



**SRI SIVASUBRAMANIYA NADAR COLLEGE OF
ENGINEERING**

(An Autonomous Institution)
Kalavakkam – 603 110

SELF STUDY REPORT

1.2.1 New Courses Introduced

M.E. Energy Engineering

Submitted to

The National Assessment and Accreditation Council

February 2024

Name of the Programme : M.E. Energy Engineering

Number of New Courses introduced in the Academic Year 2022-23 (Regulation 2022) : 9 Courses

List of New Courses :

S. No.	Name of the Course	Course Code
1	Applied Fluid Mechanics and Heat Transfer	PEY2101
2	Renewable Energy Systems	PEY2103
3	Applied Heat Transfer Lab	PEY2111
4	Fuels and Energy Systems Lab	PEY2112
5	Energy Conservation in Industrial Utilities	PEY2201
6	Computational Fluid Dynamics Lab	PEY2212
7	Solar Energy Technologies	PEY2221
8	Internship with Seminar	PEY2316
9	Digital Energy Management	PEY2331

Documentary Evidence :

- Academic Council (AC) – Minutes of the fifth AC meeting dated 06-08-2022 to consider and approve the new PG Regulations R2022 with the revisions incorporated.
- Board of Studies (BoS) – Minutes of the Board of Studies meeting dated 27-05-2022 to consider and approve the PG R2022 curriculum and syllabus for M.E. Energy Engineering.
- Curriculum – Regulations R2022 and R2018 Curriculum for M.E. Energy Engineering with the new courses highlighted.

Fifth Meeting of the Academic Council

Date & Time: 06.08.2022 (10.00 a.m. to 3.00 p.m.)

AGENDA

1. To consider and approve the new PG Regulations R2022 with the revisions incorporated.
2. To ratify the amendments made in the UG Regulations (R2021).
3. To consider and approve the curriculum and syllabi of I, II, III and IV semesters of all PG programs to be offered from the Academic year 2022-2023 onwards.
4. To consider and approve the syllabi for B.E Hons. track courses in EEE & ECE.
5. To ratify the amendments made in the MBA Regulations (R2021).
6. To ratify the changes in the curriculum and syllabi of MBA program to be offered from the Academic year 2022-2023 onwards.
7. Other items, if any, with the permission of the Chairman of the Academic Council.



Chairman

Academic Council

MINUTES OF THE FIFTH ACADEMIC COUNCIL MEETING

Date: 6th August 2022 Time: 10.00 a.m. Venue: ECE Seminar Hall, SSNCE.

The following members attended the meeting:

- Dr. V.E.Annamalai, Principal & Chairman, Academic Council, SSNCE
- Dr.S. Ramanagopal, Professor & Member Secretary, Academic Council, SSNCE.
- Dr.S.Sridhar, Professor & Head, Department of Information Science and Technology, CEG campus, Anna University, Chennai.(A.U. Nominee)
- Dr.M.Meenakshi, Professor& Head, Department of Electronics and Communication Engineering, CEG campus, A.U., Chennai.(A.U. Nominee)
- Dr.R.Vidhya Priya, Professor & Head, Department of Biomedical Engineering, PSG College of Technology, Coimbatore.(A.U. Nominee)
- Mr.N.Siva Sankaran, Chief Technical officer, Viruksa Manufacturing Solutions Pvt., Ltd., Chennai.
- Mr.G.D.Sharma, Beeline HR advisory, Chennai.
- Dr. P. Somasundaram, Professor & Head, Department of Electrical and Electronics Engineering, CEG campus, Anna University, Chennai.
- Dr.P. Gomathi Priya, Professor, Department of Chemical Engineering, Alagappa College of Technology, Chennai.
- Dr. S. Radha, Vice Principal, SSNCE.
- Dr.S.Narasimman, CoE, SSNCE
- Dr. K. Hariharanath, Director, SSN School of Management.
- Dr.V.Rajini, Professor & Head, EEE, SSNCE.
- Dr.P.Vijayalakshmi, Professor & Head, SSNCE.
- Dr.T.T.Mirnalinee, Professor & Head, CSE, SSNCE.
- Dr. Chandrabose Aravindan, Professor & Head, IT, SSNCE.
- Dr. K. Sathishkumar, Professor & Head, Chemical Engg., SSNCE.
- Dr.A.Kavitha, Professor & Head, BME, SSNCE.
- Dr. K.S. Vijay Sekar, Professor & Head, Mechanical Engg., SSNCE.
- Dr.N.Sivakumar. Professor & Head, Civil Engg., SSNCE.
- Dr. B. Praba, Professor & Head, Mathematics, SSNCE.
- Dr. Masilla Moses Kennedy, Professor & Head, Physics, SSNCE.
- Dr.V.S.Gayathri, Professor & Head, Chemistry, SSNCE.
- Dr.Martha Karunakar, Associate Prof. & Head, English, SSNCE.
- Dr.A.Jawahar, Professor/ECE,SSNCE.
- Dr.N.Venkateswaran, Professor & IQAC coordinator, SSNCE.
- Dr. R.Seyezhai, Professor/EEE, SSNCE.
- Dr.M.Suresh,Associate Professor/Mechanical, SSNCE.
- Dr.V. Balasubramanian, Associate Professor/CSE, SSNCE

The Chairman welcomed all the members and gave a brief introduction of the purpose of the meeting. The Member Secretary, after welcoming the Anna University Nominees and the other expert members, presented the changes proposed in the PG Regulation and amendments in UG Regulation. The points discussed in the meeting on the specific clauses are given below.

1. Publication by P G student need not be mandatory. If yes let them communicate to journals of repute or with conference conducted by professional bodies. Avoid internally run conferences.
2. Can data science be included as open elective?
3. If NPTEL credits are not available, can we have alternate subject? PSG does additional exam for credit conversion.
4. PO across all programs – at least common number of POs.
5. Mandatory 3 as PO, remaining as PSO.
6. Uniform number of program electives to be offered under each vertical.
7. Internship and seminar – remove ‘and’ substitute ‘with’.
8. Advanced radiation system – remove advanced.
9. Pattern recognition – very old – replace by Machine learning.
10. ME CSE – list of electives “Web application development” and “Functional programming” can go into software engineering. Electives can be regrouped.
11. IT – Health care , sports & fin Tech - can we rename as application of analytics
12. Why not include AR/VR etc. at least one paper.
13. One exclusive programming course – include in elective list
14. Can we have one exclusive lab for elective subject? Theory integrated lab can be considered for inclusion.
15. In device design include safety aspects also.
16. In Medical Electronics, ‘Internship’ name should be brought in, for uniformity.
17. In Biomedical device design, validation is important. Design for six sigma etc. can be included (Try including in syllabus)
18. a) In Manufacturing Engineering Electives – SCM is not apt. Can we replace by subject like world class mfg or subjects that talk about how to manufacture. Jigs & Fixtures, Lean Mfg etc. Control plan mechanism
b) Design for manufacturing – move to core.
19. Energy auditing can be included as value added course.
20. Professional readiness for innovation, Employability and Entrepreneurship [3 credit] for CSE, IT and ECE UG programme under EEC category to be included in the revision of regulation.
21. MBA: The subject application of Analytics can be renamed as ‘Functional Analytics’
22. Python for business – can be changed as ‘Tools for Business Analytics’
23. Digital Marketing can be added as value added course.

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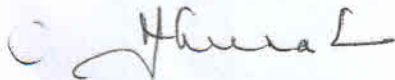


The suggestions made by the members of the academic council were accepted and the Chairman thanked all the members for their participation.


Dr. V.E. Annamalai
Chairman


Dr. S. Ramana Gopal
Member Secretary


Dr. S. Sridhar
HOD/IT, CEG


Dr. M. Meenakshi
HOD/ECE, CEG.


Dr. R. Vidhyapriya
HOD/BME, PSG Tech.

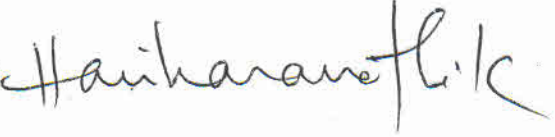
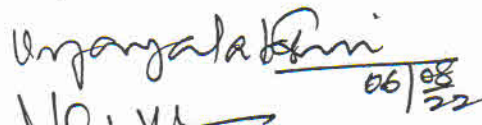
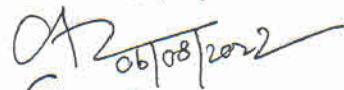
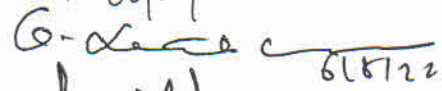
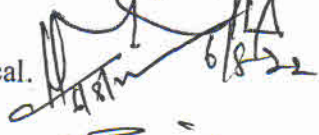
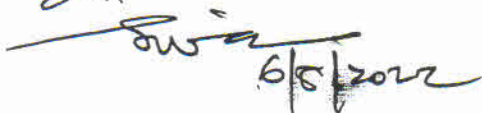

Mr. N. Siva Sankaran
CTO, Viruksa Pvt., Ltd.


Mr. G.D. Sharma
Beeline HR Advisory


Dr. P. Somasundaram
Prof./EEE, CEG


Dr. P. Gomathi Priya 6/8/2022
Prof./Chemical, A.C.Tech.

Signature of Participants: (Internal Members)

1. Dr. S. Radha, Vice Principal, SSNCE
2. Dr. S. Narasimman, CoE, SSNCE. 
3. Dr. K. Hariharanath, Director, SSN School of Management. 
4. Dr. V. Rajini, Prof. & Head, EEE. 
5. Dr. P. Vijayalakshmi, Prof. & Head, ECE. 
06/08/22
6. Dr. T.T. Mirmalinee, Prof. & Head, CSE. 
6/8/22
7. Dr. Chandrabose Aravindan, Prof. & Head, IT. 
06/08/2022
8. Dr. K. Sathish Kumar, Prof. & Head, Chemical. 
6/8/22
9. Dr. A. Kavitha, Prof. & Head, BME. 
6/8/22
10. Dr. K.S. Vijay Sekar, Prof. & Head, Mechanical. 
6/8/22
11. Dr. N. Sivakumar, Prof. & Head, Civil. 
6/8/2022

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12. Dr. B. Praba, Prof.& Head, Mathematics.
13. Dr. Masilla Moses Kennedy, Professor & Head, Physics. *MSK*
14. Dr. V.S. Gayathri, Prof. & Head, Chemistry. *Gayathri*
15. Dr. Martha Karunkar, Asso. Prof. & Head, English. *Martha Karunkar*
16. Dr.N. Venkateswaran, IQAC coordinator, SSNCE. *N. Venkateswaran*
17. Dr.A.Jawahar,Professor/ECE,SSNCE. *A. Jawahar*
18. Dr. R. Seyezhai, Professor/EEE, SSNCE. *R. Seyezhai*
19. Dr.M.Suresh, Associate Professor/Mechanical, SSNCE. *M. Suresh*
20. Dr.V.Balasubramanian, Associate Professor/CSE,SSNCE *V. Balasubramanian*

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DEPARTMENT OF MECHANICAL ENGINEERING

MINUTES OF THE IV MEETING FOR THE BOARD OF STUDIES OF PG PROGRAMS (R2022)

REGULATIONS 2022 - CHOICE BASED CREDIT SYSTEM (CBCS)

Date & Time : 27-May-2022 (FRIDAY) & 9.30 AM

Venue : **ONLINE MEETING over Microsoft Teams**

(<https://teams.microsoft.com/l/team/19%3aNoRSHD0Vng0BNDHuXYgr60ECqUiID0gBb4Xjw3lgfaE1%40thread.tacv2/conversations?groupId=1db602ff-2596-4081-9cb0-35d9ab9f0286&tenantId=5beb351c-3fb8-418f-b612-fe36ace96ef3>)

Members Present :

S. N	Name	Designation	Role
1	Dr. K.S. Vijay Sekar	Prof., & Head, Department of Mechanical Engineering, SSNCE	Chairman
2	Dr. M. Venkataramanan	Professor, Department of Mechanical Engineering, CEG Campus, Anna University, Chennai - 25	University Representative
3	Dr. Murugaiyan Amirthalingam	Assistant Professor, Department of Metallurgical and Materials Engineering, IIT Madras, Chennai - 36	Subject Expert 1 (Mfg)
4	Dr. V. Raghavan,	Professor, Department of Mechanical Engineering, IIT Madras, Chennai - 36	Subject Expert 2 (Energy)
5	Mr. Kumarasubramanian V.	Former Head, TI-IIIC (Murugappa Group), Presently Consultant (Murugappa Group of Companies)	Industrial Representative
6	Mr. T. Amalesh	Batch-2018 of M.E., Energy	Student Alumnus
7	Dr. K. Babu	Assoc. Prof., Department of Mechanical Engineering, SSNCE	Coordinator (Mfg.), Syllabus Committee
8	Dr. N. Lakshminarasimman,	Assoc. Prof., Department of Mechanical Engineering, SSNCE	Coordinator (Energy), Syllabus Committee
9	Department Faculty Members handling PG programs of Mfg. & Energy		

Agenda: To consider and approve the curriculum and syllabus of two PG programs (M.E., in Manufacturing Engineering and M.E., in Energy Engineering) run by the Department of Mechanical Engineering.

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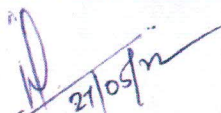


- The BoS meeting started at 9.35 am sharply with a welcome address by Dr. K.S. Viay Sekar, Chairman.
- The Chairman introduced all the distinguished members of BoS and welcomed all.
- Dr. K. Babu, syllabus committee coordinator of M.E., (Manufacturing Engineering) presented the proposed R2022 curriculum for M.E., Manufacturing Engg. program.
- Following his presentation, the suggestions/feedback on M.E., Manufacturing Engineering curriculum and syllabus are summarized below:
 1. Asked for the list of courses in which a part of the contents will be handled by appropriate industrial expert.
 2. A course on Professional Ethics & Life Skills was suggested to be included.
 3. Cold welding and adhesive bonding techniques are to be included in the course "Advances in Casting and Welding".
 4. Pad Printing as a manufacturing process is to be included in the course "Micromanufacturing".
 5. Youngsters not socializing and lacking in teamwork – a general problem faced in Industry and the topic "Teamwork" is to be covered in some course.
 6. Professional Elective – I in Semester – 1 is to be swapped with a core course from Semester-2.
 7. Suggested that the course "Internship with Seminar" be moved to Semester -1 from 2, so that students can intern during Sem 1 holidays.
- Dr. N. Lakshminarasimman, Syllabus Committee Coordinator of M.E., (Energy Engineering) then presented the proposed R2022 curriculum and syllabi of M.E., Energy Engg.
- Following his presentation, the suggestions/feedback on M.E., Energy Engineering curriculum and syllabus are summarized below:
 1. It has been suggested to include few topics under Unit-IV and V in the core course "Thermodynamic Analysis of Energy Systems" offered in Sem-I. Topics on First Law and Second laws applied to combustion, heat of reaction, Concept of Gibbs free energy, Chemical equilibrium are to be included in Unit-IV and topics on fuels, types, properties and analysis are to be included in Unit-V.
 2. Syllabus of Energy Conversion Techniques to be revised. Contents need to be separated based on heat engines based and non-heat engine based energy conversion.
 3. It has been suggested to remove the course, "Solar Energy Technologies" from the Professional Core category offered during Sem-I and replace with an appropriate course that gives an overview of all energy systems, inclusive of topics covering batteries and fuel cells.
 4. All the Electives are to be grouped and listed under separate classifications.
 5. A topic on ISO 50001 - Energy Management Systems to be included in the syllabi.
 6. "Energy Conversion Techniques" offered as Core course in Sem-I to be replaced by "Advanced Power Plant Engineering" course. "Advanced Power Plant Engineering" shall be offered as professional core course and "Energy Conversion Techniques" shall be offered as an Elective course. "Advanced Power Plant Engineering" should contain "power generation using fossil fuels".
 7. "Solar Energy Technologies" offered as Core Course in Sem-I to be replaced by "New and Renewable Energy Technologies" course and "Solar Energy Technologies" to be offered as an Elective Course.

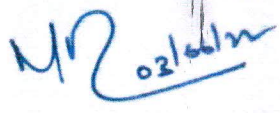
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8. It has been suggested to include some more additional contents in the professional core course "Energy Conservation in Industrial utilities". Contents on "Energy Conservation in fans, pumps, blowers, boilers, motors and illumination systems" are to be included.
 9. Similarity between Experiment No: 7 in "Applied Heat Transfer Lab" and Experiment No: 9 in "Fuels and Energy Systems Lab" noticed. It has been suggested to remove one of them from the list.
 10. It has been approved to have Solar energy lab as a core lab and CFD (computational fluid dynamics) theory as an Elective course in the curriculum.
 11. Revisions suggested on the Syllabus content of the Open Elective Course, "Waste to energy" prescribed by the AICTE model curriculum. It was brought to the notice of the expert members that the changes to Open Elective courses shall be carried out at Institutional level as the course will be offered as a common course to all PGs of the institute.
- The suggestions made by the panel members were approved by all the members of BoS.
 - The chairman accepted the revisions and suggestions made by the BoS members and the same will be forwarded to the Academic Council for further approval.
 - The meeting came to an end, with the Chairman thanking all the members for having spared their time and participation and feedback in this meeting.

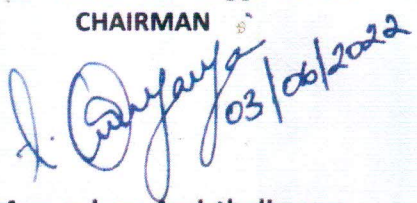
Action Plan: Revised Curriculum/Syllabi with all suggestions incorporated and response to the comments of the individual board members along with the minutes of the meeting for both programmes shall be sent to all the members of the Board of Studies for their final approval.

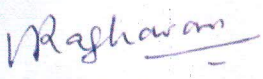

Dr. K.S. Vijay Sekar

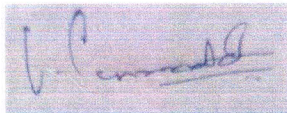
Prof., & Head,
Dept. of Mechanical Engg., SSNCE
CHAIRMAN


Dr. M. Venkataramanan
Professor

Dept. of Mechanical Engg., CEG, Anna Univ.
UNIVERSITY REPRESENTATIVE


Dr. Murugaiyan Amirthalingam
Assistant Professor
Dept. of MME, IITM
SUBJECT EXPERT (Mfg.)


Dr. V. Raghavan
Professor
Dept. of Mechanical Engg., IITM
SUBJECT EXPERT (Energy)


Mr. V. Kumarasubramanian
Former Head, TI-IIIC (Murugappa Group)
Consultant to Murugappa Group of Companies
INDUSTRIAL REPRESENTATIVE


Mr. T. Amalesh,
Ph.D., Scholar
Dept. of Mechanical Engg., SSNCE.
STUDENT ALUMNUS

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Signature of Internal Members:

S. N	Name & Designation	Signature
1	Dr. K. Babu, Assoc. Prof. Coordinator (Mfg.)	
2	Dr. N. Lakshminarasimman, Assoc. Prof. Coordinator (Energy)	
3	Dr. A.K. Lakshminarayanan, Assoc. Prof. Coordinator (Mfg.)	
4	Dr. L. Poovazhagan, Assoc. Prof. Coordinator (Mfg.)	
5	Dr. S. Rajkumar, Assoc. Prof. Coordinator (Energy)	
6	Dr. A.S. Ramana, Assoc. Prof. Coordinator (Energy)	
7	Dr. Koteswara Rao, Professor	
8	Dr. S. Vijayan, Professor	
9	Dr. B. Anand Ronald, Assoc. Prof.	
10	Dr. G. Satheeskumar, Assoc. Prof.	
11	Dr. R. Damodaram, Assoc. Prof.	
12	Dr. K. Rajkumar, Assoc. Prof.	
13	Dr. Nalla Mohammed, Assoc. Prof.	
14	Dr. Vimal Sam Singh, Assoc. Prof.	
15	Dr. C. Arun Prakash, Asst. Prof.	
16	Dr. S. Santosh, Asst. Prof.	
17	Dr. Anirudh K, Asst. Prof.	
18	Dr. R. Prakash, Assoc. Prof.	
19	Dr. B. Jayakishan, Asst. Prof.	
20	Dr. P. Dhamodharan, Asst. Prof.	
21	Dr. T. Micha Prem Kumar, Asst. Prof.	
22	Dr. T. Vinoth, Asst. Prof.	
23	Mr. D. Ebenezer, Asst. Prof.	

24. Dr. M. Suresh, Assoc. Prof.

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Rajiv Gandhi Salai (OMR), Kalavakkam – 603110.



Regulations 2022

Curriculum and Syllabi for

**Master of Engineering
in
Energy Engineering**

Vision and Mission of the Department

Vision

To be an eminent Centre of Excellence in the field of Mechanical Engineering, where teaching, learning and research synergize to deliver technical education and scientific research for public good.

Mission

- To impart quality education to create efficient Mechanical Engineers who can compete at the global level.
- To build State-of-the-art research facilities in Mechanical Engineering in order to enable the faculty and students to learn and disseminate knowledge and innovate in their applications.
- To foster the spirit of entrepreneurship and encourage consultancy to enable all round personality development in students.
- To improve communication skills to excel in higher studies and placements.
- To facilitate teamwork culture and improve the social standards and quality of life of graduates.
- To improve the research activities of the students.

Programme Educational Objectives (PEOs)

To enable our students graduating in this programme to

- PEO 1. Have a successful professional career in core/allied industries in Energy/Thermal domains, either by employment or through entrepreneurship.
- PEO 2. Demonstrate an ability for higher studies, research and lifelong learning.

Programme Outcomes (POs)

Students who graduate from this programme will be able to

- PO 1. To independently carry out research /investigation and development work to solve practical problems.
- PO 2. To write and present a substantial technical report/document.
- PO 3. To demonstrate a degree of mastery in the areas of energy, systems, audit, energy conservation and management, heat transfer, thermal storage, design and simulation of thermal and fluid flow systems.
- PO 4. To apply ethical principles and environmental guidelines to address societal, environmental, and sustainability related issues.

Programme Specific Objectives (PSO's):

- PSO 1. Apply knowledge of science and engineering fundamentals to model, design and analyze components or processes of Energy/Thermal systems
- PSO 2. Identify, formulate, review research literature and analyze complex problems in Energy and allied areas.

PEO / PO/PSO Mapping

	PO/PSO					
	PO1	PO2	PO3	PO4	PSO1	PSO2
PEO1	3	3	3	2	3	3
PEO2	3	3	3	2	3	3

1 - weak; 2 - medium; 3 - strong

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**M.E. ENERGY ENGINEERING
CURRICULUM**

SEMESTER I

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1	PEY2101	Applied Fluid Mechanics and Heat Transfer	PC	4	3	1	0	4
2	PEY2102	Thermodynamic Analysis of Energy Systems	PC	3	2	1	0	3
3	PEY2103	Renewable Energy Systems	PC	3	3	0	0	3
4	PEY2104	Advanced Power Plant Engineering	PC	3	3	0	0	3
5	PGE2176	Research Methodology and IPR	MLC [#]	2	2	0	0	2
6		* Audit Course	AC	2	2	0	0	0
PRACTICAL								
7	PEY2111	Applied Heat Transfer Lab	PC	4	0	0	4	2
8	PEY2112	Fuels and Energy Systems Lab	PC	4	0	0	4	2
Total				25	15	2	8	19

*No credits & optional

Mandatory Learning Course

SEMESTER II

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1	PMA2251	Numerical Techniques for Differential Equations	PC	3	2	1	0	3
2	PEY2201	Energy Conservation in Industrial Utilities	PC	3	3	0	0	3
3	PEY2202	Measurements and Control for Energy Systems	PC	3	3	0	0	3
4		Program Elective I	PE	3	3	0	0	3
5		Program Elective II	PE	3	3	0	0	3
PRACTICAL								
6	PEY2211	Solar Energy Laboratory	PC	4	0	0	4	2
7	PEY2212	Computational Fluid Dynamics Lab	PC	4	0	0	4	2
Total				23	14	1	8	19

SEMESTER III

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1		Program Elective III	PE	3	3	0	0	3
2		Program Elective IV	PE	3	3	0	0	3
3		Program Elective V	PE	3	3	0	0	3
4		Open Elective	OE	3	3	0	0	3
PRACTICAL								
5	PEY2316	Internship with Seminar	EEC	4	0	0	4	2
6	PEY2318	Project Phase I	EEC	12	0	0	12	6
TOTAL				28	12	0	16	20

SEMESTER IV

Sl. No.	Course Code	Course title	Category	Contact periods	L	T	P	C
PRACTICAL								
1	PEY2418	Project Phase II	EEC	24	0	0	24	12
TOTAL				24	0	0	24	12

TOTAL CREDITS = 70

Summary of credits:

SEM	PC	PE	EEC	MLC	OE
I	17	-	-	2	-
II	13	6	-	-	-
III	-	9	8	-	3
IV	-	-	12	-	-
Total	30	15	20	2	3
Credit Share (%)	42.9	21.4	28.6	2.8	4.3
		Total Credits: 70			

CATEGORY WISE LISTING OF COURSES

PROGRAMME CORE COURSES (PC)

Sl. No.	Course Code	Course title	Category	Contact periods	L	T	P	C
1.	PEY2101	Applied Fluid Mechanics and Heat Transfer	PC	4	3	1	0	4
2.	PEY2102	Thermodynamic Analysis of Energy Systems	PC	3	2	1	0	3
3.	PEY2103	Renewable Energy Systems	PC	3	3	0	0	3
4.	PEY2104	Advanced Power Plant Engineering	PC	3	3	0	0	3
5.	PMA2251	Numerical Techniques for Differential Equations	PC	3	2	1	0	3
6.	PEY2201	Energy Conservation in Industrial utilities	PC	3	3	0	0	3
7.	PEY2202	Measurements and control for energy systems	PC	3	3	0	0	3
8.	PEY2111	Applied Heat Transfer Lab	PC	3	0	0	4	2
9.	PEY2112	Fuels and Energy Systems Lab	PC	3	0	0	4	2
10.	PEY2211	Solar Energy Laboratory	PC	3	0	0	4	2
11.	PEY2212	Computational Fluid Dynamics Lab	PC	3	0	0	4	2
Total Credits								30

PROGRAMME ELECTIVES

PROGRAMME ELECTIVE I

ENERGY CONVERSION

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PEY2221	Solar Energy Technologies	PE	3	3	0	0	3
2	PEY2222	Wind Energy Technologies	PE	3	3	0	0	3
3	PEY2223	Bio Energy Conversion Techniques	PE	3	3	0	0	3
4	PEY2224	Electro-Mechanical Energy Conversion	PE	3	3	0	0	3
5	PEY2225	Nuclear Engineering	PE	3	3	0	0	3

PROGRAMME ELECTIVE II
APPLIED ENERGY SYSTEMS

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PEY2226	Electric and Hybrid Electric Vehicles	PE	3	3	0	0	3
2	PEY2227	Steam Generator Technology	PE	3	3	0	0	3
3	PEY2228	Fluidized Bed Systems	PE	3	3	0	0	3
4	PEY2229	Electrical Drives and Controls	PE	3	3	0	0	3
5	PEY2231	Hydrogen and Fuel Cell Technologies	PE	3	3	0	0	3

PROGRAMME ELECTIVE III
ENERGY CONSERVATION AND STORAGE

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PEY2321	Energy Conservation in Electrical Systems	PE	3	3	0	0	3
2	PEY2322	Advanced Power Electronics for Renewable Energy Systems	PE	3	3	0	0	3
3	PEY2323	Energy Efficient Buildings	PE	3	3	0	0	3
4	PEY2324	Advanced Energy Storage Technologies	PE	3	3	0	0	3
5	PEY2325	Advanced Energy Materials	PE	3	3	0	0	3

PROGRAMME ELECTIVE IV
ENERGY MANAGEMENT AND ENVIRONMENT

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PEY2326	Energy Forecasting, Modeling and Project Management	PE	3	3	0	0	3
2	PEY2327	Environmental Engineering and Pollution Control	PE	3	3	0	0	3
3	PEY2328	Waste Management and Energy Recovery	PE	3	3	0	0	3
4	PEY2329	Nanomaterials for Energy and Environment	PE	3	3	0	0	3
5	PEY2331	Digital Energy Management	PE	3	3	0	0	3

PROGRAMME ELECTIVE V

ENERGY SYSTEMS DESIGN AND ENERGY UTILIZATION

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PEY2332	Design and Analysis of Turbomachines	PE	3	3	0	0	3
2	PEY2333	Computational Fluid Dynamics	PE	3	3	0	0	3
3	PEY2334	Design of Heat Exchangers	PE	3	3	0	0	3
4	PEY2335	Energy Systems Modeling and Analysis	PE	3	3	0	0	3
5	PEY2336	Power Generation, Transmission and Utilization	PE	3	3	0	0	3

EMPLOYABILITY ENHANCEMENT COURSES

Sl. No.	Course code	Course title	Category	Contact periods	L	T	P	C
1.	PEY2316	Internship with Seminar	EEC	4	0	0	4	2
2.	PEY2318	Project Phase I	EEC	12	0	0	12	6
3.	PEY2418	Project Phase II	EEC	24	0	0	24	12
Total Credits								20

Audit Courses

Course Code	Course Title
AGE2001	English for Research paper writing
AGE2002	Disaster Management
AGE2003	Value Education
AGE2004	Pedagogy studies
AGE2005	Personality development through life enlightenment skills
AGE2006	Constitution of India

Open Electives

Course Code	Course Title
PGE2941	Business Analytics
PGE2942	Industrial safety
PGE2943	Operations Research
PGE2944	Cost Management of Engineering Projects
PGE2945	Composite Materials
PGE2946	Waste to Energy
PGE2947	Introduction to Data Science

Course wise PO/PSO Mapping

Subject Name	PO 1	PO2	PO3	PO4	PSO1	PSO2
Applied Fluid Mechanics and Heat Transfer	✓	✓	✓		✓	✓
Thermodynamic Analysis of Energy Systems	✓		✓	✓	✓	
Renewable Energy Systems		✓	✓	✓	✓	
Advanced Power Plant Engineering		✓	✓	✓	✓	
Research Methodology and IPR	✓	✓	✓	✓		✓
Applied Heat Transfer Lab	✓	✓	✓	✓	✓	✓
Fuels and Energy Systems Lab	✓	✓	✓	✓	✓	✓
Numerical Techniques For Differential Equations	✓		✓		✓	
Energy conservation in industrial utilities	✓	✓	✓	✓	✓	
Measurements and control for energy systems		✓	✓		✓	
Solar Energy Laboratory	✓	✓	✓	✓	✓	✓
Computational Fluid Dynamics Lab	✓	✓	✓		✓	✓
Solar Energy Technologies		✓	✓		✓	
Wind Energy Technologies		✓	✓		✓	

Sri Sivasubramaniya Nadar College of Engineering
(An Autonomous Institution, Affiliated to Anna University, Chennai)
Rajiv Gandhi Salai (OMR), Kalavakkam – 603110

Curriculum and Syllabus

Master of Engineering Energy Engineering

**Regulations 2018
Choice Based Credit System (CBCS)**



Sri Sivasubramaniya Nadar College of Engineering, Kalavakkam - 603110
(An Autonomous Institution, Affiliated to Anna University, Chennai)

REGULATIONS 2018

CHOICE BASED CREDIT SYSTEM

M.E. ENERGY ENGINEERING

CURRICULUM

Programme Educational Objectives (PEOs):

PEO1. To impart fundamental knowledge to the students in theory and practice of the core areas of Energy Engineering, making them fit to work in the industrial as well as academic environment.

PEO2. To enable students to identify, design, analyze and evaluate Mechanical Engineering components and energy systems using state-of-the-art tools.

PEO3. To enable students plan and apply Energy Conservation methods through proper energy management practices, production methodologies and industrial automation.

PEO4. To prepare the students in pursuing higher studies and Research in the field of Mechanical Engineering and interdisciplinary courses.

PEO5. To inculcate in our students, healthy interpersonal skills, entrepreneurship skills, communication skills, adhering to professional and ethical practices.

PEO6. To motivate the students to participate in research related activities.

Programme Outcomes (POs):

Students who graduate from this programme will be able to

1. Apply the knowledge of mathematics, science and fundamentals of Energy Engineering to solve complex Engineering problems and achieve Energy Economy/Conservation in real systems through detailed Energy Audits.
2. Identify, formulate, research literature, and analyze Energy Systems using the basic principles of mathematics, Energy Engineering and Mechanical Engineering fundamentals.
3. Design solutions for complex Energy Engineering problems and system components or processes that meet the specified needs with appropriate consideration for public health/safety, cultural/societal, energy conservation and environment as a whole.
4. Conduct investigations of complex Energy Engineering problems using research-based knowledge and research methods including thermal design/analysis, interpretation of data, and synthesis of information to arrive at valid conclusions.

5. Create, select, apply appropriate techniques, resources, and modern engineering/IT tools to Energy Engineering problems with an understanding of the techno-economic limitations involved.
6. Apply Energy Conservation principles with reasoning and contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practices.
7. Understand and evaluate the sustainability and impact of professional engineering work in societal, energy and environmental contexts.
8. Apply ethical principles and commit to professional ethics and responsibilities.
9. Function effectively as an individual, and as a member or leader in diverse teams and global Energy Management Groups with focus on energy management and conservation at all possible levels.
10. Communicate and interact effectively on Engineering activities with the peer engineering community and with the society at large, such as, being able to comprehend and write effective reports, design documentation, make effective presentations, and give and receive clear instructions.
11. Demonstrate knowledge and understanding of energy engineering and management principles and economic decision-making and apply these to one's own work, as a member/ leader in a team, aiding management of energy projects in multidisciplinary environments.
12. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of promotion of renewable energy sources and mitigating climate change as well as global warming.

PEO / PO Mapping

	PO											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PEO1	3	3	1	2	3	1		1			1	
PEO2	3	3	1	3	3			1				1
PEO3	2	1	2	3	2	2	1	2	1	2	3	
PEO4	3	3		1	2			1	2	2		2
PEO5			1			2	2	3	2	3	3	1
PEO6	3	3		2	3		1	2		2		

1 - weak; 2 - medium; 3 - strong

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REGULATIONS 2018
CHOICE BASED CREDIT SYSTEM
M.E. ENERGY ENGINEERING
CURRICULUM

SEMESTER I

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1	PEY1101	Incompressible and Compressible Flows	FC	5	3	2	0	4
2	PEY1102	Thermodynamic Analysis of Energy Systems	FC	5	3	2	0	4
3	PEY1103	Energy Conversion Techniques	FC	3	3	0	0	3
4	PEY1104	Energy Resources	PC	3	3	0	0	3
5		Professional Elective I	PE	3	3	0	0	3
6		Professional Elective II	PE	3	3	0	0	3
PRACTICAL								
7	PEY1111	Energy Laboratory	PC	4	0	0	4	2
Total				26	18	4	4	22

SEMESTER II

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1	PMA1276	Advanced Numerical Methods*	FC	5	3	0	2	4
2	PEY1201	Applied Heat Transfer	PC	5	3	2	0	4
3	PEY1202	Measurement and Control for Energy Systems	PC	3	3	0	0	3
4		Professional Elective III	PE	3	3	0	0	3
5		Professional Elective IV	PE	3	3	0	0	3
6		Professional Elective V	PE	3	3	0	0	3
PRACTICAL								
7	PEY1211	Thermal Systems Simulation Laboratory	PC	4	0	0	4	2
Total				26	18	2	6	22

***Theory cum Practical Course**

SEMESTER III

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1	PEY1301	Energy Conservation in Thermal Systems	PC	3	3	0	0	3
2		Professional Elective VI	PE	3	3	0	0	3
3		Professional Elective VII	PE	3	3	0	0	3
PRACTICAL								
4.	PEY1318	Project Work Phase - I	EEC	12	0	0	12	6
TOTAL				21	9	0	12	15

SEMESTER IV

Sl. No.	Course code	Course title	Category	Contact periods	L	T	P	C
PRACTICAL								
1	PEY1418	Project Work Phase - II	EEC	24	0	0	24	12
TOTAL				24	0	0	24	12

TOTAL CREDITS TO BE EARNED FOR THE AWARD OF THE DEGREE = 71

Summary of Course works category and Credits sharing

SEM	FC (Credits)	PC (Credits)	PE (Credits)	EEC (Credits)
I	3 (11)	2 (5)	2 (6)	-
II	1 (4)	3 (9)	3 (9)	-
III	-	1 (3)	2 (6)	1 (6)
IV	-	-	-	1 (12)
Total	4 (15)	6 (17)	7 (21)	2 (18)
Credit Share (%)	21.1	23.9	29.6	25.4
Total Subjects & Projects: 19 Total Credits : 71 FC-Foundation course, PC-Professional Core, PE-Professional Elective, EEC-Employability Enhancement Course				

FOUNDATION COURSES (FC)

Sl. No.	Course code	Course title	Category	Contact periods	L	T	P	C
1.	PEY1101	Incompressible and Compressible Flows	FC	5	3	2	0	4
2.	PEY1102	Thermodynamic Analysis of Energy Systems	FC	5	3	2	0	4
3.	PEY1103	Energy Conversion Techniques	FC	3	3	0	0	3
4.	PMA1276	Advanced Numerical Methods*	FC	5	3	0	2	4

PROFESSIONAL CORE COURSES (PC)

Sl. No.	Course code	Course title	Category	Contact periods	L	T	P	C
1.	PEY1104	Energy Resources	PC	3	3	0	0	3
2.	PEY1111	Energy Laboratory	PC	4	0	0	4	2
3.	PEY1201	Applied Heat Transfer	PC	5	3	2	0	4
4.	PEY1202	Measurement and Control for Energy Systems	PC	3	3	0	0	3
5.	PEY1211	Thermal Systems Simulation Laboratory	PC	4	0	0	4	2
6.	PEY1301	Energy Conservation in Thermal Systems	PC	3	3	0	0	3

PROFESSIONAL ELECTIVES

SEMESTER I

(PROFESSIONAL ELECTIVES I & II)

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PEY1121	Hydrogen and Fuel Cell Technologies	PE	3	3	0	0	3
2	PEY1122	Solar Energy Technologies	PE	3	3	0	0	3
3	PEY1123	Wind Energy Technologies	PE	3	3	0	0	3
4	PEY1124	Bio Energy Conversion Techniques	PE	3	3	0	0	3
5	PEY1125	Nuclear Engineering	PE	3	3	0	0	3
6	PEY1126	Computational Fluid Dynamics for Energy Systems	PE	3	3	0	0	3

PROFESSIONAL ELECTIVES

SEMESTER II

PROFESSIONAL ELECTIVES –III, IV and V

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PEY1221	Energy Systems Modeling and Analysis	PE	3	3	0	0	3
2	PEY1222	Design of Heat Exchangers	PE	3	3	0	0	3
3	PEY1223	Electrical Drives and Controls	PE	3	3	0	0	3
4	PEY1224	Power Generation, Transmission and Utilization	PE	3	3	0	0	3
5	PEY1225	Hybrid Electric Vehicles	PE	3	3	0	0	3
6	PEY1226	Design and Analysis of Turbomachines	PE	3	3	0	0	3
7	PEY1227	Energy Forecasting, Modeling and Project Management	PE	3	3	0	0	3
8	PEY1228	Energy Efficient Buildings	PE	3	3	0	0	3
9	PEY1229	Energy Conservation in Electrical Systems	PE	3	3	0	0	3
10	PEY1231	Nanomaterials for Energy Applications	PE	3	3	0	0	3

PROFESSIONAL ELECTIVES

SEMESTER III

(PROFESSIONAL ELECTIVES VI & VII)

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PEY1321	Advanced Power Plant Engineering	PE	3	3	0	0	3
2	PEY1322	Steam Generator Technology	PE	3	3	0	0	3
3	PEY1323	Fluidized Bed Systems	PE	3	3	0	0	3
4	PEY1324	Advanced Energy Storage Technologies	PE	3	3	0	0	3
5	PEY1325	Waste Management and Energy Recovery	PE	3	3	0	0	3
6	PEY1326	Environmental Engineering and Pollution Control	PE	3	3	0	0	3
7	PMF1376	Research Methodology	PE	3	3	0	0	3

8	PEY1327	Advanced Power Electronics for Renewable Energy Systems	PE	3	3	0	0	3
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EMPLOYABILITY ENHANCEMENT COURSES (EEC)

Sl. No.	Course code	Course title	Category	Contact periods	L	T	P	C
1.	PEY1318	Project Work Phase - I	EEC	1 2	0	0	12	6
2.	PEY1418	Project Work Phase - II	EEC	2 4	0	0	24	12

Coursewise PO Mapping

Subject Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	POs 10-12
Incompressible and Compressible Flows	✓	✓						✓	✓	✓
Thermodynamic Analysis of Energy Systems	✓	✓						✓	✓	✓
Energy Conversion Techniques	✓	✓	✓				✓	✓	✓	✓
Energy Resources	✓	✓		✓				✓		✓
Hydrogen and Fuel Cell Technologies	✓	✓		✓				✓		✓
Solar Energy Technologies		✓						✓		✓
Wind Energy Technologies	✓	✓		✓				✓		✓
Bio Energy Conversion Techniques	✓	✓		✓	✓					✓
Nuclear Engineering	✓	✓		✓	✓					✓
Computational Fluid Dynamics for Energy Systems	✓	✓		✓				✓		✓
Advanced Numerical Methods	✓	✓						✓	✓	✓
Applied Heat Transfer	✓	✓	✓				✓	✓	✓	✓
Measurement and Control for Energy Systems	✓	✓		✓				✓		✓
Energy Systems Modeling and Analysis	✓	✓						✓	✓	✓
Design of Heat Exchangers	✓	✓						✓	✓	✓