

# BSc Computer Science 3.0 Frequently Asked Questions

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## Contents

<b>1 Admission and Preparation Related Questions</b>	<b>3</b>
1.1 Are there any books I can read before joining Jacobs University?	3
1.2 Do I need to obtain any special software?	3
1.3 Which Linux distribution should I install?	3
1.4 Can I install Linux without changing my operating system?	4
1.5 Are there job opportunities on campus?	5
1.6 Are there job opportunities off campus?	5
1.7 Are programming skills expected from incoming students?	5
1.8 Will the CS degree be recognized by graduate schools?	5
1.9 Will the CS degree allow me to join global industry players?	5
1.10 What makes the CS program special compared to other programs?	6
1.11 What are the qualification aims?	7
1.12 Did the program receive accreditation?	7
<b>2 Choice Module Related Questions (Year 1)</b>	<b>8</b>
2.1 What is the structure of the CS choice module?	8
2.2 Which other modules are mandatory during the first year?	8
2.3 Which choice module combinations are recommended or popular?	8
<b>3 Core Module Related Questions (Year 2)</b>	<b>10</b>
3.1 What is the structure of the CS core modules?	10
3.2 Which other modules are mandatory during the second year?	10
3.3 What are the prerequisites for CS core modules?	10
<b>4 Specialization Module Related Questions (Year 3)</b>	<b>12</b>
4.1 What are the CS specialization modules?	12
4.2 Can I take other modules as CS specialization modules?	12
<b>5 Study Abroad Related Questions (Year 3)</b>	<b>13</b>
5.1 Why should I consider studying a semester abroad?	13
5.2 How do I apply for a study abroad semester?	13
5.3 How are credits converted into ECTS?	13
<b>6 Bachelor Thesis and Seminar Related Questions (Year 3)</b>	<b>14</b>
6.1 Who supervises Bachelor Thesis projects?	14
6.2 What are the prerequisites for the Bachelor Thesis and Seminar Module	14
6.3 What is the right format of the Bachelor thesis?	14

6.4	Do students have to give a presentation about their thesis project? . . . . .	14
6.5	Can I get an extension of the Bachelor thesis? . . . . .	14
<b>7</b>	<b>Academic Policy Related Questions</b>	<b>15</b>
7.1	Where do I find the general academic policies? . . . . .	15
7.2	Where do I find the handbook relevant for my batch of students? . . . . .	15
7.3	What happens if I fail a module? . . . . .	15
7.4	Can I continue studying when I have failed a module? . . . . .	15
<b>8</b>	<b>Academic Advising Related Questions</b>	<b>16</b>
8.1	What is students required advising beyond the scope of their major? . . . . .	16
8.2	What can faculty do if students stop responding? . . . . .	16
8.3	Where do I find out in which college a student is living? . . . . .	16
<b>9</b>	<b>Research Related Questions</b>	<b>17</b>
9.1	What are the CS research groups on campus? . . . . .	17
9.2	How can I join a CS research group? . . . . .	17
<b>10</b>	<b>Resources and Events on and off Campus</b>	<b>18</b>
10.1	Is there a mailing list for CS students? . . . . .	18
10.2	Is there a club for students interested in CS? . . . . .	18
10.3	Are there any programming competitions on campus? . . . . .	18
10.4	Is there a way to get into contact with CS alumni? . . . . .	18
10.5	Is there a way to get into contact with the industry? . . . . .	18
10.6	Is there a social network group for CS students and alumni? . . . . .	18
10.7	Are there any local hacking groups? . . . . .	18
10.8	What are the local IT companies relevant for Jacobs students? . . . . .	19
<b>11</b>	<b>Reading about Computer Science</b>	<b>20</b>
11.1	Classic Textbooks . . . . .	20
11.2	Scientific Publishers . . . . .	20
11.3	Publication Indexes . . . . .	21
<b>12</b>	<b>History and Musings</b>	<b>22</b>
12.1	What is the difference between CS 1.0, CS 2.0, and CS 3.0? . . . . .	22
12.2	Who is the current CS faculty? . . . . .	22
12.3	How do I contribute to this FAQ? . . . . .	22

# 1 Admission and Preparation Related Questions

## 1.1 Are there any books I can read before joining Jacobs University?

Introduction to Computer Science:

- H. Abelson, G.J. Sussman: Structure and Interpretation of Computer Programs, ISBN 978-0262510875, MIT Press, 1996

This book is essentially an introduction to functional programming. It uses the functional programming language Lisp (and its dialect Scheme) while at Jacobs we currently use the functional programming language Haskell in our introductory module. A good introduction to Haskell is for example:

- M. Lipovaca: Learn You a Haskell for Great Good!: A Beginner's Guide, ISBN 978-1593272838, No Starch Press, 2011

This book is also available online: <http://learnyouahaskell.com/>

Algorithms and Data Structures:

- T.H. Cormen, C.E. Leiserson, R.L. Rivest, C. Stein: Introduction to Algorithms, ISBN 978-0262531962, MIT Press, 2nd edition, 2001

This is one of the classic textbooks on algorithms and data structures.

Programming in C:

- B. W. Kernighan, D. M. Ritchie: The C Programming Language, ISBN 0131103628, Prentice Hall, 2nd edition, 1988

Another true classic. Old but still good and written by the authoritative people for the C language.

Object-oriented Programming:

- B. Stroustrup: The C++ Programming Language, ISBN 978-0321563842, Addison-Wesley Longman, 4th edition, 2013
- B. Eckel: Thinking in C++, ISBN 0139798099, Pearson, 2nd edition, 2000

The first is another true classic. It is a great references, perhaps a bit dry for learning C++.

## 1.2 Do I need to obtain any special software?

Most modules taught in CS use software that is available under open source licenses. The Linux operating system is very popular for CS education and research.

## 1.3 Which Linux distribution should I install?

Many students seem to be happy with **Ubuntu** but the choice is at the end it is a largely a matter of user interface preferences and the differences of the software package management systems. You usually get the same software for all popular Linux distributions, but not necessarily the same versions. Using Ubuntu may be an advantage for students interested in robotics since some of the robotics software is readily packaged for Ubuntu.

## 1.4 Can I install Linux without changing my operating system?

It is possible to install Linux as a virtual machine on Windows or MacOS. You need two ingredients:

- You need software to run virtual machines. We suggest using VirtualBox, which is essentially open source virtualization software currently maintained by Oracle.
- Once you have a virtual machine installed, you can download software images for different operating systems. We recommend to use the 64-bit version of Ubuntu.

There are also [YouTube videos explaining the installation procedure](#).

Creating additional virtual machines is relatively easy. If you are short on storage, you may even store virtual machine images on a USB stick and then you can carry your virtual machines easily around. Everything you do inside the virtual machine is restricted to the virtual machine; this makes it easy to cleanup in case you messed up a virtual machine.

It is possible to create shared file system spaces such that data can be easily copied between your host operating system and your virtual machine. Please consult the VirtualBox documentation for further details.

- Step #1:: Install VirtualBox

To install VirtualBox, go to the download page:

<https://www.virtualbox.org/wiki/Downloads>

If you are running Windows, download the Windows installer and run it. If you are running MacOS, download the MacOS installer and run it. Once the installation is complete, you should find an icon on your computer to start VirtualBox.

- Step #2:: Create a Ubuntu Virtual Machine

To create a Ubuntu virtual machine, start VirtualBox. In VirtualBox, select 'new virtual machine'. A dialogue will appear where you can configure the type of the new virtual machine (select 'Linux') and the version (select 'Ubuntu (64-bit)'). Give your new virtual machine a name and press 'create'. You will find many more options that you can set, we recommend to go with the defaults provided.

- Step #3:: Download an Ubuntu Image

Download a Ubuntu installation image. At the time of this writing, the latest long term support (LTS) image is ubuntu-20.04.1-desktop-amd64.iso. You can find official images here:

<https://ubuntu.com/download/desktop>

Note: Make sure you get an official image. You will have to trust your Linux virtual machine and hence you want to be reasonably sure that your installation image does not contain malware.

- Step #4:: Setup your Ubuntu Virtual Machine

Start VirtualBox and then within VirtualBox start your virtual machine. The first start will get you into a dialog where you can select your downloaded virtual image as your virtual CD drive. Click 'start' and the installation of your virtual Ubuntu system will begin. Follow the instructions (use the defaults if you are unsure).

### 1.5 Are there job opportunities on campus?

It is quite common that students in the 2nd and 3rd year work as teaching assistants to assist faculty. In addition, there are student assistant jobs throughout the university, ranging from jobs in the library to support jobs in the administration offices. You can find information about student jobs via the online campus information system.

### 1.6 Are there job opportunities off campus?

Some students work off campus in CS-related organizations, but this usually requires some travel within Bremen (which costs time) and, depending on the specifics of the job, some basic knowledge of the German language.

### 1.7 Are programming skills expected from incoming students?

The CS program does not assume that incoming students have programming skills. It is possible to study CS without any prior exposure to programming. But of course, students who already have some programming experience have an advantage in the first year. (The same holds for students who enjoyed a very strong math education at school; they will have a benefit in the math modules.)

### 1.8 Will the CS degree be recognized by graduate schools?

Our graduates get into top CS graduate programs, both in Europe and North America. Our graduates usually perform well at these institutions, often paving the way for future students. Some graduate schools accepting our graduates are listed below:

University	Country
University of Montréal	CA
ETH Zurich	CH
EPFL Lausanne	CH
RWTH Aachen	DE
TU Berlin	DE
University of Freiburg	DE
TU Delft	NL
University of Groningen	NL
VU Amsterdam	NL
University of Cambridge	UK
University College London	UK
University of Oxford	UK
Carnegie Mellon University	USA
Cornell University	USA

### 1.9 Will the CS degree allow me to join global industry players?

Several big industrial players are regularly visiting Jacobs University in order to recruit our students. During Fall 2016, Microsoft and Facebook have been visiting us. Microsoft has hired a significant number of our graduates in the past years. Some companies regularly hiring our graduating students are listed below:

Company	Country
Amazon	USA
Apple	USA
Facebook	USA
Google	USA
Intel	USA
Microsoft	USA
Skype (Microsoft)	USA / LU
Twitter	USA
VMware	USA
Cleversoft	DE
Research Gate	DE
SAP	DE
360 Treasury Systems AG	DE

### 1.10 What makes the CS program special compared to other programs?

The Computer Science program at Jacobs University aims at being rigorous on the foundations while at the same time being very contemporary with an international orientation.

- The educational approach of the faculty is to relate the theoretic contents of the discipline to its contemporary application in industry and research. Instructors aim at including recent developments of the topics covered in order to demonstrate how basic methods or techniques are applied today and how the material covered relates to research challenges.
- Early involvement in research projects is an essential aspect of student education. Students can obtain a vivid experience of research at a very early stage, which often unfolds in interdisciplinary collaborations later on.
- This distinctive educational approach together with the positive teaching environment has been acknowledged in several rankings: In the computer science ranking published by the Centre for Higher Education Development (CHE) in 2015, the support by instructors and the relationship to research was ranked 1st of 68 study programs. In the European U-Multirank ranking published in 2018, the overall learning experience in computer science was ranked 10th and research-oriented teaching in computer science was ranked 2nd of 304 European universities offering Computer Science programs.
- The involvement of students and alumni in the program development process using a direct open dialogue ensures that the program is constantly fine-tuned to the specific needs students face such as covering certain topics at a certain time that is relevant for the preparation of internship or job applications.
- The program has a successful student exchange program with Carnegie Mellon University (USA). Every year, some of the best students move to Pittsburgh in order to study a semester abroad at CMU. In addition, CS students have studied abroad with great success at Rice University (USA) and the University of Pennsylvania (USA).
- Student teams participate regularly in international programming competitions. Jacobs University has hosted the Northwestern European Regional Contest (NWERC) of the ACM International Collegiate Programming Contest on campus in 2010 and 2011. Student teams participate in NWERC competitions since then on a yearly basis. In 2014, students organized the first JacobsHack! hackathon on campus, which was sponsored

among others by Google, Microsoft, and SAP. The 2018 edition of JacobsHack!, sponsored among others by Facebook, Skyscanner, GitHub and Bloomberg, attracted participants from all over Europe.

### **1.11 What are the qualification aims?**

The main subject-specific qualification aim is to enable students to take up a qualified employment in modern industries involving information technology or to enter graduate programs related to computer science. Graduates of the Computer Science program have obtained the following competencies:

- **Computer science competence:** Graduates are familiar with the theoretical foundations of computer science and they are able to design and develop computer systems addressing a given application scenario. They are able to analyze and structure complex problems and they are able to address them using methods of computer science. Graduates are able to construct and maintain complex computer systems using a structured, analytic and creative approach.
- **Communication competence:** Graduates are able to communicate subject specific topics convincingly in both spoken and written form to fellow computer scientists or to customers.
- **Teamwork and project management competence:** Graduates are able to work effectively in a team and they are able to organize workflows in complex development efforts. They are familiar with tools that support the development, testing and maintenance of large software systems and they are able to take design decisions in a constructive way.
- **Learning competence:** Graduates have acquired a solid foundation enabling them to assess their own knowledge and skills, learn effectively and to stay up to date with the latest developments in the fast-changing field of computer science.
- **Personal and professional competence:** Graduates are able to develop a professional profile, justify professional decisions on the basis of theoretical and methodical knowledge, and critically reflect their behavior, also with respect to its consequences for society.

The design of the Computer Science program follows national guidelines published by the Gesellschaft für Informatik (GI) (GI: Empfehlungen für Bachelor- und Masterprogramme im Studienfach Informatik an Hochschulen, July 2016) and international guidelines published jointly by the Association for Computing Machinery (ACM) and the Institute of Electrical and Electronics Engineers (IEEE) (ACM/IEEE: Computer Science Curricula 2013, December 2013).

### **1.12 Did the program receive accreditation?**

The Computer Science program received accreditation by the German Accreditation Council in Fall 2020. The program accreditation is valid for eight years, i.e., the period from October 1st, 2020 to September 30th, 2028.

The university as a whole has been successfully accredited in 2001 and 2008 by the German Council of Science and Humanities (Wissenschaftsrat). The accreditation by the German Council of Science and Humanities is based on quality benchmarks in research and education as well as certain financial and structural prerequisites.

## 2 Choice Module Related Questions (Year 1)

### 2.1 What is the structure of the CS choice module?

The mandatory first year choice modules are shown in Table 1.

Table 1: Computer Science Choice Modules (first year)

Code	Module Name	Semester	Credits
CH-230	Programming in C and C++	Fall (1st)	7.5
CH-232	Introduction to Computer Science	Fall (1st)	7.5
CH-231	Algorithms and Data Structures	Spring (2nd)	7.5
CH-220	Introduction to Robotics and Intelligent Systems	Spring (2nd)	7.5

### 2.2 Which other modules are mandatory during the first year?

CS students have to take in addition the math modules shown in Table 2 during the first year.

Table 2: Mandatory Math Modules (first year)

Code	Module Name	Semester	Credits
JTMS-09	Calculus and Linear Algebra I	Fall (1st)	5.0
JTMS-10	Calculus and Linear Algebra II	Spring (2nd)	5.0

### 2.3 Which choice module combinations are recommended or popular?

It is difficult to recommend choice modules for students we do not know yet. The key is to choose choice modules that (a) match your interests and (b) provide flexibility in case CS turns out to be not your first major of choice. Looking at closely related majors, the following diagram might help:

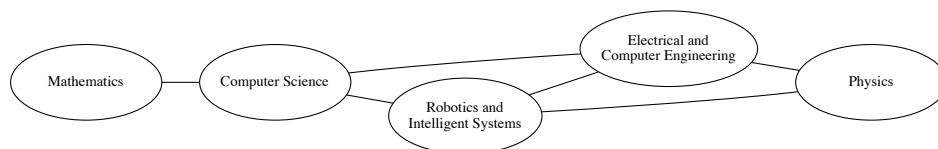


Figure 1: Computer Science and Related Programs

A pure Mathematics program puts an emphasis on proofs. The application and usage of theorems in practice is of minor interest. The theoretical part of CS is rooted in this pure mathematical approach. RIS is very close to CS but largely focused on the interaction of computing systems with the physical world. Electrical and Computer Engineering (ECE) is largely concerned with the electric parts of the physical world and covers next to classic electric circuits in particular signal processing and all techniques related to digital communication. ECE is again close to Physics since ECE is to some extent dealing with a certain subset of physics.

The choice modules required by the RIS program are a subset of the choice modules required by the CS program. Hence, students following the CS study plan can easily change to RIS. The free choice slot can be used to take in addition ECE or Mathematics. However, it is often a good idea to choose a choice module outside of the narrow CS neighborhood. Popular choice



modules further away from CS are related to economy, management, or psychology. Choosing a less technical choice module is in particular recommended for students who are unsure whether CS is a proper match to their interests. (Remember that CS tends to be formal and abstract and students need to enjoy this in order to be successful.)

### 3 Core Module Related Questions (Year 2)

#### 3.1 What is the structure of the CS core modules?

The mandatory second year core modules are listed in Table 3.

Table 3: Computer Science Core Modules (second year) (1) = mandatory if no minor

Code	Module Name	Semester	Credits
CO-560	Databases and Web Services	Fall (3rd)	7.5
CO-561	Software Engineering	Spring (4th)	7.5
CO-562	Operating Systems	Fall (3rd)	7.5
CO-563	Automata, Computability, Complexity	Spring (4th)	7.5
CO-564	Computer Networks (1)	Fall (3rd)	5.0
CO-565	Legal and Ethical Aspects (1)	Fall (3rd)	2.5
CO-566	Secure and Dependable Systems (1)	Spring (4th)	5.0
CO-567	Academic Skills in Computer Science (1)	Spring (4th)	2.5

#### 3.2 Which other modules are mandatory during the second year?

CS students have to take the math modules shown in Table 4 during the second year. Students can choose between Numerical Methods and Discrete Mathematics in the fourth semester. Students interested to work on projects where interaction with the real world is of importance may benefit from taking Numerical Methods. Students interested to work on projects in a pure software world where pretty much all data is discrete may benefit from taking Discrete Mathematics.

Table 4: Mandatory Math Modules (second year) (1) = choose one

Code	Module Name	Semester	Credits
JTMS-12	Probability and Random Processes	Fall (3rd)	5.0
JTMS-13	Numerical Methods (1)	Spring (4th)	5.0
CO-501	Discrete Mathematics (1)	Spring (4th)	5.0

#### 3.3 What are the prerequisites for CS core modules?

The prerequisites for CS core modules vary but many modules have as a prerequisite Algorithms and Data Structures. Hence, it is crucial to pass this module in the first year. To make the situation clearer, below is a prerequisite graph reverse engineered from the handbook.

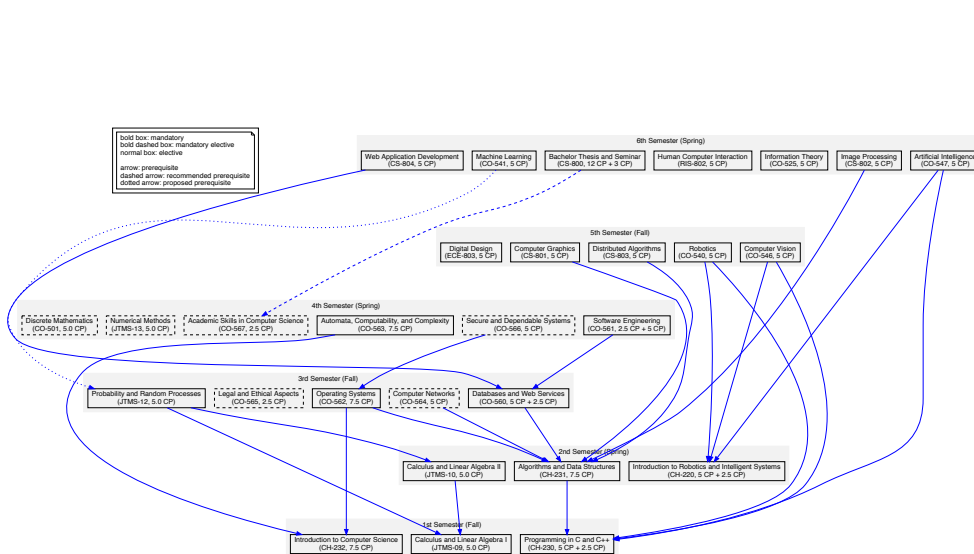


Figure 2: Computer Science Module Prerequisites

## 4 Specialization Module Related Questions (Year 3)

### 4.1 What are the CS specialization modules?

During the third year, CS students choose three modules (15 credit points) from the following portfolio of specialization modules. At the time of this writing, we expect the following modules to be offered (note that some modules are imported from the neighboring programs RIS and ECE):

Table 5: Computer Science Specialization Modules

Code	Module	Semester	Credits
CA-S-CS-801	Computer Graphics	Fall (5th)	5.0
CA-S-CS-802	Image Processing	Spring (6th)	5.0
CA-S-CS-803	Distributed Algorithms	Fall (5th)	5.0
CA-S-CS-804	Web Application Development	Spring (6th)	5.0
CA-RIS-802	Human Computer Interaction	Spring (6th)	5.0
CA-ECE-803	Digital Design	Fall (5th)	5.0
CO-540	Robotics	Fall (5th)	5.0
CO-541	Machine Learning	Spring (5th)	5.0
CO-546	Computer Vision	Fall (5th)	5.0
CO-547	Artificial Intelligence	Spring (6th)	5.0
CO-525	Information Theory	Spring (6th)	5.0

### 4.2 Can I take other modules as CS specialization modules?

It is possible to take modules not listed above as CS specialization modules (i.e., a suitable module of a CS related graduate program). This requires, however, the approval of the CS study program chair. Students are advised to obtain the formal approval before enrolling into the module to be sure the module of choice will be accepted as a CS specialization module.

## 5 Study Abroad Related Questions (Year 3)

### 5.1 Why should I consider studying a semester abroad?

A study abroad semester at a top university is a very good idea for students who plan to join top graduate programs after graduation. Having the study abroad experience not only helps to extend your personal network but also looks very nice on your CV. But according places (e.g., in our exchange program with CMU) are limited and hence quite competitive to get.

### 5.2 How do I apply for a study abroad semester?

The study abroad selection process is organized by the International Office. Please contact them at the beginning of the 3rd semester in order to learn about the study abroad application requirements and deadlines.

### 5.3 How are credits converted into ECTS?

Universities outside of the EU usually do not use the ECTS credit system. Hence, it is necessary to perform credit conversion. For some institutions, we have conversion factors:

University	Conversion Factor	Example
University of Aberdeen	1/2 ECTS/credit point	15 credit point = 7.5 ECTS
Carnegie Mellon University	2/3 ECTS/units	12 units * 2/3 = 8 ECTS
Drexel University	6/3 ECTS/credit	3 credits = 6 ECTS
Rice University	5/3 ECTS/credit hours	3 credit hours * 5/3 = 5 ECTS
University of Pennsylvania	6/1 ECTS/course unit	1 course unit * 6/1 = 6 ECTS
Washington State University	5/3 ECTS/credit hours	3 credit hours * 5/3 = 5 ECTS
University of Nottingham Ningbo	1/2 ECTS/credits	10 credits * 1/2 = 5 ECTS

The official conversion factors are maintained by the International Office based on input received from faculty. The conversion factors are communicated from the International Office to the Registrars Office. Any inconsistencies should be resolved with the International Office.

## **6 Bachelor Thesis and Seminar Related Questions (Year 3)**

### **6.1 Who supervises Bachelor Thesis projects?**

Bachelor Thesis topics are given out by Jacobs faculty members. Thesis supervision is carried out by the CS faculty. In exceptional cases, the Thesis supervision may be done by some Jacobs faculty member of a different discipline. In such cases, a CS faculty member should act as a co-supervisor.

### **6.2 What are the prerequisites for the Bachelor Thesis and Seminar Module**

The Bachelor Thesis and Seminar module does not define formal prerequisites. Faculty will, however, check that students have acquired the knowledge that is required to work on a certain thesis topic successfully.

### **6.3 What is the right format of the Bachelor thesis?**

The CS faculty provides students with a  $\LaTeX$  template for writing the bachelor thesis. Students are expected to use this template. It is generally recommended that students learn how to use  $\LaTeX$  early during their studies; writing documents with mathematical and technical content is something where  $\LaTeX$  is really strong.

### **6.4 Do students have to give a presentation about their thesis project?**

Students are expected to give a presentation about their thesis project. The presentations usually take place during the last week of the Spring semester. A presentation consists of 15 minutes presentation followed by 5 minutes discussion. The CS faculty determines a grade for the presentation, which becomes the grade for the seminar module component (weight 20%).

### **6.5 Can I get an extension of the Bachelor thesis?**

Extensions for the deadline to hand in the Bachelor Thesis (usually May 15th) are only granted in proven cases of longer medical illness or other exceptional situations.

## 7 Academic Policy Related Questions

### 7.1 Where do I find the general academic policies?

The general academic policies are posted online:

<https://www.jacobs-university.de/academic-policies>

### 7.2 Where do I find the handbook relevant for my batch of students?

The official web site usually only lists the latest version of the handbook since the site is primarily seen as a marketing instrument. If you need to find a list of all handbooks including older handbooks, you can find them on the student records web site:

<https://www.jacobs-university.de/academic-policies/study-program-handbooks>

### 7.3 What happens if I fail a module?

Students failing a final exam can sit for a second exam before the next semester starts. Students who failed the second exam or missed an exam with an official excuse will have to wait almost a year until the next exam is offered. For modules with other types of assessment, the module coordinator is the primary contact to clarify makeup opportunities.

Students have three attempts to pass the module examination. After three failed attempts to pass a module, the module is ultimately failed. If a mandatory module is ultimately failed, then students have to either change their major or disenroll. Students have the right to appeal. If they choose to do so, the Committee on Examinations and Standing will take a final decision.

Note that this text is not official. Please consult the official Policies for Bachelor Studies for the official regulations and if necessary ask for academic advice.

### 7.4 Can I continue studying when I have failed a module?

Modules typically have prerequisites. Several of the second year CS modules, for example, have the first year Algorithms and Data Structures module as a prerequisite, which in turn has the first year Programming in C and C++ module as a prerequisite. This means that students have to have passed the Algorithms and Data Structures module in order to register for several second year CS modules. It is thus important to understand the prerequisite relationships since missing prerequisites lead to problems with enrolling into other modules. In other words, make sure that you spent enough effort on those modules that are prerequisites for modules in subsequent semesters.

## 8 Academic Advising Related Questions

These questions are likely less relevant for students but likely helpful for academic advisors.

### 8.1 What is students required advising beyond the scope of their major?

The Academic Advising Services provide support for students that need to change their major or follow unconventional study plans. The main contact at this point in time is [Doris Mosbach](#).

### 8.2 What can faculty do if students stop responding?

In case a student stops responding to meeting request, the academic advisor can contact the resident mentors by sending email to the [resident-mentors-list@lists.jacobs-university.de](mailto:resident-mentors-list@lists.jacobs-university.de) mailing list. The resident mentors will then coordinate and check the well-being and status of the student.

### 8.3 Where do I find out in which college a student is living?

CampusNet provides access to the address. The colleges are indicated by certain letters according to [6](#).

Table 6: Letters Identifying Colleges

Letter	College
K	Krupp College
N	College Nordmetall
M	Mercator College
X	College III



## 9 Research Related Questions

### 9.1 What are the CS research groups on campus?

- **Large-Scale Scientific Information Systems** (Peter Baumann)
- **Robotics** (Andreas Birk)
- **Medical Image Processing** (Horst Hahn)
- **Graphics and Machine Learning** (Sergey Kosov)
- **Marine Systems and Robotics** (Francesco Maurelli)
- **Computer Networks and Distributed Systems** (Jürgen Schönwälder)
- **Machine Learning and High Performance Computing** (Peter Zaspel)

### 9.2 How can I join a CS research group?

The CS research groups usually have regular meetings and students interested in certain topics are usually welcome to join research group meetings as this allows to obtain an overview about research activities and to get involved in research work.

## 10 Resources and Events on and off Campus

### 10.1 Is there a mailing list for CS students?

Students are encouraged to subscribe to the mailing list <cs-students@lists.jacobs-university.de>. This mailing list is for all undergraduate students majoring in computer science. Since it is for education-related purposes only, it should remain low-volume. The cs-students list is used occasionally by faculty to distribute announcements that are of specific interest to CS students.

### 10.2 Is there a club for students interested in CS?

There is a very active Jacobs Computer Science Club, run by students. They organize regular meetings and they are involved in organizing events. They also provide help and orientation to CS freshmen and they occasionally meet with CS faculty to discuss about any topics related to CS education and research at Jacobs University. The Jacobs Computer Science Club also runs a hackerspace, a room where people can meet and work on projects. The hackerspace also hosts some hardware that may be interesting to program and play with. The Jacobs Computer Science Club can be reached on facebook (cs.club.jacobs).

### 10.3 Are there any programming competitions on campus?

Our student regularly participate in the [Northwestern Europe Regional Contest 2016](#). The teams are usually organized by the instructor of first year programming labs.

Our students also organize yearly hackathons, such as the [jacobsHack!](#) hackathon, which is supported by a number of industrial sponsors and the Major League Hacking. It attracts people from all over Europe to come to our campus for a weekend of hacking.

### 10.4 Is there a way to get into contact with CS alumni?

Jacobs University hosts the homecoming event every year. The event is organized by the [Jacobs Alumni Association](#). There is usually a meeting as part of the homecoming program where they reach out to current students.

### 10.5 Is there a way to get into contact with the industry?

Jacobs University hosts the Jacobs Career Fair once per year. This is a very good opportunity to get into contact with recruiters. Among the well known companies exhibiting at the Career Fair have been Amazon, Microsoft, and Tesla. It is also often possible to meet Jacobs alumni at this event.

### 10.6 Is there a social network group for CS students and alumni?

Several students and alumni have a profile on [LinkedIn](#). There is a LinkedIn group for the alumni of computer science called [CS@Jacobs](#).

### 10.7 Are there any local hacking groups?

There is a [hackerspace in downtown Bremen](#). Their meetings and their web site are in German. Perhaps a good opportunity to practice German language skills off campus. There is also a local branch of the Chaos Computer Club.

## 10.8 What are the local IT companies relevant for Jacobs students?

This is an attempt to collect local IT companies that are "open minded" towards students from Jacobs University.

Company	Area
DFKI Bremen	Robotics, Cyber-Physical Systems
Fraunhofer Mevis	Digital Medicine

## 11 Reading about Computer Science

### 11.1 Classic Textbooks

Below is a list of classic computer science textbooks. The selection is entirely arbitrary and as such the list does not attempt to be in any way complete.

- H. Abelson, G.J. Sussman: Structure and Interpretation of Computer Programs, ISBN 978-0262510875, MIT Press, 1996
- T.H. Cormen, C.E. Leiserson, R.L. Rivest, C. Stein: Introduction to Algorithms, ISBN 978-0262531962, MIT Press, 2nd edition, 2001
- B. W. Kernighan, D. M. Ritchie: The C Programming Language, ISBN 0131103628, Prentice Hall, 2nd edition, 1988
- D.E. Knuth: The Art of Computer Programming. Volume 1: Fundamental Algorithms, ISBN 978-0201896831, Addison-Wesley Professional, 3rd edition, 1997
- D.E. Knuth: The Art of Computer Programming. Volume 2: Seminumerical Algorithms, ISBN 978-0201896848, Addison-Wesley Professional, 3rd edition, 1997
- D.E. Knuth: The Art of Computer Programming. Volume 3: Sorting and Searching, ISBN 978-0201896855, Addison-Wesley Professional, 2nd edition, 1998
- J.E. Hopcroft, R. Motwani, J.D. Ullman: Introduction to Automata Theory, Languages, and Computation, ISBN 978-0321455369, Pearson, 3rd edition, 2006
- A.V. Aho, R. Sethi, J.D. Ullman: Compilers: Principles, Techniques, and Tools, ISBN 978-0321486813, Addison Wesley, 2nd edition, 2006
- J.L. Bentley, P. Chan: Programming Pearls, ISBN 978-0201657883, Addison-Wesley Professional, 2nd edition, 1999
- C.J. Date: An Introduction to Database Systems, ISBN 978-0321197849, Pearson, 8th edition, 2003
- E. Gamma, R. Johnson, J. Vlissides, R. Helm: Design Patterns: Elements of Reusable Object-Oriented Software, ISBN 978-0201633610, Addison-Wesley Professional, 1994

### 11.2 Scientific Publishers

Scientific papers in computer science are often published by the ACM, the IEEE, the IFIP, and Springer. More details how to access these organizations and their digital libraries are provided in the following sections.

#### Association of Computing Machinery (ACM)

The [Association for Computing Machinery](#) (ACM) is the world's largest international scientific and educational computing society. It is a not-for-profit professional membership group. The ACM is organized around so-called Special Interest Groups (SIGs). The ACM is giving out awards, such as the prestigious [ACM Turing Award](#) (the Nobel price in Computer Science).

The ACM publishes a large number of journals and conference proceedings. The publications are available in digital form via the [ACM Digital Library](#). A fairly general magazine like periodical is called the [Communications of the ACM](#). A good source for substantial surveys are the [ACM Computing Surveys](#).

## Institute of Electrical and Electronics Engineers (IEEE)

The [Institute of Electrical and Electronics Engineers](#) (IEEE) is a professional association for the educational and technical advancement of electrical and electronic, telecommunications, and computer engineering and allied disciplines. The IEEE is organized into so-called societies, such as the [Computer Society](#) and the [Communications Society](#). The IEEE also has an [IEEE Standards Association](#) publishing standards important for the computing industry, such as the IEEE 754 Floating Point format or the IEEE 802 family of network protocols (which includes Ethernet and WiFi).

The IEEE publishes a large number of journals and conference proceedings. The publications are available in digital form via the [IEEE Xplore](#) digital library. A general computer science magazine is [IEEE Computer](#).

## International Federation for Information Processing (IFIP)

The [International Federation for Information Processing](#) (IFIP) is a global organisation of researchers and professionals working in the field of information and communication technologies. IFIP is recognised by the United Nations and links some 50 national and international societies and academies of science. IFIP is organized in so-called Technical Committees.

IFIP publishes a number of journals and conference proceedings. The publications are available in digital form via the [IFIP Digital Library](#).

## Springer LNCS and LNAI

[Springer](#) is a large publisher of academic literature. Springer publishes a special series particularly relevant for computer science, the [Lecture Notes in Computer Science](#) (LNCS). Publications are accessible in digital formats via [Springer Link](#).

## 11.3 Publication Indexes

There are several organizations that index scientific publications. Some of them also track citations and they can report metrics such as overall citation counts, impact factors of journals, or a person's [h-index](#). (An h-index of N says that a person published N papers that were at least cited N times.)

- [DBLP](#) is a computer science bibliography that integrates information about the ACM, IEEE, IFIP, and Springer digital libraries and a number of other publication sources. DBLP makes it is very easy to obtain a list of papers published by a particular computer scientist. (Note that the list may not be complete but it is usually a good starting point.)
- [Scopus](#) is a scientific citation indexing system operated by Elsevier (NL).
- [Web of Science](#) is a scientific citation indexing service operated by Clarivate Analytics (USA).
- [ResearchGate](#) is a social networking site for scientists and researchers to share papers, ask and answer questions, and find collaborators.
- [Google Scholar](#) is a freely accessible web search engine that indexes the full text or metadata of scholarly literature across an array of publishing formats and disciplines.

## 12 History and Musings

### 12.1 What is the difference between CS 1.0, CS 2.0, and CS 3.0?

Jacobs University initially only had an integrated Electrical Engineering and Computer Science (EECS) program. Some students requested a stronger orientation towards Computer Science or towards Electrical Engineering.

- Computer Science 1.0 started in 2006 and it was tightly integrated with the EECS program, which is meanwhile discontinued. About 20-30 students graduated each year in CS or the CS-oriented part of EECS.
- Computer Science 2.0 started in 2015 and it is tightly integrated with Intelligent Mobile Systems (IMS) and (a bit less tightly) with Electrical and Computer Engineering (ECE). The CS 2.0 program allows students to earn a minor in other disciplines. Graduation numbers went up to some 50 students per year.
- Computer Science 3.0 started in 2019 and it is tightly integrated with the Robotics and Intelligent Systems (RIS) program, which evolved out of the Intelligent Mobile Systems (IMS) program. CS 3.0 has more mandatory CS and MATH content compared to CS 2.0 and a mandatory summer internship.

### 12.2 Who is the current CS faculty?

The faculty currently providing computer science education and doing computer science related research at Jacobs University is listed in Table 7.

Table 7: Current Computer Science Faculty

Name	Period	Last Job Title
Prof. Peter Baumann	2004-08-	Professor of Computer Science
Prof. Andreas Birk	2001-09-	Professor of Electrical Engineering and Computer Science
Prof. Horst Hahn	2011-05-	Professor of Medical Imaging
Dr. Sergey Kosov	2019-09-	University Lecturer in Data Engineering
Dr. Kinga Lipskoch	2014-09-	University Lecturer in Computer Science
Prof. Francesco Maurelli	2017-01-	Assistant Professor in Marine System / Marine Robotics
Prof. Jürgen Schönwälder	2003-04-	Professor of Computer Science
Prof. Peter Zaspel	2019-09-	Interim Professor of Computer Science

### 12.3 How do I contribute to this FAQ?

To correct bugs or to add new questions and answers, simply send an email to the maintainer of the FAQ. The FAQ is currently maintained by Jürgen Schönwälder.