

| Day | Session | Time | Format | Topics* | Lecturer |
|-----|---------------------------|---------------|---|---|------------------------|
| 1 | Registration | 8:00 - 9:00 | | | |
| | Computation in life | 9:00 - 9:45 | Lecture | life as an information system, the cell as a computational unit | Ivan Erill (UMBC) |
| | Algorithmic concepts | 9:50 - 10:45 | Lecture | algorithms: representation, data structures and optimization | Ivan Erill (UMBC) |
| | | 10:45 - 11:00 | <i>Coffee break</i> | | |
| | Bioinformatics resources | 11:00 - 11:25 | Lecture | bioinformatics repositories, primary vs. derivative repositories | Ivan Erill (UMBC) |
| | Essential bioinformatics | 11:30 - 13:00 | Lecture | alignment, dynamic programming, search strategies, BLAST | Cédric Notredame (CRG) |
| | | 13:00 - 14:00 | <i>Lunch</i> | | |
| | Hands-on bioinformatics | 14:00 - 14:55 | Coding | Linux environment, Python, lists, versioning | Ivan Erill (UMBC) |
| | | 15:00 - 15:45 | Hands-on | guided exercises on main bioinformatics repositories, BLAST flavors | Ivan Erill (UMBC) |
| | | 15:45 - 16:15 | <i>Coffee break</i> | | |
| | 16:15 - 17:55 | Coding | scripting remote queries using the NCBI API | Ivan Erill (UMBC) | |
| 2 | Functional genomics | 9:00 - 9:50 | Lecture | sequence orthology, reciprocal BLAST, functional annotation, HHMER, COG & eggNOG, functional categories | Toni Gabaldon (CRG) |
| | | 10:00 - 10:25 | Hands-on | guided exercises with the eggNOG database | Toni Gabaldon (CRG) |
| | | 10:30 - 11:45 | Coding | scripting the assignment and analysis of NOG identifiers | Toni Gabaldon (CRG) |
| | | 11:45 - 12:00 | <i>Coffee break</i> | | |
| | Gene Ontology analysis | 12:00 - 12:35 | Lecture | ontologies and databases, the gene and evidence ontologies, enrichment and overrepresentation | Alex Sánchez-Pla (UB) |
| | | 12:35 - 13:00 | Hands-on | gene set enrichment and overrepresentation analyses with GO | Alex Sánchez-Pla (UB) |
| | | 13:00 - 14:00 | <i>Lunch</i> | | |
| | Gene Ontology analysis | 14:15 - 15:45 | Coding | scripting the assignment and analysis of GO identifiers | Alex Sánchez-Pla (UB) |
| | Systems & network biology | 15:45 - 16:30 | Lecture | systems and network biology, directed and acyclic graphs, in- and out-degree, hubs and critical paths | Baldo Oliva (UPF) |
| | | 16:30 - 16:45 | <i>Coffee break</i> | | |
| | 16:45 - 17:15 | Hands-on | exercises with STRING and Cytoscape | Baldo Oliva (UPF) | |
| | 17:15 - 18:30 | Coding | scripting remote STRING queries | Baldo Oliva (UPF) | |

* Topic details are for reference only