

**INDIAN INSTITUTE OF INFORMATION TECHNOLOGY,
DESIGN AND MANUFACTURING, KANCHEEPURAM**

45th MEETING OF THE SENATE

Date : 21st August, 2021(Saturday)
Time : 2.30 P.M.
Venue: : Virtual through Google Meet

AGENDA

2021-45-Senate-01	Appointment of Prof. D V L N Somayajulu as Director, IIITDM Kancheepuram w.e.f. 4th August, 2021	
	<p>Prof. D V L N Somayajulu, Director IIITDM Kurnool has been appointed as the Director of IIITDM Kancheepuram by the Ministry of Education, Govt. of India and has taken over the charge with effect from 4th August 2021(AN).</p> <p><i>The Senate extended warm welcome to Prof. D V L N Somayajulu, Director and Chairman Senate.</i></p>	
2021-45-Senate-02	Relief of Prof. Banshidhar Majhi from the Institute	
	<p>Consequent to his appointment as Vice-Chancellor, Veer Surendra Sai University of Technology (VSSUT), Burla, Sambalpur District, Orissa a Prof. Banshidhar Majhi was relieved from the post of Director, IIITDM Kancheepuram as per the orders of Ministry of Education, Government of India on 04th August 2021. He has handed over the charge of Director to Prof. DVLN Somayajulu on 4th August 2021(AN)</p> <p>During his tenure as Director and Chairmen, Senate, Prof. Banshidhar Majhi has contributed significantly for furtherance of academic and research activities of the institute.</p> <p><i>The Senate appreciated the valuable contributions of Prof Banshidhar Majhi towards furtherance of academic and research activities of the institute and placed on record the valuable contributions made by him to the Institute. The Senate further wished him all the success in his new assignment.</i></p>	
2021-45-Senate-03	To confirm the Minutes of the 44th meeting of the Senate held on 10th April 2021	
	<p>The Minutes of 44th Meeting of the Senate held on 10th April 2021 was circulated to all members. No comments/suggestions were received from the members.</p> <p><i>The Senate confirmed the Minutes of the 44th meeting of the Senate placed as Annexure- I</i></p>	
2021-45-Senate-04	Action Taken Report on the decisions of 44th meeting of the Senate held on 10th April 2021	
	The action taken report of the institute is as under:	
	2021-44- Approval for Course Curriculum and Syllabus for the new M.Des. program	New M Des programme has been

Senate-04		commenced from the current academic year with the new Curriculum.
2021-44-Senate-05	Admission to M. Des. (Integrated Product Design) for Jul 2021 session	Admission process for the M. Des programme has been completed and a total of 13 students has joined the course for the July 2021 session.
2021-44-Senate-06	Constitution of Board of Studies	The members of the BoS would be included in the Senate subcommittee so as to ensure proper interdisciplinary nature of the Institute
2021-44-Senate-07	Revised curriculum for B Tech 2020 Batch	Revised curriculum is implemented effective from the 2020 batch.
2021-44-Senate-08	Revised curriculum for M Tech 2021 Batch	Revised curriculum will be implemented effective from the 2021 batch.
2021-44-Senate-09	Approval for New Electives	Approved courses have been offered from Jul-Nov 2021 semester
2021-44-Senate-11	Participation in Study in India Program of the Government to attract Foreign Students	Institute has joined the SII programme from 2021 admissions.
2021-44-Senate-12	General Guidelines: Admission, Performance and Time Schedule for Ph.D. Scholars.	Will be implemented.
2021-44-Senate-13	Approval for Rules on up-dation of "I" Grade	Implemented.
2021-44-Senate-14	Award of Provisional Degree to eligible students	Provisional Degree has been issued with the approval of Chairman, Senate. Degree will be awarded in the 9 th Convocation.
2021-44-Senate-15	Academic Calendar 2021	Mid-semester break was given to 2 nd semester classes due to the 2 nd wave of the pandemic and accordingly the revised academic calendar is placed as an item in the 45 th Senate Agenda.
2021-44-Senate-16	Cancellation of Ph D Registration of Mr. N. Siva Rama Lingham (COE19D007)	Mr. N. Siva Rama Lingham (COE19D007) has been relieved from the programme
20210-44-Senate-17(1)	Approval for offering M.Tech in AI and Robotics in place of Advanced Robotics	With increase in student intake, it will be difficult to follow the SOP at hostel premises and hence it has been decided to offer the program from 2022 onwards.
2021-44-Senate-17(3):	Selection of PDF in the Department of Electronics and Communication Engineering	Dr. Jyotismita Mishra, has joined as PDF on 12.04.2021 under the guidance of Prof. Banshidhar Majhi as Supervisor and Dr. B.Chitti Babu,

		Assistant Professor, Dept. of ECE as Co- Supervisor.
	<p><i>The Senate took note of the Action Taken Report. In case of general guidelines concerning Ph.D scholars (Item No. 2021-44-Senate-12), the Senate was apprised about the concern expressed by the faculty members. After discussion, the Chairman, Senate was authorized to review the guidelines.</i></p>	
2021-45-Senate-05	<p>Revised Academic Calendar for Jul-Nov 2021</p> <p>In the Academic Calendar approved by the 44th Senate, the Odd Semester was proposed to commence from 26th July. However, two-weeks-mid-semester-break from 3rd to 16th May 2021 for the 2nd semester classes was provided, with the approval of the Chairman Senate, on account of the 2nd wave of the pandemic. Due to this, their end-semester examinations were completed only on 22nd July 2021. As it is appropriate to commence the Odd Semester classes for all semesters together and hence with the approval of the Chairman, Senate, classes have been commenced on 2nd August, delayed by a week. Accordingly, the Academic Calendar for the odd semester has been revised and placed for the kind approval of the Senate as Annexure-2.</p> <p>M Tech admission through the CCMT special rounds would be over by 25th August and hence, with the approval of the Chairman, Senate, it has been decided to start the M Tech classes from 26th August. As the instructional days have been counted from 2nd August as per the Calendar, the missed classes would be compensated by utilizing the 8 ó clock slot and on Saturdays.</p> <p>As the JEE Mains/Advanced schedule is not yet to be announced, the academic schedule for the B Tech first years will be different from that of the seniors. As and when the dates of JoSAA/CSAB counseling rounds are announced, the academic calendar for the first years will be prepared and submitted to the Chairman, Senate for approval. This will be placed for ratification in the subsequent Senate.</p> <p><i>The Senate took note of M.Tech admission and compensation of classes proposed by the Institute. The Senate further approved the revised Academic Calendar for Jul-Nov 2021 semester.(Annexure-2)</i></p>	
2021-45-Senate-06	<p>To formulate the guidelines for allotment of Guides to Post-Doctoral Fellows at the Institute</p> <p>In line with the decision of the Senate taken in its 39th meeting (2019-39-Senate-12), the Institute is permitting one PDF in each Department with the fellowship fully funded by the Institute. As there are no guidelines currently available at the Institute for allotment of Guides in case of Post Doc, it is proposed to constitute a subcommittee to formulate a suitable guideline. In this regard, Chairman Senate may be authorized to constitute sub-committee with appropriate Terms of Reference. The recommendations of the sub-committee will be placed before the Senate for its consideration and approval.</p>	

The Senate authorized the Chairman to constitute the Sub-Committee to formulate suitable guidelines for allotment of guide to Post-Doctoral Fellows at the institute. The guidelines will be placed in the next meeting for approval.

2021-45-Senate-07

Issue of Provisional Degree Certificates to the Students

With the approval of the Chairman, Senate, provisional Degree Certificates have been issued to the students who have completed the credit requirements by 31st July 2021.

The Senate ratified the approval accorded by the Chairman.

2021-45-Senate-08

Approval for New Elective courses proposed by the faculty members

New/Modified elective courses, with due approval from the Departmental Academic Committee (DAC), as listed below is proposed herewith for kind perusal of the Senate.

Sl. No	Course Name	Type/ Level	Faculty Name	Dept. offering
1.	Advanced Semiconductor Devices	New / PG/ PhD (6)	Dr. Tejendra Dixit	Dept. of ECE
2.	Materials Design for Sensor Systems	Revision/ PG/ PhD (6)	Dr. Y. Ashok Kumar Reddy	Dept. of SH (Physics)
3.	Atomistic Modeling of Materials	New/ UG/PG (5)	Dr. Debolina Misra	Dept. of SH (Physics)
4.	Energy Harvesting Technology	New / PG/ PhD (6)	Dr. Pandiyarasan Veluswamy	Dept. of ECE
5.	Sustainable manufacturing	Revision/ UG / PG (5)	Dr. Senthilkumaran K	Dept. of ME
6.	Additive manufacturing	Revision/ UG / PG (5)	Dr. Senthilkumaran K	Dept. of ME
7.	Mass transfer in industrial applications	Revision/ UG / PG (5)	Dr. B. Raja	Dept. of ME
8.	Probabilistic engineering design	Revision/ UG / PG (5)	Dr. Siva Prasad AVS	Dept. of ME
9.	Energy storages and electrical Vehicle Systems	New/ UG/PG (5)	Dr. K. Selvajyothi	Dept. of ECE
10.	Design of Heat Exchangers	Revision/ UG / PG (5)	Dr. Shubhankar Chakraborty	Dept. of ME
11.	Advanced Mechanics	New/ UG/PG (5)	Dr. Tapas Sil	Dept. of SH (Physics)

The details of the above courses are placed as **Annexure-3**.

The Senate perused the elective courses proposed by the Institute and advised to indicate the name of external expert wherever required. The Senate approved all the elective courses proposed by the Institute.

**2021-45-
Senate-09**

Student Intake for the year 2021-22

The proposed intake for the academic year 2021-2022 in case of UG program is being maintained at the same level of 360 seats and 100 seats for the M.Tech Program + DASA seats. The program wise proposed admission details for the AY 2021-22 is as under:

Degree	Course Name	No of Seats	DASA
B.Tech	Computer Science and Engineering	80	4
B.Tech	Computer Science and Engineering with Major in Artificial Intelligence	40	3
B.Tech	Electronics and Communication Engineering	120	4
B.Tech	Mechanical Engineering	80	2
B.Tech	Smart Manufacturing	40	2
	Total (B.Tech)	360	15
M.Tech	Computer Science and Engineering with Specialization in Data Science and Artificial Intelligence	20	1
M.Tech	Electronics and Communication Engineering with Specialization in Communication Systems	20	1
M.Tech	Electronics and Communication Engineering with Specialization in Microelectronics and VLSI Systems	20	1
M.Tech	Mechanical Engineering with Specialization in Mechanical Systems Design	20	1
M.Tech	Mechanical Engineering with Specialization in Smart Manufacturing	20	1
	Total (M.Tech)	100	5
Grand Total		460	20

The Senate in its 44th meeting has given approval to start the M Tech Programmes in Computer Science and Engineering, Mechanical Engineering with Specialization in AI and Robotics and M Tech in Power Electronics System Design. However, due to the shortage of hostel accommodation and the current pandemic situation, it is proposed to start the programmes from 2022-23 onwards. Accordingly, with the approval of the Chairman, Senate, the intake for the M.Tech program (100 seats) has been communicated to CCMT.

The Senate noted the start of M.Tech programme in Computer Science and Engineering, Mechanical Engineering with Specialization in AI and Robotics and M Tech in Power Electronics System Design from academic year 2022-23. After discussion, the Senate approved the student intake proposed by the Institute.

2021-45-Senate-10	<p>Convening of the 9th Convocation of the Institute (Virtual mode)</p>																																																																																																																														
	<p>The 9th Convocation of the Institute is proposed to be convened virtually during the last week of September 2021. Dr G Satheesh Reddy, Secretary, Department of Defence R&D and Chairman, Defence Research and Development Organisation (DRDO) has kindly consented to be the Chief Guest for the convocation. The exact date will be finalized taking into account the convenience of the Chief Guest.</p> <p><i>The Senate granted approval for convening the convocation in a virtual mode as proposed by the Institute.</i></p>																																																																																																																														
2021-45-Senate-11	<p>List of Graduands for the 9th Convocation</p>																																																																																																																														
	<p>The number of students eligible to receive the degree from each programme in this convocation are given below.</p> <table border="1" data-bbox="272 636 1485 1984"> <thead> <tr> <th>Programme / Branch</th> <th>Honours with Distinction</th> <th>with Distinction</th> <th>Degree</th> <th>Total</th> <th>Not Eligible</th> </tr> </thead> <tbody> <tr> <td colspan="6" style="text-align: center;">B. Tech</td> </tr> <tr> <td>Computer Engineering</td> <td>8</td> <td>2</td> <td>32</td> <td>42</td> <td>1</td> </tr> <tr> <td>Electronics and Communication Engg with Spl. in D&M</td> <td>4</td> <td>3</td> <td>27</td> <td>34 + 1*</td> <td>0</td> </tr> <tr> <td>Mechanical Engg with Spl. in D&M</td> <td>3</td> <td>5</td> <td>28</td> <td>36 + 1*</td> <td>1</td> </tr> <tr> <td>Smart Manufacturing</td> <td>-</td> <td>3</td> <td>26</td> <td>29</td> <td>0</td> </tr> <tr> <td>Total</td> <td>15</td> <td>13</td> <td>113</td> <td>141 + 2*</td> <td>2</td> </tr> <tr> <td colspan="6" style="text-align: center;">Dual Degree</td> </tr> <tr> <td>B Tech & M Tech in Computer Engineering</td> <td>5</td> <td>1</td> <td>35</td> <td>41</td> <td>0</td> </tr> <tr> <td>B Tech in ECE with Spl. in D&M and M Tech in Signal Proc. & Comm. Systems Design</td> <td>-</td> <td>-</td> <td>11</td> <td>11 + 1*</td> <td>0</td> </tr> <tr> <td>B Tech in ECE with Spl. in D&M and M Tech in VLSI & Elec. Systems Design</td> <td>3</td> <td>-</td> <td>13</td> <td>16</td> <td>0</td> </tr> <tr> <td>B Tech in ME with Spl. in D&M and M Tech in Advanced Manufacturing</td> <td>-</td> <td>-</td> <td>15</td> <td>15 + 1*</td> <td>0</td> </tr> <tr> <td>B Tech in ME with Spl. in D&M and M Tech in Product Design</td> <td>-</td> <td>1</td> <td>11</td> <td>12</td> <td>2</td> </tr> <tr> <td>Total</td> <td>8</td> <td>2</td> <td>85</td> <td>95 + 2*</td> <td>2</td> </tr> <tr> <td colspan="6" style="text-align: center;">M. Tech</td> </tr> <tr> <td>M Tech in ECE with Spl. in Comm. Systems Design</td> <td>-</td> <td>6</td> <td>5</td> <td>11</td> <td>0</td> </tr> <tr> <td>M Tech in ECE with Spl. in Elect. Systems Design</td> <td>-</td> <td>6</td> <td>9</td> <td>15</td> <td>0</td> </tr> <tr> <td>M Tech in ME with Spl. in Mech. Systems Design</td> <td>-</td> <td>5</td> <td>8</td> <td>13</td> <td>1</td> </tr> <tr> <td>M Tech in ME with Spl. in Smart Manufacturing</td> <td>-</td> <td>5</td> <td>2</td> <td>7</td> <td>1</td> </tr> <tr> <td>Total</td> <td>-</td> <td>22</td> <td>24</td> <td>46</td> <td></td> </tr> <tr> <td>Grand Total</td> <td>23</td> <td>37</td> <td>222</td> <td>282 + 4*</td> <td>6</td> </tr> </tbody> </table> <p><i>*Previous batch students</i></p>	Programme / Branch	Honours with Distinction	with Distinction	Degree	Total	Not Eligible	B. Tech						Computer Engineering	8	2	32	42	1	Electronics and Communication Engg with Spl. in D&M	4	3	27	34 + 1*	0	Mechanical Engg with Spl. in D&M	3	5	28	36 + 1*	1	Smart Manufacturing	-	3	26	29	0	Total	15	13	113	141 + 2*	2	Dual Degree						B Tech & M Tech in Computer Engineering	5	1	35	41	0	B Tech in ECE with Spl. in D&M and M Tech in Signal Proc. & Comm. Systems Design	-	-	11	11 + 1*	0	B Tech in ECE with Spl. in D&M and M Tech in VLSI & Elec. Systems Design	3	-	13	16	0	B Tech in ME with Spl. in D&M and M Tech in Advanced Manufacturing	-	-	15	15 + 1*	0	B Tech in ME with Spl. in D&M and M Tech in Product Design	-	1	11	12	2	Total	8	2	85	95 + 2*	2	M. Tech						M Tech in ECE with Spl. in Comm. Systems Design	-	6	5	11	0	M Tech in ECE with Spl. in Elect. Systems Design	-	6	9	15	0	M Tech in ME with Spl. in Mech. Systems Design	-	5	8	13	1	M Tech in ME with Spl. in Smart Manufacturing	-	5	2	7	1	Total	-	22	24	46		Grand Total	23	37	222	282 + 4*	6
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	<p><i>The Senate took note of the graduands eligible to receive the Degrees of B Tech, Dual Degree, and M Tech programmes in the 9th Convocation and accorded approval to award the degrees to the candidates listed in Annexure-4.</i></p> <p><i>The Senate further granted approval to award the degrees to the PhD scholars who will be completing the PhD defence meeting by 15th of September 2021.</i></p>
<p>2021-45-Senate-12</p>	<p>Prize Winners of the 9th Convocation</p> <p>Various prizes for Academic Proficiency, Best Projects and Excellence in both Academic and extra-curricular activities are awarded to the Graduands at the Convocation every year. The criteria for the awards as approved by the Senate is given in Annexure-5 and the List of Prize Winners identified by the above-mentioned criteria is given in Annexure-6.</p> <p><i>The Senate took note of prize winners and suggested to revise the Gold medal winners as Institute medal winners and the branch wise toppers as Department medal winners. The Chairman informed the members that the institute is in the process of reviewing the criteria prescribed for award of prizes and assured that the suggestion of the Senate will be suitably incorporated.</i></p> <p><i>The Senate further granted approval to award the medals to the Prize winners listed in Annexure-6 in the 9th Convocation.</i></p>
<p>2021-45-Senate-13</p>	<p>Constitution of Sub-Committee to formulate additional criteria for Awards</p> <p>The criteria for identifying the Awardees in various categories (as provided in Annexure-5) was formulated and approved by the Senate (2018-37-Senate-26) during the year 2018.</p> <p>In order to inculcate the culture of Innovation, generating Patents and publishing the work in reputed Journals and Tier I/II Conferences, it is felt that some weightage should be given to the above categories in the Awards criteria. Similarly, a re-look may be required for the criteria prescribed for the All-Rounder Award as well.</p> <p>It is therefore proposed to constitute a subcommittee to look into various suggestions and formulate a revised criterion. In this regard, Chairman, Senate may kindly be authorized by the Senate to constitute a suitable Sub-Committee and recommendations of the committee will be placed before the Senate for its approval.</p> <p><i>The Senate authorized the Chairman to constitute a sub-committee to review the different criteria prescribed for the Awards along with the nomenclature of the Awards.</i></p>
<p>2021-45-Senate-14</p>	<p>Implementation of the Innovation and Startup Policy of the Institute</p> <p>SIDI has formulated the Innovation and Startup Policy document of the Institute and the same is placed as Annexure-7 for the kind perusal of the Senate.</p> <p><i>The Senate took note of the policy and also concerns expressed by the members towards setting up of startup by the faculty and student. The Senate discussed the matter and given in Principle approval for the innovation and startup policy of the Institute. However, advised the institute to constitute a committee to look into the provisions of the policy with regard to assignment of duty hours between Institute and the startup, allocation of budget for the Innovation activity and other matters requiring consideration by the Board. The senate authorized the director to place the report of the committee in the Board for approval.</i></p>

<p>2021-45-Senate-15</p>	<p>Grant of Permission to PhD Scholar to credit the courses from IIT Madras for the Dept. of H&SS (English Courses)</p> <p>Subsequent to appointment of Asst. professor in English in the Dept. of Humanities and Social Sciences, the Institute has been offering Ph. D program in English from July, 2021 semester onwards.</p> <p>However, the Institute is not having any Graduate level courses in English to be offered for the PhD Scholar. The courses, enlisted below, are offered by the Dept. of Humanities and Social sciences of IIT Madras and are found to be relevant to the research area.</p> <table border="1" data-bbox="443 519 1318 676"> <thead> <tr> <th>Course Code</th> <th>Course name</th> <th>Faculty</th> </tr> </thead> <tbody> <tr> <td>HS5812</td> <td>Feminist Writings</td> <td>Dr. Merin Simi Raj</td> </tr> <tr> <td>HS5680</td> <td>Contemporary Literary Theory</td> <td>Dr. Avishek Parui</td> </tr> </tbody> </table> <p>Accordingly, approval was sought from the Head, Dept. of HSS, IITM and the respective faculty members to credit those courses by our newly joined scholar. Based on their consent and the approval of the Chairman, Senate, the scholar has been attending the classes from the beginning of the semester.</p> <p><i>The Senate granted approval for credit transfer from IIT Madras for the English courses taken by the PhD Scholars of Department of Sciences and Humanities.</i></p> <p><i>The Senate further approved the proposal of transfer of credit from courses conducted by the IIT Madras and other institutes by the scholars in the Science and Humanities Department, in future, with due approval by the Chairman, Senate.</i></p>	Course Code	Course name	Faculty	HS5812	Feminist Writings	Dr. Merin Simi Raj	HS5680	Contemporary Literary Theory	Dr. Avishek Parui
Course Code	Course name	Faculty								
HS5812	Feminist Writings	Dr. Merin Simi Raj								
HS5680	Contemporary Literary Theory	Dr. Avishek Parui								
<p>2021-45-Senate-16</p>	<p>Any other item with the permission of the Chair.</p> <p><i>The Senate was apprised about the MoU signed with MTAB Technologies Pvt. Limited, Chennai</i></p> <p><i>i) to utilize their virtual labs for internship training programmes for students and</i></p> <p><i>ii) to organize Faculty development programmes.</i></p> <p><i>The MoU will be placed in the 46th Senate meeting.</i></p>									

The next meeting of the Senate will be held in **October 2021**.

(Dr. Binsu J Kailath)
Dean Academic

(A. Chidambaram)
Secretary

(Prof. D V L N Somayajulu)
Chairman

**MINUTES OF THE 44TH MEETING
OF THE
SENATE**



Date	:	10th April 2021
Time	:	10.30 A.M
Venue	:	Virtual through Google Meet (https://meet.google.com/tnm-gxpv-pov?hs=224)

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DESIGN AND MANUFACTURING, KANCHEEPURAM**



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MINUTES OF THE 44th MEETING OF THE SENATE

Date	:	10th April 2021
Time	:	10.30 A.M
Venue	:	Virtual through Google Meet (https://meet.google.com/tnm-gxpv-pov?hs=224)

Members Present:

1. Prof. Banshidhar Majhi, Director and Chairman
2. Mr. A Chidambaram, Registrar & Secretary
3. Prof. V Krishna Nandivada
4. Prof. Ram Bilas Pachori
5. Prof. GK Anantha Suresh
6. Prof. R Chandrashekar
7. Dr. Manoj Choudhury
8. Dr. Shankar Venugopal
9. Dr. V Chandramouliswaran
10. Dr. G Venkatesh
11. Dr. Binsu J Kailath, Dean Academics
12. Dr. Sudhir Varadarajan, Dean DII
13. Dr. M. Sreekumar, Dean FA
14. Dr. Naveen Kumar Vats, Dean SA
15. Dr. M.D. Selvaraj, Dean SR
16. Dr. V. Masilamani, HoD, CSE
17. Dr. Priyanka Kokil, HoD, ECE
18. Dr. B. Raja, HoD, ME
19. Dr. Shalu M.A., HoD, BSH

AGENDA

2021-44-Senate-01	<p>Nomination of New Senate members.</p> <p>The Senate membership is normally for a period of 2 years. However, some of the existing members have served for more than 5 years' period. Therefore, with due approval of Chairman, BoG, the following members have been nominated as members of the Senate:</p> <p>Academic Experts:</p> <ol style="list-style-type: none">1. Prof. V Krishna Nandivada Dept. of Computer Science and Engineering, IIT Madras.2. Prof. Ram Bilas Pachori Dept. of Electrical Engineering, IIT Indore.3. Prof. G K. Anantha Suresh, Dept. of Mechanical Engineering, IISC, Bangalore.4. Prof. R Chandrashekar, Dean Academics and Faculty In charge Computing, IIIT Bangalore. <p>Industry Experts</p> <ol style="list-style-type: none">1. Dr. Manoj Choudhury Global Head- Strategic Initiatives and Emerging Technologies TATA Consultancy Services.2. Dr. Shankar Venugopal Vice President, Mahindra and Mahindra3. Dr. V Chandramouliswaran Global Senior Executive PayPal Inc, Chennai.4. Dr. G. Venkatesh, Industry Professor, IIT Madras
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	<p>The following members have completed their service and the Institute has been greatly benefitted by their expertise and suggestions.</p> <ol style="list-style-type: none"> 1. Prof. Jagadeesh Kumar V Dept. of Electrical Engineering, IIT Madras. 2. Prof. P Chandramouli Dept of Mechanical Engineering, IIT Madras. 3. Prof. Krishnamoorthy Sivalingam Dept. of Computer Science and Engineering, IIT Madras. <p>Industry Experts</p> <ol style="list-style-type: none"> 1. Dr. Anand Laxmanan M/s Erricsson 2. Dr. Sathya Prasad M/s Ashok Leyland <p><i>Senate may kindly consider welcoming the distinguished new Senate members. Senate may further consider appreciating the service rendered by the outgoing members during their service as members of the Senate.</i></p>			
	<p><i>All the new members were introduced by the Chairman Senate and the Senate extended warm welcome to all the new members. The Senate further appreciated the services rendered by the outgoing members.</i></p> <p><i>The Chairman Senate has given a detailed presentation about the Institute including its growth over the last 13 years, the mandate of the academic programmes offered, mission and vision, increase in funded projects in the recent years, measures adopted for taking Institute to next level etc. The Senate had detailed deliberation on all the points including the placement statistics of the UG/DD/PG students.</i></p>			
<p>2021-44-Senate-02</p>	<p>To confirm the Minutes of the 43rd meeting of the Senate held on 19th September 2020</p> <p>The Minutes of 43rd Meeting of the Senate held on 19th September 2020 was circulated to all members. No comments/suggestions were received from the members.</p> <p><i>Senate may kindly confirm the Minutes of the 43rd meeting of the Senate placed as ANNEXURE A.</i></p> <p><i>The Senate confirmed the Minutes of its 43rd meeting held on 19th September, 2021 and the same is given as ANNEXURE A.</i></p>			
<p>2021-44-Senate-03</p>	<p>Action Taken Report on the decision of 43rd meeting of the Senate held on 19th September 2020</p> <p>The action taken report of the institute on the decision of the Senate is as under:</p> <table border="1" data-bbox="256 1742 1506 2114"> <tr> <td data-bbox="256 1742 427 2114"> <p>2020-43-Senate-04</p> </td> <td data-bbox="427 1742 922 2114"> <p>Design Spine Curriculum and Syllabus:</p> <p>(i) The Senate after due consideration accorded approval to introduce new design spine for B.Tech. and Minor/Honours in Product Design from 2020 batch.</p> </td> <td data-bbox="922 1742 1506 2114"> <p>(i) A max of 20% B.Tech. students will be given an option to pursue Minor/Honors in Product Design at the end of the 5th Semester The minor requirement will include a set of 6 design electives (2 in each semester between semesters 6-8), full-semester internship in the 7th semester and product development</p> </td> </tr> </table>	<p>2020-43-Senate-04</p>	<p>Design Spine Curriculum and Syllabus:</p> <p>(i) The Senate after due consideration accorded approval to introduce new design spine for B.Tech. and Minor/Honours in Product Design from 2020 batch.</p>	<p>(i) A max of 20% B.Tech. students will be given an option to pursue Minor/Honors in Product Design at the end of the 5th Semester The minor requirement will include a set of 6 design electives (2 in each semester between semesters 6-8), full-semester internship in the 7th semester and product development</p>
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		<p>oriented project in the 8th semester under SIDI.</p> <p>A max of 10 students will be given the option to pursue M. Des. as a Dual Degree at the end of the 5th Sem. They will complete the B.Tech. regular courses until 6th semester and do the M. Des. program between semesters 7-10.</p> <p>(ii) Advertisement for M Des. program has been released and online application portal is open for admission to M. Des program for Jul 2021 session. The syllabus for the program is placed as separate agenda for consideration of the Senate.</p> <p>(iii) An advertisement for faculty recruitment in specific areas of design (on contract and regular) is likely to be released in the first week of May 2021.</p> <p>(iv) It is proposed to start a PhD program in Interdisciplinary Design from Jul 2021. The number of candidates per faculty under regular category will be as per the Institute guidelines. The program will follow the guidelines of the existing PhD program, except for entry criteria. In line with the interdisciplinary character, the program will be open for post graduates from different streams - science, engineering, design, architecture, management - willing to pursue PhD in Design. The selection will be based on a design aptitude test and an interview conducted by the institute. Those without a design background will be expected to take 6 M.Des courses.</p>
2020-43-Senate-05	Creation of School of Interdisciplinary Design and Innovation:	
	The Senate approved the proposal of creation of School of Interdisciplinary Design and Innovation.	School of Interdisciplinary Design and Innovation (SIDI) has been created and Dr. Sudhir Varadarajan has been appointed as Head, SIDI. In addition, four of the faculty members have opted SIDI as the Dept. they would like to be associated with.
2020-43-Senate-07	Convening of 8th Convocation of the institute:	
	The Senate approved the list of graduands for awarding the degree in the convocation ceremony	8th Convocation of the Institute was held on 31st October 2020 successfully through virtual mode and degrees were awarded to 306 graduands.

	scheduled on 31 st October 2020 at 10.30 am.	The event was graced by Dr. Kasturirangan, former Chairman ISRO as Chief Guest and Sh. Arun Jain, CEO and MD Intellect Design Arena, Chennai as Guest of Honour.
2020-43-Senate-08	To discuss and approve the list of Prize winners in the 8th Convocation:	
	The Senate approved the list of prize winners for distributing the prizes in the convocation ceremony.	Medals and certificates were awarded to the eligible prize winners.
2020-43-Senate-09	New Elective Course:	
	The Senate approved the course titled “Introductory Quantum Science for Engineers” as new elective course	This new elective Course is being offered from Jan 2021 semester.
2020-43-Senate-10	Institute Challenge Project:	
	The Senate appreciated and approved the proposal of Institute Challenge Project and advised the Institute to explore the possibility for getting sponsorship from Industry.	Due to pandemic, this will be taken up in the next academic year.
2020-43-Senate-11	Academic Calendar for first year PG students for the semester Jul-Nov 2020:	
	The Senate advised the Institute to maintain constant learning pace and the classes should be engaged by the faculty rather than sending recorded lectures. The Senate further advised the Institute to reduce the contents and take classes on Saturdays.	In line with directions of the Senate, classes were conducted. All the exams have been conducted through online mode and results have been declared.
2020-43-Senate-12	Student Intake for the year 2020-21:	
	The Senate approved the intake of 375 students under B.Tech. Program and 84 students under M.Tech. program	A separate agenda on the actual admission status is placed for kind information of the Senate.
2020-43-Senate-16	General Guidelines: Admission, Performance and Time Schedule for Ph.D. Scholars:	
	The Senate advised the Institute to constitute a committee to look into the guidelines. The Senate further advised the Institute to interact with faculty and evaluate the procedures followed by other institutes. A revised guideline to be presented before the senate in its next meeting.	In line with direction of the Senate, a committee was constituted and based on recommendation of the committee, a revised Guidelines have been formulated and a separate agenda on this matter is placed for kind consideration of the Senate.
2020-43-Senate-17	Seeking Senate advice in scheduling of 1st and 2nd Semester Classes of 2020 admission B.Tech. batch:	
	The Senate approved the proposal and advised the institute to modify in line with guidelines issued by MoE.	First semester for the 2020 batch commenced from 01.12.2020 and examination were completed on 08.03.2021. The second semester for the students commenced from 30.03.2021.
<i>The Senate noted the action taken by the institute.</i>		

2021-44-Senate-04	<p>Approval for Course Curriculum and Syllabus for the new M.Des. program</p> <p>In the 43rd Senate meeting, an agenda item concerning Design spine curriculum and syllabus was placed for the kind consideration of the Senate.</p> <p>The proposal, inter alia, includes offering M. Des program in line with IIT Bombay and IIITDM Jabalpur. The Senate, after due deliberation, approved the proposal and advised the institute to place the curriculum and syllabus for the M. Des. Program.</p> <p>In line with direction of the Senate, a detailed curriculum and syllabus has been prepared by the institute and is placed as Annexure B.</p> <p>The key principle of the curriculum inter alia includes the following:</p> <ol style="list-style-type: none"> 1. Student and Practice-centered learning: <ol style="list-style-type: none"> a) A two-week foundation courses at the beginning of the program to help students rediscover their creative selves, set goals and take ownership for their learning. b) The program lays strong emphasis on experiential learning and whole-body engagement through sketching, model making, and reflexive narratives to cultivate the qualities of presence, responsiveness and improvisation in a context (learning-by-doing: 60% credits; theory: 40% credits) 2. Integration of design with technology and business: <ol style="list-style-type: none"> a) Exposure to digital tools and AI for collaborative design. b) Emerging technologies (Kinetic Art, Electric Vehicles, Wearables, Context Aware). c) Strategic management of design & innovation and Product-Service Systems. 3. Thrust on Product Innovation: Vertically integrated projects across semesters to encourage product innovation <p><i>Senate may kindly consider and approve the course Curriculum and syllabus for the M.Des. program.</i></p>
	<p><i>Dr Sudhir Varadarajan, Head SIDI has briefed the Senate about the salient features and details of the course curriculum recommended by the Design Advisory Council. The Senate enquired about the availability of faculty members with expertise in Design and it was informed that the Institute is in the process of recruitment of faculty for the Design School. And for Fine Arts related courses, External Faculty Members would be engaged. Senate also enquired regarding the final project if a prototype will be developed as mentioned in the curriculum and it was informed that the same is expected as part of the M Des programme. The Senate pointed out the error in the LTPC structure given for the Foundation for integrated product design course. The error is corrected as 2 1 0 3 in the ANNEXURE B attached herewith. Senate also advised to have all the Annexures clearly numbered and accordingly, all the Annexures are correctly marked in the minutes.</i></p> <p><i>The Senate, after deliberation, approved the course Curriculum and syllabus for the M.Des. program and the same is given in ANNEXURE B.</i></p>
2021-44-Senate-05	<p>Admission to M. Des. (Integrated Product Design) for Jul 2021 session</p> <p>In the 43rd Senate meeting, the Senate approved the introduction new M.Des. program commencing from July, 2021.</p> <p>Accordingly, the institute has formulated eligibility criteria and selection norms of the program and the details are as under:</p> <ol style="list-style-type: none"> 1. Eligibility Criteria <ol style="list-style-type: none"> a) Category 1: Regular with CEED

- A. Bachelor degree in Engineering/Design/Architecture (under 10+2+4 yrs regular) with minimum of 60% marks (55% marks in case of SC/ST/ PwD) or equivalent grades in the qualifying degree.
 - B. The Candidate should have qualified through Common Entrance Examination for design for 2021 (CEED 2021)
 - C. Candidates under this category are eligible for Assistantship as per MoE Norms.
- b) Category 2: Self/Sponsored/Industry Person/ QIP without CEED**
- A. The candidate under this category must have Bachelor degree in Engineering/Design/Architecture (under 10+2+4 yrs regular) with minimum of 60% marks (55% marks in case of SC/ST/PwD) or equivalent grades in the qualifying degree.
 - B. He/she shall be a regular employee with continuous service of at least 2 years in R&D organization, industry, academic/institution, Govt. organization etc. and engaged in professional design work. Sponsored candidates are requested to submit sponsorship letter in a prescribed format from the employer along with application.
 - C. The mode of selection under this category is based on written test and/or interview conducted by the institute.

2. Selection process:

- A. In case of candidates having valid CEED score, a category-wise merit list would be prepared based on the CEED score of the eligible candidates and **called for interview**.
- B. In case of Self/Sponsored/Industry/QIP persons without CEED score, the selection shall be **based on written test and/or interview** conducted by the institute. It is mandatory for these candidates to attend both written test and interview for qualifying the admission process. Syllabus will be communicated with candidates to be called for written test and interview.

3. Seat Matrix:

Programs	Gen	EWS	OBC(NC)	SC	ST	Total
M.Des. (with CEED)	5	1	2	1	1	10
M.Des. (Self-OR-Industry Sponsored /QIP - without CEED)	6	1	2	1	0	10
Total	11	2	4	2	1	20

In addition, it is proposed to admit another 10 students in B Tech-M Des Dual Degree program from the B Tech Students of the Institute. This would be effective from 2022 onwards (2020 admission batch students).

4. Fees Structure:

- A. The fees payable by the candidates who are joining with CEED score will be at par with regular M. Tech program.
- B. In case of students joining under Self / Sponsored / Industry / QIP, the tuition fee would be Rs. 50,000/- per semester. The details are as under:

I. Institute Fees	Amount	
	with CEED	Self-OR-Industry Sponsored / QIP
A. One time Fees:	5,000	5,000
B. Semester Fees:		
Tuition fee	25,000*	50,000
Other fee	5,000	5,000
C. Medical Insurance Premium (per annum)	450	450
Total [A+B+C]	35,450	60,450
II. Hostel Fees		
Hostel Fees & Mess Charges per semester	29,200	29,200
Total	64,650	89,650

**SC/ST students admitted under CEED are exempted from payment of tuition fee irrespective of their parental income*

**Tuition fee of Rs 25000 per semester for first year and Rs 30000 per semester for second year*

In order to give wide publicity and adequate time to the candidates, the Institute with due approval of the Chairman, Senate has released the advertisement and been inviting online applications.

In addition, the above norms have been suitably incorporated in the existing M.Tech. ordinance and a copy of revised M.Tech./M. Des. ordinance is placed as **ANNEXURE C** for consideration of the Senate.

Senate may kindly consider to ratify the approval accorded by the Chairman Senate concerning norms for admission along with invitation of application for the new M.Des program. Senate may further consider to approve the revised Ordinance suitably incorporating the provisions of M.Tech./M.Des. norms.

The Senate noted the eligibility criteria and the selection process to be adopted by the institute for M.Des admission. Senate suggested to increase the intake to 30 and it was informed that all PG programmes of the Institute has an intake of 15-20 and Institute would like to have the same for M Des as well to begin with. Senate further enquired if all the candidates who applies for admission to M Des programme against the current advertisement would be called for Interview and it was informed that Institute wishes to do the same for the first batch. The admission procedure would be reviewed and submitted to Senate subsequently. It was also informed that the Hostel Fees would be split into fixed and variable (Advance Mess Charges) components and presented in the Fees Statement when released to the students.

The Senate further perused the M Tech/M Des Ordinance and advised the institute to modify the O1 and O1(a) with respect to minimum percentile requirement for GATE and CEED respectively.

Accordingly, O1 is corrected as follows:

Candidates who have qualified for the award of the Bachelor's degree in Engineering / Technology or Master's degree in Science from educational Institutions approved by AICTE/UGC/Government and who have a valid GATE (Graduate Aptitude Test in Engineering) score are eligible to apply for admission to the M.Tech programme. Graduates from IITs/IIITs/NITs with minimum CGPA of 8 out of 10 for GC and 7.5 out of 10 in case of SC/STs are eligible for admission without GATE Score.

and O1(a) is corrected as follows:

Candidates who have qualified for the award of the Bachelor's degree in Engineering /

Technology/Design/ Architecture from educational Institutions approved by AICTE/UGC/Government and who have a valid CEED (Common Entrance Exam for Design) score are eligible to apply for admission to the M. Des. programme.

The Senate, after deliberation, ratified the approval accorded by the Chairman Senate towards norms for admission and the release of the call for application for the new M.Des program.

*Senate further approved the revised Ordinance of M.Tech./M.Des. program given as **ANNEXURE C**.*

2021-44-Senate-06

Constitution of Board of Studies

The Senate in its earlier meeting, advised the Institute to constitute Board of Studies to deliberate on all academic matters before placing the proposal before the Senate. In line with suggestion of the Senate, the Institute with the due approval of the Chairman, Senate constituted Board of Studies in each department comprising department as well as with external experts as members.

The Terms and Conditions towards constitution of BoS is as under:

1. The Board of Studies shall meet as and when necessary, but at least twice in a year.
2. The BoS of each department shall consist of the following persons:

Heads of the Departments of the Institute	Chairperson
All Professors other than the Deans or Heads of the Departments	Member
Two persons from amongst educationists of repute or persons from another field related to the activities of the Institute who are not in service of the Institute, nominated by Director	Member
Two persons who are not members of teaching staff co-opted by the Senate for their specialized knowledge	Member
Director	Invitee
Dean (Academics)	Invitee

3. **Term:**
The term of office of members shall be for a period of two years from the date of nomination.
4. **Functions and Duties of Board of Studies**
The Board of Studies of a department in the institute shall provide suitable guidance on:
 - a) Preparation of curriculum for the program, keeping in mind, the Program Educational Objectives.
 - b) Preparation of syllabi for various courses based on the course outcomes, program outcomes and the objectives of the program, interest of the stakeholders and national requirement for consideration and approval of the Academic Council;
 - c) Suggestion towards methodologies for innovative teaching and evaluation techniques;
 - d) Updation of state-of-the-art research, adoption of technology enabled teaching learning methodologies and other best academic practices in the curriculum and syllabus.
5. **Honorarium for external experts:**
Rs. 3000/- for each meeting.

*In line with the norms, the members of Board of Studies have been constituted in each department and the details of the same are placed as **ANNEXURE D** for kind perusal of the Senate.*

	<p><i>The Senate perused the proposal and cautioned that the BoS should not result in the Departments operating in silos and the Interdisciplinary nature of the Institute should not get diluted.</i></p> <p><i>And the Senate also urged to constitute a Senate subcommittee by including both Senate members as well as external experts to advise on course curriculum of individual Departments as well as the common and interdisciplinary courses. Senate advised that such a subcommittee will be able to holistically to look into the academic matters and guide the Institute as per its mandate of interdisciplinary nature. The report of the committee along with its recommendations may be placed before the Senate for approval.</i></p> <p><i>It is resolved that a Senate Subcommittee for the same would be constituted very shortly.</i></p>
<p>2021-44-Senate-07</p>	<p>Revised curriculum for B Tech 2020 Batch</p> <p>In the 41st meeting of the Senate, the Senate accorded provisional approval for updating the curriculum and syllabus for the B Tech 2020 batch.</p> <p>Internal Curriculum Revision Committee was constituted with about 20 faculty members from all Departments which made thorough deliberations and formulated the curriculum and the same was placed in the 41st Senate meeting. Based on the inputs received from the 41st Senate, the committee had further deliberations and came up with the revised curriculum incorporating the Design Vertical as approved by the 43rd Senate. The revised curriculum as presented below is submitted for the kind perusal and approval of the Senate. In order to formulate the PROFESSIONAL CORE and ELECTIVE courses pertinent to a Department, based on the advice of the Senate and with the approval of the Chairman, the Board of Studies has been formed for each department comprising of external experts from both Academia and Industry.</p> <p>The Senate may kindly note that due to the pandemic, the 2020 admission process through JoSAA/CSAB was finished in November only. In order to complete both the first and second semesters by July 2021, special academic calendar was prepared for 2020 batch which was approved by 43rd Senate with 70 working days in each semester and all Saturdays as instructional days. The first semester was completed by 10th March and the second semester started from 30th March. The curriculum and the syllabus of the 2nd semester courses for each Dept. as approved the respective BoS and the Chairman, Senate is given as Annexure E-I for the kind perusal and ratification of the Senate.</p> <p>The BoS for the CS Dept was held on 12th March 2021, for EC Dept. on 17th March 2021 and the for ME Dept on 12th and 16th March 2021. All the suggestions and comments provided by the respective BoS have been incorporated in the Department Curriculum and the same has been placed as Annexure E-II for CS Dept. and Annexure E-III for the ME Dept. The Senate may kindly peruse and consider the revised curricula for approval.</p> <p>The TEMPLATE of the revised curriculum applicable from the 2020 batch is given below for the kind approval of the Senate.</p> <p>Each Department has incorporated the suggestions and comments provided by the respective BoS in the template and the same is given in the Annexures E-II and E-III.</p>

Semester wise Credit Distribution										
Course Category	Credits									
Semesters	S1	S2	S3	S4	S5	S6	S7	S8	Total	%
Basic Science Course (BSC)	8.5	4	0	0	0	0	0	0	12.5	7.6
Science Elective Course (SEC)	0	4	4	4	0	0	0	0	12	7.3
Basic Engineering Course (BEC)	11.5	4	0	0	0	0	0	0	15.5	9.4
Design Course (DSC)	3	3	3	3	3	3	0	0	18	10.9
IT Skill Course (ITC)	0	6	0	0	4	0	0	0	10	6.1
Professional Core Course (PCC)	0	4	16	16	13	0	0	0	49	29.7
Professional Elective Course (PEC)	0	0	0	0	4	8	0	0	12	7.3
Elective Course (ELC)	0	0	0	0	0	8	12	4	24	14.5
Humanities and Social Science Course (HSC)	2	0	0	0	0	2	0	0	4	2.4
Professional Career Development (PCD)	0	0	0	0	0	0	0	8	8	4.8
Total	25	25	23	23	24	21	12	12	165	100
Cumulative Credits	25	50	73	96	120	141	153	165	165	100

Salient Features of the 2020 Curriculum

- SIX Design Courses as approved by the Senate and the BoG
- THREE IT courses
- Professional Core Course to start from 2nd semester (Branch change at the end of 1st semester)
- Syllabus of core engineering courses to have 25% weightage for Problem Based Learning with exposure to hands-on detailed design & manufacturing skills.
- Provision to have 2 / 3 / 4 hours lab sessions based on the requirement of each course
- 8/9 ELECTIVES
- To earn the Degree from a Dept, student has to complete all CORE courses and 2/3 ELECTIVES offered by the parent Dept.
- Remaining 6 electives can be chosen from any category by the student as per his/her interest.
- Every Programme will have Programme Educational Objectives and Outcomes
- Every Course will have Learning objectives and Learning Outcomes.
- Students have the option to continue 3 months internship to project from May-Dec.
- Summer Internship to be awarded PASS/FAIL grade.
- Students can opt for an Industry/Academia/Research Lab Internship supervised by Institute faculty in collaboration with the lab by submitting project proposals duly approved by both Internal and External Guides. Departmental Committee should scrutinize such proposals on merit and quality and scope of proposed work.
- As 7th Semester has only Electives, Depts. can offer those online or choose from NPTEL OR shift to 8th Semester
- Students may choose to do Elective courses of equivalent credits in place of project.
- Students can upgrade to Dual Degree Programme in the specializations offered by the Departments and approved by the Senate during the 5th semester
- Core and Electives are to be preferably of L-T-P-C 3-1-0-4.
- Electives with practice component to be 3-0-2-4 or 2-0-4-4; crediting only the theory part is not permitted.
- Maximum credits permissible to be earned from NPTEL courses as Free Electives will be 8.
- The Dept. Electives and Specialization/Minor Electives are to be In-House courses.
- Additional credits to be earned for Honors will be 12 credits in the new curriculum, equivalent to 3 courses.
- Students can earn a MINOR offered by another Department if THREE (12 credits) Courses are credited from a single vertical of that Dept.
- Students can earn a SPECIALIZATION offered by the parent Department if THREE (12 credits) Courses are credited from a single vertical of that Dept.
- MINOR/SPECIALIZATION Verticals available for the students should be released by each Dept. before the beginning of the 4th Semester of a batch.

- Students changing MINOR/SPECIALIZATION after crediting a few courses in one, are to complete all 3 courses in the new minor, courses done in previous minor will remain in the grade sheet.

The Senate was apprised about the salient features of revised course curriculum for B.Tech 2020 batch. Detailed aspects of Department courses were briefed by the respective Heads. Senate advised to plan for offering Finance related M Tech CS programme as it would be really beneficial for the Industries. It was informed that Institute would plan to offer elective courses on similar lines to begin with and plan to initiate M Tech programme as more faculty members are inducted into the CSE Department.

As AI has unlimited applications in various fields of Engineering, the Senate urged to identify Industries working in AI relevant to the respective programmes and collaborate with them and establish partnership.

The Senate has also urged that every programme offered by the Institute should ensure both the depth and breadth in the relevant field of Engineering.

The Senate enquired regarding offering courses on Controls, Optimization and Signal Processing for students in the B Tech in Mechanical Engineering programme and it was informed that such courses are part of B Tech in Smart Manufacturing and can be taken as electives by the students of B Tech ME.

The Senate advised to group all the Electives together and not specifically as Programme specific Electives and Free Electives. A student crediting the 2/3 Electives as specified by the respective Dept. will be eligible for the Degree of that Dept. Any student taking four courses offered by the Dept. from same vertical will be eligible for the specialization (of that vertical) offered by the parent Dept. Further any student taking three courses from same vertical of another Dept. will be eligible for the Minor from that Dept. Also, neither the Minor nor Specialization will be mentioned in the Degree Certificate, it will be reflected only in the grade sheet.

*The Senate perused the second semester curriculum and course contents and ratified the approval accorded by the Chairman, Senate for the same. The curriculum and course contents are given in **ANNEXURE E-I**.*

The entire curriculum and course contents of each B Tech programme applicable from 2020 batch is given in Annexure E. The curriculum and course contents of the programmes offered by the Dept. of ECE was placed in the Senate as Table Item 2021-44- Senate-17(2). As all the curricula was discussed together during the Senate meeting, the curriculum and course contents of Dept. of ECE is also included along with this item.

The B Tech programmes offered by the Institute are listed below of which Sl. No. 2 alone will be offered from the 2021 Batch.

1. B Tech in Computer Science and Engineering (**ANNEXURE E-II-A**)
2. B Tech in Computer Science and Engineering with major in Artificial Intelligence (**ANNEXURE E-II-B**)
3. B Tech in Electronics and Communication Engineering (**ANNEXURE E-III-A**)
4. B Tech in Mechanical Engineering (**ANNEXURE E-IV-A**)
5. B Tech in Smart Manufacturing (**ANNEXURE E-IV-B**)

*The curricula with syllabi for all the programmes and courses are given in **ANNEXURES E-II, III and IV** as listed above.*

The Senate has granted approval for the revised B Tech Curriculum for all the programmes that is effective from the 2020 Batch.

Institute at present offers four M Tech programmes, two from ME Dept and two from ECE Dept., namely M Tech in Mechanical Engineering with Specialization in Mechanical System Design, M Tech in ME with Specialization in Smart Manufacturing, M Tech in ECE with specialization in Electronics Systems Design and M Tech in ECE with Specialization in Communication Systems Design. These programmes were originally M Des programmes which were renamed as M Tech (without any change in curricula) as the same was found to be more appropriate with respect to course structure and contents.

The 41st Senate has granted approval to offer M Tech in Computer Science and Engineering and M Tech in Power Electronic System Design from 2021 batch. Accordingly, it was found necessary to revise the existing M Tech programmes in addition to starting the new ones. The Mechanical Department has revised the curricula of both the M Tech programmes. ECE Dept. proposes to offer three M Tech Programmes: M Tech in ECE with Specialization in Communication Systems, M Tech in ECE with specialization in Microelectronics and VLSI Systems and M Tech in Power Electronic System Design. The curricula and the course contents of all the above M Tech programmes have been placed for the approval of the respective BoS and the same has been presented as **Annexure E-II** for the CS Dept. and **E-III** for the ME Dept.

Salient Features of the M.Tech 2021 Curriculum

- M.Tech CSE - 15 seats
- M.Tech CSE (Specialization: Data Science and Artificial Intelligence) - 15 seats
- A total of 5 core courses and 5 elective courses each with 4 credits
- Three core courses and two elective courses in Sem 1 along with 1 or 2 Practice courses
- Two core courses and three elective courses in Sem 2 along with 1 or 2 Practice courses
- The project would start in summer and continue throughout the second year
- One Department/Specialization specific Design course to align to industry needs

Semester wise Credit Distribution							
Category	Credits						
Semester	S1	S2	Summer	S3	S4	Total	%
Professional Core Course (PCC)	15	11	0	0	0	26	29.5
Elective Course (ELC)	8	12	0	0	0	20	22.7
Professional Career Development (PCD)	0	0	10	16	16	42	47.7
Total	23	23	10	16	16	88	100
Cumulative Credits	23	46	56	72	88	88	100

The Senate was apprised of the existing and new M Tech programmes offered by the Institute.

The Senate urged to have close collaboration with Industries in Chennai and Bangalore with respect to M Tech programmes, their final year projects and offering Elective courses relevant to Industries.

The curriculum for M Tech Programme on M Tech in ME with specialization in AI and Robotics was placed as the table item 2021-44- Senate-17(1). As all the programmes were discussed together during the Senate meeting, the curriculum for the same is also included herewith.

The M Tech programmes offered by the Institute from 2021 are listed below:

1. *M Tech in CSE (ANNEXURE E-II-C)*
2. *M Tech in CSE with Specialization Data Science and Artificial Intelligence (ANNEXURE E-II-D)*
3. *M Tech in ECE with Specialization in Communication Systems (ANNEXURE E-III-B)*
4. *M Tech in ECE with Specialization in Microelectronics and VLSI Systems (ANNEXURE E-III-C)*
5. *M Tech in Power Electronic System Design (ANNEXURE E-III-D)*
6. *M Tech in ME with Specialization in Mechanical System Design (ANNEXURE E-IV-C)*
7. *M Tech in ME with Specialization in Smart Manufacturing (ANNEXURE E-IV-D)*
8. *M Tech in ME with Specialization in AI and Robotics (ANNEXURE E-IV-E)*

The curricula and syllabi for all the above programmes in Sl. Nos. 1- 7 are given in ANNEXURE E-II-C to E-IV-D as listed above while the curriculum for Sl. No. 8 is given in ANNEXURE E-IV-E.

The Senate perused the revised curriculum for M Tech 2021 Batch and after deliberation approved the curricula and syllabi for all the programmes as given in Annexure E.

The Elective courses proposed by the Departments are presented as 2021-44- Senate-17(3).

2021-44-Senate-09

Approval for New Electives

The Department of Basic Sciences and Humanities has proposed following 3 new elective courses with due approval from the Departmental Academic Committee (DAC).

Sl. No	Course Name	Course Code	Faculty Name	Dept. offering
1.	Engineering Optics	PH2000	Dr. Vivek Kumar/ Dr. Debolina Misra	PHY
2.	Waves and Vibrations	PH2001	Dr. Naveen Kumar/ Dr. Tapas Sil	PHY
3.	Physics of Materials	PH2002	Dr. Anushree P Khandale/ Dr. Ashok Kumar Reddy Y	PHY
4.	An introduction to Cryptography	MAT503	Dr. M. Subramani	MAT
5.	Materials Design for Sensor Systems	PHY5XX	Dr. Y. Ashok Kumar Reddy	PHY
6.	Optical Fiber Sensors	ELE558	Dr. Srijith K	ECE

The details of the above courses are placed as **ANNEXURE-F**.

The Senate perused the new electives and after deliberation approved the elective courses given in ANNEXURE F.

Admission Status of the year 2020-21

The status of student admission under B Tech Programmes through JoSAA/CSAB and M Tech Programmes through CCMT along with Ph D admissions for the year 2020-21 is as under:

a) Abstract of admission:

Degree	Sanctioned Strength	No. of Students Joined	No. of Vacant seats
B. Tech			
JoSAA	360	352	8
DASA	15	6	9
B Tech Total	375	358	17
M. Tech			
CCMT	80	65	15
DASA	4	0	4
M Tech Total	84	65	19
Total	459	423	36

b) Degree-wise Admission:

B Tech	No. of Students Admitted	M Tech	No. of Students Admitted	Total
CS	121	CDS	14	423
EC	121	EDS	17	
ME1	78	MDS	19	
ME2	38	SMT	15	
Total	358		65	

c) Rank Details:

Branch	OP
	Opening – Closing Rank
Computer Science and Engineering	8686 – 17727
Electronics and Communication Engineering	18955 -27835
Mechanical Engineering	19914 – 44183
Smart Manufacturing	24066 – 50030

d) Ph.D. admission;

Ph D			
Department	Admission Jul 2020	Admission Jan 2021	Total
CS	1	4	5
EC	6	7	13
ME	8	2	10
PH	-	1	1
MA	1	-	1
Total	16	14	30

Category wise data of admission are given in **ANNEXURE G.**

The Senate took note of the admission status for the year 2020-21.

**2021-44-
Senate-11**

Participation in Study in India Program of the Government to attract Foreign Students

The provisions of NEP 2019, inter alia includes attracting foreign students and to make the country as educational hub.

Under Study in India Program of the Government, the Institutions of National Importance are admitted as a member institution to offer admission to students from various foreign countries. The scheme is implemented by EdCIL, a Mini Ratna PSU under the control of Ministry of Education. It is also submitted that IIITM Gwalior and IIITDM Jabalpur (offering) are member institutions under Study in India program and offering 58 seats in 5 courses and 30 seats in 9 courses respectively.

In line with the mandate provided under NEP 2020, the Institute has become member institute under Study in India program and courses to be offered by the Institute and the eligibility criteria fixed by the institute are as under:

Program	Details of Seats/ Eligibility criteria/Annual Fees
B.Tech.	<p>a. Total Number of Seats: 25 Computer Science and Engineering: 10 Electronics and Communication Engineering:5 Mechanical Engineering: 5 Smart Manufacturing: 5</p> <p>b. Eligibility criteria: 10+2 in Physics, Chemistry and Maths with minimum 60% score</p> <p>c. Additional Criteria: SAT Level I with minimum valid score or SAT level II with minimum valid score or JEE main with minimum valid score.</p> <p>d. Annual Fee: Tuition Fee: 4500 USD Total Fees: 5500 USD</p>
M.Tech.	<p>a. Total Number of Seats:16 ECE: 8 Communication system Design: 4 Electronics system Design: 4 Mechanical: 8 Mechanical system Design: 4 Smart Manufacturing: 4</p> <p>b. Eligibility Criteria: As per existing norms GRE with minimum score of 280/or Valid GATE score</p> <p>Additional Criteria: IELTS with minimum valid score or TOEFL with minimum valid score</p> <p>c. Annual Fee: Tuition Fee: 4000USD Total Fees: 5000 USD</p>

	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; text-align: center; vertical-align: top;">Ph.D.</td> <td> <p>a. Total Seats: 3 One each in areas of CSE; ECE and Mechanical</p> <p>b. Eligibility criteria As per existing norms</p> <p>c. Annual Fee: Tuition Fee: 3500 USD Total Fees: 4500 USD</p> </td> </tr> </table> <p>It is pertinent to mention that the seats are to be offered on supernumerary basis.</p> <p>As the institute is required to provide all relevant information in the Study in India portal, the Institute with the approval of Chairman Senate has submitted all relevant information.</p> <p><i>The Senate, after deliberation, ratified the approval accorded by the Chairman Senate towards participation of the institute under Study in India program of the Government for admission of foreign students as per prescribed norms</i></p>	Ph.D.	<p>a. Total Seats: 3 One each in areas of CSE; ECE and Mechanical</p> <p>b. Eligibility criteria As per existing norms</p> <p>c. Annual Fee: Tuition Fee: 3500 USD Total Fees: 4500 USD</p>
Ph.D.	<p>a. Total Seats: 3 One each in areas of CSE; ECE and Mechanical</p> <p>b. Eligibility criteria As per existing norms</p> <p>c. Annual Fee: Tuition Fee: 3500 USD Total Fees: 4500 USD</p>		
<p>2021-44-Senate-12</p>	<p>General Guidelines: Admission, Performance and Time Schedule for Ph.D. Scholars.</p> <p>In the 43rd meeting of the Senate, an agenda item concerning General Guidelines- Admission, Performance and Time Schedule for Ph.D. Scholars was placed for kind consideration of the Senate.</p> <p>The Senate, after careful perusal of the item, advised the institute to constitute a committee to look into the proposed guidelines. The Senate further advised that the committee may interact with faculty; evaluate procedures followed by other institutions and place a revised proposal in the next meeting.</p> <p>In line with direction of the Senate, a committee was constituted by the institute vide its OM dated 16.10.2020 under the Chairmanship of Prof. SP Venkatesan comprising Dr. Sudhir Varadharan, Dean (Design, Innovation and Incubation), Dr. Binsu J Kailath, Dean (Academics), Dr MD Selvaraj, Dean (SRICC) as members and Joint Registrar (Acad) as member secretary. The committee convened its meeting on 28.10.2020 and 16.11.2020 and held deliberation with various stakeholders.</p> <p>Based on this, revised guidelines have been formulated by the committee and the salient features of the revised guidelines are:</p> <ol style="list-style-type: none"> a) Registration for 20 credits in each semester by the scholars comprising 16 Research credit; 2 credits for seminar and technical writing and 2 credits for TA performance. b) Scholars who are completing their research/thesis work with 3.5-4 years will be considered for rewarding with pre-doctoral fellowship for the remaining period for publication of additional research papers. c) Monetary grant upto Rs.1.0 lakh for attending workshops; publication of papers; membership to professional bodies etc. d) Request for RKA scheme will be considered only after completion of 3 years subject to publication of at least 2 SCI publications. e) JRF/SRF working in Projects having duration of two years or more shall be given an opportunity to enroll for Ph.D program. These scholars, after completion of their project duration, will normally be eligible for fellowship for further period of one year from the institute and additional period of one year is subject to satisfactory performance and recommendation of the DC in this regard. <p>A copy of the Guidelines is placed as ANNEXURE H for kind perusal of the Senate.</p> <p>These guidelines with the approval of the Chairman, Senate has been circulated all for implementation.</p>		

The Senate approved the proposal.

2021-44-Senate-13

Approval for Rules on updation of “I” Grade

At present, students have been awarded “I” Grade if they miss Quizzes/assignments/projects due to valid reasons. It has been found that the students miss to complete missing part and the grade remains as I till the final semester. It is therefore proposed to formulate the following rules towards updation of I Grade.

1. Faculty would be submitting marks scored by such students in the portal with grade as I before the grade submission deadline. The results will be declared with I grade in respective courses for such students. The faculty members will be sending email to such students to complete the missing part within three weeks after the results are announced.
2. As such students complete the missing part, the faculty members should complete the evaluation, and grades be awarded following the same cut-off as approved by the Class Committee for the rest of the students in the class. The updated grade should be submitted in the portal within one month from the date of results announcement of the semester.
3. Any student who misses to complete any of the required part within three weeks will be evaluated based on the remaining components alone (by considering “0” being scored for the missed part) and grades be awarded following the same cut-off as approved by the Class Committee for the rest of the students in the class. The updated grade should be submitted in the portal within one month from the date of results announcement of the semester.

The Senate perused the norms and after deliberation, approved the norms concerning award of “I” Grade

2021-44-Senate-14

Award of Provisional Degree to eligible students

In the 43rd Senate, list of 303 eligible graduands for award of degrees have been placed. However, three students who completed the requirements after the Senate were also awarded the degrees in the convocation after due approval by the Chairman, Senate. The details of such students are given below for kind perusal of the Senate.

Roll No	Name	Programme	Year of admission
EDS17M012	KASANABOINA RAMYA NANDINI	Master of Design in Electronic Systems	2017
MDS17M015	RAKESH BHARATI	Master of Design in Mechanical Systems	2017

The third candidate who registered for the Dual-Degree programme requested for the award of B Tech degree alone as the requisite credits for the DD could not be completed. And with the approval of the Chairman, Senate, he was awarded the B Tech degree.

Roll No	Name	Joined Programme in 2014	Degree Awarded in 2020
EVD14I018	JATIN	Bachelor of Technology in Electronics and Communication Engineering with Specialization in Design and Manufacturing and Master of Technology in VLSI and Electronic Systems Design (Under Dual Degree Programme)	Mr Jatin has earned required credits for the award of B Tech. Based on his request and approval of the Chairman, Senate he was awarded “ Bachelor of Technology in Electronics and Communication Engineering with Specialization in Design and Manufacturing ” alone in the 8 th convocation

The following students of 2020 graduating batch have completed the academic requirements in January 2021. With the approval of the Chairman, Senate, these students have been awarded provisional Degree. Senate may kindly grant permission to award their degrees in the forthcoming Convocation.

1. Mr PALURU PRADEEP KUMAR REDDY (ESD15I021)
2. Mr ABHISHEK VERMA (MDM16B001)

The Senate, after deliberation, ratified the decision of Chairman Senate for awarding degrees to additional three students in 2020 convocation. The Senate also ratified the award of provisional degree to two students upon fulfillment of academic requirements in January 2021. These two candidates will be awarded degrees in the forthcoming convocation.

2021-44-Senate-15

Academic Calendar 2021

The Academic Calendar 2021 has been prepared and with the approval of the Chairman, Senate, circulated among the Institute community. The same is placed as Annexure I for the kind perusal of the Senate. The Special Academic Calendar for the 2020 batch is also submitted herewith for the kind perusal.

*The Senate granted approval for the 2021 Academic Calendar given in **ANNEXURE I**.*

2021-44-Senate-16

Cancellation of Ph D Registration of Mr. N. Siva Rama Lingham (COE19D007)

Mr. N. Siva Rama Lingham (COE19D007) joined Ph D programme in the department of Computer Science and Engineering on 22.07.2019 under Dr Munesh Singh as a full time Ph D scholar under HTRA scheme.

In line with provision of rules and regulations, Comprehensive Viva-Voce Examination was conducted for the student on 16.12.2020 and during the evaluation his performance was found not satisfactory by the committee and the committee recommended for repeat of Comprehensive Viva-Voce. The second Viva-Voce was conducted on 05.02.2021 and once again the candidate could not clear the Comprehensive Viva-Voce Examination.

Ph. D ordinances R.12a concerning Comprehensive Examination is as under:

- a) Every Ph.D scholar shall take and perform satisfactorily in a Comprehensive Examination.
- b) If the performance of a research scholar in the Comprehensive Examination in the first attempt is not satisfactory, he / she will be given one more opportunity to appear for the

	<p><i>comprehensive examination within six months of the first attempt. The registration of a research scholar who fails to complete successfully the Comprehensive Examination in both attempts, will be given an option to convert his/her registration from Ph. D to M. S. programme if he/she so desired, otherwise his /her registration will be cancelled.</i></p> <p>c) <i>The objective of the Comprehensive Examination is to test the general capability of the research scholar and the breadth of his / her field of research. The Comprehensive Examination will usually consist of a written test and oral examination or oral examination. The Comprehensive Examination Committee shall intimate to the research scholar sufficiently in advance the scope of the Comprehensive Examination, so as to enable the scholar to prepare adequately for it.</i></p> <p>d) <i>The Ph.D. research scholars are normally expected to complete successfully the Comprehensive Examination within a year after his/her registration in the Ph. D programme and in any case not later than three semesters after his registration in the Ph.D programme.</i></p> <p>As Mr. N. Siva Rama Lingham (COE19D007) could not able to complete the comprehensive examination in 2 attempts, in line with rules and regulations, his registration for the Ph.D. program was cancelled by the Institute with due approval of the Chairman, senate.</p> <p><i>Senate, after deliberation, ratified the decision of the Chairman, Senate on cancellation of Ph.D. registration of Sh. N Siva Rama Lingham on account of non-completion of Comprehensive examination within the stipulated 2 attempts.</i></p>
<p>20210-44-Senate-17(1)</p>	<p>Approval for offering M.Tech in AI and Robotics in place of Advanced Robotics</p> <p>In the 41st meeting of the Senate held on 1st February 2020, a proposal to commence a new M.Tech program in <i>Advanced Robotics</i> was placed for consideration of the Senate. The proposal also includes offering joint degree in collaboration with University of Genova.</p> <p>The Senate, after consideration, approved the proposal and advised the Institute to consider the exchange program after mutual agreement to this effect by both the Institutes.</p> <p>Subsequent to this approval, the Govt. of India has unveiled New Education Policy 2020 wherein emphasis has been made for interdisciplinary education. Further, the policy envisaged to lead the country in preparing professionals in cutting edge areas including Artificial Intelligence. The Institute has also received an advisory to formulate action plan for implementation of provisions of NEP 2020.</p> <p>On account of change in scenario, a proposal was mooted to offer M.Tech in <i>AI and Robotics</i> in place of <i>Advanced Robotics</i> and the proposal was placed in Board of Studies. The BoS approved the proposal as it will facilitate to admit students from multiple streams which will add value to the program. The BoS further advised to offer this course by the Dept. of Mechanical Engg initially and to offer suitable bridge courses for students from other streams. A copy of Minutes of BoS held on 2nd April 2021 is placed as Annexure J1 for kind perusal of Senate. In addition, the course curriculum recommended by the BoS is placed as Annexure J2. The exchange program with University of Genova is not considered at this stage due to the Covid pandemic.</p> <p><i>Senate may kindly consider the recommendation of the BoS to offer the M. Tech program in AI and Robotics in place of Advanced Robotics. Senate may further consider to approve the course curriculum for the program.</i></p> <p><i>The Senate was apprised about the proposal.</i></p> <p><i>The Senate was further informed that the course will be offered by the Dept. of Mechanical Engineering and accordingly the degree would be offered as M. Tech in Mechanical Engineering with specialization in AI and Robotics.</i></p>

	<i>The Senate, after deliberation, approved the proposal of offering M.Tech. in Mechanical Engineering with specialization in AI and Robotics. The Senate further approved the course curriculum for the program as given in ANNEXURE E-IV-E.</i>
2021-44-Senate-17(2):	B Tech and M Tech Curricula of Dept. of ECE as recommended by the BoS and M Tech level Elective Courses offered by the Departments
	The BoS for the EC Dept. was held on 17 th March. All the suggestions and comments provided by the respective BoS have been incorporated in the Department Curriculum. <i>Senate may kindly consider the Curricula and the course contents recommended by the ECE BoS for approval. Senate may also please peruse the Elective courses proposed.</i>
	<i>The item was discussed along with the other B Tech and M Tech Curricula offered by the Institute and the same is presented in ANNEXURE E-III as detailed in Item Nos. 2021-44-Senate-07 and 08.</i>
2021-44-Senate-17(3):	Selection of PDF in the Department of Electronics and Communication Engineering
	The Institute has invited applications for various PDF position and the applications received in the Department of Electronics and Communication Engineering was evaluated by the preliminary selection committee in its meeting held on 31 st March 2021 through Google meet by inviting all the applicants. Taking into account the performance of the candidate, the committee selected Dr. Jyotismita Mishra and the candidate was advised to appear before the Institute Selection Committee constituted in line with provisions approved by the Senate. The selection committee, after due consideration and evaluation, recommended Dr. Jyotismita Mishra for the position of PDF in the Dept. of Electronics and Communication Engineering for a period of one year and further extension if any may be considered based on her performance. In line with the recommendation of the committee, the institute with due approval of Chairman Senate, offered the position of PDF to Dr. Jyotismita Mishra. CV of the candidate is placed as ANNEXURE J
	Senate may kindly take note of selection of Dr. Jyotismita Mishra, as PDF in the Dept. of Electronics and Communication Engineering and also consider to ratify the approval accorded by the Chairman Senate.
	<i>The Senate ratified the approval accorded by the Chairman Senate on selection of Dr. Jyotismita Mishra, as PDF in the Dept. of Electronics and Communication Engineering.</i>

There were no other items for discussion.

The meeting ended with vote of thanks to the Chair.

(Dr. Binsu J Kailath)
Dean Academic

(Mr. A. Chidambaram)
Registrar

(Prof. B. Majhi)
Chairman

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM
INTRODUCTION OF NEW COURSE

Course Title	Advanced Semiconductor Devices	Course Code	EC6XXX			
Dept./ Specialization	ECE	Structure (LTPC)	3	1	0	4
To be offered for	PG / PhD	Status	Core <input type="checkbox"/>		Elective <input checked="" type="checkbox"/>	
Faculty Proposing the course	Dr Tajendra Dixit	Type	New <input checked="" type="checkbox"/>		Modification <input type="checkbox"/>	
Recommendation from the DAC		Date of DAC	23/6/2021			
External Expert(s)	Prof. Shreepad Karmalkar, EE Department, IIT Madras					
Pre-requisite	Solid State Electronic Devices	Submitted for approval			45 th Senate	
Learning Objectives	<ul style="list-style-type: none"> The course is designed to teach the physical principles and operational characteristics of advanced semiconductor electronic devices with emphasis on modern field effect transistors, optoelectronics, memory devices and semiconductor sensors. This course is designed to introduce physical insights of next generation devices for IoT and AI. 					
Learning Outcomes	<ul style="list-style-type: none"> Modelling and working of state of the art semiconductor devices Ability to identify required device characteristics for a specific application Also provide foundation on for advanced courses in nano- and quantum electronics. 					
Contents of the course <i>(With approximate break-up of hours for L/T/P)</i>	<ul style="list-style-type: none"> Review of Semiconductor device fundamentals and device modelling. (L3+T1 hrs) Noise in semiconductor devices (L4+T1) Tunnelling in semiconductor devices, Current transport processes in metal-semiconductor junction, transferred electron and real space transfer devices (L5+T1 hrs) Single electron transistor, Fin Field-Effect Transistors (FinFETs), FinFET Devices for VLSI Circuits and thin film transistors. (L8+T3) Advanced MOS devices (OFET, CNFET etc.) (L4+T1 hrs) Light Emitting devices- Light emitting diodes (III-V, Quantum, Organic LEDs) and Light Emitting Transistors, Semiconductor LASERS and applications. (L6+T3 hrs) Solar cells (Si, Organic, and Quantum-well solar cells), Photodetectors, Introduction to Excitonic devices. (L6+T1 hrs) Non-volatile memory devices, Solid state drives, Phase change memory, Memristors, Introduction to Neuromorphic devices. (L5+T1) Semiconductor based sensors (Gas sensors, Thermal sensors, Chemical sensors, pressure sensor) and their utilization for IoT and AI applications. (L4+T1) 					
Text Book	<ol style="list-style-type: none"> S. M. Sze., K. K. Ng, "Physics of Semiconductor Devices", United Kingdom, Wiley, 2021. ISBN:9780471143239 Karl Hess, "Advanced Theory of Semiconductor Devices", John Wiley, 2008: ISBN: 978-0-780-33479-3 Bonani, Fabrizio, Ghione, Giovanni, "Noise in Semiconductor Devices", Springer, 2001. ISBN 978-3-662-04530-5 Colinge, J.-P., "FinFETs and Other Multi-Gate Transistors", Springer, 2008. ISBN 978-0-387-71752-4 Pallab Bhattacharya, "Semiconductor Optoelectronic Devices", Pearson Education, 2017. ISBN-10 : 9789332587410 					
Reference Books	<ol style="list-style-type: none"> M. S. Tyagi, "Introduction to Semiconductor Materials and Devices", John Wiley, 2008: ISBN: 978-0-471-60560-7 Wolfgang Bruetting, Physics of Organic Semiconductors, Wiley-VCH, 2005. ISBN:9783527405503 S. M. Sze, "Semiconductor Sensors", Wiley-Interscience, 1994. ISBN: 978-0471546092 Santosh K. Kurinec, "Nanoscale Semiconductor Memories", CRC Press, 2017. ISBN: 9781351832083 					

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM
INTRODUCTION OF NEW COURSE

Course Title	Materials Design for Sensor Systems	Course No	INT6XXX			
Department/ Specialization	Mechanical, Electronic and Design Engineering	Credits	L 3	T 1	P 0	C 4
Offered for	PG/DD and PhD	Status	Core <input type="checkbox"/>	Elective <input checked="" type="checkbox"/>		
Faculty proposing the course	Dr. Y. Ashok Kumar Reddy	Type	New <input type="checkbox"/>	Revision <input checked="" type="checkbox"/>		
Recommendation from the DAC		Date of DAC	07-12-2020			
External Expert(s)	Dr. K.R. Gunasekhar, Principle Scientist, IISc Bangalore Prof. S.P. Venkateshan, Professor Emeritus, IIT Madras					
Prerequisite	Consent of Teacher (COT)	Submitted for approval	45 th Senate			
Learning Objectives	<ul style="list-style-type: none"> To study the materials design perspectives for device fabrication To understand the concepts of Photodetectors and Infrared Sensors for energy/defence applications 					
Learning Outcomes	<ul style="list-style-type: none"> This course aims to learn the advanced design and fabrication techniques of the devices It can be mainly useful for PG/DD and PhD students towards making the Photodetectors and Infrared Sensors for bio-medical, energy and defence applications 					
Course Contents (with approximate breakup of hours for lecture/ tutorial/practice)	<p>I. Material Properties, Device Fabrication Techniques and Issues: Material properties – Structural, Optical, and Electrical properties Advanced techniques for materials design – Physical and Chemical approaches Device fabrication methods – Lithography and Etching Fabrication related issues – Residual stress, Micro cracks, and Surface oxidation (L12+T3 h)</p> <p>II. Photodetectors: Introduction to photodetectors & Architectures – M-S-M, Heterojunction, Bi-layers Materials selection and fabrication of devices – M-S-M, M-I-S, Photo-multiplier tubes; Figures of merit – Responsivity, Detectivity, External quantum efficiency Photodetectors for next generation – Energy, Bio-medical imaging and Defence areas (L14+T4 h)</p> <p>III. Infrared (IR) Sensors: Type of IR detectors – Photon (cooled) detectors, Thermal (un-cooled) detectors Metal and Superconductor based materials (Ti, Pt, YBaCuO), Semiconductor based materials (a-Si, VO_x, TiO_x); Fabrication and design of IR image sensor device Testing of IR sensors performance – Resistivity, Temperature Co-efficient of resistance (TCR), noise, Responsivity, and Detectivity Future trends of IR sensor materials – Military-night vision, Civil-security and surveillance, Gas detection and Imaging (L16+T5 h)</p>					
Essential Reading	<ol style="list-style-type: none"> Photodetectors: Materials, Devices and Applications, A. Ahmadvand, J.E. Bowers et al., B. Nabet (eds.), Woodhead Publishing, 1st ed., 2015. Infrared detectors, Antoni Rogalski, CRC Press Taylor and Francis group, 2nd ed., 2010. 					
Supplementary Reading	<ol style="list-style-type: none"> Materials Science of Thin Films: Deposition and Structure, Milton Ohring, D. Gall, S.P. Baker, Academic Press Inc, 3rd ed., 2014. Photodetectors: Devices, Circuits, and Applications, S. Donati, Prentice Hall PTR, 2011. Fundamentals of Infrared Detector Materials, M.A. Kinch, SPIE Press book, USA, 2007. 					

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	Atomistic Modeling of Materials	Course Code	PHY5XXX			
Dept./ Specialization	Physics	Structure (LTPC)	3	1	0	4
To be offered for	UG/PG	Status	Core <input type="checkbox"/>		Elective <input checked="" type="checkbox"/>	
Faculty Proposing the course	Dr. Debolina Misra	Type	New <input checked="" type="checkbox"/>		Modification <input type="checkbox"/>	
Recommendation from the DAC		Date of DAC	04-02-2021			
External Expert(s)	Prof. Tarun Kundu (IIT Kharagpur), Prof. Satyesh Yadav (IIT Madras)					
Pre-requisite	Nil	Submitted for approval			45 th Senate	
Learning Objectives	Focusing primarily on DFT-based calculations of materials properties, this course is intended to provide students from diverse backgrounds an overview of modeling materials at the basic of length scale namely the atomic scale.					
Learning Outcomes	After completion of this course students will be able to run DFT calculations. They will be able to design/model materials as a set of atoms in terms of molecular/bulk/surface structures for calculating their properties and predicting materials for specific device applications.					
Contents of the course <i>(With approximate break-up of hours for L/T/P)</i>	<p>Introduction: Introduction to computational materials science: necessity and applications, crystals and symmetry, Crystal planes, Miller indices, theory of X-ray diffraction in brief, Reciprocal space, Brillouin zone (L12+T2)</p> <p>Theory: Evolution of density functional theory starting from basic quantum mechanics, Hatree-Fock equation, Slater determinant, Kohn-Sham equations. (L12)</p> <p>A simple DFT calculation: basic idea about the popular DFT codes, geometry optimization, K-point sampling, pseudopotentials, various DFT functionals and their use (L10+T2)</p> <p>Applications of DFT-based simulations (i) electronic structure calculations (band structure, density of states) with examples, bulk modulus, optical and magnetic properties calculations. (ii) DFT-based computational materials design for device applications, surface science, photo- and electro-catalysts, chemical processes of industrial importance (L10+T8).</p>					
Text Book	1. Density Functional Theory: A Practical Introduction, D. Sholl & J. Steckel, Wiley 2009					
Reference Books	<p>1. Electronic Structure – Basic Theory and Practical Methods, R. Martin, Cambridge University Press 2004.</p> <p>2. Introduction to Solid State Physics, Charles Kittel, Wiley 2004</p>					

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	Energy Harvesting Technology	Course Code	INT6XXX			
Dept./ Specialization	Inter Disciplinary	Structure (LTPC)	L	T	P	C
			3	1	0	4
To be offered for	PG/PhD	Status	Core <input type="checkbox"/>		Elective <input checked="" type="checkbox"/>	
Faculty Proposing the course	Dr. Pandiyarasan Veluswamy	Type	New <input checked="" type="checkbox"/>		Modification <input checked="" type="checkbox"/>	
Recommendation from the DAC		Date of DAC	31/07/2021			
External Expert(s)	Assoc. Prof. Ir. Dr. Mohd Faizul Mohd Sabri (University of Malaya) Professor. Abhijit Majumdar (Indian Institute of Technology, Delhi)					
Pre-requisite		Submitted for approval			45 th Senate	
Learning Objectives	<ul style="list-style-type: none"> This course will provide recent harvesting small-scale energy that has attracted immense research efforts for applications such as wireless sensor networks for health monitoring, implantable devices, and biosensors. It shows the energy sources and their characteristics for energy harvesting, including piezoelectric, photovoltaic cells, and thermoelectric generators. 					
Learning Outcomes	<p>After the completion of the course, students will be able:</p> <ul style="list-style-type: none"> To have a broad appreciation of the potential applications for energy harvesting sources and uses of energy. Knowledge to apply and develop the model to solve the technological energy problem Understanding the design, analysis, and selection energy harvesting processes for different applications, technology, economic, environmental, and societal aspects. To better grasp the benefits of energy harvesting and explain general ways to save energy at a personal, community and global level. 					
Contents of the course <i>(With approximate break-up of hours for L/T/P)</i>	<ul style="list-style-type: none"> Energy Harvesting Basics; Energy Sources - Renewable/ Non-Renewable; Potential Global Energy Crisis; Climate Change and Sustainability (7 L, 2T) Waste Energies and Their Meso-macro-scale Energy Harvesting; Energy states in matter and Kinetic formulation; Energy Harvesting for Battery-less Information Technologies (8L, 2T) Piezoelectric Harvesters; RF Harvesting; Thermoelectric Generators; Solar Harvesting and Triboelectric nanogenerators (16L, 4T) Power Conversion Circuits; Strategies for Enhancing the Performance of Energy Harvester; Energy Combiner and Power Manager for Multi-Source Energy Harvesting; Future Directions and Scope (11L, 4T) <p>Tutorial will include research paper analysis and discussion</p>					
Text Book	1. Nicu Bizon, Naser Mahdavi Tabatabaei, Frede Blaabjerg and Erol Kurt, "Energy Harvesting and Energy Efficiency Technology, Methods, and Applications", Springer 2017.					
Reference Books	<ol style="list-style-type: none"> Mohammad Alhawari, Baker Mohammad, Hani Saleh, Mohammed Ismail, "Energy Harvesting for Self-Powered Wearable Devices", Springer 2018. Shashank Priya and Daniel J. Inman, "Energy Harvesting Technologies", Springer 2009. Ling Bing Kong, "Waste Energy Harvesting - Mechanical and Thermal Energies", Springer 2014. 					

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM

REVISION OF ELECTIVE COURSE

Course Title	Sustainable Manufacturing	Course Code	ME5XXX			
Dept./ Specialization	Mechanical Engineering	Structure (LTPC)	3	1	0	4
To be offered for	UG/PG	Status	Core <input type="checkbox"/>		Elective <input checked="" type="checkbox"/>	
Faculty Proposing the course	Dr. Senthilkumaran K	Type	New <input type="checkbox"/>		Modification <input checked="" type="checkbox"/>	
Recommendation from the DAC		Date of DAC	01-06-2021			
External Expert(s)	Professor Ramesh Babu, Department of Mechanical Engineering, IIT Madras.					
Pre-requisite	CoT	Submitted for approval			45 th Senate	
Learning Objectives	<p>The objectives of this course are to train the students.</p> <ul style="list-style-type: none"> To introduce the concept of sustainable manufacturing To enable them to analyse the impact of various decisions on sustainability. To evaluate options in a global context that minimize the impact of manufacturing activities on society, the environment, and resources 					
Learning Outcomes	<ul style="list-style-type: none"> Students would be able to identify various alternatives in design, materials, and process to make informed trade-off decisions that will minimize energy use, water use and emissions during product life cycle stages 					
Contents of the course <i>(With approximate break-up of hours for L/T/P)</i>	<p>Three pillars of sustainability, sustainable manufacturing practices and reductionist approach followed in manufacturing industries (5L +1T)</p> <p>Product life cycle and Sustainable product design and development (5L +1T)</p> <p>Reducing human environmental exposures in an industrial environment and worker's safety, sustainability assessment of products in-use stage (3L+1T)</p> <p>Practical techniques for energy and emission reduction, green productivity (2L+1T)</p> <p>Life Cycle Analysis (LCA) and other environment management tools (5L+1T)</p> <p>Environmentally benign factory layout and operations, energy, and material flow analysis in factory operations (5L +1T)</p> <p>Unit process analysis, life cycle inventory for manufacturing processes (5L +1T)</p> <p>Exergy analysis of manufacturing processes (5L +1T)</p> <p>Green supply chain, extended producers' responsibility, eco-labels, sustainability in transportation and packaging, remanufacturing, and recycling (5L+1T)</p> <p>Techniques and tools for sustainability measurement and key performance indicators (3L+ 1T)</p> <p>Case studies on sustainability reporting and information systems (3L)</p>					
Text Book	1. Dornfeld, David A., ed. Green manufacturing: fundamentals and applications. Springer Science & Business Media, 2012.					
Reference Books	<p>2. Bakshi, Bhavik R., Timothy G. Gutowski, and Dušan P. Sekulić, eds. Thermodynamics and the Destruction of Resources. Cambridge University Press, 2011.</p> <p>3. Ashby, Michael F. Materials and the environment: eco-informed material choice. Elsevier, 2012.</p> <p>4. David R. Hillis and J. Barry DuVall, Improving profitability through green manufacturing: Creating a profitable and environmentally compliant manufacturing facility, Wiley, 2012</p> <p>5. Rob Thompson and Martin Thompson, Sustainable Materials, Processes and Production, Thames and Hudson, 2013</p>					

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM

REVISION OF AN ELECTIVE COURSE

Course Title	Additive Manufacturing	Course Code				
Dept./ Specialization	Mechanical Engineering	Structure (LTPC)	3	1	0	4
To be offered for	UG/PG	Status	Core <input type="checkbox"/>	Elective <input checked="" type="checkbox"/>		
Faculty Proposing the course	Dr. Senthilkumaran K	Type	New	Modification <input checked="" type="checkbox"/>		
Recommendation from the DAC		Date of DAC	01-06-2021			
External Expert(s)	Professor Ramesh Babu, Department of Mechanical Engineering, IIT Madras.					
Pre-requisite	Basics Manufacturing Processes	Submitted for approval	45 th Senate			
Learning Objectives	The objective of the course is to impart fundamentals of additive manufacturing processes along with the various file formats, software tools, processes, techniques and applications along with hands on tutorial sessions.					
Learning Outcomes	At the end of the course, the students will be able to decide between the various trade-offs when selecting AM processes, devices and materials to suit particular engineering requirements. Students will have in-depth knowledge in latest trends and opportunities in AM, including distributed and direct digital manufacturing, mass customization, and how to commercialize their ideas. Additionally the students will also be able to adopt the process with the selection of suitable parameter values upon the part materials and strength.					
Contents of the course <i>(With approximate break-up of hours for L/T/P)</i>	<p>Introduction to the Basic Principles of Additive Manufacturing, Additive Manufacturing Processes, Extrusion, Beam Deposition. (7L +1T)</p> <p>Jetting, Sheet Lamination, Direct-Write, Photopolymerization, Sintering, Powder Bed Fusion. (8 + 3T)</p> <p>Design/Fabrication Processes: Data Sources, Software Tools, File Formats, Model Repair and Validation, Pre- & Post-processing, Designing for Additive Manufacturing, Multiple Materials, Hybrids, Composite Materials, current and future directions. (10 + 4T)</p> <p>Process & Material Selection, Direct Digital Manufacturing and Distributed Manufacturing, Related Technologies: Mold-making, Rapid Tooling, Scanning. (8 + 4T)</p> <p>Applications of AM: Aerospace, Automotive, Biomedical Applications of AM. (5 + 2T)</p> <p>Product Development, Commercialization, Trends and Future Directions in Additive Manufacturing. (4 + 2T)</p>					
Text Book	1. Gibson, Rosen, Stucker, Additive Manufacturing Technologies: Rapid Prototyping to Direct Digital Manufacturing. Springer, 2009.					
Reference Books	<p>1. Hopkinson, Hague, Dickens, Rapid Manufacturing: An Industrial Revolution for the Digital Age. Wiley, 2005.</p> <p>2. Gibson, Advanced Manufacturing Technologies for Medical Applications. Wiley, 2005.</p> <p>3. Chee Kai Chua, Kah Fai Leong, Chu Sing Lim, Rapid prototyping, World Scientific, 2010.</p>					

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM

REVISION OF AN ELECTIVE COURSE

Course Title	Mass transfer in industrial applications	Course Code	ME5XXX			
Dept. / Specialization	Mechanical Engineering	Structure (LTPC)	3	1	0	4
To be offered for	UG / PG	Status	Core <input type="checkbox"/>		Elective <input checked="" type="checkbox"/>	
Faculty Proposing the course	Dr. Raja B	Type	New <input type="checkbox"/>		Modification <input checked="" type="checkbox"/>	
Recommendation from the DAC		Date of DAC	01-06-2021			
External Expert(s)	Prof S. P Venkateshan, IIT Madras and Prof Shaligram Tiwari, IIT Madras					
Pre-requisite	Heat transfer and fluid mechanics	Submitted for approval	45 th Senate			
Learning Objectives	<ol style="list-style-type: none"> To enable the students to get familiarized with the concepts of mass transfer, its governing laws and analogies. To apply the concepts of diffusion mass transfer, mass transfer coefficients, convective mass transfer, interphase mass transfer and solve relevant design problems in various fields. 					
Learning Outcomes	<ol style="list-style-type: none"> The students will gain knowledge in mass transfer processes and its various performance To leverage the concepts and design various mass transfer operations 					
Contents of the course <i>(With approximate break up of hours)</i>	<p>Mass Transfer Concepts, Composition Relationships, Fick's Law, Diffusion in Stationary medium, Mass Diffusion Equation, Mass transfer resistance, Boundary conditions, Binary Mixtures - Air-Water Vapor Mixture, Diffusion in moving medium - Stefans tube, Equimolar Counter diffusion - applications. (L8 + T2)</p> <p>Mass convection - Laminar and turbulent flow, Analogy between friction, heat and mass transfer coefficient - limitation - Transient Diffusion, Multiphase mass transfer and Multicomponent mass transfer - Application in surface treatment processes , moisture migration in building walls. (L10 + T4)</p> <p>Simultaneous heat and mass transfer – humidification and dehumidification, effectiveness, NTU relations - Application dry and wet coil, dryers, cooling towers, distillation tower - resistance networks - Sprays and Atomization - Spray Drying - Performance parameters - Solar drying and Desalination – Mass transfer measurement techniques (L10 + T4)</p> <p>Discontinuous Concentrations at Interfaces – Evaporation, Mass transfer in atmospheric drying, Sublimation - Vacuum freeze drying , vacuum cooling (L7+T2)</p> <p>Solubility of gases in Liquids and Solids - Catalytic Surface Reactions - Mass transfer in redox reactions - applications - Crystallization - Membrane separation (L7+T2)</p>					
Text Books	<ol style="list-style-type: none"> Koichi Asano, Mass Transfer, Wiley, 1st Edition, 2006 T.L. Bergman, A.S. Lavine, F.P. Incropera and D. P. Dewitt, Fundamentals Of Heat And Mass Transfer, Seventh Edition, John Wiley ,2011 					
Reference Books	<ol style="list-style-type: none"> R.E. Treybal , Mass-Transfer Operations, 3rd Edition, McGraw-Hill Book Company,1980 D.Basmdjian Mass Transfer - Principles And Applications, CRC, 2005 A.S.Mujumdar, Handbook of Industrial Drying, Fourth Edition, CRC, 2014 					

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM

REVISION OF AN ELECTIVE COURSE

Course Title	Probabilistic Engineering Design	Course Code	ME5XXX			
Dept./ Specialization	Mechanical Engineering	Structure (LTPC)	3	1	0	4
To be offered for	UG / PG	Status	Core <input type="checkbox"/>		Elective <input checked="" type="checkbox"/>	
Faculty Proposing the course	Dr. Siva Prasad AVS	Type	New <input type="checkbox"/>		Modification <input checked="" type="checkbox"/>	
Recommendation from the DAC		Date of DAC	01-06-2021			
External Expert(s)	Prof. S Narayanan, BoG Member, IIITDM Kancheepuram					
Pre-requisite		Submitted for approval			45 th Senate	
Learning Objectives	To impart knowledge on making reliable decisions with the consideration of uncertainty associated with design variables/parameters and simulation models.					
Learning Outcomes	<p>At the end of the course student will be able</p> <ul style="list-style-type: none"> • To evaluate or assess the uncertainty associated with a particular design and improve the design. • To apply the probabilistic approach of prediction and estimation of a system response. 					
Contents of the course <i>(With approximate break-up of hours for L/T/P)</i>	<p>Elements of probability theory, Random variables, Discrete and continuous. Moments and characteristic functions, Functions of random variables, Some important random variables–Binomial, Poisson, Normal, Log Normal. (L12+T4) Reliability functions, Failure rate and hazard functions, Different failure time distributions–Exponential, Rayleigh, Weibull, Gamma etc. Mean Time to Failure (MTTF), Modelling of Geometry, Material Strength & Loads (L12+T4) Repair and maintainability, Repair time distribution, Mean Time Before Failure (MTBF), Combinational aspects of reliability, System reliability for series, parallel, series and parallel combinations, Standby redundancy. (L9+T3) Probabilistic design of mechanical components, Electrical and electronic systems, Factor of safety and reliability, Monte Carlo simulation, First order reliability methods (FORM) and Second order reliability methods (SORM), Mechanical properties of materials as random variables. (L9+T3)</p>					
Text Book	<ol style="list-style-type: none"> 1. K. C. Kapur and L. R. Lamberson, Reliability in Engineering Design, Wiley India Pvt Ltd., 2009. 2. D. C. Montgomery, Applied Probability and Statistics for Engineers, John Willey, 2006. 					
Reference Books	<ol style="list-style-type: none"> 1 J. N. Siddall, Probabilistic Engineering Design, CRC Press, 1983. 2 Dhillon, Engineering Maintainability – How to design for reliability and easy maintenance, Prentice Hall India, 2008. 3 C. E. Ebling, An Introduction to Reliability and Maintainability Engineering, Tata-McGraw Hill, 2000 					

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	Energy Storages and Electrical Vehicle Systems	Course No	INT5XXX			
Specialization	Inter disciplinary	Structure (LTPC)	3	1	0	4
Faculty Proposing the course	Dr. K. Selvajyothi	Status	Core		Elective	<input checked="" type="checkbox"/>
To be offered for	UG / PG	Type	New	<input checked="" type="checkbox"/>	Modification	<input type="checkbox"/>
Recommendation from the DAC		Date of DAC	01-06-2021			
External Expert(s)	Prof. G Bhuvanewari, IIT D and Prof Dr. Dastagiri Reddy B , NIT K					
Pre-requisite	Basic electrical, thermal fluid sciences	Submitted for approval	45 th Senate			
Learning Objectives	The objective of the course is to teach the fundamentals of working principles of electric vehicles and battery charging systems.					
Learning Outcomes	The students will be able to gain knowledge about batteries, electric vehicle's power train, their working principles, performance, testing methods and evaluation.					
Contents of the course (With approximate break up of hours)	<p>Introduction : Brief history, Electric Vehicles and the Environment, Types of electric vehicles, EMF, reversible and irreversible cells, STP Voltage, free energy, effect of cell temperature, thermodynamic calculation of the capacity of a battery, calculations of energy density of cells (L6+T2)</p> <p>Power Supplies for battery driven EVs : Principle, design, construction, performance characteristics expected of EV batteries. Primary batteries - Zn-MnO₂ carbon-zinc, carbon-zinc chlorides, and zinc-silver oxide; Secondary batteries – lead-acid, nickel-cadmium, nickel-metal hydride, silver oxide-zinc system, lithium-ion, lithium- polymer, safety issues -thermal runaway, fire/explosion hazard, Battery management system - active and passive balancing techniques, Thermal management systems - active and passive systems. Augmenting the battery power with Solar PV on the surface of the vehicle. (L9 + T3)</p> <p>Power train and motors for EVs: Electric motors and their Controllers: The ‘Brushed’ DC Electric Motor, DC Regulation and Voltage Conversion, Brushless Electric Motors, Permanent magnet synchronous motor and its control, Motor Cooling, Efficiency, Size and Mass, Electric motors for Hybrid Vehicles (L7+T3)</p> <p>Charging Infrastructure - Electricity Supply Rails, Inductive Power Transfer for Moving Vehicles, Battery Swapping, OFF-board and on-board chargers, Levels and standards for chargers - (L7+T2)</p> <p>Electric Vehicle Modelling: 2W, 3W and 4W, Tractive Effort, Modelling Vehicle Acceleration, Modelling Range, Drive cycles, Aerodynamic Considerations, Rolling Resistance, Transmission Efficiency, Electric Vehicle Chassis and Body Design, Design of Ancillary Systems, Efficiencies and Carbon Release Comparison, ARAI standards and testing procedure (L6+T2)</p> <p>Hybrid energy systems - Batteries and Supercapacitor combinations - power convertors ; Fuel Cell - Hydrogen Fuel Cells, Fuel Cell Thermodynamics, Connecting Cells in Series, Hydrogen as fuel – production and storage (L5+T2)</p>					
Text Books	<ol style="list-style-type: none"> 1. R.S.Liu, L.Zhang, X.Sun,H.Liu, J. Zhang, Electrochemical Technologies for Energy Storage and Conversion, John Wiley, 1st Edition, 2012 2. I. Husain “Electric and Hybrid vehciles – Design fundamentals” CRC Press, 2011. 3. O.H.Ryan, S.W.Cha, W.Colelle, F.B.Prinz, Fuel Cell Fundamentals, John Wiley, 3rd Edition, 2016 					
Reference Books	<ol style="list-style-type: none"> 1. Larminie, J. and Lowry, J., 2012. <i>Electric vehicle technology explained</i>. John Wiley & Sons. 2. Chau, K.T., 2015. <i>Electric vehicle machines and drives: design, analysis and application</i>. John Wiley & Sons 					

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM

REVISION OF AN ELECTIVE COURSE

Course Title	Design of Heat Exchangers	Course No	ME5XXX			
Specialization	Mechanical Engineering	Structure (LTPC)	3	1	0	4
To be offered for	UG / PG	Status	Core <input type="checkbox"/>		Elective <input checked="" type="checkbox"/>	
Faculty Proposing the course	Dr. Shubhankar Chakraborty	Type	New <input type="checkbox"/>		Modification <input checked="" type="checkbox"/>	
Recommendation from the DAC		Date of DAC	1-06-21			
External Experts(s):	Prof. SP Venkateshan (Prof. Emeritus IIT Madras), Prof PK Das (IIT Kharagpur)					
Pre-requisite	COT	Submitted for approval	45 th Senate			
Learning Objectives	<ul style="list-style-type: none"> • Familiarity with heat exchangers and its working principles • Classification and constructions, and applications • Analysis of heat exchanger performance • Thermal Design 					
Learning Outcomes	<p>The students will be able to</p> <ul style="list-style-type: none"> • select type of heat exchanger, dimensions and material based on the required scenario. • develop design methodology based on Matlab or Python programming. 					
Contents of the course (With approximate break up of hours)	<p>Background: Introduction, Heat transfer mechanisms, Heat transfer area, Heat transfer coefficient, Thermal resistances, overall heat transfer coefficient and their combination, Fouling (L4+T1)</p> <p>Classification of heat exchangers: Based on direction of flow, geometry, type of contact, compactness, fluid used, etc., Steam generators, Recuperator & Regenerator(L4+T1)</p> <p>Thermal design of heat exchanger: LMTD analysis and correction factor, Effectiveness and NTU method, Design parameters & procedure, Pressure drop, Fluids (liquid, gas and vapour) and their properties, Selection of Pump. (L6+T3)</p> <p>Design and construction of tube-in-tube and shell-and-tube heat exchangers: Principal components, Tube distribution, tube to tube sheet joint, Multi-pass, Multi-shell, Heat transfer augmentation, Material, structural and thermophysical properties, Appropriate standards, Manufacturing processes, Testing. (L8+T3)</p> <p>Fin-tube and Plate-Fin heat exchangers: Constructions, Series-parallel combination, Heat transfer and pressure drop correlations, LMTD corrections (L8+T2)</p> <p>Condensers and Evaporators: Mechanism of condensation, Single-component vapour condenser, desuperheater condenser, use of steam as process heating medium, Mechanism of evaporation, Pool boiling, Flow boiling, Reboilers, Thermal analysis, contact condenser and cooling tower (L8+T2)</p> <p>Heat Transfer augmentation and micro-heat exchangers: Heat Transfer for Gaseous and Liquid Flow in Microchannels, Single-Phase Convective Heat Transfer with Nanofluids. (L4+T2)</p>					
Text Books	<ol style="list-style-type: none"> 1. Kakac, S., Liu, H. and Pramuanjaroenkij, A., 2020. Heat exchangers: selection, rating, and thermal design. CRC press. 2. Ramesh K. Shah, Dusan P. Sekulic, Fundamentals of Heat Exchanger Design, Wiley; ed-1 2002. 					
Reference Books	<ol style="list-style-type: none"> 1. Eduardo Cao, Heat Transfer in Process Engineering, Mc Graw Hill, 2010 2. Kuppam T., Heat Exchanger Design Hand Book, Taylor & Francis, 2009 3. Kern, D.Q., 1997. <i>Process heat transfer</i>. Tata McGraw-Hill Education. 					

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	Advanced Mechanics	Course Code	PHY5XXX			
Dept./ Specialization	Science and Humanities - Physics	Structure (LTPC)	3	1	0	4
To be offered for	All branches of UG/PG	Status	Core <input type="checkbox"/>		Elective <input checked="" type="checkbox"/>	
Faculty Proposing the course	Dr. Tapas Sil	Type	New <input checked="" type="checkbox"/>		Modification <input checked="" type="checkbox"/>	
Recommendation from the DAC		Date of DAC	04/03/2021			
External Expert(s)	Prof. S. Narayanan and Prof. S.P. Venkateshan					
Pre-requisite	CoT	Submitted for approval			45 th Senate	
Learning Objectives	<ul style="list-style-type: none"> The objective of this course is to give an idea how the mechanical system/particle behaves under certain forces. This course provides an understanding of theories involved in for following topics and develop the problem-solving skill related to the topics. 					
Learning Outcomes	<ul style="list-style-type: none"> Completing this course, the student should show clear understanding of concepts and improved problem-solving skills, in the following parts of mechanics. They should be able use this knowledge in their higher level engineering courses. Students should be able to analyze physical phenomena applying the knowledge and skill gained from this course. 					
Contents of the course <i>(With approximate break-up of hours for L/T/P)</i>	<p>Review of Newtonian mechanics, constraints, principle of virtual work, D'Alembert's principle, Lagrange's equations of motion, symmetry and conservation. (L12hrs+T4hrs)</p> <p>Coordinate systems and transformations, Non-inertial frames, rotating coordinate systems, centripetal and Coriolis accelerations and applications: air-dropping, weather forecast, Foucault pendulum. (L8hrs+T2hrs)</p> <p>Two-body central force problem: Motion under central forces, conservation laws, Kepler's law and applications. (L6hrs+T2hrs)</p> <p>Basics of Special Theory of Relativity: Galilean and Lorentz transformations, Time dilation and length contraction, relativistic kinematics and mass-energy equivalence. (L8hrs+T3hrs)</p> <p>Nonlinear dynamics: Nonlinear differential equations, trajectories of different systems. Limit cycles, Attractors, Introduction to chaos. (L7hrs+T3hrs)</p>					
Text Book	<ol style="list-style-type: none"> N. C. Rana and P. S. Joag, "Classical Mechanics" McGraw Hill Education, 2017 Steven H. Strogatz, "Nonlinear Dynamics and Chaos: With Applications to Physics, Biology, Chemistry, and Engineering", CRC Press, (2014) 					
Reference Books	<ol style="list-style-type: none"> Herbert Goldstein, Charles P. Poole & John Saffo, "Classical Mechanics", Pearson Education, 2011. C. Kittle, "Mechanics-- Berkley Physics Course", Vol. 01, Tata McGraw Hill (2008) 					

ELIGIBLE STUDENTS - TOTAL – 286**LIST OF STUDENTS ELIGIBLE FOR BACHELOR OF TECHNOLOGY (HONOURS) WITH
DISTINCTION**

Sl. No	Roll No	Name	Branch	CGPA
1.	COE17B008	NERANJHANA R	COE	9.18
2.	COE17B009	ABHINAND RAJAGOPAL	COE	9.36
3.	COE17B010	N KAUSIK	COE	9.46
4.	COE17B011	S KRISH REWANTH	COE	9.26
5.	COE17B020	PARTH MAHESHKUMAR PATEL	COE	9.44
6.	COE17B029	GAYATHRI DEVI KONERU	COE	9.24
7.	COE17B036	PRANAV PARAMESHWARAN	COE	9.38
8.	COE17B047	K M BHARATHVAJ	COE	9.47
9.	EDM17B002	SATHIYA JOTHI S	EDM	9.43
10.	EDM17B014	HARSHINI S B	EDM	9.13
11.	EDM17B025	SHIVANGI T P	EDM	9.2
12.	EDM17B032	G PAVAN SAI	EDM	9.53
13.	MDM17B008	MAHESH ARUNPRASATH	MDM	9.7
14.	MDM17B017	MUTHU KUMAR N P	MDM	9.23
15.	MDM17B044	P V BALAJI	MDM	9.39
16.	CED16I010	G KRUTTIKA BHAT	CED	9.29
17.	CED16I023	MAHAJAN CHINMAY NARENDRA	CED	9.41
18.	CED16I030	SHRUTI RAGHAVAN	CED	9.34
19.	CED16I043	S PAWAN KUMAR	CED	9.53
20.	CED16I045	M MADHUMITHA	CED	9.39
21.	EVD16I006	HRISHIKESH HEMANT BORATE	EVD	9.37
22.	EVD16I007	M K SANJU VIKASINI	EVD	9.69
23.	EVD16I009	MADHUVANTHI SRIVATSAV R	EVD	9.62

LIST OF STUDENTS ELIGIBLE FOR DISTINCTION

Sl. No	Roll No	Name	Branch	Degree	CGPA
1.	COE17B017	NANDYALA SAHITHI	COE	B. Tech	9.09
2.	COE17B048	GATTU PRANAVI	COE	B. Tech	9.12
3.	EDM17B027	KARANAM KAIVALYA	EDM	B. Tech	9.1
4.	EDM17B031	PRAGADA PRAGNA	EDM	B. Tech	9.03
5.	EDM17B039	MYTHRAI	EDM	B. Tech	9.07
6.	MDM17B003	ABINITH NARAYANAN SATYANARAYANAN	MDM	B. Tech	9.21
7.	MDM17B005	SABHAREESH PRABHURAJ	MDM	B. Tech	9.08
8.	MDM17B006	PRADEEP V	MDM	B. Tech	9.21
9.	MDM17B038	V B S SURYA PRATHYUSH	MDM	B. Tech	9.06
10.	MDM17B042	GEMBALI MANOJ	MDM	B. Tech	9.02
11.	MSM17B004	DEEPAK SETHUPATHY R	MSM	B. Tech	9.43
12.	MSM17B031	BHARGAV S	MSM	B. Tech	9.01
13.	MSM17B037	T M SAKTHI PANDIAN	MSM	B. Tech	9.27
14.	CED16I044	G S NITESH NARAYANA	CED	Dual Degree	9.22
15.	MPD16I016	ARYA E	MPD	Dual Degree	9.16
16.	CDS19M001	ABIRAMI B	CDS	M. Tech	9.36
17.	CDS19M003	ARTHI S	CDS	M. Tech	9.2
18.	CDS19M006	KOTLA ANUSHA	CDS	M. Tech	9.57
19.	CDS19M009	OLETI NAGI REDDY	CDS	M. Tech	9.07
20.	CDS19M011	SHIVARANJANI S	CDS	M. Tech	9.41
21.	CDS19M014	SWATHY B H	CDS	M. Tech	9.49
22.	EDS19M002	DEEPIKA KUMARADASAN	EDS	M. Tech	9.13
23.	EDS19M004	HARIPRIYA R S	EDS	M. Tech	9.34
24.	EDS19M006	IPPILI SATYARAJ	EDS	M. Tech	9.22
25.	EDS19M012	SOWPARNA P	EDS	M. Tech	9.18
26.	EDS19M013	SUBASHINI S	EDS	M. Tech	9.06
27.	EDS19M014	SUJITHA S	EDS	M. Tech	9.95
28.	MDS19M004	LOHESHWARAN C	MDS	M. Tech	9.04
29.	MDS19M006	P ARIVAZHAGAN	MDS	M. Tech	9.25
30.	MDS19M007	RAGHAVAN P	MDS	M. Tech	9.07
31.	MDS19M008	SAMIK BANERJEE	MDS	M. Tech	9.38
32.	MDS19M016	YAGNA V	MDS	M. Tech	9.37
33.	SMT19M001	BHARANISHRAJ D S	SMT	M. Tech	9.04
34.	SMT19M003	LOKESH K S	SMT	M. Tech	9.92
35.	SMT19M006	POORNA CHANDRA C	SMT	M. Tech	9.29
36.	SMT19M007	RAJAKUMARAN M	SMT	M. Tech	9.37
37.	SMT19M008	SIVARENJINI T M	SMT	M. Tech	9.92

LIST OF STUDENTS ELIGIBLE FOR DEGREE**Bachelor of Technology in Computer Engineering**

Sl. No	Roll No	Name	CGPA	Completion Month
1.	COE17B001	FARSHANA FATHIMA JINNAH	8.92	June 2021
2.	COE17B002	RISHABH HEMANT MUTHA	8.04	June 2021
3.	COE17B003	A ARSHATH MOHAMMED	7.86	June 2021
4.	COE17B004	RAIPUDI TEJA	8.04	June 2021
5.	COE17B005	T V HARSHAWARDHAN	8.19	June 2021
6.	COE17B006	RAMYA R	7.01	June 2021
7.	COE17B007	SHANMUKHA RAO PYDI	8.77	June 2021
8.	COE17B014	MUTHYALA AAKASH	6.88	June 2021
9.	COE17B015	ANURAG NATOO	8.57	June 2021
10.	COE17B018	SHAIK AFREEN	7.63	June 2021
11.	COE17B019	B ANIRUDH SRINIVASAN	8.99	June 2021
12.	COE17B021	B CHANDRU	6.42	June 2021
13.	COE17B022	SILAMBARASAN J	7.91	June 2021
14.	COE17B023	M TEJA	8.06	July 2021
15.	COE17B024	HARMANDEEP SINGH	8.85	July 2021
16.	COE17B025	SIMRAN N MARAGI	7.77	June 2021
17.	COE17B026	PATHLAVATH ROHITH KUMAR	6.46	June 2021
18.	COE17B027	GADEKARI VENKATA PAVAN KALYAN	8.02	July 2021
19.	COE17B028	VANKARAMONI SHRAVAN KUMAR	8.87	June 2021
20.	COE17B031	TARUN KANTIWAL	7.43	June 2021
21.	COE17B032	ARJUN RAMESH	8.61	June 2021
22.	COE17B033	KOVURU SHASHANK	8.64	June 2021
23.	COE17B037	MARAM YASOLAKSHMI SRI	8.39	June 2021
24.	COE17B039	UBBANI SAI KIRAN	6.78	July 2021
25.	COE17B040	GOTTIMUKKALA VENKATA GOWTHAM	8.76	June 2021
26.	COE17B042	MADDULA MANEESHA REDDY	8.77	June 2021
27.	COE17B043	BANAVATHU HEMANTH KUMAR	6.4	June 2021
28.	COE17B044	BANDINENI KOUSHIKA	8.01	June 2021
29.	COE17B045	P KARTHIK CHOWDARY	8.4	July 2021
30.	COE17B046	RATHOD JAGADISH	7.02	June 2021
31.	COE17B049	PASALA JAHNAVI LASYA PRIYA	8.7	June 2021
32.	COE17B050	PATCHAVA GEETHIKA	8.98	June 2021

**Bachelor of Technology in Electronics and Communication Engineering with Specialization in
Design and Manufacturing**

1.	EVD15I017	K.SANJAY KAMALLESWAR	7.01	June 2021
2.	EDM17B001	ANUPRIYA GOPAL	8.5	June 2021
3.	EDM17B005	SIDDUGALLA JATIN HRUDAI	7.64	June 2021
4.	EDM17B006	S KAUSHIK	8.88	June 2021
5.	EDM17B009	APARNA B	8.39	June 2021
6.	EDM17B010	KETHAVATH VENKATA RAMANA NAIK	6.57	June 2021
7.	EDM17B011	PERUSOMULA HARI CHARAN PREETAM	8.44	June 2021
8.	EDM17B012	S SAIVARSHITH	6.93	June 2021
9.	EDM17B013	MOHIT CHANDRAN R	7.26	June 2021
10.	EDM17B015	KOTHA NIKHIL CHOWDARY	7.84	June 2021
11.	EDM17B016	TADIGADAPA KARTHIK	8.29	June 2021
12.	EDM17B017	SAYAPANENI BHANU PRASAD	7.87	June 2021
13.	EDM17B018	GOTTAM VISHNU SRI PRASANNA	8.37	June 2021
14.	EDM17B019	SASI PRIYATHAM SADANALA	6.62	June 2021
15.	EDM17B020	VARSHINI TAMMINEEDI	8.32	June 2021
16.	EDM17B021	BODDU SHIVANI	8.25	June 2021
17.	EDM17B022	KATARU CHITRAKETH	8.57	June 2021
18.	EDM17B023	MACHCHA DHEERAJ	6.88	June 2021
19.	EDM17B026	DHANRAJ V	7.52	June 2021
20.	EDM17B028	MOOLI SHASHANK REDDY	8.98	June 2021
21.	EDM17B030	PUSOJU SAI CHANDU	8.29	June 2021
22.	EDM17B033	GUNUKULA YESHWANTH REDDY	7.09	June 2021
23.	EDM17B036	ANKAM DEEPIKA	8.15	June 2021
24.	EDM17B037	JASTI VIGNATHA	8.63	June 2021
25.	EDM17B038	ANKEM SAI VENKATA KRISHNA	8.03	June 2021
26.	EDM17B041	RAJAT AHUJA	8.73	June 2021
27.	EDM17B044	CHAPALA ADVYTHA	7.38	June 2021
28.	EDM17B045	J EMMANUEL RAJAPANDIAN	8.8	June 2021

Bachelor of Technology in Mechanical Engineering with Specialization in Design and Manufacturing

1.	MDM16B001	ABHISHEK VERMA	6.7	January 2021
2.	MDM17B002	MADRI VENUS	8.49	June 2021
3.	MDM17B007	BLESSON DAVIS	8.3	June 2021
4.	MDM17B012	SARANATHAN	8.29	June 2021
5.	MDM17B013	MOOTUPOORU SAKETH KASHYAP	8.16	June 2021
6.	MDM17B014	PAKKI SILAS DEV	6.96	June 2021
7.	MDM17B015	SIDDHARTHA PRATHIPATI	7.14	June 2021
8.	MDM17B016	KEMBASARAM JASHWANTH	6.52	June 2021
9.	MDM17B018	KALLURI HARISH	8.73	June 2021
10.	MDM17B019	BHUKYA SRAVAN	7.13	June 2021
11.	MDM17B020	OMNISH KUMAR	7.57	June 2021
12.	MDM17B022	BEVARA SAI BHARGAV	8.38	June 2021
13.	MDM17B023	ARUN KRISHNA B J	8.67	June 2021
14.	MDM17B026	GARIKAPATI SAI LIKITH	6.81	June 2021
15.	MDM17B027	SATWIK MODI	7.79	June 2021
16.	MDM17B028	ESLAVATH BHARATH	6.35	June 2021
17.	MDM17B029	UDAY RAJ SINGH	7.81	June 2021
18.	MDM17B031	NARESH KUMAR	7.64	July 2021
19.	MDM17B032	AMANCHA PHANI ASHRITH	6.54	June 2021
20.	MDM17B033	HARIDHARAN M	7.58	June 2021
21.	MDM17B034	VAISHALI R	8.72	June 2021
22.	MDM17B036	AKSHAY KANNA	7.68	June 2021
23.	MDM17B040	YENUMULA SRINADHA VAMSI PRABHAKAR	7.34	June 2021
24.	MDM17B041	PUJARI AAKARSH	8.47	June 2021
25.	MDM17B043	MADHAN KUMAR B	6.18	July 2021
26.	MDM17B046	BASHABOINA RANJITH	7.63	June 2021
27.	MDM17B047	D MANONMANI	8.84	June 2021
28.	MDM17B048	NARASIMHAN.S	8.91	June 2021
29.	MDM17B049	S MOHAMED YOUSUF MATHAR	8.75	June 2021

Bachelor of Technology in Smart Manufacturing

1.	MSM17B001	NIKHIL BHARAT GEDAM	7.46	June 2021
2.	MSM17B002	DHILIPAN S P	6.49	June 2021
3.	MSM17B008	S TARUN	8.6	June 2021
4.	MSM17B011	D SHEL CIA	8.5	June 2021
5.	MSM17B012	MRUNAL PALLEMPATI	8.04	June 2021
6.	MSM17B013	PUGAZHARASU T	7.79	June 2021
7.	MSM17B014	BHATTU BADRI PANTH NAIK	6.19	June 2021
8.	MSM17B016	SRIRAM S	7.79	July 2021
9.	MSM17B017	VIJAY GOWTHAMAN	6.23	June 2021
10.	MSM17B019	SUJEET KUMAR	8.39	June 2021
11.	MSM17B020	JOTHI VIKRANTH.R	8.7	June 2021
12.	MSM17B022	SAMPAN SWAMINATHAN	7.69	June 2021
13.	MSM17B024	S LEELA LAHARI	8.83	June 2021
14.	MSM17B025	KUSH SANGHMITRA SURYAVANSHI	8.73	June 2021
15.	MSM17B026	KRISHNAKUMAR THANGAVEL	7.75	June 2021
16.	MSM17B027	CHANDRALEKHA R	6.81	June 2021
17.	MSM17B028	MIDURN J	7.27	June 2021
18.	MSM17B029	ASVATAMAN V	7.87	June 2021
19.	MSM17B030	PANUGOTHU AKHILA	7.37	June 2021
20.	MSM17B032	G DINESH KUMAR	6.52	June 2021
21.	MSM17B033	SRIMATHI R	7.56	June 2021
22.	MSM17B034	GANESH KUMAR T K	7.89	June 2021
23.	MSM17B038	RAGHURAJ SINGH	8.5	June 2021
24.	MSM17B039	JAIHARI G	7.05	June 2021
25.	MSM17B040	VARUN PUROHIT	7.93	June 2021
26.	MSM17B041	PRINCE KUMAR	7.19	June 2021

Bachelor of Technology in Computer Engineering and Master of Technology in Computer Engineering (Under Dual Degree Programme)

1.	CED16I002	ADEPU ANIL KUMAR	8.05	June 2021
2.	CED16I003	AKHIL JASROTIA	8.31	June 2021
3.	CED16I004	ANKITA CHANDRA	7.95	June 2021
4.	CED16I005	ATTILI PURNA SAI NIKHIL	7.21	June 2021
5.	CED16I006	B S CHANDRASHEKAR	7.27	June 2021
6.	CED16I007	BILLA VAMSI KRISHNA	7.48	June 2021
7.	CED16I008	EGA SARIKA	7.43	June 2021
8.	CED16I009	EMANI RAMANA SIDDANTH	8.18	June 2021
9.	CED16I011	GAJULA PAVAN BHARGAV	8.51	June 2021
10.	CED16I012	GUNTREDDI ANJINI KUMAR	7.03	June 2021
11.	CED16I013	KANAMARLAPUDI VENKATA GNANA VARDHANI	8.81	June 2021
12.	CED16I014	KANIKARLA MEGHANA	7.46	June 2021
13.	CED16I015	KARTHIKEYAN S	8.52	June 2021
14.	CED16I016	KATAKAM VENKATA SAI CHAITANYA	7.69	June 2021
15.	CED16I017	KATASANI ROHITH REDDY	7.95	June 2021
16.	CED16I018	KENNETH KARTHIK	8.6	June 2021
17.	CED16I019	KONDAVATHRI PAVITHRA	8.24	June 2021
18.	CED16I020	KORRAPATI LIKHITHA	8.74	June 2021
19.	CED16I021	KUMAR KARTIKEY	8.59	June 2021
20.	CED16I024	NADIPINENI HEMANTH KUMAR	7.63	June 2021
21.	CED16I025	NENAVATH RAHUL	7.82	June 2021
22.	CED16I026	NIPUN BHARTI	8.33	June 2021
23.	CED16I027	PODILI HRUTHIK	7.28	June 2021
24.	CED16I028	S SAI YASHOVARDHAN	8.94	June 2021
25.	CED16I029	SAURAV PURVA	8.4	June 2021
26.	CED16I031	SHUKRITHI RATHNA	8.14	June 2021
27.	CED16I032	THATAVARTHI PAVAN CHAITHANYA	8.04	June 2021
28.	CED16I033	TUTTURU LAKSHMI MANASA	8.09	June 2021
29.	CED16I035	VEGI MOHNISH	7.69	June 2021
30.	CED16I036	VIKAS VENKATRAMAN	8.88	June 2021
31.	CED16I037	VIVEK SINGH	7.88	June 2021
32.	CED16I038	YASASSWI MAHITH KATTA	6.86	June 2021
33.	CED16I039	YASH KUMAR	8.85	June 2021
34.	CED16I041	PRAVEENAA KULANDHAIVEL	8.35	June 2021
35.	CED16I042	ANUSH RAGHAVENDER	7.91	June 2021

Bachelor of Technology in Electronics and Communication Engineering with Specialization in Design and Manufacturing and Master of Technology in Signal Processing and Communication Systems Design (Under Dual Degree Programme)

1.	ESD15I021	PALURU PRADEEP KUMAR REDDY	5.55	January 2021
2.	ESD16I003	DIDDI PAVITRA VARSHA	8.91	June 2021
3.	ESD16I004	DONTHA SRICHAND	7.94	July 2021
4.	ESD16I005	KATRAVATH SRIKANTH	6.96	June 2021
5.	ESD16I006	KONETI PRUDHVI KIRAN	7.17	June 2021
6.	ESD16I007	LINGALA SRAVANI SUHASINI	8.1	June 2021
7.	ESD16I008	PADALA DEVI SOWJANYA	8.5	June 2021
8.	ESD16I009	PRACHI MITTAL	7.61	June 2021
9.	ESD16I012	SHUBHAM RAJ	8.03	June 2021
10.	ESD16I013	SUDIPTA MUKHERJEE	8.45	June 2021
11.	ESD16I014	THOGURU VISHNU PRIYA	8.43	June 2021
12.	ESD16I015	YUVRAJ SINGH AHIRWAR	7.6	June 2021

Bachelor of Technology in Electronics and Communication Engineering with Specialization in Design and Manufacturing and Master of Technology in VLSI and Electronic Systems Design (Under Dual Degree Programme)

1.	EVD16I001	ADARI NIKHILA PRANAVI	8.46	June 2021
2.	EVD16I002	CHINNAM KRISHNA CHAITANYA	6.81	June 2021
3.	EVD16I004	GUDIPALLI TARUNI PRIYANKA	8.09	June 2021
4.	EVD16I005	GUNDA RISHI	7.18	June 2021
5.	EVD16I010	MAMIDI SNIGDHA	8.63	June 2021
6.	EVD16I011	MARAMREDDY JAYADEEP REDDY	8	June 2021
7.	EVD16I012	MONIKA SHREE K	8.8	June 2021
8.	EVD16I013	MUTTAVARAPU VAMSI KRISHNA	7.42	June 2021
9.	EVD16I014	NEKURI SARATH CHAND	7.16	June 2021
10.	EVD16I015	SALIBINDLA AROGYA MADHURIMA	8.74	June 2021
11.	EVD16I016	SMITA	8.85	June 2021
12.	EVD16I017	VINEETH DAYAL	7.81	June 2021
13.	EVD16I018	BHARGAV NALLAN CHAKRAVARTULA	7.96	June 2021

Bachelor of Technology in Mechanical Engineering with Specialization in Design and Manufacturing and Master of Technology in Advanced Manufacturing (Under Dual Degree Programme)

1.	MFD14I004	GORUPUTI HARI KIRAN	5.99	June 2021
2.	MFD16I001	ABHISHEK KUMAR SINGH	8.04	June 2021
3.	MFD16I002	ADITHYAN. T R	8.35	June 2021
4.	MFD16I003	ADITYA KUMAR	7.51	June 2021
5.	MFD16I004	AKSHAY	8.01	June 2021
6.	MFD16I005	AMAN SACHAN	7.82	June 2021
7.	MFD16I006	ASHWIN M S	8.01	June 2021
8.	MFD16I007	B SRI CHAKRA	8.19	June 2021
9.	MFD16I008	DHARAVATH MICHITHA	6.95	June 2021
10.	MFD16I010	GUNTREDDI AJAY	7.42	June 2021
11.	MFD16I012	KALE AAKASH SUNIL	8.58	June 2021
12.	MFD16I014	PRAVEEN R	8.14	June 2021
13.	MFD16I016	SUBHAJIT SINHA	7.96	June 2021
14.	MFD16I017	SUDHANSHU GAURAV	7.54	June 2021
15.	MFD16I018	UTKARSH SINGH	8.32	June 2021
16.	MFD16I019	MOHAMED AREEF SHAHUL HAMEED	6.84	June 2021

Bachelor of Technology in Mechanical Engineering with Specialization in Design and Manufacturing and Master of Technology in Product Design (Under Dual Degree Programme)

1.	MPD16I001	A SAI SRIVATHSAN	8.32	June 2021
2.	MPD16I002	AARON LIJU PHILIP	8.72	June 2021
3.	MPD16I003	BHANDARE SAHIL UTTAM	8.03	June 2021
4.	MPD16I004	GOTTAPU SHANMUKHA RAO	7.21	June 2021
5.	MPD16I005	JAVVAJI PAVANI	6.58	July 2021
6.	MPD16I007	MATHEW KURIAN	8.26	June 2021
7.	MPD16I009	P ANAKHA SURESH	8.33	June 2021
8.	MPD16I011	R ANAND SRIVATSAN	8.78	June 2021
9.	MPD16I012	SANA	8.99	June 2021
10.	MPD16I014	THONTE MANALI GUNDAPPA	8.55	June 2021
11.	MPD16I015	VEMPADAPU MANIKANTA	7.37	June 2021

**Master of Technology in Electronics and Communication Engineering with Specialization in
Communication Systems Design**

1.	CDS19M002	ANNADANAM TIRUVENGALA SREEDEEPTHI	8.17	June 2021
2.	CDS19M005	BADUGU YASWANTH KUMAR	8.05	June 2021
3.	CDS19M007	MEKALA VIJAYA LAKSHMI	8.7	June 2021
4.	CDS19M008	NAVEEN S	8.68	June 2021
5.	CDS19M012	SIVARAJ KOOTTUPARAMBIL RAJENDRANATH	8.28	June 2021

**Master of Technology in Electronics and Communication Engineering with Specialization in
Electronics Systems Design**

1.	EDS19M001	ANAND PRAKASH MANDAL	8.12	June 2021
2.	EDS19M003	DINESH L	8.83	June 2021
3.	EDS19M005	HEMANTH CHINTA	8.47	June 2021
4.	EDS19M007	MANIYAM SIDDHARTH	8.59	June 2021
5.	EDS19M008	MOODE SUSHMA NAIK	8.59	June 2021
6.	EDS19M010	RATHNA A	8.73	June 2021
7.	EDS19M015	SWARAJ BOISHYA	8.44	June 2021
8.	EDS19M016	VIMAL M	8.32	June 2021
9.	EDS19M017	VINOD C M	8.64	June 2021

Master of Technology in Mechanical Engineering with Specialization in Mechanical Systems Design

1.	MDS19M002	GADI UDAYBHANU	8.91	June 2021
2.	MDS19M003	KURUBA MAHENDRA	8.14	June 2021
3.	MDS19M009	SATVIK SUNDRESH M S	7.95	June 2021
4.	MDS19M010	SHAIK NISAR BASHA	8.53	June 2021
5.	MDS19M011	SYED KASHIFULLA A	8.71	June 2021
6.	MDS19M013	THURPU SRI HARSHA	8.59	June 2021
7.	MDS19M014	UDWESH PANDA	8.43	June 2021
8.	MDS19M015	VEERASEKARAN M	8.71	June 2021

Master of Technology in Mechanical Engineering with Specialization in Smart Manufacturing

1.	SMT19M002	JADUPATI BHAKAT	8.62	June 2021
2.	SMT19M005	NEMAKAL EDIGA ARAVIND	7.22	July 2021

IIITDM KANCHEEPURAM
ACADEMICS OFFICE
CONVOCATION 2021
Various Awards for the 2021 Graduating Batch

Sl. No.	Award	Criteria	No. of Awardees
1.	All Rounder of the Graduating batch from B Tech, Dual Degree, M Tech and PhD Students	Student with CGPA ≥ 8 in addition to Proven Excellence in Extra-curricular activities including technical, cultural and literal events; sports; research publications; product development; application development etc.	1
2.	Best Graduate Institute Gold Medal B Tech	Highest CGPA across COE, EDM, MDM, MSM	1
3.	Best Dual Degree Graduate Institute Gold Medal DD	Highest CGPA across CED, ESD, EVD, MFD, MPD	1
4.	Best Post Graduate Institute Gold Medal M Tech	Highest CGPA across CDS, EDS, MDS, SMT	1
5.	Best Graduate Institute Silver Medal in each B Tech Programme	Highest CGPA from each of COE, EDM, MDM, MSM	4
6.	Best Dual Degree Graduate Institute Silver Medal in each Dual Degree Programme	Highest CGPA from each of CED, ESD, EVD, MFD, MPD	5
7.	Best Post Graduate Institute Silver Medal in each M Tech Programme	Highest CGPA from each of CDS, EDS, MDS, SMT	4
8.	Best Interdisciplinary Project Institute Gold Medal B Tech	Best Interdisciplinary Project across COE, EDM, MDM, MSM	1
9.	Best Interdisciplinary Project Institute Gold Medal Dual Degree	Best Interdisciplinary Project across CED, ESD, EVD, MFD, MPD	1
10.	Best Interdisciplinary Project Institute Gold Medal M Tech	Best Interdisciplinary Project across CDS, EDS, MDS, SMT	1
11.	Best Project Institute Silver Medal in each B Tech Programme	Best Project from each of COE, EDM, MDM, MSM	4
12.	Best Project Institute Silver Medal in each Dual Degree Programme	Best Project from each of CED, ESD, EVD, MFD, MPD	5
13.	Best Project Institute Silver Medal in each M Tech Programme	Best Project from each of CDS, EDS, MDS, SMT	4

Criteria for selection of Awardees for the 2021 Graduating Batch

Best Projects / Best Interdisciplinary Projects	Student should have got S grade for Project
	Student with maximum marks
	If there is a tie, student with highest mark from External
	If there is again tie, Student with highest marks from all Reviews by excluding Guide's marks
	Again if there is a tie, student whose project is presented in conference(s)/Journal
	Decision will be taken by the committee of all HoD's, PIC Acad, PIC Exam and Dean Acad.

All Rounder of the Graduating batch		To be Certified by
1.	B Tech/Dual Degree/M Tech/PhD Student	Academics office
2.	Student should have Good character and Conduct, no backlog courses, no disciplinary action taken against student	Academics office
3.	CGPA\geq8 (max. 20 marks)	Academics office
	If student has CGPA \geq 9.5, earns 20 marks	
	If student has CGPA \geq 9.0, earns 15 marks	
	If student has CGPA \geq 8.5, earns 10 marks	
4.	Sports (max. 20 marks)	PTI and PIC Sports
	Inter IIT Sports meet / Other Inter Institute Meets	
	Per Individual Event: Gold Medal- 8 marks, Silver – 6 marks and Bronze – 4 marks	
	Per Team Event: Gold Medal- 6 marks, Silver –4 marks and Bronze – 2 marks	
	Participation: 2 marks	
	Player of the Tournament Award – 10 marks	
	Intra Institute Meets	
	Per Individual Event: Gold Medal- 4 marks, Silver – 2.5 marks and Bronze – 1.5 marks	
	Per Team Event: Gold Medal- 3 marks, Silver –2 marks and Bronze – 1 mark	
	Participation: 0.5 marks	
	Player of the Tournament Award – 5 marks	
5.	Cultural and Technical Activities (Eg: Saarang, Shaastra, Samgatha, other state or national levels) (max. 20 marks)	PIC Cultural / PIC Technical
	Individual Event: 1 st Prize- 8 marks, 2 nd Prize-6 marks, 3 rd Prize – 4 marks	
	Group Event : 1 st Prize- 6 marks, 2 nd Prize- 4 marks, 3 rd Prize – 2 marks	
6.	Research Output / Product Development / Application Development (max. 20 marks)	Respective Guide/Mentor in the Institute and HoD
	Journal Publication: 10-marks (indexed journals), 6 marks - non-indexed journals	
	Conference Publications: 6 marks(indexed), 4 marks- (non indexed)	
	Finished Product working Prototype – 10 marks	
7.	Contribution to Institute (max. 20 marks)	PIC Cultural and Dean Students
	Active SAC member – 10 marks	
	SSO / SSG Coordinator – 5 marks	
	Main Coordinators - Samgatha, Magazine, Designers' club, other clubs – 5 marks	
	Placement Coordinator – 5 marks	
	Participation in Institute Functions (Jan 26 th , Aug 15 th , Sept. 5 th etc) – 4 marks	

LIST OF PRIZE WINNERS**CONVOCATION 2021****ALL ROUNDER OF THE GRADUATING BATCH**

Roll No	Student Name	Prize	CGPA
EVD16I009	MADHUVANTHI SRIVATSAV R	Institute Gold Medal for the All Rounder of the Graduating Batch	9.62

ACADEMIC PROFICIENCY AWARDEES

Roll No	Student Name	Prize	CGPA
MDM17B008	MAHESH ARUNPRASATH	Institute Gold Medal for the Best Graduate across B Tech	9.7
EVD16I007	M K SANJU VIKASINI	Institute Gold Medal for the Best Post Graduate across Dual Degree	9.69
EDS19M014	SUJITHA S	Institute Gold Medal for the Best Post Graduate across M Tech	9.95
COE17B047	K M BHARATHVAJ	Institute Medal for the Best Graduate in B Tech from COE, Dept. of CSE	9.47
EDM17B032	G PAVAN SAI	Institute Medal for the Best Graduate in B Tech from EDM, Dept. of ECE	9.53
MDM17B008	MAHESH ARUNPRASATH	Institute Medal for the Best Graduate in B Tech from MDM, Dept. of ME	9.7
MSM17B004	DEEPAK SETHUPATHY R	Institute Medal for the Best Graduate in B Tech from MSM, Dept. of ME	9.43
CED16I043	S PAWAN KUMAR	Institute Medal for the Best Dual Degree Graduate from CED, Dept. of CSE	9.53
ESD16I003	DIDDI PAVITRA VARSHA	Institute Medal for the Best Dual Degree Graduate from ESD, Dept. of ECE	8.91
EVD16I007	M K SANJU VIKASINI	Institute Medal for the Best Dual Degree Graduate from EVD, Dept. of ECE	9.69

MFD16I012	KALE AAKASH SUNIL	Institute Medal for the Best Dual Degree Graduate from MFD, Dept. of ME	8.58
MPD16I016	ARYA E	Institute Medal for the Best Dual Degree Graduate from MPD, Dept. of ME	9.16
CDS19M006	KOTLA ANUSHA	Institute Medal for the Best Post Graduate from CDS, Dept. of ECE	9.57
EDS19M014	SUJITHA S	Institute Medal for the Best Post Graduate from EDS, Dept. of ECE	9.95
MDS19M008	SAMIK BANERJEE	Institute Medal for the Best Post Graduate from MDS, Dept. of ME	9.38
SMT19M003	LOKESH K S	Institute Medal for the Best Post Graduate from SMT, Dept. of ME	9.92
SMT19M008	SIVARENJINI T M	Institute Medal for the Best Post Graduate from SMT, Dept. of ME	9.92

BEST PROJECTS AWARDEES

Roll No	Name	Prize	Project Title
MDM17B012	SARANATHAN	Institute Gold Medal for the Best Interdisciplinary Project across B Tech	Design and Development of a simplified and smart motorcycle handlebar for better user experience
MPD16I011	R ANAND SRIVATSAN	Institute Gold Medal for the Best Interdisciplinary Project across Dual Degree	Design and Development of an Electromechanical Exoskeleton Actuator
SMT19M008	SIVARENJINI T M	Institute Gold Medal for the Best Interdisciplinary Project across M Tech	Smart All Weather Jacket
COE17B009	ABHINAND RAJAGOPAL	Institute Medal for the Best Project in B Tech from COE, Dept. of CSE	A Novel Statistical Masking approach for BERT Architecture for Transfer Learning Systems
EDM17B025	SHIVANGI T P	Institute Medal for the Best Project in B Tech from EDM, Dept. of ECE	A Neuromorphic Approach for Anomaly Detection in ECG Signals at the Edge

MDM17B048	NARASIMHAN.S	Institute Medal for the Best Project in B Tech from MDM, Dept. of ME	Machine Learning Technique to assist Computational Fluid Dynamics
MSM17B034	GANESH KUMAR T K	Institute Medal for the Best Project in B Tech from MSM, Dept. of ME	Project Meshy - 2D RGB image to 3D object mesh reconstruction application in Flutter using Graph CNN and G-ResNet
CED16I002	ADEPU ANIL KUMAR	Institute Medal for the Best Project in Dual Degree from CED, Dept. of CSE	Skin Lesion Classification in Dermoscopy Images via Weighted Ensembling and Knowledge Distillation
ESD16I008	PADALA DEVI SOWJANYA	Institute Medal for the Best Project in Dual Degree from ESD, Dept. of ECE	Mask estimation using phase information and inter-channel correlation for speech enhancement
EVD16I009	MADHUVANTHI SRIVATSAV R	Institute Medal for the Best Project in Dual Degree from EVD, Dept. of ECE	A Novel Biphasic Encoder Architecture
MFD16I012	KALE AAKASH SUNIL	Institute Medal for the Best Project in Dual Degree from MFD, Dept. of ME	Optimize the selection of lattice unit cells for Topologically Optimized designs for minimum distortion
MPD16I007	MATHEW KURIAN	Institute Medal for the Best Project in Dual Degree from MPD, Dept. of ME	Structural Optimisation of a Composite Swingarm using ABAQUS CAE
CDS19M001	ABIRAMI B	Institute Medal for the Best Project in M Tech from CDS, Dept. of ECE	Analysis and Design of Source Antenna and Transmit Pulse for generating IEMI
EDS19M002	DEEPIKA KUMARADASAN	Institute Medal for the Best Project in M Tech from EDS, Dept. of ECE	Integration of Thermoelectric and Piezoelectric Generators For Energy Harvesting
MDS19M016	YAGNA V	Institute Medal for the Best Project in M Tech from MDS, Dept. of ME	Design of Fiber Coupled Diode Laser
SMT19M003	LOKESH K S	Institute Medal for the Best Project in M Tech from SMT, Dept. of ME	Optimal Farmer scheduling and Truck routing with Time window: A Mixed Integer Linear Programming Approach

Innovation and Startup Policy

Version 1.0

11 March 2021



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**Indian Institute of Information Technology, Design & Manufacturing
Kancheepuram, Chennai 600 127**

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1. Introduction

The Government of India's initiative to nurture the spirit of innovation among academic institutions and translate these into products, processes and services for commercial exploitation has manifested in two policy guidelines: (a) the National Innovation and Startup Policy (Ministry of Education, Sep 2019); and (b) Draft guidelines for Intellectual Property Rights (IPR) in academic institutions (Department of Industrial Policy and Promotion, Sep 2019).

Indian Institute of Information Technology, Design & Manufacturing, Kancheepuram (IIITDM Kancheepuram), hereafter referred to as the 'institute', has reviewed these policies and after consultation with faculty, staff and a cross-section of students has decided to adopt them with some minor refinements to support its specific context. This document outlines the key elements of the Innovation and Startup Policy of the institute.

2. Terminology:

- Director: means director of the Indian Institute of Information Technology, Design & Manufacturing, Kancheepuram
- Intellectual Property Rights (IPR): means ownership and associated rights relating to aforementioned Intellectual Property, either registered or unregistered, and including applications or rights to apply for them and together with all extensions and renewals of them, and in each and every case, all rights or forms of protection having equivalent or similar effect anywhere in the world
- Startup: An entity shall be considered as a Startup as per the following guidelines of the Ministry of Commerce and Industry, Gazette Notification No. G.S.R. 34 (E) dated January 16, 2019:
 - i. Entity is working towards innovation, development or improvement of products or processes or services, or if it is a scalable business model with a high potential of employment generation or wealth creation. Provided that an entity formed by splitting up or reconstruction of an existing business shall not be considered a 'Startup'
 - ii. Upto a period of ten years from the date of incorporation/ registration, if it is incorporated as a private limited company (as defined in the Companies Act, 2013) or registered as a partnership firm (registered under section 59 of the Partnership Act, 1932) or a limited liability partnership (under the Limited Liability Partnership Act, 2008) in India
 - iii. Turnover of the entity for any of the financial years since incorporation/ registration has not exceeded one hundred crore rupees.

3. Innovation and Startup Policy:

3.1 Objective and Scope:

- a. The objective of the Innovation and Startup Policy is to enable the faculty, staff and students of the institute to participate in innovation and entrepreneurship activities, and encouraging them to consider entrepreneurship and startup as a career option
- b. This policy shall apply to all faculty, staff and students who have established legal relationship with the institute. Such a legal relationship may arise pursuant to the provision of law, collective agreement or individual agreement (may refer to employment/ retainership contract/ pursuance of studies or any other legal arrangement). The policy also encourages involvement of the institute's alumni, and local industry in the entrepreneurship and startup activities.

3.2 Strategies and Governance

- a. Entrepreneurship promotion and development is one of the key dimensions of the institute's vision and strategy. The institute will use the ARIIA ranking framework to set objectives and track the different performance indicators and guide actions.
- b. The entrepreneurial agenda of the institute will be the responsibility of the Dean (Design, Innovation and Incubation). Since promoting entrepreneurship requires a different type of mindset as compared to other academic activities, this role may be staffed by a faculty or staff or external hire who understands the industry and above all business
- c. Resource mobilization plan should be worked out at the institute for supporting pre-incubation, incubation infrastructure and facilities. A sustainable financial strategy should be defined in order to reduce the organizational constraints to work on the entrepreneurial agenda
 - i. Investment in the entrepreneurial activities should be a part of the institutional financial strategy. The institute will create a separate 'Innovation Fund' and work towards allocating a minimum 1% fund of the total annual budget of the institution for funding and supporting innovation and startups related activities
 - ii. The strategy should also involve raising funds from diverse sources to reduce dependency on the public funding. Bringing in external funding through government (state and central) such as DST, DBT, MHRD, AICTE, TDB, TIFAC, DSIR, CSIR, BIRAC, NSTEDB, NRDC, Startup India, Invest India, MeitY, MSDE, MSME, etc. and non-government sources should be encouraged.
 - iii. To support technology incubators, academic institutes may approach private and corporate sectors to generate funds, under Corporate Social Responsibility (CSR) as per Section 135 of the Company Act 2013
 - iv. Institute may also raise funding through sponsorships and donations. Institute should actively engage alumni network for promoting Innovation & Entrepreneurship (I&E).
- d. For expediting the decision making, hierarchical barriers should be minimized and individual autonomy and ownership of initiatives should be promoted
- e. Importance of innovation and entrepreneurial agenda should be known across the institute and should be promoted and highlighted at institutional programs such as conferences,

- convocations, workshops, etc. The Institute Innovation Council comprising student and faculty representatives will play an important role in the above, along with student clubs
- f. The I&E strategy will embrace the entrepreneurial activities across various centers, departments, faculties, within the institute, thus breaking the silos. The objectives of the units may be aligned with the overall objectives and performance indicators
 - g. Product to market strategy for startups may be developed by the institute on case to case basis
 - h. Development of entrepreneurship culture should not be limited within the boundaries of the institution. Faculty and staff may participate in initiatives to promote startups outside the institute with prior approvals
 - i. The institute must strive to be the driving force in developing entrepreneurship culture in its vicinity (regional, social and community level). This shall include giving opportunity for regional startups, provision to extend facilities for outsiders and active involvement of the institute in defining strategic direction for local development.
 - ii. Strategic international partnerships should be developed using bilateral and multilateral channels with international innovation clusters and other relevant organizations. Moreover, international exchange programs, internships, engaging the international faculties in teaching and research should also be promoted.

3.3 Startups Enabling Institutional Infrastructure

Creation of pre-incubation and incubation facilities for nurturing innovations and startups in HEIs institutions should be undertaken. Incubation and Innovation need to be organically interlinked. Without innovation, new enterprises are unlikely to succeed. The goal of the effort should be to link INNOVATION to ENTREPRISES to FINANCIAL SUCCESS

- a. The institute may create and continuously improve facilities to support pre-incubation (e.g. IICs as per the guidelines by MHRD's Innovation Cell, EDC, IEDC, New-Gen IEDC, Innovation Cell, Startup Cell, Student Clubs, etc.) and Incubation/ acceleration by mobilizing resources from internal and external sources
- b. The Pre-Incubation/Incubation facility should be accessible 24x7 to students, staff and faculty of all disciplines and departments across the institution
- c. Pre-incubation facilities may or may not be a separately registered entity or Special Purpose Vehicle (SPV), but it is recommended that 'Incubation cum Technology Commercialization Unit' (ITCU) must be a separate entity preferably registered under Section-8 of Company Act 2013 or 'Society' registered under Society Registration Act with independent governance structure. This will allow more freedom to Incubators in decision making with less administrative hassles for executing the programs related to innovation, IPR and Startups. Moreover, they will have better accountability towards investors supporting the incubation facility
- d. Institute may offer mentoring and other relevant services through Pre-incubation/Incubation units in-return for fees (or) zero payment basis. The institute may not hold the equity as per the current statute, so SPV (Section 8 company – MaDeIT Innovation Foundation) may be requested to hold equity on its behalf. The modalities regarding Equity Sharing in Startups supported through these units will depend upon the nature of services offered by these units.

3.4 Nurturing Innovations and Startups

- a. The institute will encourage creation and nurturing of Startups/enterprises by students (UG, PG, Ph.D.), staff (including temporary or project staff), and faculty. They will be encouraged to apply for incubation with the institute's incubator. However, the selection of the startup for incubation will be as per the guidelines of the incubator (MaDeIT Innovation Foundation)
 - a. The institute will allow licensing of IPR from institute to start up as per the IPR policy. Students and faculty members intending to initiate a startup based on the technology developed or co-developed by them or the technology owned by the institute, may be given a license on the said technology as per the IPR policy.
 - i. The institute will encourage students to intern with the startups incubated in any recognized incubator while studying.
 - ii. Student inventors will also be allowed to opt for developing their startup in place of their mini project/ major project, seminars, summer trainings. The area in which student wants to initiate a startup may be interdisciplinary or multidisciplinary. However, the student must describe how they will separate and clearly distinguish their ongoing research activities as a student from the work being conducted at the startup
- b. Students entrepreneurs will be allowed to sit for the examination, even if their attendance is less than the minimum permissible percentage, with due permission from the institute
- c. The institute will allow their students to take a semester/year break (or even more depending upon the decision of review committee constituted by the institute) to work on their startups and re-join academics to complete the course. Student entrepreneurs may earn academic credits for their efforts while creating an enterprise. Institute will set up a review committee for review of start up by students, and based on the progress made, it may consider giving appropriate credits for academics
- d. The institute, depending on availability, will provide accommodation to the entrepreneurs within the campus for some period of time
- e. The institute will allow faculty and staff to take off for a semester / year (or even more depending upon the decision of review committee constituted by the institute) as sabbatical/ unpaid leave/ casual leave/ earned leave for working on startups and come back. Institution should consider allowing use of its resource to faculty/students/staff wishing to establish start up as a fulltime effort. The seniority and other academic benefits during such period may be preserved for such staff or faculty
- f. The institute will consider starting a part-time/full time Masters program in Innovation, entrepreneurship and venture development program where one can get degree while incubating and nurturing a startup company
- g. Institute may facilitate the startup activities/ technology development by allowing students/ faculty/staff to use institute infrastructure and facilities, as per the choice of the potential entrepreneur in the following manners:
 - i. Short-term/ six-month/ one-year part-time entrepreneurship training
 - ii. Mentorship support on regular basis
 - iii. Facilitation in a variety of areas including technology development, ideation, creativity, design thinking, fund raising, financial management, cash-flow management, new venture planning, business development, product development,

- social entrepreneurship, product costing, marketing, brand-development, human resource management as well as law and regulations impacting a business
- iv. Institute may also link the startups to other seed-fund providers/ angel funds/ venture funds or itself may set up seed-fund once the incubation activities mature
 - v. License institute IPR as discussed in the IPR policy
- h. Participation in startup related activities will be considered as a legitimate activity of faculty in addition to teaching, R&D projects, industrial consultancy and management duties and must be considered while evaluating the annual performance of the faculty. Every faculty may be encouraged to mentor at least one startup
 - i. Product development and commercialization as well as participating and nurturing of startups would now be added to a bucket of faculty-duties and each faculty would choose a mix and match of these activities (in addition to minimum required teaching and guidance) and then respective faculty are evaluated accordingly for their performance and promotion
 - j. Institute will also update/change/revise performance evaluation policies for faculty and staff as stated above
 - k. The institute at no stage will have any liability accrue to it because of any activity of any startup. Students who intend to pursue entrepreneurial ventures cannot use the institute address to register their company

3.5 Product Ownership Rights for Technologies Developed at Institute

- a. The ownership of IP will be as per the IPR policy of the institute
- b. All institute's decision-making body with respect to IPR / technology-licensing / incubation will consist of faculty and experts who have excelled in technology translation
- c. Interdisciplinary research and publication on startup and entrepreneurship should be promoted by the institute.

3.6 Organizational Capacity, Human Resources and Incentives

- a. Institute should recruit staff that have a strong innovation and entrepreneurial/ industrial experience, behavior and attitude. This will help in fostering the I&E culture
 - i. Some of the relevant faculty members with prior exposure and interest should be deputed for training to promote I&E
 - ii. To achieve better engagement of staff in entrepreneurial activities, institutional policy on career development of staff should be developed with constant upskilling.
- b. Faculty and departments of the institutes have to work in coherence and cross-departmental linkages should be strengthened through shared faculty, cross-faculty teaching and research in order to gain maximum utilization of internal resources and knowledge
 - a. Periodically some external subject matter experts such as guest lecturers or alumni can be engaged for strategic advice and bringing in skills which are not available internally. Such experts may be paid honorarium as per the institute norms
 - b. Faculty and staff are encouraged to do courses on innovation, entrepreneurship management and venture development using their professional development fund
- c. In order to attract and retain right people, institute in consultation with the Board of Governors will develop academic and non-academic incentives and reward mechanisms for all staff and stakeholders that actively contribute and support entrepreneurship agenda and activities.

- i. The reward system for the staff may include sabbaticals, office and lab space for entrepreneurial activities, reduced teaching loads, awards, trainings, etc.
- ii. The recognition of the stakeholders may include offering use of facilities and services, strategy for shared risk, as guest teachers, fellowships, associateships, etc
- iii. A performance matrix will be developed and used for evaluation of annual performance

3.7 Creating Innovation Pipeline and Pathways for Entrepreneurs at Institute Level

- a. To ensure exposure of maximum students to innovation and pre incubation activities at their early stage and to support the pathway from ideation to innovation to market, the institute will rely on the following mechanisms
 - i. The Design Spine curriculum at undergraduate level will be the main channel for cultivating this process. Students shall be taught that innovation (technology, process or business innovation) is a mechanism to solve the problems of the society and consumers. Entrepreneurs should innovate with focus on the market niche. And Students will be encouraged to develop entrepreneurial mindset through experiential learning by exposing them to training in cognitive skills (e.g. design thinking, critical thinking, etc.), by inviting first generation local entrepreneurs or experts to address young minds. Initiatives like idea and innovation competitions, hackathons, workshops, bootcamps, seminars, conferences, exhibitions, mentoring by academic and industry personnel, throwing real life challenges, awards and recognition shall be routinely organized. This tight integration between design-centric education and enterprise related activities will be persisted by the institute
- b. The institute shall provide support to students who show potential, in pre-startup phase. Connecting student entrepreneurs with real life entrepreneurs will help the students in understanding real challenges which may be faced by them while going through the innovation funnel and will increase the probability of success
- c. The institute shall allocate an appropriate budget for the Institute Innovation Council (IIC) for its activities. IIC will organize various activities related to innovation, startup and entrepreneurship development. Collective and concentrated efforts will be required to identify, scout, acknowledge, support and reward proven student ideas and innovations and to further facilitate their entrepreneurial journey

3.8 Norms for Faculty Startups

- a. For better coordination of the entrepreneurial activities, norms for faculty to do startups should be created by the institutes. Only those technologies should be taken for faculty startups which originate from within the same institute.
 - i. Role of faculty may vary from being an owner/ direct promoter, mentor, consultant or as on-board member of the startup.
 - ii. Institutes should work on developing a policy on 'conflict of interests' to ensure that the regular duties of the faculty don't suffer owing to his/her involvement in the startup activities.
 - iii. Faculty startup may consist of faculty members alone or with students or with faculty of other institutes or with alumni or with other entrepreneurs

- b. In case the faculty/ staff holds the executive or managerial position for more than three months in a startup, they will go on sabbatical/ leave without pay/ utilize existing leave
- c. Faculty must clearly separate and distinguish on-going research at the institute from the work conducted at the startup/ company
- d. In case of selection of a faculty start up by an outside national or international accelerator, a maximum leave (as sabbatical/ existing leave/ unpaid leave/ casual leave/ earned leave) of one semester/ year (or even more depending upon the decision of review committee constituted by the institute) may be permitted to the faculty.
- e. Faculty must not accept gifts from the startup
- f. Faculty must not involve research staff or other staff of institute in activities at the startup and vice-versa
- g. Human subject related research in startup should get clearance from ethics committee of the institution

3.9 Pedagogy and Learning Interventions for Entrepreneurship Development

- a. Diversified approach should be adopted to produce desirable learning outcomes, which should include cross disciplinary learning using mentors, labs, case studies, games, etc. in place of traditional lecture-based delivery
 - i. Student clubs/ bodies/ departments must be created for organizing competitions, bootcamps, workshops, awards, etc. These bodies should be involved in institutional strategy planning to ensure enhancement of the student's thinking and responding ability
 - ii. Institute may create an annual 'INNOVATION & ENTREPRENEURSHIP AWARD' to recognize outstanding ideas, successful enterprises and contributors for promoting innovation and enterprises ecosystem within the institute
 - iii. For creating awareness among the students, the teaching methods should include case studies on business failure and real-life experience reports by startups
 - iv. Tolerating and encouraging failures: Our systems are not designed for tolerating and encouraging failure. Failures need to be elaborately discussed and debated to imbibe that failure is a part of life, thus helping in reducing the social stigma associated with it. Very importantly, this should be a part of institute's philosophy and culture.
 - v. The Institute Innovation Council may comprise innovation champions from within the students/ faculty/ staff for each department/ stream of study
- b. Entrepreneurship education should be imparted to students at curricular/ co-curricular/ extracurricular level through elective/ short term or long-term courses on innovation, entrepreneurship and venture development. Validated learning outcomes should be made available to the students.
 - i. Integration of expertise of the external stakeholders should be done in the entrepreneurship education to evolve a culture of collaboration and engagement with external environment
 - ii. In the beginning of every academic session, institute may conduct an induction program about the importance of I&E so that freshly inducted students are made aware about the entrepreneurial agenda of the institute and available support systems. Curriculum for the entrepreneurship education should be continuously

- updated based on entrepreneurship research outcomes. This should also include case studies on failures
- iii. Industry linkages should be leveraged for conducting research and survey on trends in technology, research, innovation, and market intelligence
 - iv. Student innovators, startups, experts must be engaged in the dialogue process while developing the strategy so that it becomes need based
 - v. Customized teaching and training materials should be developed for startups
 - vi. It must be noted that not everyone can become an entrepreneur. The entrepreneur is a leader, who would convert an innovation successfully into a product, others may join the leader and work for the startup. It is important to understand that entrepreneurship is about risk taking. One must carefully evaluate whether a student is capable and willing to take risk.
- c. Pedagogical changes need to be done to ensure that maximum number of student projects and innovations are based around real life challenges. Learning interventions developed by the institute for inculcating entrepreneurial culture may be constantly reviewed and updated

3.10 Collaboration, Co-creation, Business Relationships and Knowledge Exchange

- a. Stakeholder engagement should be given prime importance in the entrepreneurial agenda of the institute. Institutes should find potential partners, resource organizations, micro, small and medium sized enterprises (MSMEs), social enterprises, schools, alumni, professional bodies and entrepreneurs to support entrepreneurship and co-design the programs
 - i. To encourage co-creation, bi-directional flow/ exchange of knowledge and people should be ensured between institutes such as incubators, science parks, etc.
 - ii. Institute should organize networking events for better engagement of collaborators and should open up the opportunities for staff, faculty and students to allow constant flow of ideas and knowledge through meetings, workshops, space for collaboration, lectures, etc.
 - iii. Mechanism should be developed by the institute to capitalize on the knowledge gained through these collaborations.
 - iv. Care must be taken to ensure that events DON'T BECOME an end goal. First focus of the incubator should be to create successful ventures.
- b. Knowledge exchange through collaboration and partnership should be made a part of institutional policy and institutes must provide support mechanisms and guidance for creating, managing and coordinating these relationships
 - i. Through formal and informal mechanisms such as internships, teaching and research exchange programmes, clubs, social gatherings, etc., faculty, staff and students of the institutes should be given the opportunities to connect with their external environment.
 - ii. Connect of the institute with the external environment must be leveraged in form of absorbing information and experience from the external ecosystem into the institute's environment.
 - iii. The institute may plan for an innovation knowledge platform using in-house Information & Communication Technology (ICT) capabilities.

3.11 Entrepreneurial Impact Assessment

- a. Impact assessment of institute's entrepreneurial initiatives such as pre-incubation, incubation, entrepreneurship education shall be performed using the Atal Ranking of Institutions on Innovation Achievement (ARIIA) on an annual basis.
 - i. Monitoring and evaluation of knowledge exchange initiatives, engagement of all departments and faculty in the entrepreneurial teaching and learning should be assessed
 - ii. Number of startups created, support system provided at the institutional level and satisfaction of participants, new business relationships created by the institutes should be recorded and used for impact assessment
 - iii. Impact should also be measured for the support system provided by the institute to the student entrepreneurs, faculty and staff for pre-incubation, incubation, IPR protection, industry linkages, exposure to entrepreneurial ecosystem, etc.
- b. Formulation of strategy and impact assessment should go hand in hand. The information on impact of the activities should be actively used while developing and reviewing the entrepreneurial strategy
- c. Impact assessment for measuring the success should be in terms of sustainable social, financial and technological impact in the market. For innovations at pre-commercial stage, development of sustainable enterprise model is critical. COMMERCIAL success is the ONLY measure in long run