <dean.engsci@acsir.res.in>, SumanKMishra <suman@nmlindia.org>

Dear Dr Mishra,

Please find my comments on the proposed course addition/withdrawal/modifications below:

2-2108: Credits are same but content is greatly increased. How is this possible?

1-2104: Same query: content is same but lecture hours are reduced; Tutorial/Practical hours added.

1-2113: Same query, content is same but now there are 2 hours for practical. Which part of the theory will not be covered given the 33% reduction in lecture hours?

2-2102: Recommend approval

"New courses" 1-2120, 1-2135, 1-2136 2-2108 are already part of other programs and if already approved do not require fresh approval.

3-2118: Recommend approval

3-2119: Recommend approval (note that there is a typo in the numbering of instructors)

1-2120 modification: Number of instructors is too high. Suggest maximum four, since there were five previously, and the number of practical hours proposed is half that in the existing course.

ANNEXURE P-5

1-2124 recommend approval of request to withdraw
1-2126 recommend approval of request to withdraw
1-2131: recommend approval of request to withdraw

1-2127: Too many instructors

1-2130: Recommend approval of modification

Regards,
Chetan

---------- Forwarded message ----------
From: **Coordinator CSIR-CMERI** <coordinator.cmeri@acsir.res.in>
Date: Tue, Aug 8, 2017 at 5:29 PM
Subject: Fwd: April 2017: Window open (from April 15-30) for Introduction/ Modification of Course(s)
[Quoted text hidden]

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**Dr. Mrs S. K. Mishra, Chief Scientist (Advanced Material Processing) and Head, Human Resource Group (HRG),
Dean Eng. Sc. and Adjunct Prof. AcSIR,
CSIR-National Metallurgical Laboratory, Jamshedpur, Jharkhand, India.831007,
Email: skm_smp@yahoo.co.in, suman@nmlindia.org, suman.nml@gmail.com
Ph. 91-657-234-5122, 5256, Fax:916572345213 mobile:09801341664**

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Dr. S.Nandy
Sr. Principal Scientist
Robotics & Automation Group, CSIR-CMERI
Coordinator, AcSIR-CMERI
Durgapur

Modification of Existing Courses

Name of Lab: CSIR-Central Mechanical Engineering Research Institute

Existing course	Modified course
Faculty (Course cluster): ES BS/CS/ES/PS/MIS:	Faculty (Course cluster): ES BS/CS/ES/PS/MIS
Course Title: Numerical methods & computer programming	Course Title: Computer programming & numerical methods
Course Nomenclature: ENG-CMERI-2-2108	Course Nomenclature: ENG-CMERI-2-2108
L-T-P-C distribution: 2-0-2-3	L-T-P-C distribution: 2-0-2-3
Name of the Teachers : Dr. Partha Bhattacharya	1. Dr. R. Ray 2. Mr. R. S. Barnwal 3. Mr. A. Srinivasan
Course content: Introduction, finite floating point arithmetic, catastrophic cancellation, chopping and rounding errors; Solution of nonlinear equations; bisection, Newton's & Muller's method, fixed point iteration; Numerical optimization, Golden section search, Newton's method optimization; linear algebraic equations; forward Gaussian elimination, pivoting, scaling, back substitution, LU-decomposition, norms and errors, condition numbers, iterations, Newton's method for systems, computer implementation; Interpolation- Lagrange, Newton & inverse ; Numerical Integration; finite differences, Newton cotes, trapezoidal, Simpson's rule, extrapolation, Gaussian quadrature; Numerical solution of ODE; Euler's method, Runge-Kutta method, multi-step methods, predictor-corrector methods, rates of convergence, global errors, algebraic and shooting methods, boundary value problems, computer implementation.	Modified Course content: Computer Programming: Introduction of C, Operators, Conditional statements and loops, Arrays, Functions, Structures and Unions, Pointers, Files handling C++ Overview, Classes in C++, Overloading, Inheritance, Overview of visual C++ MatLab - Basic, Matrix operations and functions in MATLAB, MATLAB scripts and functions (m-files) Simple sequential algorithms. Reading and writing data. Numerical Methods :Introduction, finite floating point arithmetic, catastrophic cancellation, chopping and rounding errors; Solution of nonlinear equations; bisection, Newton's & Muller's method, fixed point iteration; Numerical optimization, Golden section search, Newton's method optimization; linear algebraic equations; forward Gaussian elimination, pivoting, scaling, back substitution, LU-decomposition, norms and errors, condition numbers, iterations, Newton's method for systems, computer implementation; Interpolation- Lagrange, Newton & inverse ; Numerical Integration; finite differences, Newton cotes, trapezoidal, Simpson's rule, extrapolation, Gaussian quadrature; Numerical solution of ODE; Euler's method, Runge-Kutta method, multi-step methods, predictor-corrector methods, rates of convergence, global errors, algebraic and shooting methods, boundary value problems, computer implementation.

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _____

Date: 03/05/17

Lab Director: _____

Date: 04/05/17

Checked By: _____ (Associate Dean)   Date: _____

Approved By: _____ (Dean)   Date: _____

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

Name of Lab: **CSIR-Central Mechanical Engineering Research Institute**

Existing course	Modified course
Faculty (Course cluster): ES BS/CS/ES/PS/MIS:	Faculty (Course cluster): ES BS/CS/ES/PS/MIS
Course Title: Advanced Control System	Course Title: Advanced Control System
Course Nomenclature: ENG-CMERI- 1-2104	Course Nomenclature: ENG-CMERI- 1-2104
L-T-P-C distribution: 3-0-0-3	L-T-P-C distribution: 2-0-2-3
Name of the Teachers : 1. Dr. S. Nandy 2. Dr. Suman Saha 3. Dr. Arpita Mukherjee	1. Dr. S. Nandy 2. Dr. Suman Saha 3. Dr. Arpita Mukherjee
Course content: Introduction & Motivation: Role of Controls in Mechatronics, Mathematical Preliminaries, Review of classical control concepts, Root locus technique; Frequency response analysis, Bode Plot, Design of PID Controller,Controller tuning. State Space Design: Modeling of physical systems, Concepts of state, State-space, Representation of Linear system, Controllability and Observability, State Observers. Advance Controller Design: Kalman Filters as Dynamic System State Observers; Linear Quadratic Regulator (LQR) design, Nonlinear Control Design; Describing function, Phase-plane analysis, Fundamentals of Lyapunov Stability Theory (Autonomous Systems), Advanced Stability Theory (Non-autonomous Systems), Feedback Linearization (Input-state & Input-output linearization); Sliding Mode Control.	Modified Course content: Introduction & Motivation: Role of Controls in Mechatronics, Mathematical Preliminaries, Review of classical control concepts, Root locus technique; Frequency response analysis, Bode Plot, Design of PID Controller, Controller tuning. State Space Design: Modeling of physical systems, Concepts of state, State-space, Representation of Linear system, Controllability and Observability, Stabilizability and Detectability, Observer design Advance Controller Design: Kalman Filters as Dynamic System State Observers; Notion of Nonlinear Control, Basics of Nonlinear Control, Nonlinear Control Methods, Feedback Linearization (Input-state & Input-output linearization); Fundamentals of Lyapunov Stability Theory (Autonomous Systems), Advanced Stability Theory (Non-autonomous Systems), Robust Outer Loop Controller, Sliding Mode Controller design. **Tutorials and Practical:** • Hands on experience with MATLAB/SIMULINK model development; • Verification of control performance using P/PI/PID controller; • Case Studies on Nonlinear controller development. Hands-on experience with application of different nonlinear control systems.

**May attach a separate sheet for content if required

Proposed for: _____ **Meeting of Senate**

Coordinator AcSIR-(Lab Name) _____   Date: 03/05/17

Lab Director: _____

Checked By: _____ (Associate Dean)   Date: 04/05/17

Date: _____

Approved By: _____ (Dean)   Date: _____

AcSYR

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

Name of Lab: __CSIR-Central Mechanical Engineering Research Institute_____

Existing course	Modified course
Faculty (Course cluster): BS/CS/ES/PS/MIS: ES	Faculty (Course cluster): BS/CS/ES/PS/MIS: ES
Course Title:MECHANICAL VIBRATION	Course Title:MECHANICAL VIBRATION
Course Nomenclature:ENG-CMERI-1-2113	Course Nomenclature:ENG-CMERI-1-2113
L-T-P-C distribution: 3-0-0-3	L-T-P-C distribution: 2-0-2-3
Name of the Teachers : Dr.Pranab Samanta and Dr.Swarup Kumar Laha	Faculty: Dr.Swarup Kumar Laha&Dr.Surendra Kumar, Dr.Pranab Samanta
Course content: Free vibrations and response of single-degree-of-freedom systems to harmonic, periodic and general excitations, Energy dissipation and damping, Duhamel's Convolution Integral for response to general time varying excitation. Multi-Degree-of-Freedom Systems; Lagrange's Equations. Free Vibration- The Eigenvalue Problem, Orthogonality of Modal Vectors, Dynamic response by Modal Analysis. Rayleigh's Quotient. Distributed Systems; Exact solutions of free and forced vibrations of bars and beams (axial, torsional and bending). Modal shapes and natural frequencies of continuous systems, Systems with lumped masses, Rayleigh's Principle Approximate Methods; Transfer Matrix Methods, Holzer's Method for Torsional Vibration, Myklestad's Method for bending vibration, Dunkerley's Method, Modal Superposition Methods.	Modified Course content: Free vibrations and response of single-degree-of-freedom systems to harmonic, periodic and general excitations, Energy dissipation and damping, Duhamel's Convolution Integral for response to general time varying excitation. Multi-Degree-of-Freedom Systems; Lagrange's Equations. Free Vibration- The Eigenvalue Problem, Orthogonality of Modal Vectors, Dynamic response by Modal Analysis. Rayleigh's Quotient. Distributed Systems; Exact solutions of free and forced vibrations of bars and beams (axial, torsional and bending). Modal shapes and natural frequencies of continuous systems, Systems with lumped masses, Rayleigh's Principle Approximate Methods; Transfer Matrix Methods, Holzer's Method for Torsional Vibration, Myklestad's Method for bending vibration, Dunkerley's Method, Modal Superposition Methods.

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _Swomdy_____   Date: _03/05/17___

Lab Director: _____   Date: _04/05/17__

Checked By: _____ (Associate Dean) Date: _____

Approved By: _____ (Dean)   Date: _____

Name of Lab: CSIR-Central Mechanical Engineering Research Institute

Existing course	Modified course
Faculty (Course cluster): BS/CS/ES/PS/MIS:	Faculty (Course cluster): BS/CS/ES/PS/MIS
Course Title: ROBOTICS AND MACHINE INTELLIGENCE	Course Title: MACHINE LEARNING
Course Nomenclature: ENG-CMERI-2-2102	Course Nomenclature: ENG-CMERI-2-2102
L-T-P-C distribution: 2-0-2-3	L-T-P-C distribution: 2-0-2-3
Name of the Teachers : Dr. J. RoyChoudhury	Mr. Srinivasan A
Course content: Artificial Intelligence, Computational Intelligence, Various Machine Learning Algorithms, Pattern Reorganization, Computer Vision, Fuzzy Expert System, Fuzzy Automata. Fundamentals of Robotics & Automation., Intelligent Robots, Control Systems and Components. Robot Motion Analysis and Control, Robot End Effectors, tactile and vision sensors in robotics, Cognitive system for Human machine interaction. Future Trends, Applications, Tutorial & Laboratory.	Modified Course content: Machine Learning Basics & Statistical Modelling : Machine Learning languages, types and examples, Machine Learning vs Statistical Modelling Supervised vs. Unsupervised Learning : Learn about Classification, K-Nearest Neighbor's, Regression, The differences between Supervised and Unsupervised Learning Machine Learning Algorithms, Linear Regression, Logistic Regression, Decision Tree, Support Vector Machines, Naive Bayes Classifier.

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _____   Date: _03/05/17_

Lab Director: _____   Date: _04/05/17_

Checked By: _____ (Associate Dean)   Date: _____

Approved By: _____(Dean)   Date: _____

Ashwini AcSIR <ashwini@acsir.res.in>

April 2017: Window open (from April 15-30) for Introduction/ Modification of Course(s)

Coordinator CSIR-CMERI <coordinator.cmeri@acsir.res.in>   Fri, Aug 11, 2017 at 6:08 PM
To: SumanKMishra <suman@nmlindia.org>
Cc: Associate Science <associatedean.engsci@acsir.res.in>, Arpita AcSIR <arpita.acsir@acsir.res.in>, Ashwini AcSIR <ashwini@acsir.res.in>, SN Shome <snshome@cmeri.res.in>

Dear Madam/ Sir,
Thank you very much for approving the modification, withdrawal and new courses pertaining to the Eng. Science Section (MTech/PhD and PGD).
We shall take care the issues as pointed out while preparing the updated brochure for M.Tech/PhD (Engg) and PGD program while incorporating the
the modification, withdrawal and new courses.

Thanks and best regards..
S. Nandy

On Fri, Aug 11, 2017 at 4:41 AM, SumanKMishra <suman@nmlindia.org> wrote:
Dear Dr. Nandy

The Eng.science section modification, withdrawal and new courses are approved.

Please follow few essential and concern as per mail below for some courses. The faculty for one course can't be more than 3 in normal cases. Otherwise it gets diluted. It must be followed.
In some modified courses are somewhere more content is added but credit has remained same. The content given must be covered during the classes.
Regards
S.K. Mishra

-------- Original Message --------
From: **Associate Dean Engineering Science** <associatedean.engsci@acsir.res.in>
Date: Aug 10, 2017 12:33:06 PM
Subject: Fwd: April 2017: Window open (from April 15-30) for Introduction/ Modification of Course(s)
To: Dean Engineering Science <dean.engsci@acsir.res.in>, SumanKMishra <suman@nmlindia.org>

Dear Dr Mishra,

Please find my comments on the proposed course addition/withdrawal/modifications below:

2-2108: Credits are same but content is greatly increased. How is this possible?

1-2104: Same query: content is same but lecture hours are reduced; Tutorial/Practical hours added.

1-2113: Same query, content is same but now there are 2 hours for practical. Which part of the theory will not be covered given the 33% reduction in lecture hours?

2-2102: Recommend approval

"New courses" 1-2120, 1-2135, 1-2136 2-2108 are already part of other programs and if already approved do not require fresh approval.

3-2118: Recommend approval

3-2119: Recommend approval (note that there is a typo in the numbering of instructors)

1-2120 modification: Number of instructors is too high. Suggest maximum four, since there were five previously, and the number of practical hours proposed is half that in the existing course.

ANNEXURE P-5

1-2124 recommend approval of request to withdraw
1-2126 recommend approval of request to withdraw
1-2131: recommend approval of request to withdraw

1-2127: Too many instructors

1-2130: Recommend approval of modification

Regards,
Chetan

---------- Forwarded message ----------
From: **Coordinator CSIR-CMERI** <coordinator.cmeri@acsir.res.in>
Date: Tue, Aug 8, 2017 at 5:29 PM
Subject: Fwd: April 2017: Window open (from April 15-30) for Introduction/ Modification of Course(s)
[Quoted text hidden]

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Dr. Mrs S. K. Mishra, Chief Scientist (Advanced Material Processing) and Head, Human Resource Group (HRG),
Dean Eng. Sc. and Adjunct Prof. AcSIR,
CSIR-National Metallurgical Laboratory, Jamshedpur, Jharkhand, India.831007,
Email: skm_smp@yahoo.co.in, **s**uman@nmlindia.org, suman.nml@gmail.com
Ph. 91-657-234-5122, 5256, Fax:916572345213 mobile:09801341664

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Dr. S.Nandy
Sr. Principal Scientist
Robotics & Automation Group, CSIR-CMERI
Coordinator, AcSIR-CMERI
Durgapur

CSIR-CMERI, Durgapur-713209

Post Graduate Diploma Programme (PGDAMT, PGDR, PGDIME)

A. PGDAMT (PGD in Advanced Manufacturing Technology)

Modification/withdrawal of the Existing Courses

Sl. No.	Course Code	Course Title (Existing)	Course Title (Modified)	Hours/Week			Credit Points	Remarks
				L	T	P		
1.	ENG-CMERI-1-2120	Theory of Manufacturing Processes and Systems	Same as existing	2	0	2	3	Syllabus and credit points (1-0-4-3 to 2-0-2-3) are modified. Course code will remain same. **This course is also proposed as a new course in the current M.Tech /PhD curriculum.**
2.	ENG-CMERI-1-2124	Additive and Micro Manufacturing	NA	1	0	4	3	This course will be **withdrawn** and one new course of same credit points will be introduced (**ENG-CMERI-2-2108:** Computer Programming & Numerical Methods).

Introduction of new courses

Sl. No.	Course Code	Course Title	Hours/Week			Credit Points	Remarks
			L	T	P		
1.	ENG-CMERI-2-2108	Computer Programming & Numerical Methods	2	0	2	3	This course will be newly introduced for PGDAMT in lieu of ENG-CMERI-1-2124. The new course belongs to the existing M.Tech /PhD program.

Note: 1) Course code ENG-CMERI-1-2120 will be also offered in M.Tech/PhD curriculum

2) Course code ENG-CMERI-1-2108 is a part of M.Tech/PhD curriculum and is being introduced as a new course in PGDAMT

Nandy 03/05/17
(Dr. S. Nandy)
(Coordinator, AcSIR)
CSIR-CMERI

Modification/withdrawl of the existing courses for PGDAMT

AcSYR

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

Name of Lab: <u>CSIR-Central Mechanical Engineering Research Institute</u>

Existing course	Modified course
Faculty (Course cluster): BS/CS/ES/PS/MIS:	**Faculty (Course cluster):** BS/CS/ES/PS/MIS
Course Title: THEORY OF MANUFACTURING PROCESSES AND SYSTEMS	**Course Title:** THEORY OF MANUFACTURING PROCESSES AND SYSTEMS
Course Nomenclature: ENG-CMERI-1-2120	**Course Nomenclature:** ENG-CMERI-1-2120
L-T-P-C distribution: 1-0-4-3	**L-T-P-C distribution: 2-0-2-3**
Name of the Teachers: 1. Mr. A.J. Banerjee 2. Dr. Ranjan Sen 3. Mr. Sankar Karmakar, 4. Mr. A.K. Prasad 5. Dr. Nilrudra Mondal	1. Dr. Nagahanumaiah 2. Dr. Arup Nandi 3. Dr. Ranjan Sen 4. Dr. Samik Dutta 5. Mr. Pranabendu Saha 6. Mr. R.K. Padhi 7. Mr. Manoj Biswal 8. Mr. Soumyajit Kundu
Course content: Introduction: Overview of Machining Technology, Theory of Chip Formation in Metal Machining, cutting tools and materials. **Conventional Manufacturing Processes:** Different types of material removal processes, Joining & Forming processes, Machine tools & and their structure. **Non Conventional Manufacturing:** Electrical Discharge Machining, Electo Chemical Machining, Laser Assisted	**Modified Course content: Introduction:** Overview of Machining Technology, Theory of Chip Formation in Metal Machining, cutting tools and materials. **Conventional Manufacturing Processes:** Different types of material removal processes, Joining & Forming processes, Machine tools & and their structure. **Non Conventional Manufacturing:** Electrical Discharge Machining, Electo Chemical Machining, Laser Assisted Machining, Forming

Irandy 03/05/17

Machining, Forming and joining.	and joining.
Finishing & Polishing Processes: Abrasive assisted grinding & polishing, Ion beam machining, Abrasive jet machining, Texturing, Coating & Deposition and surface Treatment.	**Finishing & Polishing Processes:** Abrasive assisted grinding & polishing, Ion beam machining, Abrasive jet machining, Texturing, Coating & Deposition and surface Treatment.
Integrated Manufacturing Systems: Material Handling, Fundamentals of Production Lines Assembly Lines, Cellular Manufacturing, Flexible Manufacturing Systems and Cells, Computer Integrated Manufacturing.	**Production Planning and Control:** Process planning & Scheduling, Inventory Control, Material and Capacity Requirements Planning, Just-In-Time and Lean Production.
Production Planning and Control: Process planning & Scheduling, Inventory Control, Material and Capacity Requirements Planning, Just-In-Time and Lean Production	**Introduction to Micro Machining:** Micro Milling, EDM and laser machining processes.

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _Jnanchy_ Date: _03/05/17_

Lab Director: _Tisani_ Date: _04/05/17_

Checked By: _____ (Associate Dean) Date: _____

Approved By: _____(Dean) Date: _____

Name of Lab: **CSIR-Central Mechanical Engineering Research Institute**

Existing course	Modified course
Faculty (Course cluster): BS/CS/ES/PS/MIS: ES	Faculty (Course cluster):ES
Course Title: ADDITIVE AND MICRO MANUFACTURING	Course Title: NA. The course will be withdrawn
Course Nomenclature: ENG-CMERI-1-2124	Course Nomenclature: NA
L-T-P-C distribution: 1-0-4-3	L-T-P-C distribution: NA
Name of the Teachers: 1. Dr. Nagahanumaiah 2. Dr.A.K. Lohar 3. Dr. N.C. Murmu 4. Dr. Nripen Chanda 5. Dr. Abhiram Hens 6. Mr. Ravi Kumar Arun 7. Mr. Soumen Mandal	NA
Course content: Module -I: Additive Manufacturing Introduction: Prototyping, Additive and subtractive manufacturing, (layered manufacturing), Rapid prototyping and Tooling. **CAD Data:** CAD data preparation, slicing methods, stair step effects, data transfer and programming. Reverse engineering: Digitizing and 3D construction methods. Additive Manufacturing Processes: Principles of layered manufacturing, Laser fundamentals, Processes (Stereo lithography, selective laser sintering, DMD, FDM). Module-II: Micro Machining Micro- Nano Scale Manufacturing: Introduction, Micro Machining (milling, EDM, laser micro machining), Micro Injection molding, Nano-scratching, Micro patterning, Design of Micro machines, precision drives and controls, Error budgeting and Micro Factory concepts. **Micro-Nano metrology:** Precision Metrology: definitions; laser interferometer; AFM; SEM; TEM.	**Modified Course content:** NA (The course will be withdrawn)

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _Nandy_____   Date: _03/05/17_

Lab Director: _____   Date: _04/05/17_

Checked By: _____ (Associate Dean) Date: _____

Approved By: _____(Dean)   Date: _____

New Course for PGDAMT

Name of Lab: **CSIR-Central Mechanical Engineering Research Institute**

Course Title: **COMPUTER PROGRAMMING & NUMERICAL METHODS**

Faculty: (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	ENG-CMERI-2-2108
L-T-P-C	2-0-2-3
Name of Teachers:	1. Dr. Ranjit Ray 2. Mr. R S Barnwal 3. Mr. A. Srinivasan

Course Content details:

Computer Programming: Introduction of C, Operators, Conditional statements and loops, Arrays, Functions, Structures and Unions, Pointers, Files handling.

C++ Overview, Classes in C++, Overloading, Inheritance, Overview of visual C++

MatLab - Basic, Matrix operations and functions in MATLAB, MATLAB scripts and functions (m-files) Simple sequential algorithms. Reading and writing data.

Numerical Methods :Introduction, finite floating point arithmetic, catastrophic cancellation, chopping and rounding errors; Solution of nonlinear equations; bisection, Newton's & Muller's method, fixed point iteration;

Numerical optimization, Golden section search, Newton's method optimization; linear algebraic equations; forward Gaussian elimination, pivoting, scaling, back substitution, LU-decomposition, norms and errors, condition numbers, iterations, Newton's method for systems, computer implementation; Interpolation- Lagrange, Newton & inverse ;

Numerical Integration; finite differences, Newton cotes, trapezoidal, Simpson's rule, extrapolation, Gaussian quadrature; Numerical solution of ODE; Euler's method, Runge-Kutta method, multi-step methods, predictor-corrector methods, rates of convergence, global errors, algebraic and shooting methods, boundary value problems, computer implementation.

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _____ Date: _03/05/17_

Lab Director: _____ Date: _04/05/17_

Checked By: _____ (Associate Dean) Date: _____

Approved By: _____ (Dean) Date: _____

B. PGDR (PGD in Robotics)

Modification of the Existing Courses

Sl. No.	Course Code	Course Title (Existing)	Course Title (Modified)	Hours/Week			Credit Points	Remarks
				L	T	P		
1.	ENG-CMERI-1-2126	Fundamentals of Computer Programming & Robot Programming	NA	1	2	2	3	This course will be **withdrawn** and one new course will be introduced (ENG-CMERI-2-2108: Computer Programming & Numerical Methods) from M.Tech/PhD curriculum.
2.	ENG-CMERI-1-2127	Introduction to CAD, 3-D Modelling and Robot Mechanics	Same as existing	1	1	2	3	Syllabus is modified. Course code will remain same.
3.	ENG-CMERI-1-2130	Mobile robotic systems and Industrial robots	Mobile Robotic Systems	1	1	2	3	Title and Syllabus are modified. Course code will remain same.
4.	**ENG-CMERI-1-2131**	Robot Control	NA	1	1	2	3	This course will be **withdrawn** and one new course will be introduced (ENG-CMERI-1-2104: Advanced Control System).

Introduction of new courses

Sl. No.	Course Code	Course Title	Hours/Week			Credit Points	Remarks
			L	T	P		
1.	ENG-CMERI-2-2108	Computer Programming & Numerical Methods	2	0	2	3	This course will be newly introduced for PGDR in lieu of ENG-CMERI-1-2126. The new course belongs to the existing M.Tech /PhD program.
2.	ENG-CMERI-1-2104	Advanced Control System	2	0	2	3	This course will be newly introduced for PGDR in lieu of ENG-CMERI-1-2131. The new course belongs to the existing M.Tech/PhD program.

Note: 1) Course code ENG-CMERI-1-2108 is a part of M.Tech/PhD curriculum and is being introduced as a new course in PGDR

2) Course code ENG-CMERI-1-2104 is a part of M.Tech/PhD curriculum and is being introduced as a new course in PGDR

Modification/withdrawl of the existing courses for PGDR

Name of Lab: CSIR-Central Mechanical Engineering Research Institute

Existing course	Modified course
Faculty (Course cluster): BS/CS/ES/PS/MIS: ES	Faculty (Course cluster): NA BS/CS/ES/PS/MIS
Course Title: FUNDAMENTALS OF COMPUTER PROGRAMMING & ROBOT PROGRAMMING	Course Title: NA. The course will be withdrawn.
Course Nomenclature: ENG-CMERI-1-2126	Course Nomenclature: NA
L-T-P-C distribution: 3-0-1-3	L-T-P-C distribution: NA
Name of the Teachers : 1. Mrs. S Datta 2. Mr. R S Barnwal 3. Mr A Srinivasan 4. Mr A Das	NA
Course content: Introduction of C, Operators, Conditional statements and loops, Arrays, Functions (Library functions, user defined function, passing arguments to a function, call by reference, call by value, recursive functions), Structures and Unions, Pointers, Files handling C++ Overview, Classes in C++, Overloading (operator overloading ,function overloading), Inheritance (overview of inheritance ,defining base and derived classes, constructor and destructor calls), Visual C++: Introduction of Visual C++ Programming: VC++ Components – Microsoft foundation Classes. Visual C++:Event Handling – Document View` architecture – Menus – Dialog Boxes – Using VBX Controls – Using ActiveX Controls – Reading and Writing documents – SDI and MDI environments and application in Robotics MatLab: Basic, Matrix operations and functions in MATLAB, MATLAB scripts and functions (m-files) Simple sequential algorithms.MatLab: Reading and writing data, file handling, Personalized functions , Toolbox structure, Random number generation, Interactive session. XML: Basics of XML, Building Blocks, Basic Rules, Encoding, XML Tree, Schemas, DTD, XML in Robots. Robot Operating System (ROS) : Introduction, ROS Filesystem, ROS Computation Graph, Debugging ROS nods & messages, Visualization,	Modified Course content: NA. The course will be withdrawn.

Saving and playing back data

Python : Basics of Python, Operators and Expressions and Control flow, Python : Functions, Modules, Problem Solving in python, Input and outputs in python and application. Python with ROS, Modeling and Simulation using ROS, Sensors and actuators with ROS, Simulating Robot Setups.

Android: Introduction, Architecture, Android App Structure, IDE, Anatomy of Android Projects, Layouts, Views, Widgets, Menu, User Interface Design, Event Handling, Robotic Applications.

Java: Classes and Methods, Inheritance, Packages and Interfaces, Exception Handling, Multithreaded Programming.

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _____   Date: __03/05/17__

Lab Director: _____   Date: __04/05/17__

Checked By: _____ (Associate Dean)   Date: _____

Approved By: _____ (Dean)   Date: _____

Name of Lab: **CSIR-Central Mechanical Engineering Research Institute**

Existing course	Modified course
Faculty (Course cluster): BS/CS/ES/PS/MIS:	Faculty (Course cluster): BS/CS/ES/PS/MIS
Course Title: Introduction to CAD, 3-D Modelling and Robot Mechanics	Course Title: Introduction to CAD, 3-D Modelling and Robot Mechanics
Course Nomenclature: ENG-CMERI-1-2127	Course Nomenclature: ENG-CMERI-1-2127
L-T-P-C distribution: 1-1-2-3	L-T-P-C distribution: 1-1-2-3
Name of the Teachers : Dr. A Maity, Dr. S. Sen, U. S. Patkar, A. Das, S. Reddy	Dr. A Maity, Mr. Virendra Kumar Dr. S. Sen, Mr. U. S. Patkar, Mr. A. Das, Mr. S. Reddy
Course content: Module I: Definition, Historical development of CAD, Evolution of CAD, exposure to different CAD platforms, part and assembly 3D-modeling in different CAD platforms, exposure to different formats of data exchange in CAD, generation of 2D drawings from part model, integration of CAD with other platforms and its implementation. Module II: Robotics: State-of-the-Art; types of robots – Geometry and structures; Serial Link Robots; Conventions; Kinematics-Position. Orientation. Rotation Matrix, Euler angles, Linear and Angular velocities, accelerations. Position and velocity transformations Jacobians; kinematic constraints; Forward and Inverse Kinematics; Statics –Task space Joint space forces/torques; Force-velocity duality; Stiffness analysis. Robot Dynamics – Principles of rigid body dynamics, notion of Inertia tensor Robot dynamics algorithms – forward and inverse dynamics; Tendon driven system Tutorial and Practical Hands-on training, CAD packages (Auto CAD, Soild Works, Inventor, Idea, Catia, ADAMS). Robot kinematics, task planning and programming; Force sensing and decomposition; Joint and end-effector stiffness and deflection; hands-on tendon driven system.	Modified Course content: Module I: Definition, Historical development of CAD, Evolution of CAD, exposure to different CAD platforms, part and assembly 3D-modeling in different CAD platforms, exposure to different formats of data exchange in CAD, generation of 2D drawings from part model, integration of CAD with other platforms and its implementation. Module II: Types of robots – Geometry and structures;. Rotation Matrix, Transformations, Kinematics-Position. Orientation Serial Link Robots; Conventions; DH descriptions. Euler angles, velocities, accelerations. Jacobian; Joint and task space forces/torques; Principles of rigid body dynamics, Notions of Robot Dynamics Tutorial and Practical Hands-on training, CAD packages (Auto CAD, Soild Works, Inventor, Idea, Catia, ADAMS). Robot kinematics and DH description

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _____   Date: 03/05/17

Lab Director: _____   Date: 04/05/17

Checked By: _____ (Associate Dean)   Date: _____

Approved By: _____ (Dean)   Date: _____

Name of Lab: **CSIR-Central Mechanical Engineering Research Institute**

Existing course	Modified course
Faculty (Course cluster): ES BS/CS/ES/PS/MIS	Faculty (Course cluster): ES BS/CS/ES/PS/MIS
Course Title: Mobile robotic systems and Industrial robots	Course Title: Mobile Robotic Systems
Course Nomenclature: ENG-CMERI-1-2130	Course Nomenclature: ENG-CMERI-1-2130
L-T-P-C distribution: L-T-P-C : 1-1-2-3	L-T-P-C distribution: L-T-P-C : 1-1-2-3
Name of the Teachers : 1. Dr. D N Ray 2. Dr. Ranjit Ray/US Patkar	Name of the Teachers : 1. Dr. D N Ray 2. Mr. U S Patkar 3. Mr. M. K. Biswal
Course content: Module -I: Mobile robotic systems Fundamentals of Autonomous Mobile Robotics, including both perception and planning for autonomous operation. Kinematics and dynamics, Trajectory planning, Vehicle state estimation, Localization, Mapping and Planning. Module-II: Industrial robots Introduction of industrial robotics and automation, Robot anatomy, Use of industrial robot in spot welding, continuous welding, Robots in Assembly Operations. Robot cell layouts, multiple robots and machine interface and robot cycle time analysis. Tutorial and Practical Hands-on experience on Pioneer WMR, Manipulator Arms, SCARA Robot, Welding Robots etc.	Modified Course content: Module -I: Fundamentals of Autonomous Mobile Robotics, Robot Locomotion, Kinematics and dynamics, Perception: Sensors for Mobile Robots, Uncertainty and Feature extraction, Mobile Robot Localization, Planning & Navigation: Path Planning, Obstacle Avoidance. Module-II: Introduction of industrial robotics and automation, Robot anatomy, Robot End Effectors & Sensors, Robot cell layouts & Economic Analysis, Robot Application, Social Issues & Future of Robotics. Tutorial and Practical Hands-on experience on Mobile Robots, Manipulator Arms, Welding Robots etc.

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _____   Date: 03/05/17

Lab Director: _____   Date: 04/05/17

Checked By: _____ (Associate Dean)   Date: _____

Approved By: _____(Dean)   Date: _____

Name of Lab: CSIR-Central Mechanical Engineering Research Institute

Existing course	Modified course
Faculty (Course cluster): BS/CS/ES/PS/MIS: ES	Faculty (Course cluster): NA BS/CS/ES/PS/MIS
Course Title: Robot Control	Course Title: NA. The course will be withdrawn.
Course Nomenclature: ENG-CMERI-1-2131	Course Nomenclature: NA
L-T-P-C distribution: 1-1-2-3	L-T-P-C distribution: NA
Name of the Teachers : 1. Dr. S. Nandy 2. Dr. Suman Saha 3. Dr. Arpita Mukherjee	
Course content: Introduction, Control Principles, Control Objectives, Modelling of Physical systems, Principles of Linear Control-Stability aspects, Root locus technique; Frequency response analysis, Bode Plot, Design of PID Controller, Controller tuning. State Space Design: Concepts of state, State-space, Representation of Linear system, Controllability and Observability, Stabilizability and Detectability, Observer design, Linear Kalman Filters. Notion of Nonlinear Control, Basics of Nonlinear Control, Nonlinear Control Methods: Feedback Linearization (Input-state & Input-output linearization); Concepts of Lyapunov Stability and analysis, Sliding Mode Control. Tutorials and Practical: Hands on experience with MATLAB/SIMULINK model development; Verification of control performance using P/PI/PID controller; Modelling and experiments with rectilinear control systems; Case Studies on Nonlinear controller development. Hands-on experience with application of different nonlinear control systems in robotics.	Modified Course content: NA. The course will be withdrawn.

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _Nandy_____   Date: _03/05/17_

Lab Director: ___Kiran_____   Date: _04/05/17_

Checked By: _____ (Associate Dean)   Date: _____

Approved By: _____ (Dean)   Date: _____

New Courses for PGDR

Name of Lab: **CSIR-Central Mechanical Engineering Research Institute**

Course Title: COMPUTER PROGRAMMING & NUMERICAL METHODS

Faculty: (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	ENG-CMERI-2-2108
L-T-P-C	2-0-2-3
Name of Teachers:	1. Dr. Ranjit Ray 2. Mr. R S Barnwal 3. Mr. A. Srinivasan

Course Content details:

Computer Programming: Introduction of C, Operators, Conditional statements and loops, Arrays, Functions, Structures and Unions, Pointers, Files handling.

C++ Overview, Classes in C++, Overloading, Inheritance, Overview of visual C++

MatLab - Basic, Matrix operations and functions in MATLAB, MATLAB scripts and functions (m-files) Simple sequential algorithms. Reading and writing data.

Numerical Methods :Introduction, finite floating point arithmetic, catastrophic cancellation, chopping and rounding errors; Solution of nonlinear equations; bisection, Newton's & Muller's method, fixed point iteration;

Numerical optimization, Golden section search, Newton's method optimization; linear algebraic equations; forward Gaussian elimination, pivoting, scaling, back substitution, LU-decomposition, norms and errors, condition numbers, iterations, Newton's method for systems, computer implementation; Interpolation- Lagrange, Newton & inverse ;

Numerical Integration; finite differences, Newton cotes, trapezoidal, Simpson's rule, extrapolation, Gaussian quadrature; Numerical solution of ODE; Euler's method, Runge-Kutta method, multi-step methods, predictor-corrector methods, rates of convergence, global errors, algebraic and shooting methods, boundary value problems, computer implementation.

**May attach a separate sheet for content if required

Proposed for: _____ **Meeting of Senate**

Coordinator AcSIR-(Lab Name) _Srawly_   Date: _03/05/17_

Lab Director: _Bisan_   Date: _04/05/17_

Checked By: _____ (Associate Dean)   Date: _____

Approved By: _____(Dean)   Date: _____

Name of Lab: **CSIR-Central Mechanical Engineering Research Institute**

Course Title: **Advanced Control System**

Faculty: (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	ENG-CMERI-1-2104
L-T-P-C	2-0-2-3
Name of Teachers:	1. Dr. S. Nandy 2. Dr. Suman Saha 3. Dr. Arpita Mukherjee

Course Content details:

Introduction & Motivation: Role of Controls in Mechatronics, Mathematical Preliminaries, Review of classical control concepts, Root locus technique; Frequency response analysis, Bode Plot, Design of PID Controller, Controller tuning.

State Space Design: Modeling of physical systems, Concepts of state, State-space, Representation of Linear system, Controllability and Observability, Stabilizability and Detectability, Observer design

Advance Controller Design: Kalman Filters as Dynamic System State Observers; Notion of Nonlinear Control, Basics of Nonlinear Control, Nonlinear Control Methods, Feedback Linearization (Input-state & Input-output linearization); Fundamentals of Lyapunov Stability Theory (Autonomous Systems), Advanced Stability Theory (Non-autonomous Systems), Robust Outer Loop Controller, Sliding Mode Controller design.

Tutorials and Practical:
- Hands on experience with MATLAB/SIMULINK model development;
- Verification of control performance using P/PI/PID controller;
- Case Studies on Nonlinear controller development.
- Hands-on experience with application of different nonlinear control systems.

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _Nandy_____   Date: _03/05/17_

Lab Director: _Hiran_____   Date: _04/05/17_

Checked By: _____ (Associate Dean)   Date: _____

Approved By: _____(Dean)   Date: _____

ANNEXURE P-5

C. PGDIME (PGD in Industrial Maintenance Engineering)

Modification of the Existing Courses

Sl. No.	Course Code	Course Title (Existing)	Course Title (Modified)	L	T	P	Credit Points	Remarks
1.	ENG-CMERI-1-2133	Introduction to Vibration and Reliability	NA	1	0	2	2	This course will be **withdrawn** and one new course will be introduced (ENG-CMERI-1-2113: Mechanical Vibration) from M.Tech /PhD curriculum.
2.	ENG-CMERI-1-2135	Diagnostic Maintenance and Condition Monitoring	Same as Existing	2	0	2	3	Syllabus and credit points (2-0-4-4 to 2-0-2-3) are modified. Course code will remain Same. **This course is also proposed as a new course in the current M.Tech /PhD curriculum.**
3.	ENG-CMERI-1-2137	Instrumentation and Control	Same as existing	1	0	2	2	Syllabus and credit points (1-1-0-2 to 1-0-2-2) are modified. Course code will remain Same.
4.	ENG-CMERI-1-2139	Corrosion and Corrosion Protection	Same as existing	1	0	2	2	Syllabus is modified. Course code will remain same.
5.	ENG-CMERI-1-2140	Maintenance Management	Reliability Engineering & Maintenance Management	1	1	0	2	Title and Syllabus are modified. Course code will remain same.

Introduction of New courses

Sl. No.	Course Code	Course Title	L	T	P	Credit Points	Remarks
1.	ENG-CMERI-1-2113	Mechanical Vibration	2	0	2	3	This course will be newly introduced for PGDIME in lieu of ENG-CMERI-1-2133. The new course belongs to the existing M.Tech /PhD program.

Note: 1) Course code ENG-CMERI-1-2113 (Mechanical Vibration) is a part of M.Tech/PhD curriculum and is being introduced as a new course in PGDIME.

2) Course code ENG-CMERI-1-2135 (Diagnostic Maintenance and Condition Monitoring) is a part of PGDIME program and is being introduced as a new course M.Tech/PhD curriculum.

3) Course code ENG-CMERI-1-2136 (Damage Assessment) is a part of PGDIME program and is being introduced as a new course M.Tech/PhD curriculum.

Sisorodia 03.05.17

Modification/withdrawal of Existing Courses for PGDIME

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

Name of Lab:__CSIR-Central Mechanical Engineering Research Institute_____

Existing course	Modified course
Faculty (Course cluster): BS/CS/ES/PS/MIS: ES	Faculty (Course cluster): BS/CS/ES/PS/MIS: NA
Course Title: INTRODUCTION TO VIBRATION AND RELIABILITY	Course Title: NA. The course will be withdrawn.
Course Nomenclature:ENG-CMERI-1-2133	Course Nomenclature: NA
L-T-P-C distribution:1-0-2-2	L-T-P-C distribution: NA
Name of the Teachers :Dr. Swarup Kumar Laha & Dr. Naresh Chandra Murmu	Faculty: NA
Course content: Single-degree-of-freedom systems: Free vibrations and response of to harmonic, periodic and general excitations, Energy dissipation and damping, Duhamel's Convolution Integral for response to general time varying excitation. Multi-Degree-of-Freedom Systems: Free Vibration-The Eigen value Problem, Orthogonality of Modal Vectors, Dynamic response by Modal Analysis, Introduction to Rotordynamics and Machine vibration. Probability concept, Reliability definition, Failure Data Analysis- Mean time to Failure (MTTF), Mean Time Between Failures (MTBF), Maintainability, Availability, etc	Modified Course content: NA. The course will be withdrawn.

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _____   Date: __03/05/17__

Lab Director: _____   Date: __04/05/17__

Checked By: _____ (Associate Dean)   Date: _____

Approved By: _____(Dean)   Date: _____

AcSIR

Headquarters
Training & Development Complex, CSIR Campus, CSIR Road, Taramani, Chennai– 600 113

Coordination Office
CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P.O., New Delhi–110 025

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

Name of Lab: __CSIR-Central Mechanical Engineering Research Institute_____

Existing course	Modified course
Faculty (Course cluster): BS/CS/ES/PS/MIS: ES	Faculty (Course cluster): BS/CS/ES/PS/MIS: ES
Course Title: DIAGNOSTIC MAINTENANCE AND CONDITION MONITORING	Course Title: DIAGNOSTIC MAINTENANCE AND CONDITION MONITORING
Course Nomenclature: ENG-CMERI-1-2135	Course Nomenclature: ENG-CMERI-1-2135
L-T-P-C distribution: 2-0-4-4	L-T-P-C distribution: 2-0-2-3
Name of the Teachers : Mr.Kamalkishor J Uke, Dr. Robin Kumar Biswas and Mr.Soumya Sen Sharma	Faculty: Mr.Kamalkishor J Uke, Dr.Swarup Kumar Laha, Dr.Kalyan Kumar Mistry Lab Instructor: Mr.BiplabSwarnakar
Course content: Maintenance Strategies: Predictive, preventive and condition based; cost effectiveness; Balancing- single plane and multi plane, alignment; Basic Signal Processing Techniques: time domain, frequency domain and time-frequency domain; Machinery Vibration Diagnostics: Machine vibration standards, Fault Signature. Advanced Diagnostic Techniques: Gear Diagnostics, Rolling Element Bearing Diagnostics, Rotating Machine Diagnostics Tests for electric motor, power distribution testing, motor control testing including starters, soft starts, variable frequency drive etc. Electric motor, mechanical coupling, test of driven equipment, voltage and current harmonics, power factor. Practical: Single plane and multi plane Balancing, Alignment	Modified Course content: Maintenance Strategies: Predictive, preventive and condition based; cost effectiveness. Balancing- single plane and multi plane, Basic Signal Processing Techniques: time domain, frequency domain. Machinery Vibration Diagnostics: Machine vibration standards, Fault Signature. Advanced Diagnostic Techniques: Gear Diagnostics, Rolling Element Bearing Diagnostics, Rotating Machine Diagnostics Introduction to industrial electrical machine- Electrical motors, Switch gear, Transformers, generator, alternator etc. Various faults in electrical machine – stator fault, rotor fault, transformer fault, switch gear fault Method of fault diagnosis or fault detection technique- motor current analysis, motor temperature analysis etc. Introduction to electrical motor current signature analysis Various fault detection equipment and industrial instruments Practical: Single plane and multi plane Balancing

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _____   Date: 03/05/17

Lab Director: _____   Date: 04/05/17

Checked By: _____ (Associate Dean)   Date: _____

Approved By: _____ (Dean)   Date: _____

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

Name of Lab: __CSIR-Central Mechanical Engineering Research Institute_____

Existing course	Modified course
Faculty (Course cluster): BS/CS/ES/PS/MIS: ES	Faculty (Course cluster): BS/CS/ES/PS/MIS: ES
Course Title: INSTRUMENTATION AND CONTROL	Course Title: INSTRUMENTATION AND CONTROL
Course Nomenclature:ENG-CMERI-1-2137	Course Nomenclature:ENG-CMERI-1-2137
L-T-P-C distribution: 1-1-0-2	L-T-P-C distribution: 1-0-2-2
Name of the Teachers : Mr. Saikat Kumar Shome&Mr.SoumenMondal	Faculty: Mr.Saikat Kumar Shome, Mr.SoumenMondal, Dr.Arpita Mukherjee Lab Instructor: Mr.PratapKarmakar, Mr.Kalyan Chatterjee, Mr.Subhasis Biswas
Course content: Sensing techniques and Signal processing approaches: Basics of analog and digital systems , General concepts of measurement systems, Performance terms, static and dynamic characteristics, system accuracy, sources of error, Transducer Fundamentals, resistive, inductive, capacitive, pressure, strain, torque, speed, temperature. Continuous time signals, discrete time signals, sampling theorem, Frequency Analysis and Discrete Fourier Transform Industrial instrumentation and process control: Electromagnetic Relays, Case studies on ladder diagrams, Programmable logic controllers: Construction Working and case studies. RS232, virtual instrumentation. Labview applications. Basic Control: Basic concept of control system, Mathematical model of Physical system, Time domain analysis: steady state and transient response, Frequency domain analysis: Nyquist stability criteria, Design of Controller: PD, PI and PID Tutorials: Electronic devices, Signal processing , Instrumentation and process controls, Control theory Practical: Testing the I-V characteristics of capacitor, resistor and diodes, Simulation of active and passive filters on MATLAB platform, Study and analysis of actuation of various types of motors, Data acquisition from Piezo-sensors and their calibration, Development of an instrumentation amplifier module, Design of a PID controller for a DC motor, Controlling stepper motor using NI LabView software, Development, simulation and testing of ladder diagrams using RS LOGIX	Modified Course content: Sensing techniques: General concepts of measurement systems, Performance terms, static and dynamic characteristics, system accuracy and sources of error, Transducer Fundamentals. Signal processing approaches. Industrial Instrumentation: Electromagnetic Relays, Programmable logic controllers, Ladder diagrams, Communication Protocols, Labview applications. Overview of Microcontrollers and system architecture Basic Control: Basic concept of control system, Mathematical model of Physical system, Time domain analysis: steady state and transient response, Frequency domain analysis, Design of Controller: PD, PI and PID. Practical: Testing the I-V characteristics of capacitor, resistor and diodes. Data acquisition from sensors. Development of instrumentation amplifier module. Hands-on training on microcontroller - Demonstration on microcontroller based circuit, Programming of different modules, simulation and implementation on micro-controller based circuit: I/O Ports, Timer/ counter, ADC module. Design of a PID controller for a DC motor. Controlling stepper motor

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _____   Date: _03/05/17_

Lab Director: _____   Date: _04/05/17_

Checked By: _____ (Associate Dean)   Date: _____

Approved By: _____(Dean)   Date: _____

AcSIR

Headquarters
Training & Development Complex, CSIR Campus, CSIR Road, Taramani,Chennai– 600 113

Coordination Office
CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P.O.,New Delhi–110 025

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

Name of Lab: __CSIR-Central Mechanical Engineering Research Institute_____

Existing course	Modified course
Faculty (Course cluster): BS/CS/ES/PS/MIS: ES	Faculty (Course cluster): BS/CS/ES/PS/MIS: ES
Course Title CORROSION AND CORROSION PROTECTION	Course Title: CORROSION AND CORROSION PROTECTION
Course Nomenclature:ENG-CMERI-1-2139	Course Nomenclature:ENG-CMERI-1-2139
L-T-P-C distribution: 1-0-2-2	L-T-P-C distribution: 1-0-2-2
Name of the Teachers : Dr. Priyabrata Banerjee and Dr.Debashis Ghosh	Faculty: Dr. Priyabrata Banerjee and Dr.Debashis Ghosh Lab Instructor: Mr. Jiten Mandal, Mr.BimalHansda, Mr.Dipankar Sarkar
Course content: Basic concept of corrosion: Anodic and cathodic reactions, anodic reaction characterization, cathodic reaction characterization, types of corrosion cells, Pourbaix diagram, Mechanism of chemical, electrochemical corrosion-Pilling Bedworth rule Types of Electrochemical corrosion - galvanic corrosion, differential aeration corrosion, pitting corrosion, stress corrosion; Measurement of corrosion (wt. Loss/Tafel/Impedance/Bode plot); factors influencing corrosion. Corrosion control: Cathodic protection , anodic protection, mixed type protection; Corrosion inhibitors (scope of inhibitor, application of inhibitor, important consideration in selection of inhibitors, classification of inhibitors, inorganic and organic inhibitors, inhibitors application techniques, inhibition efficiency and inhibitor concentration); High temperature corrosion: introduction, oxidation, kinetic behavior, high Temperature corrosion damage assessment, high temp coating, corrosion protective coatings, case studies. Practical: weight chemical analysis, Tafel Polarization, EIS studies of real specimens, Corrosion Techniques (Aqueous and High Temperature)	Modified Course content: Basic concept of corrosion: Anodic and cathodic reactions, Mechanism of chemical, electrochemical corrosion-Pilling Bedworth rule Types of Electrochemical corrosion - Measurement of corrosion (wt. Loss/Tafel/Impedance/Bode plot); factors influencing corrosion. Corrosion control: Cathodic protection , anodic protection, Corrosion, application of inhibitor, important consideration in selection of inhibitors, inhibitors application techniques, inhibition efficiency High temperature corrosion: introduction, oxidation, kinetic behaviour, corrosion protective coatings, case studies. Practical: weight chemical analysis, Tafel Polarization, EIS studies of real specimens, Corrosion Techniques (Aqueous and High Temperature)

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _____   Date: _03/05/17_

Lab Director: _____   Date: _04/05/17_

Checked By: _____ (Associate Dean)   Date: _____

Approved By: _____ (Dean)   Date: _____

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Headquarters
Training & Development Complex, CSIR Campus, CSIR Road, Taramani, Chennai– 600 113

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CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P.O., New Delhi–110 025

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

Name of Lab: __CSIR-Central Mechanical Engineering Research Institute_____

Existing course	Modified course
Faculty (Course cluster): BS/CS/ES/PS/MIS: ES	Faculty (Course cluster): BS/CS/ES/PS/MIS: ES
Course Title: Maintenance Management	Course Title: Reliability Engineering & Maintenance Management
Course Nomenclature:ENG-CMERI-1-2140	Course Nomenclature:ENG-CMERI-1-2140
L-T-P-C distribution:1-1-0-2	L-T-P-C distribution: 1-1-0-2
Name of the Teachers : Dr. Robin Kumar Biswas and Dr.Naresh Chandra Murmu	Faculty: Mr.Phani Kumar M. &Dr.Naresh Chandra Murmu
Course content:

Principles of maintenance management, Condition-based maintenance, Managing maintenance workers, Managing finances in maintenance, Managing maintenance information, Maintenance improvement and strategy, Risk management, Maintenance approaches and strategies, Organization, planning and application of maintenance and maintenance strategies, Technological aspects of engineering economics and accountancy and implementation of maintenance planning systems, Asset operations optimization. | Modified Course content:

Fundamentals of statistical analysis, Measures of central tendency, Elements of probability, introduction to Reliability, failure data analysis, system reliability and its improvement, fault tree analysis, Failure mode effect analysis, Maintainability and availability.
Maintenance approaches and strategies, planning and application of maintenance and maintenance strategies. |

**May attach a separate sheet for content if required

Proposed for: _____ Meeting of Senate

Coordinator AcSIR-(Lab Name) _____ Date: _03/05/17_

Lab Director: _____ Date: _04/05/17_

Checked By: _____ (Associate Dean) Date: _____

Approved By: _____(Dean) Date: _____

Introduction of New Courses for PGDIME

ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH

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Headquarters
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CSIR-Central Road Research Institute, Delhi–Mathura Road, CRRI P.O.,New Delhi–110 025

Name of Lab: _____ **CSIR-Central Mechanical Engineering Research Institute** _____

Course Title: MECHANICAL VIBRATION

Faculty (BS/CS/ES/PS/MIS)	ES
Course Nomenclature	ENG-CMERI-1-2113
L-T-P-C	2-0-2-3
Name of Teachers:	1. Dr. Swarup Kumar Laha 2. Dr. Surendra Kumar 3. Dr. Pranab Samanta **Mr.SouravKansabanik (Lab instructor)**

Course Content details:

Free vibrations and response of single-degree-of-freedom systems to harmonic, periodic and general excitations, Energy dissipation and damping, Duhamel's Convolution Integral for response to general time varying excitation.
Multi-Degree-of-Freedom Systems; Lagrange's Equations. Free Vibration- The Eigenvalue Problem, Orthogonality of Modal Vectors, Dynamic response by Modal Analysis. Rayleigh's Quotient.
Distributed Systems; Exact solutions of free and forced vibrations of bars and beams (axial, torsional and bending). Modal shapes and natural frequencies of continuous systems, Systems with lumped masses, Rayleigh's Principle
Approximate Methods; Transfer Matrix Methods, Holzer's Method for Torsional Vibration, Myklestad's Method for bending vibration, Dunkerley's Method, Modal Superposition Methods

**May attach a separate sheet for content if required

Proposed for: _____ **Meeting of Senate**

Coordinator AcSIR-(Lab Name) _~~Swandy~~_ _____   **Date:** ___~~_____~~ 03/05/17___

Lab Director: _____~~Bilani~~_____   **Date:** __14/05/17__

Checked By: _____ **(Associate Dean)**   **Date:** _____

Approved By: _____**(Dean)**   **Date:** _____