

Modules	Lectures	Topics	Instructor	Institute	Date	Time	
	L0	Administration		UML	Monday	8:30AM	
M1	L1	Introduction – Biologics Development Overview	Sanchayita Ghose, PhD	BMS		8:40 AM	
		Upstream Bioprocessing Technology – Current Status, Challenges, and Future				10:30 AM	
	L2	Upstream – Cell-line development	Mengmeng Xu				
		Upstream – Media					
	L3	Upstream – Bioreactor Development and Operation	Mitchell Tai, PhD				1:30PM
		Upstream – Cell-Culture Scale-up					
	L4	Upstream – Harvest Technology I	Melissa Holstein, PhD				3:30PM
		Upstream – Industrial case studies of upstream processes	Mitchell Tai, PhD				
M2	L5	Downstream Processing Technology – Current Status, Challenges, and Future		BMS	Tuesday	8:30 AM	
		Downstream – Chromatography I	James Angelo, PhD				
		Downstream – Chromatography II					
	L6	Downstream – Membrane filtration I					10:30 AM
		Downstream – Membrane filtration II	Melissa Holstein, PhD				
	L7	Downstream – Cryo Technology	Alan Shupe, PhD				1:30 PM
		Pilot facility and Automations in Bioprocessing Development and Manufacturing	Derek Choy, PhD				
	L8	Downstream – Industrial case studies of downstream processes					3:30 PM
Downstream – Industrial case studies of downstream processes		Srinivas Chollangi, PhD					
M3	L9	Analytical Technology – Current Status, Challenges, and Future		Pfizer	Wednesday	8:30 AM	
		Analytics – Protein characterization assays I	Yan Gu, PhD				
		Analytics – Protein characterization assays II					
	L10	Analytics – Bioassay I					10:30 AM
		Analytics – Bioassay II	Rebeca Urbano, PhD				
L11	Analytics – Technologies for clinical bioprocessing and regulatory submission				1:30 PM		
	Analytics - CMC Analytical Strategies	Jason Starkey, PhD			3:30 PM		
M4	L13	Cell therapy Bioprocessing I	Kara Levine, PhD Emily Kurdzo, PhD Aletta Schnitzler, PhD Naines Jane Ring	MilliporeSigma	Thursday	8:30 AM	
	L14	Cell therapy Bioprocessing II				10:30 AM	
M5	L15	Gene therapy, Science	Philip Tai, PhD	UMass Medical		1:30 PM	
	L16	Gene therapy Bioprocessing	Onur Kas, PhD; Dongli Guan, PhD Ashish Saksule, Sonal Patel	MilliporeSigma		3:30 PM	
		L16a	Gene therapy bioprocessing case study	David McNally, PhD	MassBiologics	Friday	8:30 AM
M6	L 17	Regulatory, QbD and PAT	Anthony Cura, PhD	BMS		9:30 AM	
M7	L18	Big data analytics for Biopharmaceuticals - DOE and MVDA	Seongkyu Yoon, PhD	UML		11:00 AM	