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| **1. Course title\***: Statistical Machine Learning (video course) |
| **2. Instructor(s)\***: Christoph Lampert |
| **3. Track(s)\*:** CS, DSSC | **4. Track segments\*:** CS-AI, DSSC-PROB |
| **5. Semester\*:** Fall | **6. Duration\*:** half-semester |
| **7. Course type\*:** advanced | **8. Specific class room requirements:**blackboard/whiteboard for extended recitation slot |
| **9. Minimum attendance**: 1 | **11. Preferred schedule** (if applicable): [ ]  Mon/Wed [ ]  Tue/Thu [x]  other: [ ]  morning [ ]  afternoon [ ]  no preference  |
| **10. Maximum attendance:** 99 |
| **12. Course is expected to be offered\*** **a) 2020/21**  [ ]  **b) 2021/22** **[x]**  **c) 2022/23** **[ ]** if successful | **13. Teaching assistant:**[ ]  No TA required.[ ]  I will assign the TA myself.[x]  I want to advertise this course as a TAship opportunity to all PhD students.[ ]  I already know the name of the TA (please indicate):  |
| **14. Course description/course goals\*:**Introduction to modern statistical machine learning, in particular probabilistic models. Syllabus:* Hands-on Introduction
* Bayesian Decision Theory, Generative Probabilistic Models
* Discriminative Probabilistic Models
* Maximum Margin Classifiers, Generalized Linear Models
* Estimators; Overfitting/Underfitting, Regularization, Model Selection
* Bias/Fairness, Domain Adaptation
* Statistical Learning Theory
* Deep Learning
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| **15. Target audience\*:** Students from all scientific disciplines with interest in machine learning as a research topic. **16. Prerequisites\*:** * mathematics: linear algebra, calculus, probabilities
* programming skills in a language that allows numeric computation, such as Python

**17. Teaching format(s)\*:*** video lectures from 2020 recording, interactive discussion meetings, homework, final project

**18. Evaluation\*:** 50% homework, 50% final project**19. Grading scheme: a) Numeric grades (1-5)**  [x]   **b) pass/fail** **[x]**   |
| **20. Additional remarks for the graduate school office:** |

\*required field

**21. To be completed by GSO:**

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| HP approved: | ECTS approved: | Notes:  |

1. Please indicate the course title.
2. Please list all instructors for this course. If there are more than three, please indicate who will be the main contact person for organizational matters.
3. Please specify related track(s): Biology, Neuroscience, Physics, Math, CS, DSSC. Service courses are currently not assigned to any track.
4. Please specify the track segment(s) the course should be assigned to (may be one or more, also from different tracks). An overview of the current track segments can be found [here](https://wiki.ist.ac.at/images/a/a0/Tracks_Segments_overview.pdf).
5. Please specify the (half) semester in which you would like your course to take place: Fall 1 / Fall 2 / Fall 1+2/ Spring 1 / Spring 2 / Spring 1+2 (please see [academic calendar](https://intranet.ist.ac.at/istwiki/index.php/Graduate_School%22%20%5Cl%20%22Information_for_course_instructors) for details).
6. Please indicate the length of the course: half semester / full semester / blocked course (blocked format only allowed for service courses; if applicable, indicate number of days and hours).
7. Please specify the course type: introductory (previously known as ‘breadth’), advanced, track core, general core, service (please see [info sheet for course instructors](https://wiki.ist.ac.at/images/d/d8/FINAL_infosheet_courses_update2018.pdf) for details).
8. Please indicate whether there are any special requirements with respect to the class room (e.g. large whiteboards).
9. Please specify the minimum number of participants (if applicable).
10. Please specify the maximum number of participants (if applicable).
11. Please indicate your preferred teaching days. GSO will try to accommodate your wishes, however, reserves the right to suggest a different schedule.
12. Please indicate whether you are planning to offer this course in alternate years (this will help students to plan their curriculum).
13. Please indicate whether or not you will have a TA for the course and how they will be assigned, if applicable. If you want to advertise your course as a TAship opportunity to all PhD students, GSO will inform students accordingly via email and on the PhD website.
14. Please provide a course description (will be used to announce the course on the [PhD website](https://phd.pages.ist.ac.at/course-list/)). Make sure that the goals of the course become clear.
15. Please indicate target audience.
16. Please indicate any prerequisites. It will help students to identify courses that suit their previous knowledge and experience.
17. Please indicate the teaching format(s): lectures, student presentations, project work etc..
18. Please specify how the final grade will be determined: regular assignments, presentations, final exam, participation etc.
19. Please indicate whether which grading scheme you would like to use a) Numeric grades (1-5 with 1 being the best and 4 the last passing grade) or b) pass/fail.
20. Field for additional remarks (e.g. on scheduling restrictions, overlaps with other courses that need to be avoided etc.)
21. To be completed by the GSO. Please note that Heaven points are a reward system for good teaching, and will be awarded for meaningful contributions to the PhD curriculum. In order for a course to qualify, it must follow the approved format. For details please refer to [Memo on heaven points](https://intranet.ist.ac.at/istwiki/index.php/Graduate_School%22%20%5Cl%20%22Information_for_course_instructors)

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| **Please note:** 1. a) Especially for **core and track core course proposals** it is essential that information on
* course contents,
* course goals,
* teaching format,
* assessment/evaluation,
* target audience and pre-requisites

 are provided in **sufficient detail**. b) All information for course instructors is available on the Graduate School Wiki: [https://intranet.ist.ac.at/istwiki/index.php/Graduate\_School#Information\_for\_course\_instructors](https://intranet.ist.ac.at/istwiki/index.php/Graduate_School%22%20%5Cl%20%22Information_for_course_instructors)  |