**Pre-course preparation**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Topic** | **Format** | **Duration** | **Time** | **Lecturer** |
| Video 1 - Introduction to Mendelian Randomisation (MR) | Recorded  |  |  | Dr Abbas Dehghan |
| Video 2 - What is GWAS and where to get summary data? | Recorded |  |  | Dr Abbas Dehghan  |

**First Day – May 15, 2025**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Topic** |  |  |  | **Lecturer** |
| Welcome and introduction to course | Live | 15 minutes | 10:00-10:15 | Dr Abbas Dehghan |
| Lecture 1 - Assumptions of MR | Live | 30 minutes | 10:15-10:45 | Dr Abbas Dehghan |
| Q&A |  | 15 minutes | 10:45-11:00 |  |
| Lecture 2 - One-sample MR: Data input, analysis and Two-stage least squares | Live | 20 minutes | 11:00-11:20 | Dr Verena Zuber |
| Q&A |  | 15 minutes | 11:20-11:35 |  |
| Lecture 3 - Two-sample MR: Data input and IVW | Live | 40 minutes | 11:35-12:15 | Dr Kostas Tsilidis |
| Q&A |  | 15 minutes | 12:15-12:30 |  |
| Lunch break |  |  | 12:30-13:30 |  |
| Lecture 4 - MR-Egger and robust methods (Weighted Median and Mode) | Live | 30 minutes | 13:30-14:00 | Dr Kostas Tsilidis  |
| Q&A |  | 15 minutes | 14:00-14:15 |  |
| Lecture 5 - Violations of the assumptions: Pleiotropy and weak instrument bias | Live | 30 minutes | 14:15-14:45 | Dr Abbas Dehghan |
| Q&A |  | 15 minutes | 14:45-15:00 |  |
| Lecture 6 - Advanced methods (MR-PRESSO, Contamination mixture, MR-RAPS) | Live | 30 minutes | 15:00-15:30 | Dr Verena Zuber |
| Q&A |  | 15 minutes | 15:30-15:45 |  |
| Break |  |  | 15:45-16:00 |  |
| Lecture(s) on applications of MR (15 minutes lecture +5minutes Q&A) | Live | 60 minutes | 16:00-17:00 | Manyi Jia, Emmanouil Bouras, Terry Huang |

**Homework**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Topic** |  |  |  | **Lecturer** |
| Video 3 - Model diagnostics: Plots and heterogeneity | Recorded |  |  | Dr Kostas Tsilidis  |
| Video 4 - An introduction to MR-BASE | Recorded  |  |  | Dr Abbas Dehghan  |
| Practical 1: Using ‘ivreg’ command in “AER” R package |
| Practical 2: Two sample MR using “MendelianRandomisation” R Package |

**Second Day – May 16, 2025**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Topic** |  |  |  | **Lecturer** |
| Solutions to Practical 1: Using ‘ivreg’ command in “AER” R package | Live | 30 minutes | 10:00-10:30 | Dr Devendra Meena |
| Q&A for Practical 1 | Breakout rooms | 30 minutes | 10:30-11:00 | All lecturers |
| **Lecture 7 - Genetics in Drug Development** | Live | 45 minutes | 11:00-11:45 | Dr James Yarmolinsky |
| Q&A |  | 15 minutes | 11:45-12:00 |  |
| Lunch break |  |  | 12:00-12:45 |  |
| Lecture 8 - Emerging methods in MR | Live | 45 minutes | 12:45-13:30 | Prof. Stephen Burgess  |
| Q&A |  | 15 minutes | 13:30-13:45 |  |
| Lecture 9 - Multivariable and multiresponse MR | Live | 30 minutes | 13:45-14:15 | Dr Verena Zuber |
| Q&A |  | 15 minutes | 14:15-14:30 |  |
| Solutions to Practical 2 - ‘MendelianRandomisation’ R package | Live | 30 minutes | 14:30-15:00 | Dr Devendra Meena |
| Q&A for Practical 2 | Breakout rooms | 30 minutes | 15:00-15:30 | All lecturers |
| Lecture 10 - Colocalization | Live | 30 minutes | 15:30-16:00 | Dr Ville Karhunen |
| Q&A |  | 15 minutes | 16:00-16:15 |  |
| Break |  | 15 minutes | 16:15-16:30 |  |
| Invited lecture: MR in the field of epigenetics: its development, application, strengths and limitations | Live | 60 minutes | 16:30-17:30 | Prof. Segun Fatumo |

**Homework**

|  |
| --- |
| Practical 3: MR-PRESSO – Multivariate MR  |