



**SRI SIVASUBRAMANIYA NADAR COLLEGE OF
ENGINEERING**

(An Autonomous Institution)
Kalavakkam – 603 110

SELF STUDY REPORT

1.2.1 New Courses Introduced

M.Tech. Environmental Science and Technology

Submitted to

The National Assessment and Accreditation Council

February 2024

Name of the Programme : M.Tech. Environmental Science & Technology

Number of New Courses introduced in the Academic Year 2022-23 (Regulation 2022) : 5 Courses

List of New Courses :

S. No.	Name of the Course	Course Code
1	Analytical Instrumentation Laboratory for Environmental Applications	PES2112
2	Separation Processes in Environmental Applications Laboratory	PES2211
3	Computational Simulation in Environmental Engineering Laboratory	PES2212
4	Internship with Seminar	PES2216
5	Applied Mathematics for Environmental Engineering	PMA2151

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 16-05-2022 to consider and approve the PG R2022 curriculum and syllabus for M.Tech. Environmental Science and Technology.
- Curriculum – Regulations R2022 and R2018 Curriculum for M.Tech. Environmental Science and Technology with the new courses highlighted.

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



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.

A handwritten signature in black ink, likely of the Chairman, is positioned above the title 'Chairman'. The signature is stylized and cursive.

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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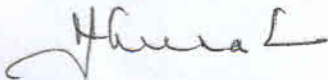


The suggestions made by the members of the academic council were accepted and the Chairman thanked all the members for their participation.


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.

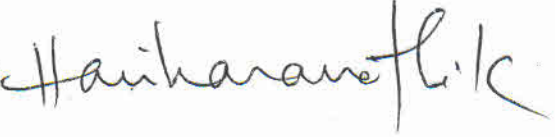
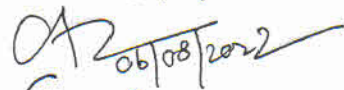
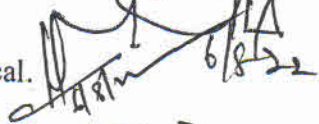
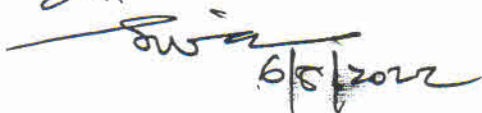

Mr. N. Siva Sankaran
CTO, Viruksa Pvt., Ltd.


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*

SRI SIVASUBRAMANIYA NADAR COLLEGE OF ENGINEERING

(Approved by AICTE, New Delhi and Affiliated to Anna University: Chennai)

Rajiv Gandhi Salai (OMR), Kalavakkam, Kancheepuram Dt – 603 110, Tamil Nadu, India.

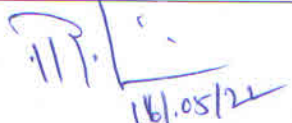
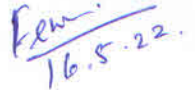
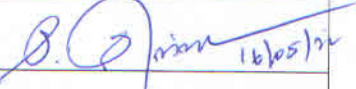
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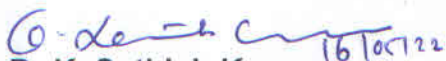
ATTENDANCE

Meeting of the Board of Studies for PG course on Environmental Science and Technology

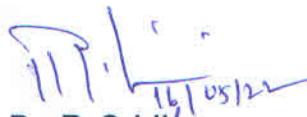
Date: 16.05.2022

Sl.No.	Name and Address		Signature
1.	Dr.K. Sathish Kumar Professor & Head Department of Chemical Engineering Sri Sivamaniya Nadar College of Engineering, Kalavakkam – 603 110.	Chairman	
2.	Dr. R. Sridhar Associate Professor & Head Department of Chemical Engineering Puducherry Technological University Pillaichavady, Puducherry – 605 014.	University Nominee	 16/05/22
3.	Dr. A. Sivasamy Chief Scientist & Prof of AcSIR Head, Catalysis Science Laboratory CSIR- Central Leather Research Institute, Adyar, Chennai – 600 020.	Institution Academic Expert	
4.	Dr. K. M. Meera Sheriffa Begaum Professor Department of Chemical Engineering National Institute of Technology Tiruchirappalli – 620015.	Institution Academic Expert	 16/5/2022
5.	Mr. P. Ganesh Kumar Deputy General Manager (Process) Water & Effluent Treatment IC L & T Construction Limited Chennai – 600 089.	Industry Representative	
6.	Dr. C. Femina Carolin Assistant Professor Department of Biotechnology Rajalakshmi Engineering College Rajalakshmi Nagar, Thandalam Chennai – 602 105.	Meritorious PG Alumna	 16.5.22.
Department Faculty Members			
7.	Dr. R. Parthiban Professor	Member	 16/5/2022
8.	Dr. P. Senthil Kumar Professor	Member	 16/05/22
9.	Dr. V. Jaikumar Associate Professor	Member	
10.	Dr. K. Jagannathan Associate Professor	Member	

11.	Dr. D. Gnana Prakash Associate Professor	Member	
12.	Dr. Nalinkanth V Ghone Associate Professor	Member	
13.	Dr. B. Ambedkar Associate Professor	Member	
14.	Dr. M. Subramanian Associate Professor	Member	
15.	Dr. J. Dhanalakshmi Associate Professor	Member	
16.	Dr. R. Anantharaj Associate Professor	Member	
17.	Dr. D. Balaji Associate Professor	Member	
18.	Dr. B. Chitra Associate Professor	Member	
19.	Dr. Kilaru Harsha Vardhan Associate Professor	Member	
21.	Dr. Pachimatla Rajesh Assistant Professor	Member	


16/05/22

Dr. K. Sathish Kumar
Professor & Head
Department of Chemical Engineering
SSNCE


16/05/22

Dr. R. Sridhar
Associate Professor
Department of Chemical Engineering
Puducherry Technological University
Pillaichavady, Puducherry – 605 014.


16/05/2022

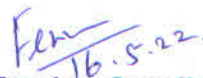
Dr. A. Sivasamy
Chief Scientist & Prof of AcSIR
Head, Catalysis Science Laboratory
CSIR- Central Leather Research Institute,
Adyar, Chennai – 600 020.


16/5/2022

Dr. K. M. Meera Sheriffa Begaum
Professor
Department of Chemical Engineering
National Institute of Technology
Tiruchirappalli – 620015.



Mr. P. Ganesh Kumar
Deputy General Manager (Process)
Water & Effluent Treatment IC
L & T Construction Limited
Chennai – 600 089.


16.5.22.

Dr. C. Femina Carolin
Assistant Professor
Department of Biotechnology
Rajalakshmi Engineering College
Rajalakshmi Nagar, Thandam
Chennai – 602 105.

Department Faculty Members		
Dr. R. Parthiban Professor	Member	 16/5/22
Dr. P. Senthil Kumar Professor	Member	 16/05/22
Dr. V. Jaikumar Associate Professor	Member	
Dr. K. Jagannathan Associate Professor	Member	
Dr. D. Gnana Prakash Associate Professor	Member	
Dr. Nalinkanth V Ghone Associate Professor	Member	
Dr. B. Ambedkar Associate Professor	Member	
Dr. M. Subramanian Associate Professor	Member	

Dr. J. Dhanalakshmi Associate Professor	Member	J. Dhany
Dr. R. Anantharaj Associate Professor	Member	R. Anantharaj
Dr. D. Balaji Associate Professor	Member	Dan
Dr. B. Chitra Associate Professor	Member	cl - A
Dr. Kilaru Harsha Vardhan Associate Professor	Member	hw
Dr. Pachimatla Rajesh Assistant Professor	Member	P. Rajesh

SRI SIVASUBRAMANIYA NADAR COLLEGE OF ENGINEERING**(Approved by AICTE, New Delhi and An Autonomous Institution, Affiliated to Anna University)**

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Phone: +91 44 32909138, 32909855, www.ssn.edu.in**MINUTES OF THE MEETING FORBOARD OF STUDIES-CHEMICAL ENGINEERING****Date : 16th May 2022, Monday****Time : 9.30 a.m.**

The following are the members of Board of Studies:

1	Dr.K. Sathish Kumar	Professor &Head, Dept. of Chemical Engineering, SSNCE	Chairperson
2	Dr. R. Sridhar	Associate Professor & Head Department of Chemical Engineering Puducherry Technological University Pillaichavady, Puducherry – 605 014.	University Nominee
3	Dr. A. Sivasamy	Chief Scientist & Prof of AcSIR Head, Catalysis Science Laboratory CSIR- Central Leather Research Insitute, Adyar, Chennai – 600 020.	Institution Academic Expert
4	Dr. K. M. Meera Sheriffa Begum	Professor Department of Chemical Engineering National Institute of Technology Tiruchirappalli – 620015.	Institution Academic Expert
5	Mr. P. Ganesh Kumar	Deputy General Manager (Process) Water & Effluent Treatment IC L & T Construction Limited Chennai – 600 089.	Industry Representative
6	Dr. C, FeminaCarolín	Assistant Professor Department of Biotechnology Rajalakshmi Engineering College Rajalakshmi Nagar, Thandalam Chennai – 602 105.	Meritorious Alumnus
7	Dr. R. Parthiban	Professors, Dept. of Chemical Engineering, SSNCE Associate Professors, Dept. of Chemical Engineering, SSNCE	Members
8	Dr. P. Senthil Kumar		
8	Dr. V. Jaikumar		
9	Dr. K. Jagannathan		
10	Dr. D. Gnana Prakash		
11	Dr. Nalinkanth V Ghone		
12	Dr. B. Ambedkar		
13	Dr. M. Subramanian		
14	Dr. J. Dhanalakshmi		
15	Dr. R. Anantharaj		
16	Dr. D. Balaji		
17	Dr. B. Chitra		
18	Dr. Kilaru HarshaVardhan		
19	Dr. Pachimatla Rajesh	Assistant Professor, Dept. of Chemical Engineering, SSNCE	

AGENDA

1. To Consider and approve the proposed curricula for the PG programme in Environmental Science and Technology under CBCS to be offered under autonomous status – 2022 with effect from the academic year 2022-23

This matter is placed before the Board of Studies for consideration and Approval.

The proposed curricula for all the semesters of Environmental Science and Technology subjects were presented and the modifications from the previous curricula were highlighted with the following points

- i. One Mandatory and common course on Research methodology will be introduced in Ist semester
- ii. A Foundation course on "Applied Mathematics for Environmental Engineering will be introduced in Ist semester
- iii. Three labs will be introduced in the Ist Year providing more focus on Practical Subjects.
- iv. One audit course will be introduced in the IInd Semester based on AICTE model curriculum.
- v. An open elective course will be introduced in the IIIrd Semester
- vi. There will be involvement of industrial expert in Project review
- vii. There will be minimum 10% variation in core courses
- viii. Theory to Practical ratio = 61:39 (AICTE Recommendation – 60:40)

The following point was suggested by the expert members for the PG curricula

The course title "Modern Instrumentation for Environmental applications Laboratory" shall be changed to "Analytical Instrumentation Laboratory for Environmental applications"

2. To Consider and approve the proposed syllabus 2022 under CBCS for PG degree programme to be offered under autonomous status

The proposed syllabi of Environmental Science and Technology were presented and the following points were suggested by the Expert members

In "Applied Mathematics in Environmental Engineering", topic on Environmental statistics shall be included.

In "Environmental Chemistry", the contents on Unit II shall be rephrased based on the PG level.

In "Unit Operations and Unit Processes in Environmental Technology", modern design approach for Biological unit processes shall be included in Unit V.

In "Computational and Simulation Laboratory", some more industrial software's shall be included if possible.

In "Principles of Green Chemistry", contents on Intensification shall be added in Unit IV.

In "Carbon Capture and Storage", one unit on carbon foot print shall be included.

In "Bio-Energy Conversion Techniques", Unit V shall be renamed as Biofuels and a topic on Bio hydrogen shall be included.

Some general points discussed were

Number of Reference books shall be uniform and the recent edition of reference books shall be added.

Number of experiments in each laboratory shall be mentioned under each lab course.

3. To Consider and approve the amendments in the proposed syllabus 2021 under CBCS for UG degree programme to be offered under autonomous status

Two courses namely Numerical methods in Chemical Engineering in 4th Semester & Chemical Process modeling & simulation in 7th semester were modified as Theory cum Laboratory courses (TCP).

4. Others, if any

Nil

The suggestions made by the panel members were approved by all the members of the Board of Studies. The Chairman accepted the revisions and suggestions made by the BoS members and informed that the same will be forwarded to the Academic Council for further approval.

The meeting came to end, with the Chairman thanking all the members for having spared their time and participated in the Board of Studies of Chemical Engineering, SSN College of Engineering, Kalavakkam.

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 Technology Environmental Science & Technology

**Regulations 2022
Choice Based Credit System (CBCS)**



Sri Sivasubramaniya Nadar College of Engineering, Kalavakkam - 603 110
(An Autonomous Institution Affiliated to Anna University Chennai)

Rajiv Gandhi Salai (OMR), Kalavakkam – 603110

Vision and Mission of the Department

Vision

- To be a globally recognized Chemical Engineering department with excellence in teaching, research and consultancy services.

Mission

- To prepare our students to become successful professional Chemical Engineers capable of undertaking advanced studies and life-long learning.
- To produce Chemical Engineers who will contribute to the process industries worldwide.
- To provide the students a strong fundamental technical education that makes them capable of catering to the needs of a changing technological environment and the society.
- To nurture the innovative capabilities of students by providing them with a research platform and exposure to current technologies.

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PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

- I. To provide the engineering graduates with technical expertise in environmental science and technology which will enable them to have a career and professional accomplishment in the public or private sector, to pursue higher studies or may start up their own business.
- II. Address the complexities of real-life environmental problems related to domestic and industrial waste management, environmental impact assessment, industrial pollution prevention and control.
- III. Identify, formulate, analyse, develop processes and technologies to meet desired environmental protection needs of society and formulate solutions that are technically sound and economically feasible.

PROGRAMME OUTCOMES (POs):

By the time of their graduation, the students are expected:

- PO 1. An ability to independently carry out research /investigation and development work to solve practical problems.
- PO 2. An ability to write and present a substantial technical report/document.
- PO 3. Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.
- PO 4. An ability to select/design the treatment units to mitigate the environmental pollution.

PEOs mapping with POs

PEO	PO1	PO2	PO3	PO4
I	3	1	3	3
II	3	2	3	3
III	3	3	3	3

COURSE - PO MAPPING

Semester	Course Name	Programme Outcomes			
		PO1	PO2	PO3	PO4
I	Applied Mathematics for Environmental Engineering			3	2
	Environmental Chemistry			3	1
	Unit Operations and Unit Processes in Environmental Technology		3	3	3
	Biological Wastewater Treatment	2		3	2
	Research Methodology & IPR	3	3		
	Program Elective I				
	Environmental Engineering Laboratory	3	3	3	3
	Analytical Instrumentation Laboratory for Environmental applications	3	3	3	3
II	Air Pollution and Control Engineering	1	3	3	2
	Separation Processes in Environmental Applications		3	3	3
	Solid and Hazardous Waste Management		1	3	2
	Program Elective II				
	Program Elective III				
	Separation Processes in Environmental Applications Laboratory	3	3	3	3
	Computational Simulation in Environmental Engineering Laboratory	1	3	3	3
	Internship & Seminar	3	3	3	3
III	Program Elective IV				
	Program Elective V				
	Open Elective				
	Project Phase I	3	3	3	3
IV	Project Phase II	3	3	3	3
Program Electives	Safety and Hazard Control		1	2	1
	Environmental Policies and Legislation		1	2	1
	Environmental Sustainability		2	2	
	Ecology and Environment	1		2	2
	Industrial Pollution Prevention			2	2
	Modeling of Environmental Systems	2	3	3	3
	Environmental Impact Assessment	2	2	3	2
	Environmental Risk Assessment	1		2	2
	Wastewater Engineering			3	1
	Marine Pollution and Control		3	3	2
	Membrane Technologies for Water and Wastewater Treatment	2	2	2	2
	Environmental Reaction Engineering	2	3	3	2
	Advanced Oxidation Processes and Technology	2	3	3	2
	Electrochemical Environmental Technology		3	3	2
	Principles of Green Chemistry and Engineering			3	1
	Carbon Capture and Storage	1	3	3	
	Climate Change and Adaptation		2	3	
	Environmental Biotechnology	1		2	

	Remote Sensing and GIS Applications in Environmental Management		3	3	
	Soil Pollution Engineering			3	2
	Bio-Energy Conversion Techniques		2	3	
	Waste Management and Energy Recovery		2	3	
	Electronic Waste Management		3	3	2
	Plastic Waste Management		2	3	2
	Agricultural Waste Management		1	3	
Open Electives	Business analytics	1			1
	Industrial safety	1		2	
	Operations Research	2	2		
	Cost Management of Engineering Projects	2	1		
	Composite Materials	2	1		
	Waste to Energy	2		2	
	Introduction to Data Science	2			2

I TO IV SEMESTERS CURRICULUM -R2022 (CBCS)

SEMESTER I								
Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	PMA2151	Applied Mathematics for Environmental Engineering	FC	4	3	1	0	4
2	PES2101	Environmental Chemistry	FC	3	3	0	0	3
3	PES2102	Unit Operations and Unit Processes in Environmental Technology	PC	3	3	0	0	3
4	PES2103	Biological Wastewater Treatment	PC	3	3	0	0	3
5	PGE2176	Research Methodology & IPR	MLC [#]	2	2	0	0	2
6		Program Elective I	PE	3	3	0	0	3
PRACTICALS								
7	PES2111	Environmental Engineering Laboratory	PC	4	0	0	4	2
8	PES2112	Analytical Instrumentation Laboratory for Environmental Applications	PC	4	0	0	4	2
TOTAL				26	17	1	8	22

#Mandatory Learning Course

SEMESTER II								
Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	PES2201	Air Pollution and Control Engineering	PC	3	3	0	0	3
2	PES2202	Separation Processes in Environmental Applications	PC	3	3	0	0	3
3	PES2203	Solid and Hazardous Waste Management	PC	3	3	0	0	3
4		Program Elective II	PE	3	3	0	0	3
5		Program Elective III	PE	3	3	0	0	3
6		Audit Course*	AC	2	2	0	0	0
PRACTICALS								
7	PES2211	Separation Processes in Environmental Applications Laboratory	PC	4	0	0	4	2
8	PES2212	Computational Simulation in Environmental Engineering Laboratory	PC	4	0	0	4	2
9	PES2216	Internship with Seminar	EEC	2	0	0	2	2
TOTAL				27	17	0	10	21

*No credit & Optional

SEMESTER III								
Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1		Program Elective IV	PE	3	3	0	0	3
2		Program Elective V	PE	3	3	0	0	3
3		Open Elective	OE	3	3	0	0	3
PRACTICALS								
5	PES2318	Project 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
PRACTICALS								
1	PES2418	Project Phase II	EEC	24	0	0	24	12
TOTAL				24	0	0	24	12

Total Credits: 70

PROGRAM ELECTIVES

SEMESTER I

PROGRAM ELECTIVE –I

Sl.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PES2121	Safety and Hazard Control	PE	3	3	0	0	3
2	PES2122	Environmental Policies and Legislation	PE	3	3	0	0	3
3	PES2123	Environmental Sustainability	PE	3	3	0	0	3
4	PES2124	Ecology and Environment	PE	3	3	0	0	3
5	PES2125	Industrial Pollution Prevention	PE	3	3	0	0	3

SEMESTER II

PROGRAM ELECTIVE –II

Sl.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PES2221	Modeling of Environmental Systems	PE	3	3	0	0	3
2	PES2222	Environmental Impact Assessment	PE	3	3	0	0	3
3	PES2223	Environmental Risk Assessment	PE	3	3	0	0	3
4	PES2224	Wastewater Engineering	PE	3	3	0	0	3
5	PES2225	Marine Pollution and Control	PE	3	3	0	0	3

PROGRAM ELECTIVE –III

Sl.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PES2226	Membrane Technologies for Water and Wastewater Treatment	PE	3	3	0	0	3
2	PES2227	Environmental Reaction Engineering	PE	3	3	0	0	3
3	PES2228	Advanced Oxidation Processes and Technology	PE	3	3	0	0	3
4	PES2229	Electrochemical Environmental Technology	PE	3	3	0	0	3
5	PES2231	Principles of Green Chemistry and Engineering	PE	3	3	0	0	3

SEMESTER III**PROGRAM ELECTIVE –IV**

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PES2321	Carbon Capture and Storage	PE	3	3	0	0	3
2	PES2322	Climate Change and Adaptation	PE	3	3	0	0	3
3	PES2323	Environmental Biotechnology	PE	3	3	0	0	3
4	PES2324	Remote Sensing and GIS Applications in Environmental Management	PE	3	3	0	0	3
5	PES2325	Soil Pollution Engineering	PE	3	3	0	0	3

PROGRAM ELECTIVE –V

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PES2326	Bio-Energy Conversion Techniques	PE	3	3	0	0	3
2	PES2327	Waste Management and Energy Recovery	PE	3	3	0	0	3
3	PES2328	Electronic Waste Management	PE	3	3	0	0	3
4	PES2329	Plastic Waste Management	PE	3	3	0	0	3
5	PES2331	Agricultural Waste Management	PE	3	3	0	0	3

SEMESTER II**AUDIT COURSES**

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	AGE2001	English for Research Paper Writing	AC	2	2	0	0	0
2	AGE2002	Disaster Management	AC	2	2	0	0	0
3	AGE2003	Value Education	AC	2	2	0	0	0
4	AGE2004	Pedagogy Studies	AC	2	2	0	0	0
5	AGE2005	Personality Development Through Life Enlightenment Skills	AC	2	2	0	0	0
6	AGE2006	Constitution of India	AC	2	2	0	0	0

SEMESTER III

OPEN ELECTIVE COURSES

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PGE2941	Business Analytics	OE	3	3	0	0	3
2	PGE2942	Industrial Safety	OE	3	3	0	0	3
3	PGE2943	Operations Research	OE	3	3	0	0	3
4	PGE2944	Cost Management of Engineering Projects	OE	3	3	0	0	3
5	PGE2945	Composite Materials	OE	3	3	0	0	3
6	PGE2946	Waste to Energy	OE	3	3	0	0	3
7	PGE2947	Introduction to Data Science	OE	3	3	0	0	3

Foundation Courses (FC)

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1	PMA2151	Applied Mathematics for Environmental Engineering	FC	4	3	1	0	4
2	PES2101	Environmental Chemistry	FC	3	3	0	0	3

Program Core (PC)

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1	PES2102	Unit Operations and Unit Processes in Environmental Technology	PC	3	3	0	0	3
2	PES2103	Biological Wastewater Treatment	PC	3	3	0	0	3
3	PES2201	Air Pollution and Control Engineering	PC	3	3	0	0	3
4	PES2202	Separation Processes in Environmental Applications	PC	5	3	0	0	3

5	PES2203	Solid and Hazardous Waste Management	PC	3	3	0	0	3
PRACTICALS								
6	PES2111	Environmental Engineering Laboratory	PC	4	0	0	4	2
7	PES2112	Analytical Instrumentation Laboratory for Environmental Applications	PC	4	0	0	4	2
8	PES2211	Separation Processes in Environmental Applications Laboratory	PC	4	0	0	4	2
9	PES2212	Computational Simulation in Environmental Engineering Laboratory	PC	4	0	0	4	2

Employability Enhancement Courses (EEC)

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
PRACTICALS								
1	PES2216	Internship & Seminar	EEC	4	0	0	4	2
2	PES2318	Project Work Phase-I	EEC	12	0	0	12	6
3	PES2418	Project Work Phase-II	EEC	24	0	0	24	12

SUMMARY

Subject category	I	II	III	IV	Total
FC	7	0	0	0	7
PC	10	13	0	0	23
PE	3	6	6	0	15
OE	0	0	3	0	3
EEC	0	2	6	12	20
MLC	2	0	0	0	2
AC	0	0	0	0	0
Total	22	21	15	12	70

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 Technology **Environmental Science & Technology**

Regulations 2018
Choice Based Credit System (CBCS)



Sri Sivasubramaniya Nadar College of Engineering, Kalavakkam - 603 110
(An Autonomous Institution Affiliated to Anna University Chennai)

Rajiv Gandhi Salai (OMR), Kalavakkam – 603110

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

- I. To provide the engineering graduates with technical expertise in environmental science and technology which will enable them to have a career and professional accomplishment in the public or private sector, to pursue higher studies or may start up their own business.
- II. Address the complexities of real life environmental problems related to domestic and industrial waste management, environmental impact assessment, industrial pollution prevention and control.
- III. Identify, formulate, analyse, develop processes and technologies to meet desired environmental protection needs of society and formulate solutions that are technically sound and economically feasible.

PROGRAMME OUTCOMES (POs):

By the time of their graduation, the students are expected:

- PO 1. **Engineering Knowledge:** Apply the knowledge of mathematics, science, and engineering fundamentals, to solve the complex environmental technology problems.
- PO 2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex environmental problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
- PO 3. **Design/development of solutions:** Design solutions for complex environmental problems and design system components or process that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal and environmental considerations.
- PO 4. **Conduct investigations of complex problems:** Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, simulating complex problems and synthesis of the information to proceed valid conclusions.
- PO 5. **Modern tool usage:** Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction, modeling and simulating the complex technology activities with an understanding of the limitations.
- PO 6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional environmental technology practice.
- PO 7. **Environment and sustainability:** Understand the impact of the professional environmental technology solutions in societal and environmental contexts, and demonstrate the knowledge of and need for sustainable development.
- PO 8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the environmental technology practice.

- PO 9. **Individual and team work:** Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO 10. **Communication:** Communicate effectively on complex environmental science and technology activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO 11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO 12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological changes in environmental science and technology.

Program Specific Outcomes (PSOs)

- PO 13. **Ethos:** Possess a great spirit of an innovative environmental technologist and passionate towards solving the environmental science and technology problems and design.
- PO 14. **Contemporary Issues:** Aware of contemporary issues like climate change, environmental pollution and energy crisis and foresee a suitable solution for the issues related these problems.

Programme Educational Objectives	Programme Outcomes													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PO13	PO14
I	3	3	3	3	2	1	3	2	3	3	3	2	3	3
II	3	3	3	3	2	2	3	2	1	2	1	3	3	3
III	3	3	3	3	3	3	3	2	1	2	1	3	3	2

			PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14
YEAR 1	SEM I	Environmental Impact Assessment			3	3		3	3		1	3	3			3
		Biological Wastewater Treatment	3	3	3	3				1				2	2	
		Environmental Chemistry	3	2	2	3			2							3
		Unit Operations and Unit Processes in Environmental Technology	3	2	3	3			2	1				2	3	
		Professional Elective I														
		Professional Elective II														
		Environmental Engineering Laboratory	2	3	2	3	3									
	SEM 2	Air Pollution and Control Engineering	3	3	3	3		2	1						3	3
		Advanced Numerical Methods	3	3	2	3	3									
		Separation Processes in Environmental Applications	3	2	3	3			2					2	3	
		Solid and Hazardous Waste Management	2	2	3				3					2	3	3
		Professional Elective III														
		Professional Elective IV														
		Seminar									3	2		3	2	

YEAR II	SEM 3	Modeling of Environmental Systems	3	2	2	5	5							2		
		Professional Elective V														
		Professional Elective VI														
		Internship									3	2		3	2	
		Project Work Phase-I	3	3	3	3	2	1	2	3	3	3	3	3	3	3
	SEM 4	Project Work Phase-II	3	3	3	3	2	1	2	3	3	3	3	3	3	3

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REGULATIONS 2018

CHOICE BASED CREDIT SYSTEM

M. TECH. - ENVIRONMENTAL SCIENCE & TECHNOLOGY

CURRICULUM

SEMESTER I

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1	PES1101	Environmental Impact Assessment	PC	3	3	0	0	3
2	PES1102	Biological Wastewater Treatment	PC	3	3	0	0	3
3	PES1103	Environmental Chemistry	FC	3	3	0	0	3
4	PES1104	Unit Operations and Unit Processes in Environmental Technology	PC	5	3	2	0	4
5		Professional Elective I	PE	3	3	0	0	3
6		Professional Elective II	PE	3	3	0	0	3
PRACTICALS								
7	PES1111	Environmental Engineering Laboratory	PC	4	0	0	4	2
Total				24	18	2	4	21

SEMESTER II

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1	PES1201	Air Pollution and Control Engineering	PC	3	3	0	0	3
2	PMA1276	Advanced Numerical Methods	FC	5	3	2	0	4
3	PES1202	Separation Processes in Environmental Applications	PC	5	3	0	0	3
4	PES1203	Solid and Hazardous Waste Management	PC	3	3	0	0	3
5		Professional Elective III	PE	3	3	0	0	3
6		Professional Elective IV	PE	3	3	0	0	3

PRACTICALS								
7	PES1215	Seminar	EEC	4	0	0	4	2
Total				24	18	2	4	21

SEMESTER III

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1	PES1301	Modeling of Environmental Systems	PC	5	3	2	0	4
2		Professional Elective V	PE	3	3	0	0	3
3		Professional Elective VI	PE	3	3	0	0	3
PRACTICALS								
4	PES1316	Internship	EEC	2	0	0	2	1
5	PES1318	Project Work Phase-I	EEC	12	0	0	12	6
Total				25	9	2	14	17

SEMESTER IV

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
PRACTICALS								
1	PES1418	Project Work Phase-II	EEC	24	0	0	24	12

TOTAL CREDITS = 71

PROFESSIONAL ELECTIVES

SEMESTER I

PROFESSIONAL ELECTIVE –I

Sl.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PES1121	Safety and Hazard Control	PE	3	3	0	0	3
2	PES1122	Environmental Policies and Legislation	PE	3	3	0	0	3
3	PES1123	Environmental Sustainability	PE	3	3	0	0	3
4	PES1124	Ecology and Environment	PE	3	3	0	0	3
5	PES1125	Energy Management	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE –II

Sl.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PES1126	Marine Pollution and Control	PE	3	3	0	0	3
2	PES1127	Environmental Risk Assessment	PE	3	3	0	0	3
3	PES1128	Wastewater Engineering	PE	3	3	0	0	3
4	PES1129	Industrial Pollution Prevention	PE	3	3	0	0	3
5	PES1131	Climate Change and Adaptation	PE	3	3	0	0	3

PROFESSIONAL ELECTIVES

SEMESTER II

PROFESSIONAL ELECTIVE – III

Sl.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PES1221	Membrane Technologies for Water and Wastewater Treatment	PE	3	3	0	0	3
2	PES1222	Environmental Reaction Engineering	PE	3	3	0	0	3
3	PES1223	Advanced Oxidation Processes and Technology	PE	3	3	0	0	3
4	PES1224	Pollution Abatement	PE	3	3	0	0	3
5	PES1225	Corrosion Engineering	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE – IV

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PES1226	Environmental Biotechnology	PE	3	3	0	0	3
2	PES1227	Soil Pollution Engineering	PE	3	3	0	0	3
3	PES1228	Environment, Health and Safety in Industries	PE	3	3	0	0	3
4	PES1229	Remote Sensing and GIS Applications in Environmental Management	PE	3	3	0	0	3
5	PES1231	Hydrogen and Fuel Cells	PE	3	3	0	0	3

PROFESSIONAL ELECTIVES**SEMESTER III****PROFESSIONAL ELECTIVE – V**

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PES1321	Waste Management and Energy Recovery	PE	3	3	0	0	3
2	PES1322	Bio-Energy Conversion Techniques	PE	3	3	0	0	3
3	PES1323	Electrochemical Environmental Technology	PE	3	3	0	0	3
4	PES1324	Electronic Waste Management	PE	3	3	0	0	3
5	PES1325	Environmental Transport Processes	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE – VI

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	PES1326	Principles of Green Chemistry and Engineering	PE	3	3	0	0	3
2	PES1327	Plastic Waste Management	PE	3	3	0	0	3
3	PES1328	Agricultural Waste Management	PE	3	3	0	0	3
4	PES1329	Monitoring of Air Pollutants	PE	3	3	0	0	3
5	PES1331	Carbon Capture and Storage	PE	3	3	0	0	3

Foundation Courses (FC)

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1	PES1103	Environmental Chemistry	FC	3	3	0	0	3
2	PMA1276	Advanced Numerical Methods	FC	5	3	2	0	4

Professional Core (PC)

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1	PES1101	Environmental Impact Assessment	PC	3	3	0	0	3
2	PES1102	Biological Wastewater Treatment	PC	3	3	0	0	3
3	PES1104	Unit Operations and Unit Processes in Environmental Technology	PC	5	3	2	0	4
4	PES1201	Air Pollution and Control Engineering	PC	3	3	0	0	3
5	PES1202	Separation Processes in Environmental Applications	PC	5	3	0	0	3
6	PES1203	Solid and Hazardous Waste Management	PC	3	3	0	0	3
7	PES1301	Modeling of Environmental Systems	PC	5	3	2	0	4
PRACTICALS								
8	PES1111	Environmental Engineering Laboratory	PC	4	0	0	4	2

Employability Enhancement Courses (EEC)

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
PRACTICALS								
1	PES1215	Seminar	EEC	4	0	0	4	2
2	PES1316	Internship	EEC	2	0	0	2	1
3	PES1318	Project Work Phase-I	EEC	12	0	0	12	6
4	PES1418	Project Work Phase-II	EEC	24	0	0	24	12

SUMMARY

Subject Area	I	II	III	IV	Total
FC	3	4	0	0	7
PC	12	9	4	0	25
PE	6	6	6	0	18
EEC	0	2	7	12	21
Total	21	21	17	12	71