Universidad Carlos III de Madrid
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| COURSE: Image reconstruction | | |
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| **DEGREE: Master on Information & Health Engineering** | **YEAR: 2025/2026** | **TERM: 2nd** |

**WEEKLY PLANNING**

| WEEK | SESSION | DESCRIPTION | GROUPS (mark X) | | SPECIAL ROOM FOR SESSION (Computer class room, audio-visual class room) | Indicate YES/NO If the session needs 2 teachers | WEEKLY PROGRAMMING FOR STUDENT | | |
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| | | | LECTURES | SEMINARS | | | DESCRIPTION | CLASS HOURS | HOMEWORK HOURS (Max. 7h week) |
| 1 | 1 | Introduction | | | X | | | 1,5 | |
| 1 | 2 | Some basis | | | X | | | 1,5 | 4 |
| 2 | 3 | Projective systems I | | | X | | | 1,5 | 2 |
| 2 | 4 | Projective systems II | | | X | | Projector submission | 1,5 | 2 |
| 3 | 5 | Analytical reconstruction – 2D FBP I | | | X | | | 1,5 | 2 |
| 3 | 6 | Analytical reconstruction – 2D FBP II | | | X | | | 1,5 | 2 |
| 4 | 7 | Analytical reconstruction – 2D FBP III | | | X | | | 1,5 | 2 |
| 4 | 8 | Analytical reconstruction – Fan beam I | | | X | | FBP submission | 1,5 | 2 |
| 5 | 9 | Analytical reconstruction – Fan beam II | | | X | | | 1,5 | 2 |

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| 5 | 10 | Analytical reconstruction – Fan beam III | | | X | | | 1,5 | 4 |
| 6 | 11 | Analytical reconstruction – Limited angle/Parker | | | X | | | 1,5 | 2 |
| 6 | 12 | Analytical reconstruction – FDK | | | X | | Fan beam + Parker submission | 1,5 | 2 |
| 7 | 13 | 3D PET data - Single Slice Rebinning | | | X | | | 1,5 | 2 |
| 7 | 14 | Deep learning in image reconstruction: Intro | | | X | | FDK submission | 1,5 | 2 |
| 8 | 15 | Deep learning in image reconstruction: postprocessing (noise and streaks) | | | X | | | 1,5 | 2 |
| 8 | 16 | Iterative reconstruction – Introduction/Selections | | | X | | | 1,5 | 4 |
| 9 | 17 | Iterative reconstruction – System matrix | | | X | | | 1,5 | 2 |
| 9 | 18 | Iterative reconstruction – (Weighted) Least Squares | | | X | | | 1,5 | 2 |
| 10 | 19 | Iterative reconstruction – (Weighted) Least Squares | | | X | | | 1,5 | 2 |
| 10 | 20 | Iterative reconstruction – (Weighted) Least Squares | | | X | | | 1,5 | 2 |
| 11 | 21 | Iterative reconstruction – ADMM with TV regularization | | | X | | LS-WLS submission | 1,5 | 4 |
| 11 | 22 | Iterative reconstruction – ADMM with TV regularization for dynamic CT | | | X | | | 1,5 | 2 |
| 12 | 23 | Iterative reconstruction – ADMM with TV regularization for dynamic CT | | | X | | | 1,5 | 2 |
| 13 | 24 | Deep learning in image reconstruction: PICDL | | | X | | ADMM submission | 1,5 | 2 |
| 14 | 25 | Deep learning in image reconstruction – Diffusion posterior sampling | | | X | | | 1,5 | 4 |
| 14 | 26 | Deep learning in image reconstruction – Diffusion posterior sampling for dynamic CT | | | X | | PICDL submission | 1,5 | 2 |
| 15 | 27 | Deep learning in image reconstruction – Diffusion posterior sampling for dynamic CT | | | X | | | 1,5 | 4 |
| 15 | 28 | Deep learning in image reconstruction – Diffusion posterior sampling for dynamic CT | | | X | | | 1,5 | 2 |
| 15 | 29 | Deep learning in image reconstruction – Diffusion posterior sampling for dynamic CT | | | X | | Diffusion posterior sampling submission | 1,5 | |
| | | | X | | | | **Subtotal 1** | **43,5** | **66** |

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| **Total 1** *(Hours of class plus student homework hours between weeks 1-14)* | |

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| **TOTAL A** *(Total 1 + Total 2)* | **108** |