S. C. M. S. SCHOOL OF ENGINEERING AND TECHNOLOGY

ACADEMIC AND ADMINISTRATIVE AUDIT
PEER TEAM REPORT

<u>AAA Team</u>

Chairperson: **Dr. C. R Muthukrishnan**

Fmr. Deputy Director, IIT Madras

Member Coordinator: **Dr. Suresh Mony**

Former Director NMIMS Bengaluru

Member: **Mr. T.R. Parasuraman**

Senior Executive Advisor, Toyota Industries Engine India (P) Ltd., Chairman, ASSOCHAM, Southern Development Council & Karnataka State Development Council

Member-Observer: **Dr. N. Jayasankaran**

Fmr. Vice Chancellor, Kanchi University

S. C. M. S. SCHOOL OF ENGINEERING AND TECHNOLOGY,VIDYA NAGAR, PALISSERY, KARUKUTTY, ERNAKULAM

Section I: GENERAL INFORMATION

1.Name & Address of the institution:	SCMS SCHOOL OF ENGINEERING AND TECHNOLOGY VIDYA NAGAR, PALISSERY, KARUKUTTY, ERNAKULAM, 683576
2.Year of Establishment	2001
3.Current Academic Activities at the Institution (Numbers):	Graduate, Post Graduate and Ph.D programmes in various streams of Engineering and Technology. Affiliated to the A. P. J. Abdul Kalam Technological University, (APJAKTU) Thiruvananthapuram
Faculties/Schools:	Not Applicable
Departments/Centres:	Six (6) departments: (a) Department of Automobile Engineering (b) Department of Civil Engineering (b) Department Of Mechanical Engineering (c) Department Of Computer Science and Engineering (d) Department Of Electrical and Electronics Engineering (e) Department of Electronics and Communication Engineering
Programmes offered:	21 including 9 UG, 6 PG, 6 DOCTORAL programs as follows: **UG programs-9 nos.** (i) B.Tech, Automobile Engineering, 30 sanctioned strength

	(xix) PhD or DPhil Electrical and Electronics Engineering,4 sanctioned strength (xx) PhD or Electronics and Communication Engineering, 4 sanctioned strength (xxi) PhD or DPhil, Mechanical Engineering, 4 sanctioned strength
Permanent Faculty Members:	126 including 15 Professors, 22 Associate Professors and 89 Assistant Professors
Permanent Support Staff:	32 Non-teaching and 31 Technical
Students:	1368 UG students; 89 PG students; 20 Doctoral students- Total 1477 students
4.Three major features in the institutional Context (As perceived by the AAA Team):	1. Has UG, PG and Doctoral programs 2. SCMS Water Institute (SWI) 3. SCMS Institute of Road Safety and Transportation (SiRST)
5.Dates of visit of the AAA Team	July 27, 28, 2024
6.Composition of Peer Team which undertook the on-site visit:	

	Name	Designation & Organization Name
Chairperson	Dr.C.R.Muthukrishnan (Chairperson)	Former Deputy Director IIT Madras
Member:	Dr. Suresh Mony (Member Coordinator)	Former Director NMIMS Bengaluru
Member:	Mr. T.R. Parasuraman	Senior Executive Advisor, Toyota Industries Engine India (P) Ltd., Chairman, ASSOCHAM, Southern Development Council & Karnataka State Development Council
Member-Observer	Dr.N. Jayasankaran	Fmr. Vice Chancellor, Kanchi University

Section II: CRITERION WISE ANALYSIS

Observations (Strengths and/or Weaknesses) on each qualitative metric of the key Indicator under the respective criterion (**This will be a qualitative analysis of descriptive nature aimed at critical analysis presenting strength and weakness of HEI under each criterion**)

Criterion I - Curricular Aspects
(QlMs in Criterion I)

1.1.1	The Institution ensures effective curriculum planning and delivery through a well-planned and documented process including Academic calendar and conduct of continuous internal Assessment
1.3.1	Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability into the Curriculum

Qualitative analysis of Criterion 1

CURRICULUM PLANNING AND DELIVERY

SSET is affiliated to the APJAKTU, Thiruvanathapuram and offers 9 UG, 6 PG, and 6 Doctoral programs. It follows a 4 stage curriculum planning process followed by delivery:

SSET adheres to the course requirements and syllabus prescribed by by APJ Abdul Kalam Technological University (APJAKTU. Department Program Assessment Committee (PAC) address curriculum gaps through a semester-wise Plan of Action (POA). Value-Added and Add-on Courses are approved by the Curriculum Development Committee. Course Information Sheets, curriculum, textbooks, CO-PO mapping, course plan, and evaluation tools, are created by course advisers. The HoD and subject matter experts review and approve course information sheet, ensuring compliance with OBE and topic relevance.

- Adherence to academic calendar is monitored at regular HoD meetings.
- Course advisors create a CO Assessment Description sheet, outlining assessment tools like internal tests, quizzes, class tests etc. and their weightage for CO attainment.
- Allocation of courses to faculty are based on their preferences and specializations. Timetable Committee design timetables for common courses, which are further refined by departmental Timetable Coordinators. The timetable is uploaded in the Linways LMS with provision for class substitution and attendance entry by course advisors. Blended teaching methods are incorporated along with conventional and ICT-based techniques for optimal content delivery.
- Course files and Course Diaries serve as comprehensive records, documenting course plans, course conduct, attendance, CO-PO attainment records, assessments, remedial measures, and result analyses. Documentation is regularly audited by internal and external audit teams.
- Mentor-Mentee groups are formed with a mix of students in each group to facilitate focussed attention. Class advisors identify advanced and slow learners, and enable support and learning opportunities for them. Slow learners given remedial classes while advanced learners are given special assignments and tasks which encouraged their creative and competitive attitude.

The academic planning process is systematic and structured. Blended learning is being employed, there is a robust mentoring system and the monitoring and control mechanisms are rigorous.

INTEGRATING CROSS CUTTING ISSUES

Cross-cutting themes- Professional Ethics, Gender, Human Values, Environment and Sustainability are embedded in the curriculum and reinforced through committee activities:

Ethics:

- Every program curriculum of the institution has a mandatory course on Professional ethics. Ethics is taken cognizance of while students submit their assignments and reports, using Turn-it-in software to check the plagiarism in project reports. Faculty ensure that ethical issues pertaining to their field of study are discussed to embed the ethical values.

- Special sessions on topics related to Intellectual property rights and copyright issues are conducted. Students encouraged to use open software rather than pirated software for their project activities. The training and placement cell incorporates discussions on professional ethics expected from a fresher graduate.

Gender Integration:

- 45% of students and 68 % of faculty and staff are women, demonstrating a good balance.

- Women's Cell and NSS activities sensitize the student community to gender issues, promoting awareness and inclusivity. Consideration for student menstrual leave, Women's common rooms provide comfortable and inclusive space.

- Leadership roles within the Student Union and various committees for both male and female candidates ensure gender equality.

Human Values:

- A mandatory course on Universal Human Values (UHV), as part of first year curriculum, taught by inhouse faculty trained at the AICTE FDP on UHV.

- NSS activities like old -age home visits and orphanage visits and the group activities of Helping Hands Organisation (H2O) make a deep impression on students; Mentor-mentee relationships deepen understanding of human values, reinforcing respect for one another; Anti-ragging measures and efforts to foster a culture of mutual respect build a sense of togetherness among students.

Environment and Sustainability:

- A mandatory course in 'Environmental Studies and Sustainability'

- The evaluation rubrics of final year projects of students emphasise the inclusion of environmental consideration and sustainability practices.

- Green initiatives maintain the campus environment, with regular plantation drives to enhance green spaces; designated parking spaces for electric vehicles is a step towards carbon free campus; Effective electronic waste management policy ensures responsible disposal, with collection points in each lab.

- The SWI addresses water management and environmental concerns in collaboration with the Kerala government, contributing to sustainability efforts in the state.

SSET appear to have taken significant practical measures to promote the cross cutting issues of ethics, gender, human values, environment and sustainability.

Criterion II - Teaching-learning and Evaluation (QlMs in Criterion II)	
2.3.1	Student centric methods, such as experiential learning, participative learning and problem solving methodologies are used for enhancing learning experiences using ICT tools
2.5.1	Mechanism of internal/ external assessment is transparent and the grievance redressal system is time- bound and efficient
2.6.1	Programme Outcomes (POs) and Course Outcomes (COs) for all programmes offered by the institution are stated and displayed on website.
2.6.2	Attainment of Programme outcomes and course outcomes are evaluated.

Qualitative analysis of Criterion II

STUDENT-CENTRIC METHODS

SSET employs appropriate pedagogies for experiential, participative, problem-solving techniques as outlined below:

Personalized Learning Platform

➢ Blended Learning powered by inhouse ERP software *'Linways'* to provide online notes, assignments, and other technical content;

➢ Flipped method of teaching -Teaching materials and topic related videos shared with the students prior to the planned course hour, to facilitate student-led discussions, debates and problem-solving during classroom hours.

Participative Learning:

➢ (i)Interactive Class Sessions (ii) Group Learning (iii) debates, group discussions, public speaking, role plays, student seminars and quizzes (iv) interaction with industry experts visiting the campus (vi) participation in Institute level and University level technical fests, National and state-level hackathons and project competitions.(vii)Industrial visits.

ICT tools

➢ Utilize tools like Google Workspace, Microsoft Teams, for virtual group discussions, project work, and real-time collaboration.

➢ Digital Projectors facilitate dynamic and visual presentations of complex concepts.

➢ Online discussion forums to interact with the technical experts from the industry through Google Meet, Zoom etc.

➢ Animated videos, power point presentations for students to visualize the engineering concepts.

➢ Online Open-source software tools like EasyEDA, enabling simulation of experiments

➢ Digital Notes and Materials, previous year question papers via Google classroom.

➢ Library Resources: Online journals, technical materials, University question papers

➢ MOOC Courses - students attend certificate courses provided by NPTEL/SWAYAM, Coursera etc.

Experiential Learning:

➤ simulation software tools like MATLAB and the laboratory models of machines.
➤ FAB Lab to give expression to creative ideas through experimentation and prototyping of their design.
➤ SWI and SiRST undertakes projects that provide opportunities for solving real time technical glitches.
➤ Industry-related projects
➤ Internships

Problem-Solving techniques:

➤ Closed and Open-Ended Problems: Core courses focus on both conventional and open-ended problems. Tutorials are designed to improve students' mathematical and analytical skills.

The selection of techniques by SSET under the umbrella of participative, problem-solving and experiential learning including the use of ICT tools for ensuring student-centricity appears comprehensive.

ASSESSMENT
Mechanism of Internal/External Assessment:

➤ Continuous internal assessment is conducted through various assessment tools including class tests, Q&A sessions, quizzes, tutorials, Series Tests, internal lab exams, and assignments.
➤ At the beginning of each semester, faculty prepares a CO Assessment tool Description sheet outlining the assessment tools and their weightage for each CO.
➤ While Series Tests and internal lab exams are mandatory, other assessment tools are chosen by faculty based on requirements.
➤ The plan for assessment is outlined in the course plan, with Series Exam dates aligned with the KTU Academic calendar.
➤ External assessment, for theory course, is conducted by KTU exam cell through a semester-end examination.
➤ The external examiners appointed by the university conduct the lab course university exam.

Transparency in Assessment:

For the internal assessment, process transparency is ensured through:

● Clear evaluation criteria and their communication and reinforcement by faculty at the beginning of each assessment period.
● Rubrics for evaluation process
● Plagiarism check for assignments and project reports submitted for evaluation
● Circulation of Exam Answer key and Scheme of evaluation among student groups.
● Timely and constructive feedback after each assessment
● Continual evaluation at the lab
● Access to graded assignments, tests, and examinations through the Linways Portal.
● Sharing of all internal assessment results and evaluated answer sheets with students, allowing time for grievances.

Grievance Redressal Process: Time-Bound Redressal:

> Course advisors are advised to complete internal assessment for theory courses within 3 days of completing the Series Exam.
> Internal marks are published to students at least three days before the final submission to the KTU portal, allowing ample time for any related grievances.
> Student grievances are resolved before the publication of internal assessment scores.
> Access to university answer sheets through a clearly defined process involving Course Advisor, HoD, Academic Dean.
> Most of the grievances are resolved at the HoD level.

SSET's assessment process and grievance redressal mechanism appears transparent, time-bound.

PROGRAM AND COURSE OUTCOMES DISSEMINATION

Defining and stating POs and COs:

> Graduate attributes (GAs) defined which are broadly classified into *Academic and Intellectual attributes, Communication Skills, Professional attributes, cultural and global awareness, sensitivity to environmental and sustainable goals, adaptability, and lifelong learning.*
> From GAs, 12 Programme Outcomes (POs) have been formulated. In addition, each department articulates POs specific to the domain termed as PSOs, which were approved by Department Advisory Board (DAB).
> The POs are attained (i)through the aggregate of all courses in the curriculum (ii) through co-curricular and extra-curricular activities. The COs of every course are mapped to the POs.
> The COs are defined by the course advisor with help from subject experts and are approved by the Program Assessment Committee (PAC) of each department.
> The POs and COs are well-documented.

Displaying and disseminating the POs:

> POs and COs are displayed by each department and in academic documents.
> Course Outcomes (COs) were initially provided by the Kerala Technological University (KTU)- however, based on the GAs and POs, and needs of industry necessary modifications and refinements are initated through Course advisors, along with subject experts..
> POs are exhibited in key areas including the staff-room, Head of Department (HoD) cabins, classrooms, laboratories, and corridors.
> POs and COs are integrated with the course information sheets in the course files..
> To ensure that the POs and COs are accessible and transparent on the institution's official website, a systematic process is implemented involving: (I) *Website is overseen by a dedicated* committee (ii) *Approval and Upload on Linways (iii) Program Page Accessibility on the SSET* website.

POs/COs are being given by the university. Dissemination of POs/ COs is being done well. In order to make the process more robust and need-based (industry, society), GAs are being formulated by SSET and KTU specified COs are modified to suit the requirements of POs. POs specified by KTU are maintained sacrosanct. Since OBE is still in its infancy, it requires constant monitoring and strengthening.

ATTAINMENT OF OUTCOMES:

1. **Assessment Planning for CO evaluation** - Course advisors prepare a course plan that includes the assessment tools to be employed for the evaluation of CO attainment, and periodically update the CO-PO attainment sheets.

2. **Assessment Tools** - For every course the CO-PO mapping and the weightage of each assessment tool are mentioned on Linways and the course plans. Direct assessment tools include : (i)University End Semester Examination, (ii)Internal tests (iii) Module Tests, (iv)Assignments, (v)Quizzes, (vi)Tutorials, (vii) Viva and lab practicals (viii) Presentations. Indirect assessment tools include (i)Course Exit Feedback (ii) Achievements and participation in extracurricular activities (iii) Participation in technical workshops, seminars, conferences.

3. **Level of attainment**
   a. **Attainment level 3: (Substantial):** 70% of students scoring more than 60% marks out of the relevant maximum marks
   b. **Attainment level 2: (Moderate):** 60% of students scoring more than 60% marks out of the relevant maximum marks
   c. **Attainment level 1: (Low):** Less than 60% of students scoring more than 60% marks out of the relevant maximum marks

4. **Evaluating and Recording of CO Attainment** - Assessment structure and calculation have been automated through the ERP software Linways. The courses mapping to each PO and CO are given on Linways. CO attainment is computed based on 80% weightage for direct assessment and 20% for indirect assessment. Further, the Direct assessment includes 67.33% weightage for external assessment (university exams) and 33.33% weightage for internal assessments.

5. **CO-PO Articulation Matrix** is prepared based on the CO-PO mapping of all the courses. The CO-PO attainment of all the courses is compiled into a single matrix and then compared with the articulation matrix.

6. **PO Attainment** – The attainment of PO is computed by comparing the values derived from the CO-PO attainment and articulation matrix. The CO and PO attainment is discussed and verified in the Program Assessment Committee (PAC). The DAB meets to discuss PO attainment and gives constructive suggestions for improvement after careful analysis to improve the quality of teaching- learning process.

The PO attainment process is adequate and POs are generally in the range of 1.2 to 2.7

Criterion III – Research Innovations and Extension
(QlMs in Criterion III)

3.2.1	Institution has created an ecosystem for innovations, Indian Knowledge System (IKS), including awareness about IPR, establishment of IPR cell, Incubation centre and other initiatives for the creation and transfer of knowledge/technology and the outcomes of the same are evident.
3.4.1	Extension activities are carried out in the neighborhood community, sensitizing students to social issues, for their holistic development, and impact thereof during the last five years.
3.4.2	Awards and recognitions received for extension activities from government / government recognised bodies

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Qualitative analysis of Criterion III

ECOSYSTEM FOR INNOVATIONS:

The innovation ecosystem is driven through the following initiatives:

- Centre for Robotics, FAB Lab and IOT Lab aim to develop prototype assembly/modules for product development.
- Seminars, workshops, hackathon, and idea pitching competitions are organized to instil a start-up culture among students.
- The Dr. Pradeep P Thevannoor Innovation Awards (PPTIA) that attracts student participation including overseas students.
- Technical events like CREATIVO and those organized by the Professional Body Chapters at SSET, helps to identify and celebrate the outstanding talents and promote their ideas for prototyping and commercialization.
- Library resources beyond curriculum are made available to support staff and students in shaping ideas.
- Faculty members are awarded research incentives based on projects and publications.
- SSET's Innovation & Entrepreneurship Development Centre (IEDC), supported by Kerala Start-Up Mission, received funding of Rs.7.65 lakhs.

Evidence and Outcomes of Innovative Culture:

The following are indicative of the innovation culture:
- A De-addictive Coil for Drug Addicts,
- Muscle to Machine Interface for Paralyzed Persons (MMIPP),
- Brain Wave Nerve Excitation for Physically Disabled,
- Non-Invasive Anti-depression E-M Stimulator,
- Dynamic Brake Lighting Emergency System,
- Shopping Assistance for Blind.
- SSET's projects have received national and international recognitions, including the Gandhian Young Technological Innovation Award in 2018 and 2020 and AICTE-ECI Chhatra Vishwakarma Awards at IIT Delhi in 2017.
- IEDC has generated 4 entrepreneurs from the institute
- SSET faculty have -----published patents during the past 5 years, of which ---have been granted

The outcomes including new products, start-ups and patents indicate that there is a robust innovation culture at SSET.

However, they have not yet made a start on the IKS front.

EXTENSION ACTIVITIES

Extension activities are driven through the National Service Scheme (NSS)- 2 units of NSS, 2 NGOs namely Helping Hands organization (H2O) and Kootu funded by SSET. It was started in 2007 and presently has two units, viz., No.182 and No.584 with 200 members. The motto of the NSS unit is *"Personality Development through Community Service"*. NSS units at SSET has established tie ups with Haritha Keralam Mission, Govt. of Kerala & Suchitwa Mission, Govt. of India and other organizations to support programmes to protect and preserve the environment:

> - Activities within the Campus – includes activities related to awareness programmes, health and hygiene, Blood donation camps, personality development, team building, organic farming etc.
> - Activities for the Community – includes awareness programmes on Road Safety, Computer literacy, health surveys and camps, flood relief, energy audits, cleaning and maintenance of government health centres, tribal education, afforestation programs, cleanliness drives.
> - *Helping Hands organization (H2O):-V*isits to an orphanage or an old age home , spending quality time, serving lunch to the inmates and having food with them is done periodically by students.
> - 80% of students are deployed in various areas for a week to assist in: preparing flood maps, assessing damages of houses, roads and their refurbishment (still ongoing after 2018-19 floods).
> - *Kootu:*is in its budding stages with nearly 60 members, and focuses on activities to help the deaf community.

SSET is active with respect to regular conduct of extension activities throughout the year.

AWARDS AND RECOGNITIONS

SSET has received awards for:

- Water audit & Rainwater harvesting design-2020

- Flood mapping and response plan development-2020

- Implementing Green Protocol At Thiruvairanikulam temple Mahastov-2019

- Water Survey at flood affected area in Thrissur district-2019

- TP Canal mapping-2016.

The above awards have been received from:Kochi Metro Rail Ltd, NSS Technical Cell, Kerala, Meloor Gram Panchayat, Chief Minister of Kerala, and the Kochi Municipal Corporation, Mathrubhoomi.

The awards won by SSET are for serious societal developmental issues/problems and are indicative of their commitment to societal issues.

Criterion IV - Infrastructure and Learning Resources (QlMs in Criterion IV)	
4.1.1	Availability of adequate infrastructure and physical facilities viz., classrooms, laboratories, ICT facilities, cultural activities, gymnasium, yoga centre etc. in the institution
4.2.1	Library is automated using Integrated Library Management System (ILMS), subscription to e-resources, amount spent on purchase of books, journals and per day usage of library
4.3.1	Institution frequently updates its IT facilities and provides sufficient bandwidth for internet connection

Qualitative analysis of Criterion IV

ADEQUACY OF INFRASTRUCTURE:

The SSET campus is spread over 21 acres with a built-up area of 37972 sq. Meters and is equipped with:.

- Classrooms and Seminar Halls: 62 Classrooms of which 49 are ICT enabled. Total 5 Seminar Halls of which 4 are ICT enabled.
- Laboratories: 36 laboratories, 802 Computers of which 603 are utilised for academic purposes.
- The Centre for Robotics houses a Fab lab, a Robotics lab, and an IoT lab
- Mike Computational Lab provided by Danish Hydraulic Institute, Denmark is available for water modelling research.
- Language Lab for its own indigenously developed English language training module
- Cultural and Sports facilities: sports, games (indoor and outdoor), and cultural activities for students and staff- A Physical Education Director looks after all the sports and games activities
- Yoga Centre and Gymnasium: operates from 6:00-8:00 am and 4:00 pm to 7:00 pm, with separate timings for boys and girls- a dedicated trainer is available at the gymnasium to assist students.
- Auditorium and Amphitheatre-seating capacity of 2500, covering 1550 square meters- Open-air amphitheatre, of 705 square meters
- Power: 400kVA, and 315kVA transformers and five generators of 400kVA, 320kVA, 125kVA, 63kVA, and 30kVA respectively. Two UPS of 40kVA and two UPS of 20kVA, 10kVA, 50kW on grid solar power system is also in service.
- Water Supply: 4 bore wells, one underground water tank with a capacity of 1 lakh litre and a water purification plant with a capacity of 12000 litres/hr. with rainwater harvesting installation, and one open well with associated pumping and distribution network.

The total built-up area of 37972 sq. metres works out to a built-up area per student of 18.5 sq.m per student; the computer student ratio is 1:3. . Overall, the infrastructure is adequate and has scope for expansion.

LIBRARY:

SSET's library has the Integrated Library Management System (ILMS) with RFID technology. The Dr. Pradeep P. Thevannoor Learning Resource Centre, has a carpet area of 2309 square meters, including dedicated reading space with a seating capacity of 190. It houses 38,000 books in 9,683 titles, 124 Indian printed periodicals, a vast collection of subscribed, open-access e-resources of national and international, and OER links.

Key Features of Library and ILMS:

Linways Library Management Module with all library functions automated using Integrated Library management System (ILMS). (ii) Digital Facilities: include book check-in/check-out, book search (OPAC service), and links to subscribed e-resources and databases with remote access details. (iii) E-Journal Links: access to important e-resources such as IEEE, ASME, ASCE, J-Gate, EBSCO E-Books, DELNET, NPTEL, NDL (National Digital Library) of India, SSET-NDLI CLUB, SWAYAM, MIT Open Courseware, etc. (iv) Online Resources: access to University Digital Library Service, ensuring remote access (KNIMBUS Platform) to subscribed e-resources. (v) Turnitin Similarity Checking: All faculty members are registered (vi) Wi-Fi Access and Computer Systems: Open Wi-Fi access is available with 15 computer systems and 2 scanners for e-resource access and document scanning. (vii) CCTV Surveillance. (viii) Energy Saving Initiative-designed to utilize maximum daylight and LED panel lights are used for lighting, with sensors for energy efficiency. (ix) Subscription and Access: various International and National databases, including IEEE, ASME, ASCE, ScienceDirect, J-Gate Database, and EBSCO E-Books- average annual Expenditure for the purchase of resources during the last five years is INR 15 lakhs. (x) Remote Access facility -Knimbus Platform – Screen Shot.

Average footfall 400+ per day in 2022-23.

The library has physical and digital resources, is automated.

UPDATION OF IT FACILITIES:

SSET has 802 computers of which 603 systems are used for academic purposes with a student-computer ratio of 3:1. 7 Computer labs are available for students with a Central Computing Facility (CCF) and a Hardware Lab. The major updation initiatives are:

- Internet bandwidth upgraded from 400 Mbps to 700 Mbps with a 200 Mbps backup leased.
- Addition of 60 core i5 processors
- 48 Wi-Fi connecting points are spread across the campus including hostels.
- Zoom software
- Networking facility with more access points and 7 switches
- Bentley Academic Perpetual Offering for 10 users with a 3 year renewal period
- 5 canon LBP 2900 printers
- Subscription to Microsoft campus license, SAP, Ansys-15, MATLAB, Autodesk AutoCAD 2021, Turnitin, Open Access software.

There has been a eight fold increase in bandwidth during the past 5 years and number of automation facilities have been installed to provide support for both faculty and students.

Criterion V - Student Support and Progression
(QIMs in Criterion V)
5.4.1	There is a registered Alumni Association that contributes significantly to the development of the institution through financial and/or other support services

Qualitative analysis of Criterion V

- The SCMS Alumni Association was formally registered in 2017 at SCMS Campus, Prathap Nagar, Muttom, Aluva. The administration is overseen by the Executive Committee comprising the President, Secretary, Treasurer, Vice President, Joint Secretary, and six members.

- It has National and International chapters- Regular alumni meets were organized in Bangalore, Chennai, Delhi, Dubai, Hyderabad, Kochi, and Mumbai.

- The objectives include: (I)Data Maintenance (II) Promoting Friendship Bond (III) Funding Support for development of SSET (IV) Forum for Exchange of ideas on academic, cultural, and social issues through reunion activities.

- Alumni Contributions: Mr. Abhilash Abhaykumar (2008 pass out) funded the setup of the MIKE computational lab worth Rs. 50 lakhs, in the campus,

- Non-financial support includes: (I) participating in academic and administrative processes. (II) Shared experiences, and suggestions for development (III) Guest lectures, (IV) mentorship for final year projects, (V) seminars, workshops, and support for industry visits, internships, (VI) placement assistance (VII) suggesting gaps in the syllabus based on industry demands. (VIII) participating in meetings of Department, Academic Boards, College Council, and IQAC.

SSET Alumni association has scope to strengthen contributions tangibly and intangibly.

Criterion VI - Governance, Leadership and Management
(QIMs in Criterion VI)
6.1.1	The institutional governance and leadership are in accordance with the vision and mission of the Institution and it is visible in various institutional practices such as NEP implementation, sustained institutional growth, decentralization, participation in the institutional governance and in their short term and long-term Institutional Perspective Plan
6.2.1	The functioning of the institutional bodies is effective and efficient as visible from policies, administrative setup, appointment and service rules, procedures, deployment of institutional Strategic/ perspective/development plan etc.
6.3.1	The institution has effective welfare measures and Performance Appraisal System for teaching and non-teaching staff
6.4.1	Institution has strategies for mobilization and optimal utilization of resources and funds from various sources (government/ non-government organizations) and it conducts financial audits regularly (internal and external).

6.5.1	Internal Quality Assurance Cell (IQAC) has contributed significantly for institutionalizing the quality assurance strategies and processes. It reviews teaching learning process, structures & methodologies of operations and learning outcomes at periodic intervals and records the incremental improvement in various activities

Qualitative analysis of Criterion VI

INSTITUTIONAL GOVERNANCE AND LEADERSHIP ALIGNMENT WITH VISION AND MISSION

The essence of SSET's Vision is: *to be a centre of excellence* in providing technical education. The essence of the Mission is *to offer technology-related education of exceptional quality, emphasising the holistic development of students, ethical values, and meeting industry challenges.*

In order to achieve the vision and mission it is observed that there is:

- Focus on long-term goals- higher admissions, academic system- OBE (one of the NEP recommendations), faculty excellence, student outcomes, and sustainability
- Impetus for academic excellence, consultancy, research, innovation, and extension activities over the last five years.
- Qualified, experienced, and motivated faculty appointments
- Continual upgradation of infrastructure with modern labs
- Avenues for faculty and student knowledge upgradation, industry interactions, and societal responsibilities

The pillars of institutional governance at SSET include:

- **Participative** management by faculty in Curriculum preparation/updation, accreditation
- **Decentralisation**- Close involvement of Dy. Deans and HODs in policy-making, decision-making and implementation- HoDs given the authority to take administrative decisions for their respective departments.
- **Empowerment**: Faculty and staff empowerment through decentralized mechanisms in academics examinations, co-curricular and extra curricular activities.
- **Feedback** system from various stakeholders, including students, parents, employers, industry, and alumni
- **Committees** including IQAC, play a vital role in planning and reviewing progress quarterly.

Decentralisation and Participatory Management, shared leadership and collaborative decision-making are redeeming features of SSET's governance. They are also implementing the NEP 2020 in earnest, particularly the Outcome based education.

STRATEGIC PLAN-FUNCTIONING OF INSTITUTIONAL BODIES-EFFECTIVENESS AND EFFICIENCY

- SSET's strategic quality plan is drawn from its Vision. Both short-term and long-term goals are identified, with a focus on departmental goals, academic excellence, faculty development, and institutional sustainability. The management actively directs long-term growth strategies. During the past 5 years, the focus has been on academic excellence, consultancy, research, innovation, and extension activities.

- The Board of Management (BoM) regularly (I)scans environmental changes and assesses potential market opportunities (II) scrutinizes and approves suggestions from the Principal, endorsing action plans. (III) Mobilizes resources necessary for program implementation and approves budgets and allocates funds for various programs and activities. maintaining transparency and accountability.
- The Organization runs on collective leadership with periodic formal and informal meetings that facilitate open communication channels..
- In regard to day-to-day management, (I) Routine activities fall under the jurisdiction of HoDs and the Principal and are reviewed in monthly faculty meetings. Non-routine activities are presented to the BoM for approval. The Principal submits monthly activity reports to the BoM, covering progress, plans, and budgetary requirements for review.
- Regular reporting/communication of student and faculty progress/achievements is maintained. management.

Key Indicators of the Success of the strategic plan and functioning of institutional bodies are:

- SSET has consistently maintaining a top-15 position in semester results of APAJAKTU
- Rise in paper publications
- Increased consultancy activities,
- National and international awards for innovation, numerous patents

As part of strategic planning annual targets need to be stipulated for processes like Placement and Research. Most of the quality objectives are ongoing and a continuing journey. These require quality index, targets/milestones and raising the bar once achieved. Thus, the strategic planning process needs to be strengthened.

WELFARE MEASURES AND PERFORMANCE APPRAISAL

Welfare measures
For faculty: (a)Reservation in admission for eligible wards of employees. (b)Concession/ fee waivers for meritorious wards of employees. (c)Incentives for publication of papers/ research articles (d)Sponsoring for attending conferences, workshops, and FDPs Ph.D. (d)leave with pay for Course work, pursuing Ph.D. (e)Traveling allowance (f)Maternity leave and Medical leave (g)Subsidized canteen facility (h)Subsidised college bus facility (i)annual get together of all employees and family members on 23rd January, on Founders Day.

For non-teaching staff: Earned leave, Concession for bus travel, ESI, fee reduction for children, group insurance benefits, health benefits , advance salary option during emergency

Performance Appraisal System:

The components/salient features of the appraisal system at SSET include:
- Institution-specific roles, parameter values, role component weights, and their relative impact
- Focus on enhancing teaching methods, research involvement, and contributions to academic and administrative areas.
- The appraisal is conducted annually in June, reviewing the preceding year's performance. Probationary faculty ares evaluated from joining to confirmation (completion of one year), and confirmation/annual increment triggers performance appraisal.
- Feedback from the appraisal process is used to plan faculty development programs, advanced training, and seminar participation.

➢ Avenues for career progression are emphasized through continuous improvement and professional development.

Performance appraisal involves a 3/4-part process as follows:

➢ Part I – Self Assessment/Self-Appraisal by Faculty and staff for the appraisal period

➢ Part II – Appraisal by HOD based on self-appraisal and their own assessment-aligned with UGC PBAS system, the focus is on teaching, learning, evaluation, innovation in teaching, involvement in co-curricular/extracurricular activities, academic support, research projects, case studies, and publications.

➢ Part III – Appraisal by Principal/Director: based on self-appraisal, HOD comments, students' feedback, and contributions in service and administrative areas.

➢ Part IV – Corporate Office Review/Director SSET

The appraisal system at SSET is comprehensive and appears to be fair based on the policy. SSET has a slew of welfare measures for motivating faculty. Whether some of the general welfare measures are applicable to non-teaching staff needs to be verified.

FUND MOBILISATION, CONTROL AND AUDITS

SCMS Group has a centralised finance department that manages the finances of each institute. The finance department reports directly to the management. SSET maintains separate accounting for internal control purposes.

Revenue Streams include: (I)Fee receipts and (II) Research and consultancy income. Funding sources include Bank loans and internal cash surplus

Budgetary Processes and Financial Controls

- The principal actively participates in the budget planning process, submitting a detailed proposal before the commencement of each financial year based on inputs from department heads and various units.
- Budgetary control techniques are employed for regular monitoring, with periodic assessments of actual expenditure against forecasts.
- Variances are thoroughly evaluated by the top management, and adjustments to the allocated funds are made when deemed necessary.

Internal and External Financial Audits are done as per statutory requirements.

95+% of the revenue comes from student fees. Budgets are decided at the beginning of the year. Deans/HoDs have approval limits upto Rs 1 lakh and Principal upto Rs. 7 lakhs. Rallocation/reappropriation of budgets depending on exigencies is provided for in the system.

CONTRIBUTION OF IQAC

IQAC since its establishment in 2015 has contributed to the planning and implementation of quality enhancement system as follows:

- Policy Formulation, and revision for continuous improvement

- Quality Assurance Framework: that defines clear objectives, outcomes, and performance indicators and guides the implementation

- Audits (Academic and Administrative): Conducted regularly to ensure compliance with quality standards.

- Documentation and Record Keeping

- Faculty and Staff Development programs

- Student Feedback and Satisfaction surveys

Significant contributions made by IQAC during the past 5 years include:

- MHRD approved Institutional Innovation Council.
- Institute visibility by participation and winning in innovation projects competitions.
- Transition to ISO-9001:2015 from ISO-9001:2008.
- Tie-ups with Central Govt. organizations, LSGD's, municipalities etc.
- Improved outreach activities in association with government agencies.
- Greater number of MoUs with International Universities for academic and research excellence.
- NPTEL local chapter (LC ID: 1813) formed in Feb 2018.

- Increased number of consultancy from government organisations.
- Increased participation of faculty in technical consultancy, projects, and socio-cultural activities.
- Mentor-mentee system made more robust.

- Online classes and continuous internal assessments taken up online during Covid
- Mentoring was taken up online to ensure constant support to the students
- ECE Department applied for NBA accreditation
- Institutionalisation of OBE

IQAC contribution to the quality process is significant. However, the OBE process requires constant monitoring and strengthening. KPIs need to be identified for Quality improvement objectives and need to be measured every year.

Criterion VII - Institutional Values and Best Practices (Key Indicator and Qualitative Metrices (Q₁M) in Criterion VII)	
7.1.1	Institution has initiated the Gender Audit and measures for the promotion of gender equity during the last five years.
7.1.4	Describe the Institutional efforts/initiatives in providing an inclusive environment i.e., tolerance and harmony towards cultural, regional, linguistic, communal socioeconomic and Sensitization of students and employees to the constitutional obligations: values, rights, duties and responsibilities of citizens
7.2.1	Describe two best practices successfully implemented by the Institution as per NAAC format provided in the Manual.
7.3.1	Portray the performance of the Institution in one area distinctive to its priority and thrust within 1000 words.

Qualitative analysis of Criterion VII

GENDER EQUITY , FESTIVALS/COMMEMORATIVE DAYS CELEBRATIONS

SSET advocates gender equity both within the institute and through outreach as under:

Within SSET

- Girls' hostel is inside the campus with three full time wardens and security round the clock. 1st year Year Men's hostel is separate from senior men's hostel to ensure and security. Activities within and outside the campus are always overseen by female and male faculty.

- For students' moral development and mental support, is handled by staff advisors and counselors on hand.

- Girls common room and Infirmary is available for use to students with any discomforts and unhealthiness.

- Well-lit corridors and classrooms with CCTV cameras that plays a significant role in ensuring the overall safety of students on campus.

- Women's forum, Anti-sexual harassment committee, Internal complaints committee work to promote women's empowerment and gender equality-they organize informative sessions to create awareness about dangers associated with use of social media and awareness about increasing cyber-crimes.

Outside SSET and for public

- Through the NSS units- public awareness campaigns about anti-discrimination and mechanisms of protection against gender-based discrimination with our students

- Promoting activities related to health and nutrition, blood donation camps, aids awareness, eye donation awareness campaigns

- Annual 7 day camp in which male and female students attend and equally participate in various activities. During these camps LGBT+A member also addresses the students-effort to create student's respect and acceptance towards all genders.

- Training of the tribal community of Athirapally and Vazhchal to develop their communication skills.

- Seminars and workshops on the latest advancements in science and technology to initiate women entrepreneurship.

- Awareness programs and campaigns with interactive sessions on women rights and gender equality.

Celebrations: of national and international commemorative days-7 national days and International Women's Day, International Yoga day celebrated.

There is a sound system in place for promoting gender equity-the male-female ratio is 32:68 among employees and 57:43 among students respectively. The practice of having an annual gender audit needs to be initiated.

INCLUSIVITY

Inclusivity is being promoted in diverse ways through:

- FDPs- 75 employees attended an AICTE-sponsored FDP on Inculcating Universal Human Values in Technical Education from August 2020 to October 2021.

- 30 hours' value added course on Human Rights and Duties Education, Indian Constitution and Civil Liberty. 30+ students enrolled for each session

- Ample opportunities for faculty and staff to showcase their talents (singing and dancing) during Onam, Christmas.

- Every year on November 1st, students and staff members dress up in traditional attire and celebrate Kerala Piravi Day to promote religious harmony and secularism.

The 30 hour course on Human Rights and Duties Education, Indian Constitution and Civil Liberty, may be made mandatory. Many national and international commemorative days could be celebrated.

TWO BEST PRACTICES

Best Practice(BP) 1: Title: ENGINEERING FOR SOCIETAL DEVELOPMENT
Goal

The Mechanical and Automobile departments at SSET have consistently focused on increasing public and student awareness of road safety. The Civil Department conducted a survey, which revealed an increase in road fatalities due to accidents, highlighting the need for widespread public awareness leading to the launch of SCMS Institute for Road Safety and Transportation (SiRST)

The Practice

- Projects to make students know about techno-legal-social issues in road safety and transport
- Research on causes of accidents and its solutions.
- Research in vehicle safety, educational programs like KYV and KYR.
- Programs to introduce technological changes in the field of transportation happening at the international level in our state.
- Awareness programs on various aspects of road safety and transportation.
- Various certificate courses in transportation planning, designing, traffic engineering, traffic management etc.

Evidence of Success

- Around 40 Road Safety Awareness sessions organized by SiRST from February 2023 to October 2023.
- Programs like Behavioral Aspects of Driving, Capacity Building Program to Driving School Instructors, Road Etiquette for college bus drivers organized.
- Competitive exam training taken as AMVI Training Program - Motor Vehicle Rules.
- Driver Counselling Centre – Crash Prevention Course (CPC) had organized more than 20 sessions.
- PACE, sessions at various campus to impart the importance of safe driving among college students.
- Departments had initiated programs like Road survey by, Buddy App by Computer Science, Know Your Vehicle by Automobile and Mechanical.

BP-1 is a successful societal initiative and has been well demonstrated.

Best Practice 2: Title: INNOVATIONS FOR SOCIAL SUSTAINABILITY

Goal

- to create cost-effective innovations that can promote a state of well-being for human, social, economic, and environmental interactions towards sustainable development

- to expose society to the most recent scientific and technological advancements in the field, as well as to develop our youth's technical skills in order to improve manpower and increase employability.

The Practice

SSET has a series of laudable themes such as:

1. Implementing energy-efficient lighting and a solar power plant on campus.
2. Green audit showing zero percent carbon emissions, demonstrating the presence of greenery on campus.
3. Community well-being infused through activities initiated by NSS, SiRST and H2O (Helping Hands Organization) for societal improvement.
4. Innovation/Technological advancement through IEDC, Yi YUVA, and Fab Lab
5. Visiting old ages homes, coordinating the relief camps, road safety awareness campaign.

In the process of pursuing these themes, they have conducted number of events as follows:

1. 24 hour 'HACK' from 31-OCT-2022 to 01-NOV-2022 for school and college students.
2. H2O's, Join hands for rebuilding lives: One brick at a time a community well-being initiative SPARSHAM – 2023.
3. Yi Yuva Digital Detox Skit Competition.
4. Yi YUVA, in collaboration with the Kerala Police, Motor Vehicle Department - Kerala, SiRST , NSS, and Medical Trust, organized a comprehensive road safety awareness campaign at Edapally Junction.
5. On June 5, 2023, the Yi Yuva SSET Chapter organized a fruit sapling planting event
6. SAE India Southern Section – Cochin Division organized SAE Trek on April 1st and April 2nd ,2023 which received 49 registrations from across the southern states and an online hackathon "Auto Hack" February 2022 on the technical knowledge of the students on February 2022.
7. SAE & IEDC, conducted a vehicle review competition "Auto Analyst" on 21st February 2022 and a 2-day hands on "Workshop on 3D Printing" for the 8th Semester students and also "Go Kart WORKSHOP" at Karukutty campus exclusively on February 19th & 20th, 2020.
8. Collaboration on a funded project from Higher College of Technology, Muscat, Sultanate of Oman Smart Mask for developing a social distancing system for Covid was done.

9. The Association of Energy Engineers held a "Project competition" in two stages. The first phase was a "Idea Pitching Competition" on November 29th, 2022, and the second phase was a "Modelling Competition" on December 8th, 2022.

10. Hands-on training on coding with the Arduino board and simulation using TinkerCad Software by Mr. Jebin Lukose, PG scholar, Department of Electronics and Communication.

The Best Practice may be cast under the six headings of: (I) Innovation (II) Participation (III) Sustainability (IV) Efficiency (V) Transversality and (VI) Reproducibility.

PERFORMANCE IN A DISTINCTIVE AREA

The distinctive area that SSET has identified is 'Water' and has set up an institute to further its objectives.

- SCMS Water Institute (SWI) was established in 2010 as part of a MoU with University of Applied Sciences Ravensburg-Weingarten, Germany to address the water related environmental problems affecting the society. SWI mission is to address the water related issues through multidisciplinary efforts in order to achieve a sustainable and secure water future.

- SWI does R&D, technology incubation and application, education and training, demand driven consultancy and networking. SWI was funded by Baden Wuttemburg Stiftung Germany for establishing an Indo-German centre of competence for water and waste water under the leadership of University of Applied Sciences Ravensburg- Weingarten.

- SWI have MoUs with many German companies working on water and waste water as well as with German Universities for Institutional strengthening, joint research and for faculty and student exchange. SWI has been working closely with local self-governments in Kerala to address their water related challenges.

- SWI provides enormous opportunities for the students of SSET to get involved in service learning, where the technological talents of students get upgraded by addressing the real time problems faced by the society. Further, SWI facilitates the students to confront and resolve unforeseen difficulties while implementing projects which make them more suited for industry. Engagement of engineering students in solving the society related problems help them to be more responsible technological citizens of the nation.

- SWI focuses on the aspects related to urban water security & management through multidisciplinary efforts. SWI offered expertise in areas like (I)water quality monitoring & assessment; (II) environmental modelling; (III) water auditing; (IV) remote sensing & geographic information systems; (V) policy development; (VI)eco restoration & watershed management; (VII)design of water & waste water treatment units; (VIII) rainwater harvesting; (IX) water distribution network analysis; (X)storm water management.

- SWI has emerged as a technical support provider for local self-governments in Kerala. It provides continued support to Kochi Municipal Corporation, Thrissur Municipal Corporation, Guruvayur Municipality, Meloor Grama Panchayath, Koratty Grama Panchayath, Kochi Metro Rail Ltd (KMRL), Cochin International Airport Ltd (CIAL) and various academic institutions in Kerala to address their environmental challenges.

Some of the projects undertaken include:

- Study on urban flooding in Thrissur Municipal Corporation
- Water Audit & Rain Water Harvesting Feasibility Assessment for Kochi Metro Rail Limited (KMRL)
- City Water Audit for Guruvayoor Municipality

- Development of Flood Preparedness and Response Plan for Meloor Grama Panchayath
- Background Study done for Developing a Water Management Plan for Meloor Grama Panchayat
- Leak Detection for Cochin International Airport Limited (CIAL, Kochi)
- Survey of Thevara Perandoor Canal, Kochi Municipal Corporation
- City Water Audit and Water Policy formulation for Kochi Municipal Corporation
- Water quality analysis & Water Quality Atlas for Koratty Grama Panchayath
- Green audit and Water audit for various Educational Institutions and Apartment Complexes

Projects Underway include:

- Development of a Water Management Plan for Koratty Grama Panchayat
- Smart KWA Network (Kochi water Information system)
- Abatement of Pollution of Rivers in Kerala – Kadambrayar and Kecheri
- Storm Water Management for Kalamassery
- Eco restoration of Bodi North Hills, Tamil Nadu

Students from various departments of SSET choose to voluntarily work with SWI to get exposure on real life projects. A state of the science environmental engineering laboratory at SSET is currently facilitating the research and consultancy works of SWI.

SWI has been working for almost a decade as knowledge partner to various local self-governments in solving water related issues. This has significantly helped to improve the delivery mechanism of such local bodies to the public and SSET has provided considerable hand holding help and support.

As a societal initiative SWI is engaged in significant contribution to the state of Kerala. Besides, students get opportunities to learn water management practice and can leverage on these learnings later in their career.

Section III: OVERALL ANALYSIS
Observations

3.1 Institutional Strengths:	- Compassionate Management with a focus on quality - Dedicated faculty team with a positive attitude - Approval as a Research Centre - Water Institute(SWI) - Rad safety institute (SiRST)
3.2 Institutional Weaknesses:	- Research output - Limited autonomy because of affiliation
3.3 Institutional Opportunities:	- Augment research publications - To become a University - Offer program in Sustainability - Leveraging SWI to augment research output in the Water area and solve national problems and emerge as a Centre of Excellence
3.4 Institutional Challenges	- Expand range of programs in sciences - Attracting talented and meritorious students and faculty with growing competition in India and abroad - Mobilisation of Funds - Foreign universities setting up campuses in India

Section IV: Recommendations for Quality Enhancement of the Institution

1. Value added courses
2. Strengthen OBE system to improve Assurance of Learning (AOL)
3. Strengthen research culture, formulate research strategy to augment quality and output
4. Promote Quality circles and introduce organization-wide Kaizen system
5. Maximize resource utilization - eg. Library, computer centre etc.
6. Strengthen Placements and Career counselling
7. Provide four career paths to faculty-Teaching stream, Research stream, Teaching plus Research stream, Teaching plus academic leadership
8. Establish a competency development system for employees and develop a systematic career development plan for all employees
9. Constantly train and retrain faculty and staff including leadership coaching as part of a TQM effort-Set up a Learning & Development centre
10. Promote multi-skilling for all employees
11. Develop a leadership pipeline through coaching of potential talent
12. Improve strategic planning exercises with quantitative targets
13. Systematically develop key KPIs/outcomes/ benchmarks that will show evidence of quality enhancement
14. A suitable academic framework may be developed under to ensure continuity and replicability and transferability of the practice
15. In collaboration with industry and alumni fund mobilization drives may be initiated

I have read the report and agree to the recommendations

Dr. Anitha Pillai

Principal

AAA Team

Dr. C. R Muthukrishnan (Chairperson)

Dr. Suresh Mony (Member Coordinator)

Dr. T.R. Parasuraman (Member)

Dr. N. Jayasankaran (Member Observer)

Place : Kochi

Date: July 28, 2024