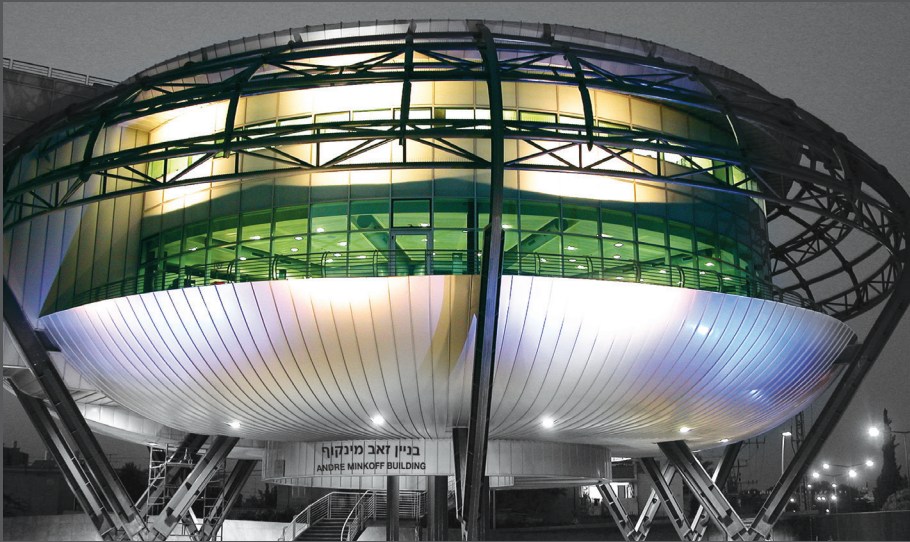

THE SHAMOON COLLEGE OF ENGINEERING (SCE)

CREATING A NEW GENERATION
OF ENGINEERS IN ISRAEL'S
SOUTHERN PERIPHERY



sce
SHAMOON COLLEGE OF ENGINEERING



College of Engineering in Southern Israel

The Shamoon College of Engineering (SCE) is Israel's largest engineering college dedicated to creating a new generation of engineers and technology specialists. Combining world-class academic excellence with a unique approach to education and social responsibility, SCE is much more than a college; it is a source of inspiration and cultivation in the southern periphery of Israel which encourages forward-thinking and facilitates significant achievements. "Engineering the future" is more than a promise – it is a mission which propels students forward and leads them to set an example of excellence amongst their peers and within their communities. With two campuses located in southern Israel, a continuously growing body of over 5,500 students and six different engineering tracks, SCE is a pioneering academic powerhouse.

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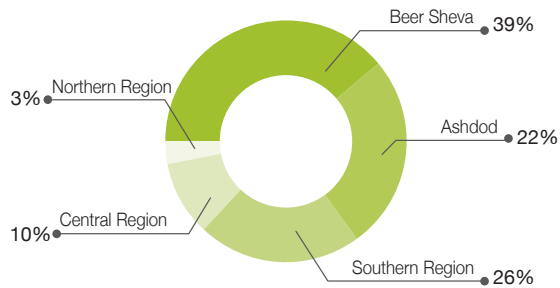
SCE's main campus is in Beersheva, capital of the Negev and 75-80% of the student body comes from the south of the country. SCE's satellite campus is located in Ashdod, Israel's fifth largest city. Founded in 1995, SCE has 6,370 graduates, over 90% of whom are working in the engineering and technology sector, one of the most underserved and crucial sectors in the Israeli economy.

SCE is a public institution with an annual operating budget of NIS 200 million, one third of which is funded by the government. The Beersheva campus is a "green" campus, featuring cutting edge architecture, the latest in lab technology and ecological innovation.

Strengthening the South by Realizing Human Potential

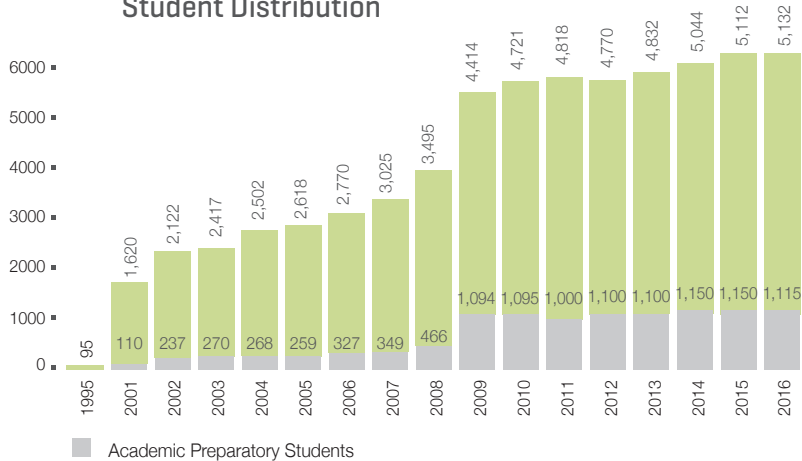
As Israel's largest engineering college, SCE is committed to three cornerstones: academic excellence, cutting edge research and development, and innovation. Through the vehicle of educating students from the southern periphery, SCE firmly believes that it can change the dynamic of this region. The institution is unique in the country in its approach to absorbing and preparing students for the rigors of an education in engineering.

Geographic Distribution



The students entering with weaker skills or those who are lacking in prerequisite courses and matriculation are directed to a one year preparatory program. This program is all encompassing providing extra support in math, science and English as well as a formal support system of mentoring and coaching. Although the preparatory year drop-out rate hovers at 15%, the graduation rate for those who continue on to the academic program reaches 90%.

Student Distribution





SCE takes pride in the fact that the majority of its graduates continue to live and work in the Negev region.

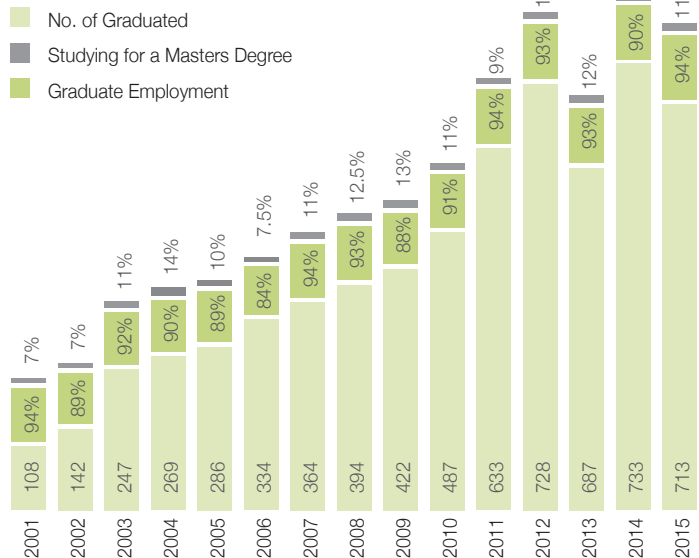


While SCE supports all its students, there are two populations that are the beneficiaries of extra support: women and potential students from the Ethiopian population. SCE is at the forefront of encouraging women to embark upon careers in the field of technology, particularly in the areas of electrical, structural and mechanical engineering. Towards that end, women are encouraged to enroll through incentives such as women's empowerment courses, enrichment classes and an augmented scholarship program called Scholarship for Social Change.

New immigrant students are similarly encouraged and receive extra economic help, which often proves to make the difference in helping them stay the course until they attain a degree of higher education.

Expanding educational opportunities for socially and economically disadvantaged youth is one of the most effective equalizers for bridging the gap in Israeli society. SCE takes pride in the fact that the majority of its graduates continue to live and work in the Negev region. At SCE, we firmly believe that our approach vastly improves the lives of individuals, families and ultimately, the community.

Graduate Analysis

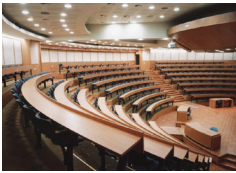


Academic Programs and Innovation

Degree Programs

SCE offers academic programs leading to Bachelor and Master of Engineering degrees in six departments:

- Electrical and Electronics Engineering / Communications, Electricity and Electronics
- Mechanical Engineering / Mechatronics, Product Planning & design
- Software Engineering / Cyber, Software
- Civil Engineering
- Chemical Engineering / Biotechnology, Processing Industry
- Industrial Engineering and Management / Data, Industrial and Management Systems



SCE is committed to supporting students and alumni in seeking meaningful employment. The Career Development Department offers advice and assistance for SCE students



B.Sc. Electrical and Electronic Engineering **Communications, Electricity and Electronics**

The current technological revolution alongside a highly competitive marketplace and a global shift towards clean energies, have led to an increased demand for engineers specializing in electricity and electronics. The programs in this department train students to become top-level engineers specializing in a broad spectrum of disciplines such as electrical circuit development, monitoring and communications and more. Graduates are successfully employed at power plants, monitoring and automation systems and other industrial entities.

B.Sc. Chemical Engineering **Biotechnology, Processing Industry**

According to the Israeli Bureau of Statistics, SCE is the leading academic institution for Chemical Engineering. This department offers two key tracks: biotechnology and processing industry. Its curriculum combines basic theoretical knowledge with cutting-edge technology and science, placing emphasis on practical implementation in industry and research. The department also runs a center for green processes, integrating basic and applied research towards the development of sustainable processes within the industry and community.

B.Sc. Mechanical Engineering

Mectronics, Product Planning and Design

Mechanical Engineering is the base for all of the world's modern industry. The studies within this department combine basic sciences with engineering applications, encompassing numerous fields, including mectronics, computers, industry and energy, research processes, planning and development, production and maintenance of various systems, to name a few.



B.Sc. Civil Engineering

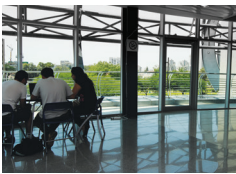
This department trains students to become civil engineers in the fields of planning, managing and construction operations. The curriculum was designed to produce professional and creative engineers who will be integrated into the workplace in a broad spectrum of sectors, such as roads, bridges, steel tracks, tunnels, airports, buildings, skyscrapers, water supply, waste management and others.

Special emphasis is placed on gaining an in-depth understanding of updated computer systems, which serve as a crucial skill for engineers in any field.

B.Sc. Software Engineering

Cyber, Software

This department trains software engineers while combining computer sciences, engineering and diverse aspects of industry. Graduates of this department are equipped with strong analytical capabilities and in-depth knowledge regarding algorithms and analyzing system reliability in accordance with today's highest standards. Special emphasis is placed on academic research as well as "industry-oriented" courses, which expose students to updated processes and tools that enable them to make their way into the marketplace. Staying in tune with the dynamic needs of this field, a new track has been developed recently in the field of cyber warfare and data security, offered solely to excelling students.



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All Engineering students on the college campus are required to study physics as part of their course requirements, comprising approximately 1,000 students each year.

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B.Sc. Industrial Engineering and Management

Data, Industrial and Management Systems

Industrial and Engineering and Management is a broad field, incorporating topics of engineering, economics, data, organization and management. This field applies scientific and engineering principles of planning, operation and problem solving in integrated systems which comprise equipment, materials and human resources. The department offers its students a wide spectrum of tools, equipping them with the capabilities required to make managerial decisions and devise engineering solutions for new situations.



M.Sc. Software Engineering

The Masters program in Software Engineering provides students with advanced scientific and research knowhow as well as practical tools with which to solve crucial engineering problems. This two year program is designed for working students, teaching them how to develop and manage engineering and technological processes and apply them within any organization that views software use as a focal strategic tool.



M.Sc. Industrial Engineering and Management

A Master's Degree studies in Industrial Engineering and Management trains and prepares engineers for senior management positions. The objective of the studies is to impart, to engineers, broad scope and up to date knowledge in the field of Industrial Engineering. The curriculum incorporates a wide range of innovative engineering methods, advanced technologies, management doctrines, tools, skills and much more. All these assist the graduates to run, at their place of employment, complex projects using technological and management processes, facilitating their promotion to key positions in the world of business, in industry, in research or in academia.

M.Sc. Degree in Electrical and Electronic Engineering

Trajectory: Specialization in Power and Energy Systems

Master's Degree studies in the field of power systems provides the student with the knowledge necessary to be successfully absorbed into the developing energy sector. The curriculum enables the graduates to specialize and professionalize in the field of the development of electronic circuits, electronic equipment and computers, and also enables graduates to advance to senior electrical engineer positions in leading enterprises in Israel. The objective of the program is to train the next echelon of senior engineers, who will be able to lead, both at research and practical levels. In order to do this, the courses are held in an environment that integrates experience at a high level alongside theoretical studies.

Entrepreneurship and Innovation Center

SCE is one of the only engineering institutions in Israel today with a focus on project oriented programs. To that end, SCE has instituted the EIC – Entrepreneurship and Innovation Center which actively promotes student and faculty initiatives and launches technological enterprises.

EIC provides counseling and support services for the implementation of technological ideas. It assists students in developing skills in entrepreneurship and innovation, while forging ties between academia, business and industry and serving as an incubator and a springboard for innovation and creativity. Every fourth year student is required to submit a final project showcasing the development of those skills.

The center targets faculty members, students, graduates and various external entities, creating collaborations and frameworks that propel ideas and engineering initiatives forward. The center is focused around several tasks:

1. Training students in technological entrepreneurship (the Engineer-Entrepreneur Program).
2. Individual business coaching for outstanding projects (students, faculty members, graduates).
3. Research in technological entrepreneurship.
4. Training managers in technological entrepreneurship (in and outside the organization).
5. Business counseling and support in propelling successful research projects from the theoretical stage towards commercial development.
6. Encouragement of international partnerships through conferences, workshops and student exchanges.



Research and Development Centers

In a relatively short time SCE has become one of the country's leading academic institutions, its innovative and advanced research contributing impressively to the Israeli economy and society. The college's R&D centers and faculty members, many with prestigious reputations in the academic world, have gained the attention of the international scientific community and are recipients of generous research grants. Some of the research areas at SCE include:

- The Corrosion Research Center, Nano-Bio & Advanced Materials
- The Green Processes Center
- The Negev Monte Carlo Research Center
- The Center for Reliability and Risk Management
- Energy and Numerical Simulations Research Center
- Center for Health Statistics and Bioinformatic Engineering CHSBI)

The Corrosion Research Center, Nano-Bio & Advanced Materials

The Corrosion Research Center's main areas of activity are international research, project development in a sea environment, and enhancing student awareness of the center's work.

In the area of international research, the center initiates joint efforts. It has received grants for research projects in the automobile and bio-materials industries, and electro-chemical cell simulations for implant grafting in the human body. In sea environment research, the center has set up a station at the Port of Ashdod in cooperation with the Marina Authority. The aim of the project is to create an intercontinental sea map for understanding the corrosion rate in port infrastructures and corrosive damage to seagoing vessels in anchorage.

Worldwide corrosive damage is estimated at 3.2 trillion dollars a year; therefore it is of utmost urgency to find solutions that reduce maintenance costs, extend infrastructure lifetime, and lower the corrosion rate. The Corrosion Center studies ways to safeguard the water infrastructure in Israel and the international community.

The center, together with the international student cell, holds study days and seminars on SCE's two campuses that introduce students to the center's projects and main areas of corrosive studies. The activities of the center include several scientists and engineers as well as dozens of students.

The Corrosion Center continues to receive generous research grants from overseas, while developing scientific-industrial contacts in Israel and abroad, thus maintaining its position as a recognized international research center.

The Green Processes Center

SCE's Green Processes Center integrates basic and applied research in sustainable processes into industry and the community. The center's aim is to take the lead in green development in Israel through its research in green engineering, green chemistry, and clean technologies. It has initiated a number of academic and community projects in this field. The center's combination of basic research and applied projects emphasizes the development of effective and selective processes based on cleaner materials, and biological and chemical catalysts that use separation and recycling systems for treatment of waste produced.

Current projects:

- Discovering sustainable solvents for organic syntheses.
- Design and development of sustainable services.
- Fixing liquid wastes in geopolymers.
- Development and implementation of a novel generator of micron-nanometer sized bubbles at instable flow with low energy consumption.

The center's staff is actively involved in environmental issues, international conferences, and public education in the media; staff members serve on various committees and are consultants in several green tech companies.

The center plays a leading role in the extended community and also provides professional courses to industrial companies, such as Intel, and governmental bodies, such as the Ministry of Infrastructure.

The Negev Monte Carlo Research Center

Negev Monte Carlo Research Center (NMCRC) - a research center that specializes in Monte Carlo simulation.

The NMCRC brought together scientists from a variety of fields – mathematicians, physicists, chemists, biologists, and software engineers – in order to develop simulation tools for different scientific spheres, utilizing the requirements, rigors, and standards of software engineering.

Over the years, the scope of the NMCRC center expanded from Monte Carlo simulation to the applied Computational Science, and Engineering Center, which exploits the power of computation to

provide scientific software products for a variety of scientific and engineering fields under proven principles, approaches, tools, and standards.

The goal of the Negev Monte Carlo Research Center is to combine research in physical, environmental, biological, chemical, and medical models with proven software capability, while ensuring software quality, software development, methodology, and advanced testing standards.

The Center for Reliability and Risk Management

The Center for Reliability and Risk Management (CRRM) is a Research Center established to improve industrial productivity and efficiency through advanced reliability, maintenance, and survivability (RMS) technologies and corresponding risk management, and logistics principles.

The Mission of the Center for Reliability and Risk Management emphasizes its commitment to provide high-level research work in order to improve productivity and profitability for its partners in industry. The four components of this Mission are Research and Technology Assessment, Education, Information Sharing, and e-Consulting.

CRRM bridges the gap between theoretical advances in academia and practical engineering in industry. In order to provide high-level research work CRRM is functioning under the supervision of the International Scientific Board, which includes leading experts from all over the world who have demonstrated outstanding achievements in the field.

The CRRM offers a spectrum of educational opportunities including courses in a variety of RMS & Applied Technology related subjects, executive seminars, and consultations.

Researchers of CRRM have published one book, and more than 50 scientific articles and book chapters in the field of RMS & Applied Technologies.



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Energy and Numerical Simulations Research Center

The Research Center for Energy and Numerical Simulations was established in the Mechanical Engineering Department of SCE. The center performs applied theoretical and experimental research on energy that combines fields of thermal sciences, heat and mass transfer, multiphase flows, cryogenics, and transport phenomena. The theoretical modelling is performed on a dedicated computer cluster dedicated to numerical simulations. The experimental studies are conducted on laboratory experimental systems and devices developed by the center researchers. The laboratory is equipped with modern measuring devices including high-speed camera and a laser diffraction device.

Primary investigators in the research center are Dr. Gedalya Mazor - director of the center, Dr. Maksim Mezhericher – team leader, energy and numerical simulations, and Dr. Itzhak Ladizhensky – team leader, energy and experimental systems.

The main research topics of the center are: production of submicron and nano- droplets and particles by a new liquid atomization method (patent pending), milling of hard particles, mixing of immiscible liquids, development of medical devices, new method of fast freezing food, enhancement of heat transfer in fast cryogenic treatment of materials, shock waves reflection, and ecological monitoring.

Center for Health Statistics and Bioinformatic Engineering (CHSBI)

The Center for Health Statistics and Bioinformatic Engineering (CHSBI) is a Research, Education, and Development center in the SCE-Shamoon College of Engineering.

The main aims of the CHSBI are to: establish new research cooperations and collaborations; develop cutting-edge theoretical and applied biostatistical, bioinformatics, and engineering methods that offer innovative solutions to important medical, biomedical, and public health problems; support world-wide access for a broad authority of theoretical and clinical investigators to novel developments related to health statistics and bioinformatic engineering; create new training programs for students and clinical investigators; provide new statistical program packages with applications to real world problems; publish relevant results in high impact factor international journals and books.

The CHSBI conducts research projects on various problems in the theoretical and applied health-related sciences including biostatistics

and bioinformatics. The center organizes meetings, conferences, and workshops including on-line conferences. The CHSBI also provides e-mail consulting and scientific collaborations with all members of the center.

SCE is committed to supporting students and alumni in seeking meaningful employment. The Career Development Department offers advice and assistance for SCE students and alumni in all stages of their careers. Its purpose is to maintain close contact with industry, and put a variety of services at the disposal of students and alumni: updated job listings on SCE's website, meetings with potential employers, annual job fairs, guidance on resumes and interviews, career development workshops, and more.

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Night of Scientists' is an annual event where SCE opens its doors to community members of all ages. It is extremely well attended with children and adults learning how to run lab experiments

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Strengthening the Community External Studies Center

While many academic institutions in Israel are situated in populous areas, they make almost no impact upon the wider population. SCE's location in Beersheva's challenging 'Shechuna Aleph' neighborhood provides it with ample opportunity to impact the wider population. SEC's External Studies Center is a specialized training center offering courses for professional advancement as well as personal enrichment, in diverse areas such as computers, English and home design. In this capacity, the center strengthens SCE's ties with the general public.



Sami Shamoon College of Engineering

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