TECH
PROGRAMMES

KNOWLEDGE ALONE IS NOT ENOUGH. YOU NEED SKILLS.

CONTENTS

MAKING SOMETHING FLY IN THE REAL WORLD IS THE PURPOSE OF EVERYTHING WE DO

KEA TECH

KEA Tech offers practice-oriented study programmes covering a wide range of areas from energy, automation, installation, technology to optometry. All programmes are characterised by close connections with the business community through, for example, case studies and internships.

KEA Tech has approximately 800 students.

BACHELOR TOP-UP 1½ YEARS / 90 ECTS —	DK	INT	BACHELOR 3½ YEARS / 210 ECTS —	DK	INT
PRODUCT DEVELOPMENT & INTEGRATIVE TECHNOLOGY	●	●	OPTOMETRY	●	

AP-DEGREE 2 YEARS / 120 ECTS —	DK	INT
PRODUCTION TECHNOLOGY	●	●
ENERGY TECHNOLOGY	●	
AUTOMATION ENGINEERING	●	
IT TECHNOLOGY	●	
SERVICE ENGINEERING (ELECTRICITY)	●	
SERVICE ENGINEERING (PLUMBING)	●	

KEA Tech offers two international programmes taught entirely in English:

• Academy Profession (AP) degree (2 years) in Production Technology
• Top-up Bachelor degree (1½ years) in Product Development and Integrative Technology

Incoming exchange students are accepted to both programmes.

In addition, KEA Tech offers a number of programmes in Danish. Four of these: Energy Technology, Automation Engineering, IT Technology and Optometry may be open to other forms of international collaboration than exchange of students (for example, short-term mobility, projects, staff exchange). The programmes are described briefly later in this brochure.

KEA Tech also offers Service Engineering (electricity) and Service Engineering (plumbing) in Danish. Both programmes prepare students to apply for professional certifications.

Teaching is generally case-based and involves group work. All KEA Tech programmes focus on preparing students to implement their skills and knowledge in a business context. Lecturers have practical business experience and many draw on their business connections in case projects.

All students complete a compulsory (unpaid) internship lasting 10 weeks. Internships take place in a wide range of companies, ranging from start-ups to multinationals. Internships allow students to test what they have learned in practice and contribute enormously to their development as professionals in their field.

In keeping with the concept of lifelong learning, it is important that students take responsibility for their own learning – to an increasing degree as they progress through their studies and grow into professionals.

Lecturers provide continuous feedback to help students develop within the field, but students should be prepared to make and discuss their own decisions.

Most KEA Tech programmes offer approximately 20 contact hours between lecturers and students but require full-time study (approximately 37 hours/week), with students being expected to work independently and in groups on projects outside the contact hours.

Exchange students should be aware of these requirements and be prepared to challenge themselves with a new way of working if they are used to a different approach to teaching and learning from their home institutions.

GLOBALISED EDUCATION

EXCHANGE STUDENTS – INCOMING AND OUTGOING
All programmes have opportunities for incoming and outgoing students, which are detailed in the individual programme descriptions in this brochure.

At KEA, the autumn semester runs from late August until late January, while the spring semester runs from the beginning of February until late June.

Exams for the autumn semester are held in January. If the semester at the partner institution starts at the beginning of January, every effort will be made in collaboration with the partner institution to permit incoming exchange students to KEA and outgoing exchange students from KEA to complete the required exams that take place in January at KEA.

Arrangements may be made, for example, to take oral exams virtually (e.g. on Skype) if this is acceptable to the partner institution.

DO YOU WANT TO WORK IN THE SPACES BETWEEN PRODUCT DEVELOPMENT, PROCESS AND MANUFACTURING?

The Academy Profession (AP) degree in Production Technology is a two-year (four-semester) full-time programme taught entirely in English.

There is one uptake each year (summer) for the international programme, while the Danish programme has both a summer and a winter uptake.

The programme prepares students to use technical, innovative, creative and analytical skills relating to product development and production. Graduates are typically employed as product developers, concept developers, project managers, operations planners, designers, buyers, sales consultants, quality managers or supervisors.

2 YEARS
4 SEMESTERS
120 ECTS

Programme start:
Summer and Winter

Language of
instruction: English

Learn more:
KEA.DK/PTINT

1	2	3	4
ONE, TWO OR THREE-WEEK COURSES IN THE FIELDS OF: PRODUCT DEVELOPMENT AND DESIGN CONSTRUCTION MATERIALS AND MANUFACTURING PROCESSES BUSINESS TECHNOLOGY PRODUCTION PROCESSES TECHNICAL DOCUMENTATION	PROJECT COURSE	AUTOMATION	INTERNSHIP
		PRODUCT DEVELOPMENT OR PRODUCTION SPECIALISATION	
			EXAMINATION PROJECT
METHODOLOGY PROJECT			

OPEN TO EXHANGE

JOB OPPORTUNITIES
Product developer, idea developer, operational planner, designer, purchaser, sales consultant, quality manager, workshop supervisor, project manager.

FURTHER EDUCATION
BA in Design & Business, BA in Product Development and Integrative Technology, BA in Innovation and Entrepreneurship.

During the first year of study, students are introduced through one- to three-week courses to a range of core areas: product development and design, construction, materials and manufacturing processes, business technology, production processes and technical documentation. They then work on projects that they help design.

During the second year, students can tailor the programme to their interests by selecting one of two course packages: 1) Production or 2) Product development.

Throughout the programme, students work with cases that address product development and production related issues as well as other typical aspects of projects, such as business models.

EXCHANGE
OUTGOING EXCHANGE STUDENTS
KEA students can go on exchange in the 3rd semester (autumn or spring semester). Students have some flexibility in their choice of courses at the host institution as long as they strengthen and develop the skills and knowledge the students have acquired in the first year of the programme.

INCOMING EXCHANGE STUDENTS
Exchange students are accepted to the 3rd semester (autumn semester for the international programme). In this semester, they take the 5 ECTS course "Automation" and 25 ECTS in one of two course packages: 1) Production or 2) Product development. The students must take all of the subjects within the chosen course package for the semester.

Automation: 5 ECTS
This course provides students with a basic knowledge of pneumatics, hydraulics, PLC and electricity, as well as corporate robots in Danish production. This knowledge can be used in both product development and automation in production (optimisation).

After the course, the student should be able to calculate simple electrical circuits using Ohm's and Watt's Laws and have a basic understanding of:

- relevant analogue electronic components and technologies
- relevant digital electronic components, technologies, and Binary and HEX digital number systems
- ESD
- EMC
- PLC and ladder programming
- financial calculations as inputs to decision-making on the use of corporate robots in a Danish production company

As well as an understanding of the basic components of relevant relays, hydraulics and pneumatics and their dimensioning.

Course packages – choose one of two: 1) Production or 2) Product Development

Production course package: 25 ECTS
The Production course package covers topics such as the supply chain, LEAN and accounting.

Product Development course package: 25 ECTS
The Product Development course package covers topics such as design history, design for environment, prototyping, Industry 4.0

DO YOU DREAM OF WORKING WITH PRODUCT DEVELOPMENT AND NEW TECHNOLOGIES?

The Bachelor degree in Product Development and Integrative Technology (PTI) focuses on how to integrate and coordinate technical, creative and business-oriented parts of a development process of physical products, concepts or technical services. PTI is a top-up degree; students have already completed studies at the AP level (four semesters)

in, for example, Production Technology, Service Engineering, Automation Technology, Energy Technology or IT Technology.
Therefore, students already have considerable knowledge and skills, as well as experience as a practitioner since all AP degree programmes have a mandatory internship.

1½ YEARS
3 SEMESTERS
90 ECTS

Programme start:
Summer and Winter

Language of
instruction: English

Learn more:
KEA.DK/PDIT

5	6	7
THEORETICAL PRODUCT DEVELOPMENT	SUSTAINABILITY IN PRODUCT DEVELOPMENT	INTERNSHIP
	CROSS-DISCIPLINARY PRODUCT DEVELOPMENT AND DESIGN	
PROFESSIONAL PRODUCT DEVELOPMENT AND DESIGN		BACHELOR PROJECT
	ELECTIVES	

OPEN TO EXHANGE

JOB OPPORTUNITIES
Product development, project management, optimisation of production systems and processes, energy optimisation and installations, consultancy and advice, sole proprietorship and entrepreneurship.

FURTHER EDUCATION
With a BA in Product Development and Integrative Technology, students have the option of pursuing a Master's degree, for example, a Master of Science and Technology degree at Aalborg University or one of IT University's Master's programmes.

The top-up degree allows students to develop a more advanced understanding of relevant theory and how it can be applied in the context of a large project or network with multiple stakeholders.

As students have different academic backgrounds, PTI takes a cross-disciplinary approach, with students working in project groups of mixed skills to develop and deliver the best possible solutions. This prepares them for the workforce, where the ability to participate in teamwork and collective problem solving is crucial. Students are also expected to engage in self-driven study.

There is one uptake each year (summer) for the international programme, while the Danish programme has both a summer and a winter uptake.

EXCHANGE
OUTGOING EXCHANGE STUDENTS
KEA students can go on exchange in the 2nd semester (spring or autumn semester). Students have some flexibility in their choice of courses at the host institution as long as they strengthen and develop the skills and knowledge the students have acquired in the first year of the programme.

INCOMING EXCHANGE STUDENTS
Exchange students are accepted to the 2nd semester (spring semester for the international

programme). It is important to remember that since the PTI is a top-up programme students take after completing an AP degree, the 2nd semester corresponds to the students' sixth semester of studies.

The 2nd semester consists of three projects, which are carried out in succession. An exam is held after each of the three modules.

- **Module 1** consists of an elective (such as "Green Technologies") chosen from a limited number of options.
- **Module 2** is within the area of Sustainability in Product Development.
- **Module 3** covers Interdisciplinary Product Development and Design.

OTHER POSSIBILITIES FOR INTERNATIONAL COLLABORATION
KEA Tech offers three AP (Academy Profession) degree programmes and one professional bachelor's programme in Danish that may be open to other forms of international cooperation than semester exchange: Energy Technology, Automation Engineering, IT Technology and Optometry.

Possible activities may include: short-term (one-two weeks) mobility programmes for students, project collaboration with partner institutions or companies, staff exchange or guest lectures.

ENERGY TECHNOLOGY ^{DK}

Energy Technology is a two-year AP (Academy Profession) programme. The programme provides a broad overview of sustainable energy technology and its place in a modern business environment.

Students learn how to identify energy problems in buildings and industrial processes and develop solutions for them. Graduates typically work as project managers, handling complex planning tasks, and energy consultants, advising clients ranging from house owners, over directors of small and large companies, to politicians on practical energy optimisation and how to meet energy and climate goals.

By instigating local energy changes, energy technology specialists can have a global impact.

AUTOMATION ENGINEERING ^{DK}

Automation Engineering is a two-year AP (Academy Profession) programme. Students learn about control, regulation, construction and optimisation of technical operating systems.

Graduates in Automation Engineering work with the design, construction and operationalisation of automatic machinery and processing equipment. During the programme students learn to take responsibility for the entire process.

Focus is on three main areas:
- **The machine:** Students gain basic knowledge of the development, design and operationalisation of machines with both digital and analog control signals.
- **The cell:** Students learn about automatic systems and the importance of the correct communication technology between the individual systems and the operator of the system.
- **The line:** Students learn about data exchange and data collection to enable them to document the quality of products.

Students are in close contact with the business community during their studies; they do a compulsory ten-week internship in a business in the public or private sector, which forms the basis of their final project.

MAIN TOPICS COVERED:
DESIGN AND CONSTRUCTION OF AUTOMATIC UNITS
Electrical and technical installation theory. Using technical and creative calculation methods to develop and design technical operating and regulating systems. Development and dimensioning of operating and regulating systems. Product development.

INTEGRATION OF AUTOMATIC UNITS
Designing operator interfaces to operate automatic systems on industrial computers. Preparing overall solutions to tasks related to processing plants with mechanics, electronics and operating and regulating systems.

SYSTEM DESIGN OF PROCESS AND PRODUCTION LINES
Network technologies and protocols used for communication in an automatic system. Programming and configuration of operating and regulating systems.

BUSINESS-RELATED ELEMENTS
Key methods and tools used in innovative processes, production management, financial management and other business activities. Graduates can handle tasks as operations managers and project managers.

IT TECHNOLOGY ^{DK}

IT Technology is a two-year AP (Academy Profession) programme. Using innovative methods, students learn how to design and set up electronic and technical communication systems. In addition, they learn about project, quality and resource management in connection with development and project planning tasks.

Students gain solid insight into the latest computer and electronic technology and learn how to develop and use it in practice. At the same time, they learn how to analyse a company's requirements within the area of networks and electronics and transform these needs into technical solutions.

The teaching takes place as a combination of class instruction and project work - individually and in groups. There is always a cross-disciplinary and application-oriented focus.

Students are in close contact with the business community during their studies; they do assignments in collaboration with businesses in the public and private sectors and a compulsory ten-week internship.

MAIN TOPICS COVERED:
NETWORKS AND OPERATING SYSTEMS
Using tools and equipment in connection with designing and testing hardware solutions and building a technical communication system.

TECHNOLOGY
Using tools and equipment in connection with designing and testing hardware solutions and building electronic systems.

COMMUNICATION
Communication and documentation in connection with both internal and external customer relationships, for example, the presentation of projects.

MANAGEMENT
Innovation, project management, understanding the principles of business, advising and consulting.

NETWORKS
Network design and evaluation of technical network solutions in relation to the needs of businesses and customers.

DATABASE AND PROGRAMMING TECHNIQUES
Building, testing and maintaining database systems.

ADVISING AND CONSULTING FUNCTIONS
Using network technology knowledge in connection with advising and consulting tasks, for example, with regard to technical network solutions.

SECURITY
Aspects of security, including encryption, certificates, firewalls, access control and server security. Analysing, identifying requirements, proposing solutions and designing security solutions.

OPTOMETRY DK

The Bachelor's Degree Programme in Optometry offers graduates – in their capacity as authorised optometrists – the opportunity to embark on a career in the health-care sector with a focus on sight corrections and the communication of solutions to clients.

The programme rests on both a theoretical and practical foundation. What the students learn during

their studies is tested on a regular basis at KEA's eye test clinics and during the internship periods.

The combination of theory and practice provides the students with knowledge about eye measurements and the correction of eye defects, eye diseases and the selling of eyewear (within the latest fashion trends) as well as contact lenses with a view to offering optimum guidance for clients.

**3½ YEARS
7 SEMESTERS
210 ECTS**

Programme start:
Summer

Language of
instruction: danish

Learn more:
**KEA.DK/
OPTOMETRI**

1	2	3	4	5	6	7
BASIC SCIENCE		INTERNSHIP	OCULAR PATHOLOGY AND PHARMACOLOGY	BASIC SCIENCE	INTERNSHIP	INTERNSHIP
HUMAN SCIENCE				OPTOMETRY/ BINOCULAR VISION		
VISUAL SCIENCE/ OCULAR ANATOMY & PHYSIOLOGY/ VISUAL OPTICS			OPTOMETRY/ BINOCULAR VISION	CONTACT LENSES		
				INTERNSHIP		BACHELOR-PROJECT
OPTICS			CONTACT LENSES			
OPTOMETRY: REFRACTION						
EYEGLASS LENSES, TECHNOLOGY AND WORKSHOP OPTICS						

BASIC SCIENCE
The subjects taught on the Basic Science course are mathematics, statistics, epidemiology, chemistry, biology and scientific methodology. Knowledge within this field enables the students to calculate sizes, assess and present statistics for use in the production of eyeglass lenses and contact lenses; to work with the methodologies of relevance to optometry and to understand cells, molecules and microorganisms.

HUMAN SCIENCE
The Human Science course is about getting to know the human body and covers the subject areas anatomy, physiology, pharmacology, pathology and psychology. It provides the students with knowledge of and insights into the context which the eye and the visual system form part of.

OPTICS
Geometric optics and physical optics are the main topics studied on the Optics course. The course enables the students to analyse and calculate optical issues of relevance to optometry.

OPTOMETRY
The aim of the Optometry course is to provide the students with competencies within refraction, binocular vision, contact lenses, ergo-optometry and low vision optics. They learn to make optometric measurements and observations and to analyse and document measurements and observations in order to be able to make a correct diagnosis.
In addition, the students learn to provide the correct guidance and instructions and to refer the client for other treatment, if necessary.

VISUAL SCIENCE
The aim of the Visual Science course is for the students to acquire competencies within ocular anatomy and physiology, physiological/visual optics and visual psychophysics and perception. With these competencies, they gain an in-depth understanding of the eye and the structures, components and function of the visual system.

EYEGLASS LENSES, TECHNOLOGY AND WORKSHOP OPTICS
As an optometrist, having extensive product knowledge and being highly quality-conscious are important competencies in order to be able to guide and advise clients and assess product quality. The students acquire these competencies on the Eyeglass Lenses, Technology and Workshop Optics course, where they learn about eyeglass lens technology, quality assurance, grinding technology, frame technology and frame adjustment.

LEGISLATION AND TRADE
As many optometrists work for dispensing opticians, it is important that the students know about the applicable legislation. On the Legislation and Trade course, they work with legislative and regulatory issues and acquire knowledge of ethical and social behaviour and good industry practice.

OCULAR PATHOLOGY AND PHARMACOLOGY
In the course of their studies, the students acquire competencies with the fields of ocular pathology, ocular neurology and ocular pharmacology. This provides them with an in-depth understanding of symptoms of disease in the visual system and how vision may be affected by medication.

WORKSHOP FACILITIES
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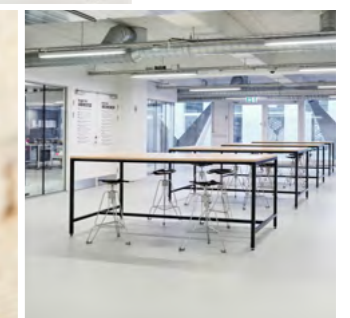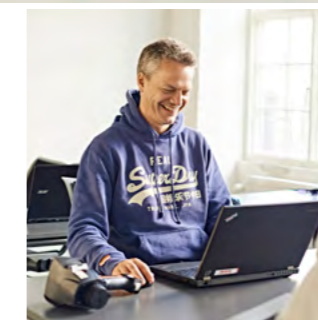# KEA IS A PLAYGROUND, A COMMUNITY, A WEALTH OF ACTIVITIES AND RESPONSIBILITIES

There are both traditional classrooms and rooms or areas for group work. All buildings have wifi and printing services but students are expected to bring own their computers to classes. Some classes require that students have certain programs installed – if a cost is involved, students must pay for themselves, but there are often student discounts.

LIBRARY AND MATERIAL CONNEXION
An essential part of KEA is the library service. The staff provides profound guidance to students, lecturers and external stakeholders. The library is not only filled with books, but also has online searching platforms and a material box with samples of all the materials the students use on the different programmes at KEA.

KEA has one of the world's leading material libraries. In autumn 2013, KEA became the seat of the largest material collection in the Nordic region, a project carried out in collaboration with Material ConneXion in New York. Material ConneXion includes approximately 1,500 physical samples on display and gives online access to more than 7,000 material samples.

All KEA students have access to the KEA library, which has many online resources and Material Connection as well as KEA Makerlab, which offers an introductory workshop at the start of each semester.

CREATIVE ENVIRONMENTS AT EVERY CORNER

At KEA, there is a new challenge around every corner. KEA offers endless opportunities to experiment and develop ideas into products in the different workshops and labs, which are equipped with everything from CNC milling machines and 3D printers to a wide range of digital hardware. KEA has cozy corners, roof terraces, cafes and bars that students can use for meetings and socialising.

KEA MAKERLAB
KEA's prototype workshop can be found across from the reception at Guldbergsgade.

Here the students have access to several workshop facilities, including a wide range of machines and equipment like a CNC milling machine, a laser cutter or different 3D printers, allowing them to elaborate on their ideas from concept to final product.

More information about Makerlab at
kea.dk/kealabs/workshopgbg

KNOWLEDGE ALONE IS NOT ENOUGH.
YOU NEED SKILLS.

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