

# MASTER CURRICULUM – SCIENCE AND TECHNOLOGY OF NUCLEAR FUSION – 2024/2025

| Compulsory courses NF  |  |    |     |          |
|------------------------|--|----|-----|----------|
| Code                   | Course   | EC | Q   | Timeslot |
| <a href="#">3MF513</a> | Fusion basics: Physics for Engineers, Engineering for physicists | 5  | GS1 | D        |
| <a href="#">3MF100</a> | Fusion on the back of an envelope                                | 5  | GS1 | E        |
| <a href="#">3MF110</a> | Magnetic confinement and MHD of fusion plasmas                   | 5  | GS2 | C        |
| <a href="#">3MF120</a> | Fusion reactor materials and plasma-wall interaction             | 5  | GS4 | E        |

| Free elective          |                    |     |           |          |
|------------------------|--------------------|-----|-----------|----------|
| Code                   | Course             | EC  | Q         | Timeslot |
| <a href="#">3MC010</a> | Career development | 2,5 | GS2or GS4 | D1,C2    |

| Internship & Graduation   |   |      |          |
|---------------------------|---|------|----------|
| Code                      | Course  | EC   | Timeslot |
| <a href="#">3NFA45</a>    | Graduation project Science and Technology of Nuclear Fusion                 | 45   | X        |
| <a href="#">3NFA60</a>    | Graduation project Science and Technology of Nuclear Fusion                 | 60   | X        |
| <a href="#">3NFS15</a>    | Internship Science and Technology of Nuclear Fusion                         | 15   | X        |
| <a href="#">3NFIDD225</a> | Combined graduation project - Science and Technology of Nuclear Fusion part | 22,5 | X        |
| <a href="#">3NFIDD30</a>  | Combined graduation project - Science and Technology of Nuclear Fusion part | 30   | X        |

| NF Track Electives - Fusion Physics (Experimental) |                                       |    |         |          |
|--|---------------------------------------|----|---------|----------|
| Code   | Course                                | EC | Q       | Timeslot |
| <a href="#">3MB010</a>                             | Physics of plasma and radiation       | 5  | GS1     | A        |
| <a href="#">3MA020</a>                             | Advanced electrodynamics              | 5  | GS2     | B        |
| <a href="#">3MF130</a>                             | Heating and diagnosing fusion plasmas | 5  | GS3     | B        |
| <a href="#">5SPB0</a>                              | Microwave engineering and antennas    | 5  | GS2     | E2       |
| <a href="#">5CTA0</a>                              | Statistical signal processing         | 5  | GS1+GS3 | A,B      |

| NF Track Electives – Computational Fusion & Theory |   |    |     |          |
|--|---|----|-----|----------|
| Code   | Course  | EC | Q   | Timeslot |
| <a href="#">3MA010</a>                             | Computational and mathematical physics                  | 5  | GS1 | B        |
| <a href="#">3MT120</a>                             | Advanced computational fluid and plasma dynamics        | 5  | GS3 | E        |
| <a href="#">2MMN10</a>                             | Scientific Computing                                    | 5  | GS1 | E        |
| <a href="#">2MMN20</a>                             | Scientific Programming                                  | 5  | GS2 | B        |
| <a href="#">2MMN30</a>                             | Scientific Computing in partial differential equations  | 5  | GS4 | C        |
| <a href="#">4AI000</a>                             | Machine learning for multi-physics modelling and design | 5  | GS4 | E        |
| <a href="#">5SC28</a>                              | Machine learning for Systems and Control                | 5  | GS4 | B        |

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| NF Track Electives – Fusion Control |  |    |         |          |
|-------------------------------------|--|----|---------|----------|
| Code                                | Course name                                    | EC | Q       | Timeslot |
| <a href="#">3MF130</a>              | Heating and diagnosing fusion plasmas          | 5  | GS3     | B        |
| <a href="#">4CM00</a>               | Control engineering                            | 5  | GS1+GS3 | C,E      |
| <a href="#">4SC090</a>              | Control and Operation of Future Energy Systems | 5  | GS3     | D        |
| <a href="#">4CM10</a>               | System theory for control                      | 5  | GS1     | B        |

| NF Masterclasses (first week of the quarter) |  |     |     |          |
|--|--|-----|-----|----------|
| Code   | Course name  | EC  | Q   | Timeslot |
| <a href="#">3MF501</a>                       | Fusion Masterclass: Smarter than ITER                          | 2,5 | GS2 | X        |
| <a href="#">3MF507</a>                       | Fusion Masterclass: Turbulence and transport in fusion plasmas | 2,5 | GS3 | X        |
| <a href="#">3MF508</a>                       | Fusion Masterclass: Fusion Engineering                         | 2,5 | GS4 | X        |

| NF Track Electives – Fusion Materials |   |    |     |          |
|---------------------------------------|---|----|-----|----------|
| Code                                  | Course name                                   | EC | Q   | Timeslot |
| <a href="#">4MM10</a>                 | Advanced computational continuum mechanics    | 5  | GS1 | D        |
| <a href="#">4MM20</a>                 | Computational and experimental micromechanics | 5  | GS2 | D        |
| <a href="#">4MM50</a>                 | Fracture mechanics                            | 5  | GS3 | C        |
| <a href="#">4MM60</a>                 | Advanced and Additive Manufacturing           | 5  | GS4 | A        |

| NF Track Electives – Fusion Engineering |                          |    |     |          |
|---|--------------------------|----|-----|----------|
| Code                                    | Course name              | EC | Q   | Timeslot |
| <a href="#">5SVA0</a>                   | High voltage technology  | 5  | GS2 | A        |
| <a href="#">5LEGO</a>                   | Pulsed power technology  | 5  | GS3 | D        |
| <a href="#">4CM70</a>                   | Integrated system Design | 5  | GS2 | E        |