EKSAMENSSAMARBEIDENDE FORKURSINSTITUSJONER

Forkurs for 3-årig ingeniørutdanning og integrert masterstudium i teknologiske fag og tilhørende halvårig realfagskurs.

Universitetet i Sørøst-Norge, OsloMet, Høgskulen på Vestlandet, Høgskolen i Østfold, NTNU, Universitetet i Agder, Universitetet i Stavanger, UiT-Norges arktiske universitet, NKI, Metis.

Eksamensoppgave

ENGELSK

Bokmål

23. mai 2025

kl. 9.00-13.00

Hjelpemidler:

PC med institusjonens eksamensplattform med retteprogram og elektronisk ordbok - og samtidig sperret internett

   1. Retteprogram skal være aktivert.

   2. Digital ordbok kan benyttes, enten Ordnett.no og/eller Clue.no

   3. Fysiske ordbøker som er godkjent av institusjonen, men uten eksempeltekster på brev og lignende kan benyttes.

NB! Den digitale eksamen i Engelsk skal også ha utlevert oppgaver og vedlegg på papir.

Andre opplysninger:

Oppgavesettet består av to sider medregnet forside, samt to vedlegg.

Oppgavesettet inneholder to oppgaver. Begge må besvares for å oppnå ståkarakter.
Vekting: "Short Answer 30% og "Long Answer" 70%

"Much like the calculator did not signal the end of students' grasp of mathematics knowledge, typing did not eliminate handwriting, and Google did not herald the end of research skills, AI does not signal the end of reading and writing or of education in general" (Britannica, 2025).

Short Answer (30%): Formal Email

You are newly employed in an international engineering company. Your leader has seen that you have experience using AI effectively. She wants you to write a formal email informing your colleagues about the benefits of using AI at your workplace. Sign as Eric/Erica Hanson.

Long Answer (70%): Five-Paragraph Essay

Discuss some of the challenges and benefits using AI in the fields of engineering and engineering education. What should engineering students and engineers be mindful of in a world where AI technology is gaining an increasingly dominant position? Use the two attachments and cite your sources.

Note that the attachments have been modified/edited.

Artificial Intelligence (AI)

Is Artificial intelligence good for society?

By Britannica, published 28 January 2025

Artificial intelligence (AI) is the use of "computers and machines to mimic the problem-solving and decision-making capabilities of the human mind," according to IBM. Now, artificial intelligence is used for a variety of everyday implementations including facial recognition software, online shopping algorithms, search engines, digital assistants like Siri and Alexa, translation services, automated safety functions on cars, cybersecurity, airport body scanning security, poker playing strategy, and fighting disinformation on social media.

AI makes work easier for students and professionals alike.

Much like the calculator did not signal the end of students' grasp of mathematics knowledge, typing did not eliminate handwriting, and Google did not herald the end of research skills, AI does not signal the end of reading and writing or of education in general.

AI can make work easier and more efficient, rather than signaling the rise of the robot employee. Pesky, time-consuming tasks like scheduling and managing meetings, finding important emails amongst the spam, prioritizing tasks for the day, and creating and posting social media content can be delegated to AI, freeing up time for more important and rewarding work. The technology can also help with brainstorming, understanding difficult concepts, finding errors in code, and learning languages via conversation, making daunting tasks more manageable.

AI is a tool that, if used responsibly, can enhance both learning and work for everyone. Carri Spector of the Stanford Graduate School of Education says, "I think of AI literacy as being akin to driver's ed: We've got a powerful tool that can be a great asset, but it can also be dangerous. We want students to learn how to use it responsibly."

AI helps marginalized groups by offering accessibility for people with disabilities.

Artificial intelligence is commonly integrated into smartphones and other household devices. Virtual assistants, including Siri, Alexa, and Cortana, can perform innumerable tasks from making a phone call to navigating the internet. People who are deaf and hearing impaired can access transcripts of voicemail or other audio, for example.

Other virtual assistants can transcribe conversations as they happen, allowing for more comprehension and participation by those who have impairments that affect their communication. Using voice commands with virtual assistants can help people with mobility disabilities who may have difficulty navigating buttons or screens or turning on a lamp.

Apps enabled by AI on smartphones and other devices can read messages, describe app icons or images, and give information such as battery levels for visually impaired people. Other apps can transcribe and standardize the voices of people with speech impediments. Other AI implementations, such as smart thermostats, smart lighting, and smart plugs, can be automated to work on a schedule to aid people with mobility or cognitive disabilities to lead more independent lives.

Artificial intelligence can improve workplace safety.

AI does not get stressed, tired, or sick, three major causes of human accidents in the workplace. AI robots can collaborate with or replace humans for especially dangerous tasks. For example, 50% of construction companies that used drones to inspect roofs and other risky tasks saw improvements in safety. Artificial intelligence can also help humans be safer. For instance, AI can ensure employees are up to date on training by tracking and automatically scheduling safety or other training. AI can also check and offer corrections for ergonomics to prevent repetitive stress injuries or worse.

An AI program called AI-SAFE (Automated Intelligent System for Assuring Safe Working Environments) aims to automate the workplace personal protective equipment (PPE) check, eliminating human errors that could cause accidents in the workplace. As more people wear PPE to prevent the spread of COVID-19 and other viruses, this sort of AI could protect against large-scale outbreaks.

In India AI was used in the midst of the coronavirus pandemic to reopen factories safely by providing camera, cell phone, and smart wearable device-based technology to ensure social distancing, take employee temperatures at regular intervals, and perform contact tracing if anyone tested positive for the virus. AI can also perform more sensitive tasks in the workplace such as scanning work emails for improper behavior and types of harassment.

On the other hand, AI will harm the standard of living for many people by causing mass unemployment as robots replace people.

AI robots and other software and hardware are becoming less expensive and need none of the benefits and services required by human workers, such as sick days, lunch hours, bathroom breaks, health insurance, pay raises, promotions, and performance reviews, which spells trouble for workers and society at large. 48% of experts believed AI will replace a large number of blue- and even white-collar jobs, creating greater income inequality, increased unemployment, and a breakdown of the social order.

The axiom "everything that can be automated, will be automated" is no longer science fiction. Self-checkout kiosks in stores use AI-assisted video and scanners to prevent theft, alert staff to suspicious transactions, predict shopping trends, and mitigate sticking points at checkout. These AI-enabled machines have displaced human cashiers.

An Oct. 2020 World Economic Forum report found 43% of businesses surveyed planned to reduce workforces in favor of automation. Many businesses, especially fast-food restaurants, retail shops, and hotels, automated jobs during the COVID-19 pandemic. Income inequality was exacerbated over the last four decades as 50–70% of changes in American paychecks were caused by wage decreases for workers whose industries experienced rapid automation, including AI technologies.

AI can be easily politicized, spurring disinformation and opinions masquerading as facts.

The idea that the Internet is making us stupid is legitimate, and AI is like the Internet on steroids. With AI bots doing everything from research to writing papers, from basic math to logic problems, from generating hypotheses to performing science experiments, from editing photos to creating "original" art, students of all ages will be tempted (and many will succumb to the temptation) to use AI for their schoolwork, undermining education goals.

"The academic struggle for students is what pushes them to become better writers, thinkers and doers. Like most positive outcomes in life, the important part is the journey. Soon, getting college degrees without AI assistance will be as foreign to the next generation as payphones and Blockbuster are to the current generation, and they will suffer for it," says Mark Massaro, professor of English at Florida SouthWestern State College.

A June 2023 study found that increased use of AI correlates with increased student laziness because of a loss of human decision-making. Similarly, an Oct. 2023 study found increased laziness and carelessness as well as a decline in work quality when humans worked alongside AI robots. The implications of allowing AI to complete tasks are enormous. We will see declines in work quality and human motivation as well as the rise of dangerous situations from deadly workplace accidents to George Orwell's dreaded "groupthink." And, when humans have become too lazy to program the technology, we'll see lazy AI, too.

Google's AI chatbot Gemini even generated politically motivated historical inaccuracies by inserting people of color into historical events they never participated in, further damaging historical literacy. "An overreliance on technology will further sever the American public from determining truth from lies, information from propaganda, a critical skill that is slowly becoming a lost art, leaving the population willfully ignorant and intellectually lazy," explains Massaro.

A May 2023 study by the Brookings Institute ("The politics of AI: ChatGPT and political bias") found that the AI knowledge source routinely supported left-leaning positions on issues of the day. For example, it gave affirmative answers to questions about a woman's "right to an abortion," the "benefits" of illegal immigration, the "banning" of semi-automatic weapons, and "raising taxes" on corporations and the wealthy.

AI hurts racial minorities by repeating and exacerbating human racism.

Facial recognition has been found to be racially biased, easily recognizing the faces of white men while wrongly identifying Black women 35% of the time. One study of Amazon's Recognition AI program falsely matched 28 members of the U.S. Congress with mugshots from a criminal database, with 40% of the errors being people of color.

AI has also been disproportionately employed against Black and Brown communities, with more federal and local police surveillance cameras in neighborhoods of color, and more social media surveillance of Black Lives Matter and other Black activists. The same technologies are used for housing and employment decisions and TSA airport screenings. Some cities, including Boston and San Francisco, have banned police use of facial recognition for these reasons.

One particular AI software tasked with predicting recidivism risk for U.S. courts—the Correctional Offender Management Profiling for Alternative Sanctions (Compas)——was found to falsely label Black defendants as high risk at twice the rate of white defenders, and to falsely label white defendants as low risk more often. AI is also incapable of distinguishing between when the N-word is being used as a slur and when it's being used culturally by a Black person.

In China facial recognition AI has been used to track Uyghurs, a largely Muslim minority. The U.S. and other governments have accused the Chinese government of genocide and forced labor in Xinjiang, where a large population of Uyghurs live. AI algorithms have also been found to show a "persistent anti-Muslim bias," by associating violence with the word "Muslim" at a higher rate than with words describing people of other religions including Christians, Jews, Sikhs, and Buddhists.

Attachment 2: Edited Version

Engineer of the Future

Engineering Education at Universities of Science & Technology in Europe to Tackle Global Challenges
By Cesaer, 23 April 2024

One of the factors impacting engineering, science and technology is the digital transformation, driven by fast-paced innovations, building on the growing fields of, among others, data analytics and artificial intelligence. Therefore, professionals will benefit from an engineering education providing them with knowledge and skills to deal with these transformations and innovations properly and responsibly. Universities have a role to play to prepare students for a society, and labour market, increasingly shaped by emerging disruptive technologies.

AI in engineering

Without a doubt, Artificial Intelligence (AI) will have a defining place in engineering. AI and related techniques are already firmly embedded in optimisation, search, and planning processes. For example, to optimise the design of engineered systems, such as aerospace components, building structures, or electronic circuits. AI is also widely used to support supply chain management, through predicting demand, identifying bottlenecks, and finding the most efficient routes for transportation.

However, in the last decade, AI has witnessed a sea change in performance and scope. AI can now offer meaningful contributions in engineering domains that previously were the exclusive realm of educated engineers. This is driven by several revolutions in the field: the availability of large amounts of data on which to train machine learning, the unprecedented availability of computing power through the use of networked on-chip parallel processing, interconnected systems through which AI solutions can be made available on the internet, and the use of novel machine learning algorithms.

Several categories can be distinguished, each with their specific use in engineering. Deep neural networks, for example, find applications in data interpretation and prediction and have shown exceptional performance in visual tasks, such as interpreting medical images or predictive maintenance. Generative AI, in which the AI produces data starting from a 'prompt', has shown to be useful in generating natural language, audio and images, and can, for example, be used to assist architects in creating and enhancing computer-aided (CAD) designs and visualisations. Finally, reinforcement learning, in which the AI is taught to take actions based on data, has proven invaluable in energy management and smart grids, optimising the control of energy storage systems and energy consumers to balance supply and demand efficiently.

While these changes take place at an unprecedented pace, it is key to remind ourselves that, at the time of writing, these newer AI systems have only been around for a few years and that the engineering profession will witness more revolutions in the next decades. These will shape the profession and education in ways that are difficult to predict. Still, a number of trends are clear. AI will be more accessible than ever before. Not only will it be almost imperceptibly integrated into the tools used by engineers, but it will also be easy to access AI through online services, reducing the need for in-house computational infrastructure and expertise. Another trend which is likely to continue is the bringing together of different separate AI systems into a single multipurpose system that can handle different kinds of data. These "multimodal" AI systems could, for example, allow an engineer to take a photo of a malfunctioning drive shaft, after which the fault is identified through an AI-aided procedure including suggestions for appropriate action and parts that need to be ordered to solve the problem.

AI in education
Engineers of the future will not only be AI users, but they will also be at the forefront of shaping AI. Students in computer science and related disciplines will need training on the technical intricacies of AI. Curricula and programmes across universities already have recognised the importance of AI and have responded by offering more AI subjects and specialities at earlier stages. However, as AI will affect all science and engineering disciplines, we will need to train students to use and understand AI in the broadest possible sense. Beyond the technology of AI, it also comes with its own ethical, sustainability and economic impact which students across all engineering disciplines need to be aware of. Already, this need is addressed at some universities by offering faculty-wide or even university-wide courses on AI. These courses offer just enough technical details to have an informed understanding of AI and complement this by discussing the societal and economic implications of AI.

In terms of education, AI will have a strong impact on teaching and learning. It should not be seen as a threat to conventional methods of research and learning, but instead as an opportunity to improve teaching and learning. Tools aiding teaching practice are already available. For instance, PowerPoint adds illustrations to slides to support visual communication, Wooclap30 uses AI to generate questions and multiple-choice tests from learning material. Students rely on AI for their research and communication. Large Language Models help students ideate and phrase their thoughts, Copilot supports students during programming. Students will inevitably lose some skills due to AI, similar to the broader reduction in manual calculation skills observed following the introduction of the pocket calculator. A conversation is needed on which skills are important enough that we should ensure they remain part of the curricula, also following the further integration of AI, and where the teaching of that skill can instead be supplemented with other skills.

It should be noted that rapid technological and societal evolutions also bring with them challenges and threats. There are legitimate concerns about privacy, surveillance, data ownership and sourcing, shifts in resources and wealth, and the lack of policies, regulations, or legal frameworks to address these challenges. Engineers of the future should, next to being trained in the technologies of the future, also be made aware of the challenges posed by these new evolutions and develop critical thinking towards the information delivered by AI. Finally, actions aimed to enhance digital skills must also address data literacy and put more focus on fostering transversal skills that complement increasingly advanced and "intelligent" machines and algorithms.