Ethics for the Digital Society (PSI-EDS-B)

Syllabus for Winter Semester 2023 · v1.0 / 20231022

This course introduces students to fundamental concepts of ethics and their application to techniques that shape the digital society. We will discuss the influence of current and upcoming technologies and their implications from an ethical perspective. The lecture is accompanied by a series of case studies, which focus on a concrete problem that is to be analyzed by the participants. Topics include decision making in autonomous systems and systems that employ so-called artificial intelligence, the reliability and dependability of computer systems, and privacy aspects of information systems.

This course is worth 3 ECTS, consists of a lecture (2 hours per week), and is taught in English. All materials will be made available via its corresponding VC course. During the first two weeks of the semester, you do not need an enrollment key. After that, please contact our office.

Learning Objectives. Successful students will know, understand, and apply basic concepts of ethics in the context of information systems. Moreover, they will know how to take useful notes and how to read texts more effectively. Finally, they will have improved their skills to write up their knowledge coherently in short essays.

This **syllabus** provides all relevant pieces of information one place. The syllabus helps managing expectations, gives reasons for the course design, and answers all organizational questions. Please read it carefully since it also contains guidelines and rules. Feel free to approach us if anything is unclear or missing.

A word of warning. This module has the reputation of requiring a significant amount of work. The weekly cases and the Booklet will keep you quite busy. Working on the cases, in particular, may not feel rewarding at first. Remember to **play the long game!** Writing the essays will improve your writing skills significantly. You will only learn to write by practicing *a lot*. You will reap the benefits when you write term papers or a thesis.

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A "syllabus" is a document that summarizes information on the organization and content of a course. The term is used mainly in Anglo-Saxon countries.

If you read this syllabus on a small screen, we recommend the responsive and mobile-friendly HTML version.

1. Flipped Classroom

This lecture runs in the *flipped classroom model*. The flipped classroom model aims to overcome the problems of classical face-to-face lectures. Classical lectures, in which a lecturer presents slides, result in an environment where students attend lectures and watch them passively. After the lecture, students struggle to post-process the contents of the lecture. As a result, there happens little engagement with the content.
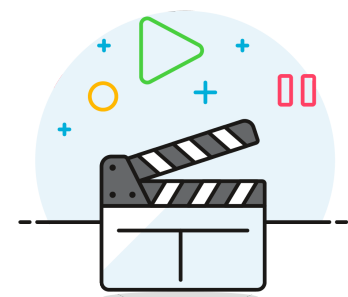
In a flipped classroom, the locations where students acquire knowledge and where students practice are switched. Students acquire new information by watching lecture videos at home whenever it fits their schedule (instead of in the lecture hall at a fixed point in time). After that, they come to face-to-face sessions in the lecture hall. There, they are asked to apply the newly acquired

knowledge via exercises and discussions, i. e., practicing takes place as a group place during the lecture hours (instead of at home). This design promises to be more engaging – and more fun – which hopefully results in more students mastering the material.

1.1 Materials

We provide materials for self-studying. Work with the materials before the face-to-face sessions ("Plenary"). There are **five types of materials**: lecture videos, lecture slides, plenary slides, cases, and readings.

Slides and documents will be made available via VC, videos will be released on Panopto (accessible via the VC course). Videos can either be viewed in the browser or downloaded. We recommend downloading the videos to have access to them in case of network failures or overloads.

1.2 Face-to-Face Sessions: Plenaries

At the time of the lecture, we meet for for the **Plenary**. The plenary takes place roughly every two weeks. These face-to-face sessions will not be recorded.

You can find the rooms and times for the Plenary in UnivIS. As with all other lectures at the WIAI Faculty, attendance in lectures is not mandatory but, of course, recommended. Watch for VC announcements that inform you when face-to-face sessions take place. Typically, the next plenary will be announced at end of the plenary slides.

In the plenary, you can consolidate and review the knowledge you have acquired so far. In contrast to a lecture, the plenary does not consist of a presentation that you are supposed to consume. Instead, you will work on questions and discuss them with your peers. In the plenary, I will call on you and engage in discussions with you. Please come to the plenary only if you have studied the material provided up to that point. Bring your notes and be prepared to take notes during the plenary.

1.3 Asking Questions

Do not hesitate to ask your questions! It is quite likely that you are not alone with your question. You are, of course, welcome to answer other students' questions if you feel that you can help.

Too scared to ask questions? Maybe the article The Fear of Publicly Not Knowing will help you.

We would like to help you as quickly and effectively as possible. Supporting you becomes more efficient – and more effective – if you ask **informative questions**. Informative questions provide the following information:

– what you have already tried (e. g., considered concept, excerpt of source code, or functions you used),

– what result you observed or where exactly you got stuck (including the exact wording of the error message), and

– what you would have expected.

For more information on asking informative questions, see the Teaching Philosophy.

1.4 Questions on the VC Forum

For online interaction we use the VC forums and emails.

We would like to lower the threshold for asking questions in the VC forums. Your questions and answers can be asked **informally** – as it is done in other help forums, e. g., Stackoverflow. This means you do not have to add a formal salutation at the beginning or a greeting at the end of your posts.

Some of you may prefer to ask **anonymous questions**. You can use our anonymous user account *psi-student* for this purpose. The password and further instructions for login can be found in the VC course.

1.5 Study Groups

We strongly recommend that you form study groups to work on the material and the cases. Within the group it is easier to support each other and keep motivated.

1.6 Keeping Up

It is crucial that you stay on top of the course content throughout the semester. Catching up with the material at the end of the semester or shortly before the exam will, most likely, not work out. We offer an incentive system (the "Booklet") to motivate you, which will be described later.

2. Prerequisites

There are no prerequisites for this course.

3. Essays and Bonus Points

Many students struggle with writing and programming. The ability to write is an essential skill for your studies, e. g., in seminar reports and theses. One proven way to improve one's writing is to practice it regularly. This is why we encourage you to write multiple essays in PSI-EDS-B throughout the semester.

You can work on eight cases and two programming tasks during the semester by submitting essays and writing small programs. Participation in essay writing and programming tasks is voluntary.

Consider the essays not as a time-consuming duty. These activities allow you to practice your writing and programming skills and, more importantly, your ability to think clearly.

Please approach us if you are struggling. We can recommend books and online resources on writing techniques.

3.1 Essays

There will be **eight cases and eight corresponding essay deadlines**. An essay consists of plain text submitted via our web application *Peery* (https://peery.psi.uni-bamberg.de).

For every case, you are asked to write a short **five-paragraph essay** (everyone on their own, no group work) of 500–1000 words.

After the deadline, every essay is anonymously reviewed by three randomly chosen students, i. e., every student who submitted an essay receives three essays of other students. Every reviewer is asked to rank the three essays according to their quality and provide a short justification within five days, which the authors of the essays receive together with the two other essays their essay was compared against. Reviews are anonymous.

Optionally, authors can anonymously respond to the reviewers to challenge their justification. Reviewers will receive the authors' responses but cannot change the ranks any more at that point in time. This feedback channel may help improve the quality of the reviews over the course of time.

3.2 Programming Tasks

There will be **two programming projects about fairness in software**.

Programming skills that allow you to automate some analysis or job are a core competency of computer science and information systems students. The best way to adopt such skills is not a lecture or a tutorial but a small project with a concrete goal, which we offer with the two programming tasks.

Some of you may have no experience with coding yet. While doing the programming projects is optional, we offer them to motivate you to acquire practical skills. I, personally, would solve the exercises using a scripting language called *Ruby*. More popular languages like *Python* and *JavaScript* are also suitable. All these languages come with file parsing libraries as well as array and map data structures that make it easier to do the actual analysis. There are many tutorials for these languages available online.

We recommend picking one of the languages mentioned above and working through one of the tutorials in your own time. Once you have adopted basic skills in the language you can start to solve the exercises by searching for useful libraries and techniques. If you start with the tutorial early in the semester you will be ready when the time comes to work on the projects.

You can also use Java or even C to perform the analysis. I do not recommend C, however, due to the higher complexity of memory management and string handling, which can be frustrating for novices. Some students even managed to do the analysis in Excel. Using Excel is fine but can be cumbersome if you do not have advanced skills in Excel (which you also might want to learn).

3.3 Guidance on Writing and Reviewing

Guidance on *writing* essays is provided in VC and in the plenary. When you are reviewing, please consider the following guidance.

Double-check the assigned ranks. In the past we had to intervene manually because the numbers got confused during assignment.

You can use the draft rubric shown in the first plenary to assess essays. Apart from that, we are intentionally not giving you a list of quality indicators to look out for. Assessing essays *is* a very subjective task. If two essays are very similar in terms of quality, you will still have to make a ranking decision. Find a rule how to treat such a situation.

The *word count* provided in the case description is solely supposed to prevent you from spending too much effort on the essay. Therefore, we recommend that you do not penalize essays that are somewhat shorter or longer – unless it affects their quality.

Be fair to your peers; do not choose the ranks in a completely arbitrary fashion. Provide a **reasonable justification** for your decision in the text field. Your justification will be forwarded to the authors of the essays. For every reviewer, authors of an essay will see the two other essays with which their essay has been compared.

Please abstain from **plagiarism** or copying text from others when you create an essay. If we become aware of this kind of academic misconduct, you will not be eligible to obtain bonus points.

Since the essay writing activities are primarily meant to improve your text creation and thinking skills, there is no strictly enforced requirement about citing references. Obviously, if you present evidence in your essays that is not common knowledge, you should back that up with a reference – otherwise your argument would not be credible. It is up to you how you add such references into your essay. For instance, a URL in parentheses may be sufficient (but it breaks the reading flow).

3.4 Bonus Points

To be eligible for obtaining bonus points in PSI-EDS-B, you have to submit and review **six of the eight** essays and submit a solution for **one of the two** programming tasks (required threshold for bonus points).

Every week in which you submit an essay *and* review three other essays on the same case will count towards the required threshold. This means that it does not matter how your essay is ranked. For the programming tasks, we will, however, review your solution to verify that you made a faithful attempt at solving it.

If you are eligible to obtain bonus points, you can participate in a **supervised writing assignment**. In the supervised writing assignment, which lasts 180 minutes, you write a short essay without internet access and support of automated writing assistants. You will receive a writing prompt, all lecture slides, and maybe other material that you can use as input for your essay. Every student submits an essay on their own (no group work).

The supervised writing assignment will take place at the end of the teaching period in a lecture hall. You will write an essay under supervision. This means that, like in an exam, you will have to work on the assignment on your own.

The exact date and details about the logistics for the supervised writing assignment will be announced on VC.

The bonus points ("studienbegleitende Leistung") obtained in the supervised writing assignment are added to the points achieved in the exam – if the exam itself has been passed. Up to 10 % of the maximum number of points that can be achieved in the exam can be achieved via bonus points. This equals two grade levels (every grade level is equivalent to 5 percentage points of the maximum points on the exam).

The bonus points are only valid on the first and on the second exam offered in this semester. if you attend an exam in a future semester, you will have to participate in the assignments during that semester to obtain bonus points.

Some of the cases or the programming tasks may have a **deadline that is later than the date of the supervised writing assignment**. You can participate in the supervised writing assignment only if you can reach the required thresholds by the end of the semester. If it turns out that you did not reach the thresholds after all, we will not grade your essay submitted in the supervised writing assignment and you will not get no bonus points.

Late Submissions of Essays. Late submissions of essays or reviews are not accepted. If you could not submit an essay because you were sick, you must provide a suitable doctor's certificate of incapacity. In this case, you do not have to submit an essay, but the respective case will still count towards reaching the required threshold.

Late Submissions of Programming Tasks. Late submissions of programming tasks are not accepted. If you could not submit a task because you were sick, you must provide a suitable doctor's certificate of incapacity. In this case, you will be granted an extension of the deadline.

3.5 AI Policy

You are allowed to use any aids you see fit to work on the cases, essays, and programming tasks. The only condition is that you indicate any aids used when you submit your essay or programming task solution.

This policy includes tools that help you figure out the solution, structure the problem, generate code, generate text, and revise text. This includes, among others, tools such as Github Copilot and ChatGPT.

Exception: Using aids like automated writing assistants and grammar checkers is not permitted during the *supervised writing assignment*. During this assessment, you may only use materials and aids provided by us.

4. Booklet

One of the most effective learning techniques is to take notes while reading and listening (active reading or active listening).

We observe, however, that many students cannot motivate themselves to take notes continuously. Instead, many students procrastinate throughout

the semester. Shortly before the exam period, students engage frantic binge-learning activities. This form of studying is not only stressful but not an effective technique to master the material and adopt sustainable skills (besides stress resistance).

As a motivation to take notes on a regular basis instead, we have introduced the instrument of **personal exam booklets**. A booklet consists of up to 15 pages of size A5.

Every week you can submit one page by a certain deadline (the exact deadline will be announced online). You can fill your booklet pages with any content you deem useful for the exam (subject to the conditions set out in Section Conditions). If you submit pages every week, your booklet will consist of 15 pages, otherwise it will consist of less pages.

The pages that you submit can have any size and any format. Before the exam, we will scale down your pages to A5, print them **in color**, and assemble them into a stapled booklet. You will receive your personal booklet on the day of the exam with the exam questions.

At the end of the examination, you hand in the booklet with your exam so that it can be archived with the exam. If you fail the exam, you will receive your booklet in the repeat exam.

Creating the pages for your booklet requires critical thinking. What is the best way to condense the material and write it down clearly and concisely? What content do you want to outsource to the booklet, what can you remember on your own? The booklet thus stimulates an active learning process. If you are working in a learning group, it is advisable that each member of your group prepares his or her own draft for every page. Then you can discuss the drafts in your learning group before all group members compile their own pages based on the discussion.

Submitting booklet pages is a voluntary activity. You can pass the exam without a booklet, and we do not create exam questions that assume that you have a booklet.

4.1 Conditions

Booklet pages may be submitted **only during the semester that the lecture is offered** and are acceptable aids to the examination *only in this semester*. If you do not submit a page by the deadline, your booklet will have less pages than possible. Changing pages after the deadline is not possible.

The conditions may seem pedantic. However, they are necessary to maintain the examination principle of *equal opportunity*.

All booklet pages must be written in **your own handwriting**, either on paper or using a tablet. Ideally, by the end of the semester, you will know what is in the booklet and what is not, so all lookups during the exam will be quick.

Screenshots of slides, the lecture notes, or from the videos are not allowed – unless you have transferred them in your own handwriting into your booklet. One printed heading in a typewritten font is allowed per page, which is the default behavior of some note-taking apps for tablets.

Whether handwritten or computer-generated notes are more effective for learning success cannot yet be answered unequivocally. Recent studies come to different conclusions. See the seminar study by Mueller and Oppenheimer (2014), its replication by Morehead et al. (2019), the online article by Haring and Kelner (2021) as well as the more recent studies by Umejima et al. (2021) and Wiechmann et al. (2022).

Scaling down and arranging multiple handwritten elements on a page is allowed. The key condition is that all the content is in your own handwriting.

You do not have to include citations on the pages, which means, lecture slides, answers to exercise questions, content from Wikipedia etc. can be included without mentioning the source. It is also irrelevant whether booklets of different students contain the same drawings – if they have been drawn independently by every person.

Working out booklet pages in learning groups is allowed – as long as each booklet page has been completely handwritten by each person.

If you have taken the course in the past, it is permitted to re-submit your own pages from a past course run once again. While this practice saves work, it has the disadvantage that you will not get the incentive of regular notetaking and the benefit of active learning during the present semester.

4.2 Submission of the Booklet Pages

The submission process is handled via our booklet web application at https://booklet.psi.uni-bamberg.de. The booklet tool requires authentication via the university's single sign-on service. An invitation code is required the first time you use it. The code can be found in the VC course.

To submit a page, you **upload an image**, ideally using a desktop browser. In the following, we provide some tips to achieve a good result.

First, note that we will print your pages in A5 format on a laser printer. If you write very small, you must take care to upload a sharp image with high contrast. Check that your submissions are not too pale, cut off at the edges, or fuzzy. If you take photos of your pages, ensure sufficient and – more importantly – *even* illumination and use a sufficiently high resolution. Consider using a dedicated app that helps with digitizing paper documents. Prepare a suitable setup early on, that you are not pressed for time.

Uploading is also possible directly from the smartphone. However, the booklet web application is not yet designed for smartphone browsers.

What is a high enough resolution? Printouts are easy to read if their resolution is at least 300 dpi. So, the short side of your image should have at least 1771 pixels, the long side at least 2480 pixels.

Use the **preview** function of the booklet web application to adjust the cropping and improve the contrast. To get a feel for readability, change the scaling on the computer screen so that the displayed size corresponds to a sheet of A5 sheet of paper laid on top of it. If you can read your writing at this scale, everything should be fine. The booklet application also allows you to download a **preview booklet** after uploading, which you can print yourself.

4.3 Problem Handling

After successfully uploading a booklet page, the booklet application displays a verification code. Please **make a copy of this code and the uploaded file**. The code serves as proof that you have successfully uploaded a particular file before the deadline.

If later you find that a booklet page is missing, please send us an email with the image file (the exact same file you previously uploaded) and the code

previously displayed in the booklet application. Only if our check shows that this code matches the file, we will add the file to your booklet afterwards.

Sometimes, just before a booklet deadline, the internet is down – or the Wi-Fi at the university is overloaded. If you cannot upload your image file in time because of this, please calculate a cryptographic hash value of the file you wanted to upload. Use a hash function like SHA-256 for this purpose. The obtained hash value uniquely identifies your file. Send us the hash value (and the hash function used) by e-mail before the deadline. You can also take a photo of the hash value and email it to us over the mobile network. Only if our check after the deadline shows that the hash value matches your image, we will add the file to your booklet.

We recommend that you do not upload booklet pages until just before the deadline. Test the upload process before the deadline to avoid any surprises. You can upload each page as many times as you like until the deadline.

We will not subsequently accept booklets for which you have not provided us with a hash value before the deadline – unless you immediately provide a suitable doctor's certificate of incapacity.

If you want to prepare for this scenario, it is best to familiarize yourself in advance with how to calculate a cryptographic hash value of a file locally on your computer (in Linux there are command line tools for this). It is also a good idea to prepare everything so that you can quickly send an e-mail over the mobile network using a smartphone, if you have one.

5. Examination

There will be opportunities to take a **written exam** at the end of the winter semester. You must pass only one of the exams to pass the module. The exam will **require your on-site presence**. The dates of the exams will be announced in VC. Note that besides the two exams in the winter semester, there will be no further exams. The next exams will be offered about one year later.

The exam will be an **e-exam**, i. e., you will write the exam on a laptop that is provided by us. More details on the logistics of the e-exam will be released during the semester in VC. There will be a test exam so that you can familiarize yourself with the electronic examination environment.

The exam questions will be in English, but you can answer in English or in German.

5.1 Relevant Material

Exam tasks focus on content from the lectures, the mandatory readings, and the case studies. Exam tasks about the case studies will summarize the relevant facts from the case study, i. e., it is not necessary to know all details by heart.

Please have a look at previous exams in VC to become familiar with the style of the exam tasks. Our examinations often differ considerably regarding the types of tasks used and the focus. Do not draw conclusions from previous exams as to what topics might be on the next exam.

5.2 Authorized Aids

We will give you your booklet together with the exam tasks. Only the **booklets distributed by us** are authorized, i. e. you are not allowed to bring any further notes to the exam. You are also **not allowed to add notes to your booklet before or during the exam**. Adding highlights with highlighters, however, is allowed.

Booklets that have **not been entirely handwritten by yourself are no authorized aids**. It is your responsibility to check whether your booklet meets this criterion. If you find that one of your pages does not meet the requirements after the deadline for that page has passed, you can ask us to delete it from your booklet by the deadline of the last booklet page. Replacing the content of deleted pages is not possible.

Furthermore, using a **non-programmable calculator** in the exam is permitted. Pocket calculators are considered programmable, where you can store data sets or programs, which remain available after switching off and on again. The Casio FX-5800P, for instance, is not authorized, while the Casio FX-991DE is an authorized aid.

Finally, a **dictionary** is also an allowed aid during the exam.

If we discover during or after the examination that unauthorized aids have been used, we must proceed in accordance with §7 (4) APO, i. e., **you will fail the exam**. In severe cases and cases of repeated misconduct, additional measures may be imposed by the examination board.

We would like to know if this syllabus is read. If you have read this text, we would be pleased if you send us a picture via this link showing an animal you like.

6. Expectations

We love teaching, and we care for you. On occasion, however, we have to make unpopular decisions to make you (more) successful. For me, it is "more important to be a good professor than your favorite professor."

Please find more information on my expectations in the Teaching Philosophy in VC.

We will not focus on teaching you facts. Instead, we want to **teach you how to think**. In some parts of the course, you will have to learn concepts by yourself.

It is your responsibility to

– abstain from cheating and plagiarism,

– acquire necessary background knowledge,

– invest sufficient time for self-studying,

– prepare before attending lecture and tutorials,

– consider switching to a part-time studies program if you cannot handle the workload,

- and to learn to ask effective questions.

We strongly recommend that you work on the lectures each week rather than presuming to make up the notes. Take handwritten notes, rework your notes, and form study groups where everyone works on all assignments rather than dividing assignments among yourselves.

Of course, we also expect you to be legally compliant. In addition, we would like you to treat each other in a professional and considerate manner.

Please ask us if you are unsure whether a particular activity is in line with our expectations.

7. Academic Integrity

We are investing much time to offer you a high-quality academic education. In response, **we expect you to act with integrity**, namely by behaving per the commonly shared values of honesty, trust, fairness, respect, and responsibility.

Cheating on the exam, when preparing your essays, or the booklet pages

- abuse the trust between you and me,

- aim at creating an unfair advantage,

- are disrespectful toward me as your professor, your fellow students, and the institution as a whole, and

- represents a failure to take personal responsibility.

Any action or attempted action that breaches one or more of the fundamental values associated with academic integrity is considered *academic misconduct*.

Acts of academic misconduct can interfere with your intellectual development as they obstruct the opportunity to meet a university education's challenges. Moreover, such actions can potentially undermine our students' and faculty's reputation and credibility, which degrades the value of a degree our university. Thus, we cannot tolerate academic misconduct.

Academic misconduct is often a result of **overwhelming pressure**. Please seek help instead of giving up your integrity. The university offers psychological counseling services to all students. We are also there for you if you struggle, but you have to get in touch with us for that.

Parts of this section are inspired by the Academic Integrity Tutorial of University of Waterloo (CC BY-NC 4.0).

Counseling Services for students of University of Bamberg

8. Contact and Support

Please ask questions when you are stuck or when you do not understand something. You can ask questions during the tutorials or asynchronously.

While some of the pre-recorded videos still mention Rocket.Chat as communication option, according to our experience and feedback from students

there is little benefit in having a group chat for a course. Therefore, there **will not be any Rocket.Chat support** this semester.

We prefer to get **questions about the content** in the Q&A forum in VC. We encourage you to *post answers* if you can answer a question of your peers. Explaining concepts to others or answering their questions is one of the best ways to improve your own understanding.

Asking questions in German is fine if you are uncomfortable with English. Alternatively, use tools such as deepl.com for translation.

If you have a **question about organizational or examination matters**, which you do not want to post publicly, you can reach me via e-mail at dominik.herrmann@uni-bamberg.de. Preferably, approach the tutors first because they can answer most of the questions.

9. Textbooks and Readings

This course is loosely based on the following three textbooks:

– Ibo van de Poel and Lamber Royakkers: *Ethics, Technology, and Engineering – an Introduction*.

– Herman T. Tavani: *Ethics and Technology: Controversies, Questions, and Strategies for Ethical Computing*.

– Jay Quinn: *Ethics for the Information Age*.

We will publish links to more focused readings in VC. Some of these readings are **mandatory readings**.

10. Outline of the Course

Finally, let's preview the content of the course. We will cover the following areas in the order given below:

1. Introduction

2. Responsibility

3. Professional Codes

4. Critical Reasoning

5. Moral Judgements

6. Privacy

7. Designing Technology

8. Automated Decisions

Learning Outcomes. Participants will be able to reflect on their actions as a scientist as well as a computer professional. They learn how to evaluate the trade-offs that are inherent in new technologies and how to design information systems in ways that support the needs of a digital society. Successful participants will obtain the ability to apply ethical thinking to novel problems and potential solutions.