



Master on Integrative Synthetic Biology

Engineering Molecular and Cellular Systems

1st Edition. 2021-2023

Semester 1 (10/2021 – 02/2022)

M1. FUNDAMENTALS (25 ECTS)

M1a. Basic principles & research topics (15 ECTS): ASSEMBLY, SYNTHESIS, BIOFACTORIES

M1b. TOOLS (10 ECTS)

- 3 days of classes per week (Tues, Wed, Thu): up to 3 classes / 1 h (morning; 10:00, 11:15, 12:30) + afternoon sessions (optional)
- Mon and Fri reserved for tutorials, journal clubs, **FRONTIERS** activities of the semester

M2. FRONTIERS I (2-3 seminars & 1-2 workshops)

FUNDAMENTALS 1 (04-08/10/2021)

INTRODUCTORY SESSIONS: Essentials of SynBio and related disciplines

Coordination: MISB team

FUNDAMENTALS 2 (13/10/2021 – 12/11/2021)

Engineering molecular systems (bottom-up approaches)

ASSEMBLY & SYNTHESIS (I) + TOOLS (I)

Coordination: ASSEMBLY & SYNTHESIS (I) – R Pérez, S Martín-Santamaría & G Rivas (CIB). TOOLS (I): B Monterroso, S Zorrilla & G Rivas (CIB)

FUNDAMENTALS 3 (15/11/2021 – 10/12/2021)

Engineering cellular systems (top-down approaches)

ASSEMBLY & SYNTHESIS (II) + TOOLS (II)

Coordination: R Giraldo & J Nogales (CNB); J Buceta & J Peretó (I₂SysBio)

EXAMS 1 (12/2021)

FUNDAMENTALS 4 (10/01/2022 – 11/02/2022):

BIOFACTORIES + TOOLS (III)

Coordination: BIOFACTORIES - J Barriuso (CIB) & J Nogales (CNB). TOOLS (III) J Nogales (CNB); I Otero & J Buceta (I₂SysBio)

EXAMS 2 (second half 02/2022)

Semester 2 (03/2022 – 06/2022)

M2. FRONTIERS I (5-6 seminars & 2-3 workshops) – engineering synthetic and natural systems

M3. EXTENSION I

M4 LAB ROTATIONS I

04/10/2021 – 08/10/2021:

FUNDAMENTALS 1 (welcoming + introductory lectures) + **Opening seminar**

Day	Lectures / Activities	Teachers
04/10/21	L1 (10:00 – 10:25): Welcoming L2 (11:00 – 12:00): Foundations of Synthetic Biology	G Rivas L Serrano (CRG) (*) (*) on-line
05/10/21	L1-L2 (10:00 – 12:00): Introduction to the MISB + practical aspects / questions	G Rivas & MISB team
06/10/21	L1 (10:00 – 11:15): Bottom up and top-down SynBio approaches – introductory remarks L2 (11:30 – 12:45): Synthetic Biology –story of a yearning	R Giraldo J Peretó
07/10/21	L1 (10:00 – 11:15): The chemical origins of life L2 (11:30 – 12:45) – Proto-cell: what is in a name? L4 (16:00): OPENING SEMINAR (*)	J Peretó K Ruiz-Mirazo J Szostak (U. Harvard) Nobel Prize 2009 Chairs: J Peretó & K Ruiz-Mirazo
08/10/21	SPECIAL EVENT – 25 YEARS OF THE DISCOVERY OF THE GENETIC BASIS OF ALKAPTONURIA	MA Peñalva, S Rodríguez de Córdoba, etc.

FINAL PROGRAM AND CALENDAR OF FUNDAMENTALS 2 AND 3 WILL BE ANNUNCED BY MID-SEPTEMBER 2021

18/10/2021 – 12/11/2021:

FUNDAMENTALS 2 (engineering molecular systems – bottom-up approaches)

ASSEMBLY & SYNTHESIS I

TOOLS I:

FRONTIERS: 1 seminar + 1 workshop - round-table (minimal cells)

15/11/2021 – 10/12/2021: **FUNDAMENTALS 3** (engineering cellular systems – top-down approaches)

ASSEMBLY & SYNTHESIS II

TOOLS II

FRONTIERS: 1 seminar + 1 workshop