

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: November 2023 - April 2024

Department : Biotechnology

Name of the Faculty : Dr. Aruna Sharmili. S

Course Title : Applications of Stem Cell and Tissue Engineering

Course Code : 19BY/PC/ST44

Shift : II

Week & No. of hours	Units & Topics	Teaching Methodology	Text & References	Method of Evaluation
Nov 22 – 23, 2023 (Day Order 1 & 2) 2 hrs	Unit 1 Introduction to Stem Cells 1.1 Stem Cells – History	Lecture and PowerPoint presentation, videos	BOOKS FOR STUDY Robert Lanza. <i>Essentials of Stem Cell Biology</i> . U.S.A.: Academic Press, 3d Edition, 2014. BOOKS FOR REFERENCE Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem. <i>Principles of Regenerative Medicine</i> . 3rd Edition, U.S.A. Elsevier publications, 2018. Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution</i> . US.: Author House, 2015 Fong, Calvin A. <i>Stem Cell Research Developments</i> . U.S.A.: Nova, 2007. Greer, Erik V. <i>Neural Stem Cell Research</i> . U.S.A.: Nova, 2006. Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods</i> . U.S.A.: Academic, 2009	Group discussion
Nov 24-30, 2023 (Day Order 1 to 6) 6 hrs	Unit 1 Introduction to Stem Cells	Lecture and PowerPoint presentation	BOOKS FOR STUDY Robert Lanza. <i>Essentials of Stem Cell</i>	Group discussion

	<p>1.2 Stem Cells –Definition, Types</p> <p>1.3 Stem Cell Banking</p>	<p>Videos</p>	<p><i>Biology</i>. U.S.A.: Academic Press, 3d Edition, 2014.</p> <p>BOOKS FOR REFERENCE</p> <p>Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem.</p> <p><i>Principles of Regenerative Medicine</i>. 3rd Edition, U.S.A. Elsevier publications, 2018.</p> <p>Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution</i>. US.: Author House, 2015</p> <p>Fong, Calvin A. <i>Stem Cell Research Developments</i>. U.S.A.: Nova, 2007.</p> <p>Greer, Erik V. <i>Neural Stem Cell Research</i>. U.S.A.: Nova, 2006.</p> <p>Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods</i>. U.S.A.: Academic, 2009</p>	
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<p>Dec 1-7, 2023 (Day Order 1 to 6) 6 hrs</p>	<p>Unit 1 Introduction to Stem Cells 1.4 Stem Cell Niches 1.5 Role of International Society for Stem Cell Research (ISSCR)</p>	<p>Lecture and PowerPoint presentation, videos</p>	<p>BOOKS FOR STUDY Robert Lanza. <i>Essentials of Stem Cell Biology</i>. U.S.A.: Academic Press, 3d Edition, 2014. BOOKS FOR REFERENCE Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem. <i>Principles of Regenerative Medicine</i>. 3rd Edition, U.S.A. Elsevier publications, 2018. Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution</i>. US.: Author House, 2015 Fong, Calvin A. <i>Stem Cell Research Developments</i>. U.S.A.: Nova, 2007. Greer, Erik V. <i>Neural Stem Cell Research</i>. U.S.A.: Nova, 2006. Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods</i>. U.S.A.: Academic, 2009</p>	<p>Group Discussion</p>
<p>Dec 8-9, 2023 (Day Order 1, 3) 2 hrs</p>	<p>Unit 2 Application of Stem Cells – I 2.1 Multiple Sclerosis</p>	<p>Lecture and PowerPoint presentation, Videos</p>	<p>BOOKS FOR STUDY Robert Lanza. <i>Essentials of Stem Cell Biology</i>. U.S.A.: Academic Press, 3d Edition, 2014. BOOKS FOR REFERENCE Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem. <i>Principles of Regenerative Medicine</i>. 3rd Edition, U.S.A. Elsevier publications, 2018. Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution</i>. US.:</p>	<p>Class Test</p>

			<p>Author House, 2015 Fong, Calvin A. <i>Stem Cell Research Developments</i>. U.S.A.: Nova, 2007. Greer, Erik V. <i>Neural Stem Cell Research</i>. U.S.A.: Nova, 2006. Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods</i>. U.S.A.: Academic, 2009</p>	
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<p>Dec 11-15, 2023 (Day Order 2 to 6) 5 hrs</p>	<p>Unit 2 Application of Stem Cells – I 2.2 Macular Degeneration 2.3 Diabetes</p>	<p>Lecture and PowerPoint presentation, Videos</p>	<p>BOOKS FOR STUDY Robert Lanza. <i>Essentials of Stem Cell Biology</i>. U.S.A.: Academic Press, 3d Edition, 2014. BOOKS FOR REFERENCE Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem. <i>Principles of Regenerative Medicine</i>. 3rd Edition, U.S.A. Elsevier publications, 2018. Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution</i>. US.: Author House, 2015 Fong, Calvin A. <i>Stem Cell Research Developments</i>. U.S.A.: Nova, 2007. Greer, Erik V. <i>Neural Stem Cell Research</i>. U.S.A.: Nova, 2006. Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods</i>. U.S.A.: Academic, 2009</p>	<p>Class Participation</p>
<p>Dec 16 – 22, 2023 (Day Order 1 to 6) 3 hrs</p>	<p>Unit 2 Application of Stem Cells – I 2.3 Heart disease 2.4 Parkinson’s disease</p>	<p>Lecture and PowerPoint presentation, Videos</p>	<p>BOOKS FOR STUDY Robert Lanza. <i>Essentials of Stem Cell Biology</i>. U.S.A.: Academic Press, 3d Edition, 2014. BOOKS FOR REFERENCE Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem. <i>Principles of Regenerative Medicine</i>. 3rd Edition, U.S.A. Elsevier publications, 2018. Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution</i>. US.: Author House, 2015</p>	<p>Class Test</p>

			<p>Fong, Calvin A. <i>Stem Cell Research Developments</i>. U.S.A.: Nova, 2007.</p> <p>Greer, Erik V. <i>Neural Stem Cell Research</i>. U.S.A.: Nova, 2006.</p> <p>Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods</i>. U.S.A.: Academic, 2009</p>	
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<p>Jan 3 – 6, 2024 (Day Order 1 to 4) 4 hrs</p>	<p>Unit 3 Application of Stem Cells – II 3.1 Cancer Stem Cells</p>	<p>Lecture and PowerPoint presentation, Videos</p>	<p>BOOKS FOR STUDY Robert Lanza. <i>Essentials of Stem Cell Biology</i>. U.S.A.: Academic Press, 3d Edition, 2014. BOOKS FOR REFERENCE Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem. <i>Principles of Regenerative Medicine</i>. 3rd Edition, U.S.A. Elsevier publications, 2018. Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution</i>. US.: Author House, 2015 Fong, Calvin A. <i>Stem Cell Research Developments</i>. U.S.A.: Nova, 2007. Greer, Erik V. <i>Neural Stem Cell Research</i>. U.S.A.: Nova, 2006. Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods</i>. U.S.A.: Academic, 2009</p>	<p>Class Test</p>
<p>Jan 8 – 12, 2024</p>	<p>C.A. Test – I</p>			
<p>Jan 13, 2024 (Day Order 1)1 hr</p>	<p>Unit 3 Application of Stem Cells – II 3.2 Spinal Cord Injury</p>	<p>Lecture and PowerPoint presentation, Videos</p>	<p>BOOKS FOR STUDY Robert Lanza. <i>Essentials of Stem Cell Biology</i>. U.S.A.: Academic Press, 3d Edition, 2014. BOOKS FOR REFERENCE Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem. <i>Principles of Regenerative Medicine</i>. 3rd Edition, U.S.A. Elsevier publications, 2018.</p>	<p>Short answer test</p>

			<p>Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution</i>. US.: Author House, 2015</p> <p>Fong, Calvin A. <i>Stem Cell Research Developments</i>. U.S.A.: Nova, 2007.</p> <p>Greer, Erik V. <i>Neural Stem Cell Research</i>. U.S.A.: Nova, 2006.</p> <p>Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods</i>. U.S.A.: Academic, 2009</p>	
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<p>Jan 18 -20, 2024 (Day Order 4 to 6) 3 hrs</p>	<p>Unit 3 Application of Stem Cells – II 3.2 Spinal Cord Injury 3.3 Burns and Skin Ulcers</p>	<p>Lecture and PowerPoint presentation, Videos</p>	<p>BOOKS FOR STUDY Robert Lanza. <i>Essentials of Stem Cell Biology</i>. U.S.A.: Academic Press, 3d Edition, 2014. BOOKS FOR REFERENCE Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem. <i>Principles of Regenerative Medicine</i>. 3rd Edition, U.S.A. Elsevier publications, 2018. Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution</i>. US.: Author House, 2015 Fong, Calvin A. <i>Stem Cell Research Developments</i>. U.S.A.: Nova, 2007. Greer, Erik V. <i>Neural Stem Cell Research</i>. U.S.A.: Nova, 2006. Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods</i>. U.S.A.: Academic, 2009</p>	<p>Short answer test</p>
<p>Jan 22-29, 2024 (Day Order 1 to 6) 6 hrs</p>	<p>Unit 3 3.4 Orthopedic Applications Unit 4 Tissue Engineering 4.1 Introduction, Time Line</p>	<p>Lecture and PowerPoint presentation, Videos</p>	<p>BOOKS FOR STUDY Robert P. Lanaza, Robert Langer and Joseph Vacanti. <i>Principles of Tissue Engineering</i>. U.S.A.: Academic, 4th Edition, Elsevier Publications, 2013. BOOKS FOR REFERENCE Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem. <i>Principles of Regenerative Medicine</i>. 3rd Edition, U.S.A. Elsevier publications, 2018.</p>	<p>Assignment III Component Group discussion</p>

			<p>Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution</i>. US.: Author House, 2015</p> <p>Fong, Calvin A. <i>Stem Cell Research Developments</i>. U.S.A.: Nova, 2007.</p> <p>Greer, Erik V. <i>Neural Stem Cell Research</i>. U.S.A.: Nova, 2006.</p> <p>Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods</i>. U.S.A.: Academic, 2009</p>	
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<p>Jan 30 – Feb 2, 2024 (Day Order 1 to 4) 4 hrs</p>	<p>Unit 4 Tissue Engineering 4.2 Biodegradable Polymers</p>	<p>Lecture and PowerPoint presentation, Videos</p>	<p>BOOKS FOR STUDY Robert P. Lanaza, Robert Langer and Joseph Vacanti. <i>Principles of Tissue Engineering</i>. U.S.A.: Academic, 4th Edition, Elsevier Publications, 2013. BOOKS FOR REFERENCE Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem. <i>Principles of Regenerative Medicine</i>. 3rd Edition, U.S.A. Elsevier publications, 2018. Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution</i>. U.S.: Author House, 2015 Fong, Calvin A. <i>Stem Cell Research Developments</i>. U.S.A.: Nova, 2007. Greer, Erik V. <i>Neural Stem Cell Research</i>. U.S.A.: Nova, 2006. Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods</i>. U.S.A.: Academic, 2009</p>	<p>Group discussion</p>
<p>Feb 3, 2024 (Day Order 2) 1 hr</p>	<p>Unit 4 Tissue Engineering 4.3 Growth Factors</p>	<p>Lecture and PowerPoint presentation, Videos</p>	<p>BOOKS FOR STUDY Robert P. Lanaza, Robert Langer and Joseph Vacanti. <i>Principles of Tissue Engineering</i>. U.S.A.: Academic, 4th Edition, Elsevier Publications, 2013. BOOKS FOR REFERENCE Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem. <i>Principles of Regenerative</i></p>	<p>Assignment III Component</p>

			<p><i>Medicine</i>. 3rd Edition, U.S.A. Elsevier publications, 2018. Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution</i>. U.S.: Author House, 2015 Fong, Calvin A. <i>Stem Cell Research Developments</i>. U.S.A.: Nova, 2007. Greer, Erik V. <i>Neural Stem Cell Research</i>. U.S.A.: Nova, 2006. Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods</i>. U.S.A.: Academic, 2009</p>	
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<p>Feb 5- 6, 2024 (Day Order 5 to 6) 2 hrs</p>	<p>Unit 4 Tissue Engineering 4.3 Growth Factors</p>	<p>Lecture and PowerPoint presentation, Videos</p>	<p>BOOKS FOR STUDY Robert P. Lanaza, Robert Langer and Joseph Vacanti. <i>Principles of Tissue Engineering</i>. U.S.A.: Academic, 4th Edition, Elsevier Publications, 2013.</p> <p>BOOKS FOR REFERENCE Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem. <i>Principles of Regenerative Medicine</i>. 3rd Edition, U.S.A. Elsevier publications, 2018. Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution</i>. US.: Author House, 2015 Fong, Calvin A. <i>Stem Cell Research Developments</i>. U.S.A.: Nova, 2007. Greer, Erik V. <i>Neural Stem Cell Research</i>. U.S.A.: Nova, 2006. Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods</i>. U.S.A.: Academic, 2009</p>	<p>Assignment III Component</p>
<p>Feb 7 – 14, 2024 (Day Order 1 to 6) 6 hrs</p>	<p>Unit 4 Tissue Engineering 4.4 Bioreactors</p> <p>Unit 5 Applications of Tissue Engineering 5.1 Bioartificial Organs - Bioartificial Pancreas</p>	<p>Lecture and PowerPoint presentation, Videos</p>	<p>BOOKS FOR STUDY Robert P. Lanaza, Robert Langer and Joseph Vacanti. <i>Principles of Tissue Engineering</i>. U.S.A.: Academic, 4th Edition, Elsevier Publications, 2013.</p> <p>BOOKS FOR REFERENCE Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem.</p>	<p>Class Test</p>

			<p><i>Principles of Regenerative Medicine</i>. 3rd Edition, U.S.A. Elsevier publications, 2018. Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution</i>. US.: Author House, 2015 Fong, Calvin A. <i>Stem Cell Research Developments</i>. U.S.A.: Nova, 2007. Greer, Erik V. <i>Neural Stem Cell Research</i>. U.S.A.: Nova, 2006. Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods</i>. U.S.A.: Academic, 2009</p>	
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<p>Feb 15 – 22, 2024 (Day Order 1 to 6) 6 hrs</p>	<p>Unit 5 Applications of Tissue Engineering 5.1 Bioartificial Organs - Hepat Assist Liver Support System 5.2 Heamatopoietic System - Red Blood Cell Substitutes</p>	<p>Lecture and PowerPoint presentation, Videos</p>	<p>BOOKS FOR STUDY Robert P. Lanaza, Robert Langer and Joseph Vacanti. <i>Principles of Tissue Engineering.</i> U.S.A.: Academic, 4th Edition, Elsevier Publications, 2013.</p> <p>BOOKS FOR REFERENCE Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem. <i>Principles of Regenerative Medicine.</i> 3rd Edition, U.S.A. Elsevier publications, 2018. Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution.</i> US.: Author House, 2015 Fong, Calvin A. <i>Stem Cell Research Developments.</i> U.S.A.: Nova, 2007. Greer, Erik V. <i>Neural Stem Cell Research.</i> U.S.A.: Nova, 2006. Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods.</i> U.S.A.: Academic, 2009</p>	<p>Group discussion</p>
<p>Feb 23 – 24, 2024 (Day Order 1 & 5) 2 hrs</p>	<p>Unit 5 Applications of Tissue Engineering 5.2 Heamatopoietic System - Renal Replacement Devices</p>	<p>Lecture and PowerPoint presentation, Videos</p>	<p>BOOKS FOR STUDY Robert P. Lanaza, Robert Langer and Joseph Vacanti. <i>Principles of Tissue Engineering.</i> U.S.A.: Academic, 4th Edition, Elsevier Publications, 2013.</p> <p>BOOKS FOR REFERENCE Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem. <i>Principles of</i></p>	<p>Group discussion</p>

			<p><i>Regenerative Medicine</i>. 3rd Edition, U.S.A. Elsevier publications, 2018. Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution</i>. U.S.: Author House, 2015 Fong, Calvin A. <i>Stem Cell Research Developments</i>. U.S.A.: Nova, 2007. Greer, Erik V. <i>Neural Stem Cell Research</i>. U.S.A.: Nova, 2006. Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods</i>. U.S.A.: Academic, 2009</p>	
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<p>Feb 26 – Mar 1, 2024 (Day Order 2 to 6) 5 hrs</p>	<p>Unit 5 Applications of Tissue Engineering 5.2 Hematopoietic System - Renal Replacement Devices 5.3 Artificial Womb</p>	<p>Lecture and PowerPoint presentation, Videos</p>	<p>BOOKS FOR STUDY Robert P. Lanaza, Robert Langer and Joseph Vacanti. <i>Principles of Tissue Engineering</i>. U.S.A.: Academic, 4th Edition, Elsevier Publications, 2013.</p> <p>BOOKS FOR REFERENCE Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem. <i>Principles of Regenerative Medicine</i>. 3rd Edition, U.S.A. Elsevier publications, 2018. Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution</i>. U.S.: Author House, 2015 Fong, Calvin A. <i>Stem Cell Research Developments</i>. U.S.A.: Nova, 2007. Greer, Erik V. <i>Neural Stem Cell Research</i>. U.S.A.: Nova, 2006. Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods</i>. U.S.A.: Academic, 2009</p>	<p>Group discussion</p>
<p>Mar 2, 2024 (Day Order 1) 1 hrs</p>	<p>Unit 5 Applications of Tissue Engineering 5.3 Artificial Womb</p>	<p>Lecture and PowerPoint presentation, Videos</p>	<p>BOOKS FOR STUDY Robert P. Lanaza, Robert Langer and Joseph Vacanti. <i>Principles of Tissue Engineering</i>. U.S.A.: Academic, 4th Edition, Elsevier Publications, 2013.</p> <p>BOOKS FOR REFERENCE Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem. <i>Principles of</i></p>	<p>Group discussion</p>

			<p><i>Regenerative Medicine</i>. 3rd Edition, U.S.A. Elsevier publications, 2018. Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution</i>. U.S.: Author House, 2015 Fong, Calvin A. <i>Stem Cell Research Developments</i>. U.S.A.: Nova, 2007. Greer, Erik V. <i>Neural Stem Cell Research</i>. U.S.A.: Nova, 2006. Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods</i>. U.S.A.: Academic, 2009</p>	
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Mar 4 –8, 2024	C.A. Test – II			
Mar 9 – 16, 2024 (Day 6 & Day Order 1 to 6) 7 hrs	Unit 5 Applications of Tissue Engineering 5.4 Breast Reconstruction	Lecture and PowerPoint presentation, Videos	BOOKS FOR STUDY Robert P. Lanaza, Robert Langer and Joseph Vacanti. <i>Principles of Tissue Engineering.</i> U.S.A.: Academic, 4 th Edition, Elsevier Publications, 2013. BOOKS FOR REFERENCE Atala, Anthony, Robert Lanza, Tony Mikon, Robert Nerem. <i>Principles of Regenerative Medicine.</i> 3rd Edition, U.S.A. Elsevier publications, 2018. Eliot Lander MD, Mark Berman MD. <i>The stem cell Revolution.</i> U.S.: Author House, 2015 Fong, Calvin A. <i>Stem Cell Research Developments.</i> U.S.A.: Nova, 2007. Greer, Erik V. <i>Neural Stem Cell Research.</i> U.S.A.: Nova, 2006. Lanza, Robert and Klimankaya, Irina. <i>Essential Stem cell Methods.</i> U.S.A.: Academic, 2009	Group discussion
Mar 18 - 19, 2024 (Day Order 2 to 3) 2 hrs	Unit 1 Introduction to Stem Cells 1.5 Stem Cell Research Techniques - Demonstration	Workshop		Class Participation
April 10 – April 12, 2023 (Day Order 1 to 3) 3 hrs	Unit 1 Introduction to Stem Cells 1.5 Stem Cell Research Techniques - Demonstration	Workshop		Class Participation
Mar 20-22, 2024 (Day Order 4 to 6)	REVISION			

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: November 2023 - April 2024

Department : **Biotechnology**
Name/s of the Faculty : **Dr. J. Anbumalarmathi**
Course Title : **Bio-Nanotechnology**
Course Code : **19BY/PC/BN44**
Shift : **II**

Week & No. of hours	Units & Topics	Teaching Methodology	Text & BOOKS FOR REFERNCES	Method of Evaluation
Nov 22 – 23, 2023 (Day Order 1 & 2) 2hrs.	Unit 1 Introduction to Nanotechnology 1.1 Concept and Definitions of Nano-biotechnology & Historical Background	Lecture: power point presentation	BOOKS FOR STUDY Arunava Goswami and Samrat Roy Choudhury. <i>Nanobiotechnology, Basic and Applied Aspects</i> Anthem Press, Delhi, India, 2017. Pradeep T . <i>A Textbook of Nanoscience and Nanotechnology</i> . New Delhi.: Tata McGraw Hill Education.2012. BOOKS FOR REFERENCE Chad A. Mirkin and Christof M. Niemeyer. <i>Nanobiotechnology II: More Concepts and Applications</i> , Wiley-VCH. 2007.	Group discussion
Nov 24-30, 2023 (Day Order 1 to 6) 5hrs.	Unit 1 1.2 Fundamental Sciences and Broad Areas of Nano-biotechnology	Lecture: power point presentation	BOOKS FOR STUDY Pradeep T. <i>A Textbook of Nanoscience and Nanotechnology</i> . New Delhi.: Tata McGrawHill Education Pvt. Ltd, 2012. BOOKS FOR REFERENCE Chad A. Mirkin and Christof M. Niemeyer. <i>Nanobiotechnology II: More Concepts and Applications</i> , Wiley-VCH. 2007.	Test (short answers)

<p>Dec 1-7, 2023 (Day Order 1 to 6) 5hrs.</p>	<p>Unit 1 1.3 Raw materials of Nanotechnology; Properties of Nanomaterials</p>	<p>Lecture: power point presentation</p>	<p>BOOKS FOR STUDY Arunava Goswami and Samrat Roy Choudhury. <i>Nanobiotechnology, Basic and Applied Aspects</i> Anthem Press, Delhi, India, 2017.</p> <p>Pradeep T . <i>A Textbook of Nanoscience and Nanotechnology</i>. New Delhi.: Tata McGraw Hill Education.2012.</p> <p>BOOKS FOR REFERENCE Chad A. Mirkin and Christof M. Niemeyer. <i>Nanobiotechnology II: More Concepts and Applications</i>, Wiley-VCH. 2007.</p>	<p>Quiz (oral)</p>
<p>Dec 8-9, 2023 (Day Order 1, 3) 1hr.</p>	<p>Unit 2 Classes of Nanomaterials 2.1 Classification Based on Dimensionality - Quantum Dots, Wells and Wires</p>	<p>Lecture: power point presentation</p>	<p>BOOKS FOR STUDY Pradeep T. <i>A Textbook of Nanoscience and Nanotechnology</i>. New Delhi.: Tata McGrawHill Education Pvt. Ltd, 2012.</p> <p>BOOKS FOR REFERENCE Chad A. Mirkin and Christof M. Niemeyer. <i>Nanobiotechnology II: More Concepts and Applications</i>, Wiley-VCH. 2007.</p>	<p>Test (short answers)</p>
<p>Dec 11-15, 2023 (Day Order 2 to 6) 4hrs.</p>	<p>Unit 2 2.2 Carbon Based Nano Materials – Bucky Balls, Nanotubes, Graphene</p>	<p>Lecture: power point presentation</p>	<p>BOOKS FOR STUDY Pradeep T. <i>A Textbook of Nanoscience and Nanotechnology</i>. New Delhi.: Tata McGrawHill Education Pvt. Ltd, 2012.</p> <p>BOOKS FOR REFERENCE Murthy, B.S., Shankar, P., Baldev, R., Rath, B.B., and Murday, J. <i>Textbook of Nanoscience and Nanotechnology</i>. India.: IIM, Universities Press, 2012.</p>	<p>Test (detailed answers)</p>

<p>Dec 16 – 22, 2023 (Day Order 1 to 6) 5hrs.</p>	<p>Unit 2 2.3 Metal Based Nanomaterials - Nanogold, Nano Silver and Metal Oxides 2.4 Nanocomposites, Nanopolymers, Nanoglasses, Nano ceramics, Biological Nanomaterials</p>	<p>Lecture: power point presentation</p>	<p>BOOKS FOR STUDY Pradeep T. <i>A Textbook of Nanoscience and Nanotechnology</i>. New Delhi.: Tata McGrawHill Education Pvt. Ltd, 2012. BOOKS FOR REFERENCE Murthy, B.S., Shankar, P., Baldev, R., Rath, B.B., and Murday, J. <i>Textbook of Nanoscience and Nanotechnology</i>. India.: IIM, Universities Press, 2012.</p>	<p>Group discussion</p>
<p>Jan 3 – 6, 2024 (Day Order 1 to 4) 3hrs.</p>	<p>Unit 2 2.4 Nanoglasses, Nano ceramics, Biological Nanomaterials Unit 3 Fabrication of Nanomaterials 3.1 Nanoparticle Synthesis – Solvent Evaporation, Spontaneous Emulsification, Double Emulsion and Evaporation, Polymerization, Salting Out</p>	<p>Lecture: power point presentation</p>	<p>BOOKS FOR STUDY Arunava Goswami and Samrat Roy Choudhury. <i>Nanobiotechnology, Basic and Applied Aspects</i> Anthem Press, Delhi, India, 2017. Pradeep T . <i>A Textbook of Nanoscience and Nanotechnology</i>. New Delhi.: Tata McGraw Hill Education.2012. BOOKS FOR REFERENCE Chad A. Mirkin and Christof M. Niemeyer. <i>Nanobiotechnology II: More Concepts and Applications</i>, Wiley-VCH. 2007.</p>	<p>Test (detailed answers)</p>
<p>Jan 8 – 12, 2024</p>	<p>C.A. Test – I</p>			
<p>Jan 13, 2024 (Day Order 1) 1hr.</p>	<p>Unit 3 Emulsions- Diffusion, Solvent Displacement, Production of Nanoparticles Using Supercritical Fluid Technology</p>	<p>Lecture: power point presentation</p>	<p>BOOKS FOR STUDY Pradeep T. <i>A Textbook of Nanoscience and Nanotechnology</i>. New Delhi.: Tata McGrawHill Education Pvt. Ltd, 2012. BOOKS FOR REFERENCE Murthy, B.S., Shankar, P., Baldev, R., Rath, B.B., and Murday, J. <i>Textbook of Nanoscience and</i></p>	<p>Group discussion</p>

			<i>Nanotechnology. India.: IIM, Universities Press, 2012.</i>	
Jan 18 -20, 2024 (Day Order 4 to 6) 3hrs,	Unit 3 3.2 Solid State Synthesis, Vapour Phase Synthesis; Solution Processing of Nanoparticles – Sol Gel, Solution Precipitation, Reverse Micelle Method	Lecture: power point presentation	BOOKS FOR STUDY Arunava Goswami and Samrat Roy Choudhury. <i>Nanobiotechnology, Basic and Applied Aspects</i> Anthem Press, Delhi, India, 2017. Pradeep T . <i>A Textbook of Nanoscience and Nanotechnology.</i> New Delhi.: Tata McGraw Hill Education.2012. BOOKS FOR REFERENCE Chad A. Mirkin and Christof M. Niemeyer. <i>Nanobiotechnology II: More Concepts and Applications,</i> Wiley-VCH. 2007.	Quiz
Jan 22-29, 2024 (Day Order 1 to 6) 5hrs.	Unit 3 3.3 Molecular Self Assembly, Biosynthesis – Bacteria, Fungi, Yeast and Plant 3.4. Biogenic and Green Synthesis of Nanoparticles – Demonstration	Lecture: power point presentation	BOOKS FOR STUDY Pradeep T. <i>A Textbook of Nanoscience and Nanotechnology.</i> New Delhi.: Tata McGrawHill Education Pvt. Ltd, 2012. BOOKS FOR REFERENCE Chad A. Mirkin and Christof M. Niemeyer. <i>Nanobiotechnology II: More Concepts and Applications,</i> Wiley-VCH. 2007.	Third component Test- Biosynthesis of nanoparticle (Detailed answer)
Jan 30 – Feb 2, 2024 (Day Order 1 to 4) 3hrs.	Unit 4 Application of Nanotechnology 4.1 Food -Applications	Lecture: power point presentation	BOOKS FOR STUDY Arunava Goswami and Samrat Roy Choudhury. <i>Nanobiotechnology, Basic and Applied Aspects</i> Anthem Press, Delhi, India, 2017. BOOKS FOR REFERENCE Ravishankar Rai. V and Jamuna A. Bai.	Group discussion

			<i>Nanotechnology Applications in the Food Industry.</i> US.: CRC Press. 2018.	
Feb 3, 2024 (Day Order 2) 1hr.	Unit 4 Application of Nanotechnology 4.1 Cosmetics Applications	Lecture: power point presentation	BOOKS FOR STUDY Arunava Goswami and Samrat Roy Choudhury. <i>Nanobiotechnology, Basic and Applied Aspects</i> Anthem Press, Delhi, India, 2017. BOOKS FOR REFERENCE Ravishankar Rai. V and Jamuna A. Bai. <i>Nanotechnology Applications in the Food Industry.</i> US.: CRC Press. 2018.	Group discussion
Feb 5- 6, 2024 (Day Order 5 to 6) 2hrs.	Unit 4 4.2 Textiles, Paints and Catalysis	Lecture: power point presentation	BOOKS FOR STUDY Arunava Goswami and Samrat Roy Choudhury. <i>Nanobiotechnology, Basic and Applied Aspects</i> Anthem Press, Delhi, India, 2017. BOOKS FOR REFERENCE Ravishankar Rai. V and Jamuna A. Bai. <i>Nanotechnology Applications in the Food Industry.</i> US.: CRC Press. 2018.	Group discussion
Feb 7 – 14, 2024 (Day Order 1 to 6) 5hrs.	Unit 4 4.3 Bioremediation	Lecture: power point presentation	BOOKS FOR STUDY Arunava Goswami and Samrat Roy Choudhury. <i>Nanobiotechnology, Basic and Applied Aspects</i> Anthem Press, Delhi, India, 2017. BOOKS FOR REFERENCE Murthy, B.S., Shankar, P., Baldev, R., Rath, B.B., and Murday, J. <i>Textbook of Nanoscience and Nanotechnology.</i> India.: IIM, Universities Press, 2012.	Test (short answers)

<p>Feb 15 – 22, 2024 (Day Order 1 to 6) 5hrs.</p>	<p>Unit 4 4.3 Biochips – Analytical Devices, Biosensors</p>	<p>Lecture: power point presentation</p>	<p>BOOKS FOR STUDY Arunava Goswami and Samrat Roy Choudhury. <i>Nanobiotechnology, Basic and Applied</i> <i>Aspects</i> Anthem Press, Delhi, India, 2017. BOOKS FOR REFERENCE Murthy, B.S., Shankar, P., Baldev, R., Rath, B.B., and Murday, J. <i>Textbook of Nanoscience and Nanotechnology</i>. India.: IIM, Universities Press, 2012.</p>	<p>Test (short answers)</p>
<p>Feb 23 – 24, 2024 (Day Order 1 & 5) 2hrs.</p>	<p>Unit 5 Nanotechnology in Diagnosis and Therapy 5.1 Nanomaterials in Bone Substitutes</p>	<p>Lecture: power point presentation</p>	<p>BOOKS FOR STUDY Arunava Goswami and Samrat Roy Choudhury. <i>Nanobiotechnology, Basic and Applied Aspects</i> Anthem Press, Delhi, India, 2017. BOOKS FOR REFERENCE Tuan Vo- Dinh. <i>Nanotechnology in Biology and Medicine: Methods, Devices and Applications</i>. London: Taylor and Francis, 2007.</p>	<p>Quiz</p>
<p>Feb 26 – Mar 1, 2024 (Day Order 2 to 6) 4hrs.</p>	<p>Unit 5 Nanotechnology in Diagnosis and Therapy 5.1 Nanomaterials in Dentistry 5.2 Nanoparticles for Cancer Therapy</p>	<p>Lecture: power point presentation</p>	<p>BOOKS FOR STUDY Arunava Goswami and Samrat Roy Choudhury. <i>Nanobiotechnology, Basic and Applied Aspects</i> Anthem Press, Delhi, India, 2017. BOOKS FOR REFERENCE Tuan Vo- Dinh. <i>Nanotechnology in Biology and Medicine: Methods, Devices and Applications</i>. London: Taylor and Francis, 2007.</p>	<p>Quiz</p>
<p>Mar 2, 2024 (Day Order</p>	<p>Unit 5 5.3 Nanopharmaceuticals</p>	<p>Lecture: power point</p>	<p>BOOKS FOR STUDY Arunava Goswami and Samrat Roy Choudhury.</p>	<p>Third component Assignment</p>

1) 1hr.		presentation	<p><i>Nanobiotechnology, Basic and Applied</i></p> <p>Aspects Anthem Press, Delhi, India, 2017.</p> <p>BOOKS FOR REFERENCE Tuan Vo-Dinh. <i>Nanotechnology in Biology and Medicine: Methods, Devices and Applications</i>. London: Taylor and Francis, 2007.</p>	on nanopharmaceuticals
Mar 4 –8, 2024	C.A. Test – II			
Mar 9 – 16, 2024 (Day 6 & Day Order 1 to 6) 6hrs.	Unit 5 5.3 Nanopharmaceuticals – Nanosuspensions	Lecture: power point presentation	<p>BOOKS FOR STUDY</p> <p>Arunava Goswami and Samrat Roy Choudhury. <i>Nanobiotechnology, Basic and Applied</i></p> <p>Aspects Anthem Press, Delhi, India, 2017.</p> <p>BOOKS FOR REFERENCE Tuan Vo-Dinh. <i>Nanotechnology in Biology and Medicine: Methods, Devices and Applications</i>. London: Taylor and Francis, 2007.</p>	Quiz
Mar 18 - 19, 2024 (Day Order 2 to 3) 1hr.	Unit 5 5.3 Nano-encapsulation, Nanogels for Drug Therapy	Lecture: power point presentation	<p>BOOKS FOR STUDY</p> <p>Arunava Goswami and Samrat Roy Choudhury. <i>Nanobiotechnology, Basic and Applied</i></p> <p>Aspects Anthem Press, Delhi, India, 2017.</p> <p>BOOKS FOR REFERENCE Tuan Vo-Dinh. <i>Nanotechnology in Biology and Medicine: Methods, Devices and Applications</i>. London: Taylor and Francis, 2007.</p>	Group discussion
Mar 20-22,	REVISION			

2024

(Day Order 4
to 6)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: November 2023 - April 2024

Department : **Biotechnology**
Name/s of the Faculty : **Dr. S. Jayashree**
Course Title : **IPR, BIOSAFETY, BIOETHICS AND ENTREPRENEURSHIP**
Course Code : **19BY/PE/IB15**
Shift : **II**

Week & No. of hours	Units & Topics	Teaching Methodology	Text & References	Method of Evaluation
Nov 22 – 23, 2023 (Day Order 1 & 2) 1hr	Unit 1 Intellectual Property Rights 1.1 Introduction to IPRs	Lecture	Verma and Agarwal. <i>Intellectual property Rights</i> . New Delhi: I. K. International, 1992. Kriti Sharma, Vedant Shukla, <i>Intellectual Property Rights-I</i> , Lexis Nexis, India, 2015. Narayanan P., <i>Intellectual Property Law</i> , Eastern Law House (ELH); India, 2017.	Quiz
Nov 24-30, 2023 (Day Order 1 to 6) 5hrs	Unit 1 Intellectual Property Rights 1.1 Introduction to IPRs - Patents, Trademarks, Copyrights, Industrial Design, Geographical Indications, Traditional Knowledge, Plant Breeders Rights, Patentability of Living Organisms 1.2 IPRs-Implications for India, WTO, WIPO, GATT, TRIPS	Power Point and Lecture	Verma and Agarwal. <i>Intellectual property Rights</i> . New Delhi: I. K. International, 1992. Kriti Sharma, Vedant Shukla, <i>Intellectual Property Rights-I</i> , Lexis Nexis, India, 2015. Narayanan P., <i>Intellectual Property Law</i> , Eastern Law House (ELH); India, 2017.	Group Discussion

<p>Dec 1 – 7, 2023 (Day Order 1 to 6) 5hrs</p>	<p>Unit 1 Intellectual Property Rights 1.3 Types of Patent Applications: Provisional and Complete Specifications, PCT and Conventional Patent Applications</p>	<p>Power Point and Lecture</p>	<p>Verma and Agarwal. <i>Intellectual property Rights</i>. New Delhi: I. K. International, 1992.</p> <p>Kriti Sharma, Vedant Shukla, <i>Intellectual Property Rights-I</i>, Lexis Nexis, India, 2015.</p> <p>Narayanan P., <i>Intellectual Property Law</i>, Eastern Law House (ELH); India, 2017.</p>	<p>Group Discussion</p>
<p>Dec 8 – 9, 2023 (Day Order 1, 3) 1hr</p>	<p>Unit 1 Intellectual Property Rights 1.4 Methods of Application of Patents - Patent Search, Drafting, Procedures Involved in the Applications for Patents, Granting of Patent and Infringement, Compulsory Licenses</p>	<p>Power Point and Lecture</p>	<p>Verma and Agarwal. <i>Intellectual property Rights</i>. New Delhi: I. K. International, 1992.</p> <p>Kriti Sharma, Vedant Shukla, <i>Intellectual Property Rights-I</i>, Lexis Nexis, India, 2015.</p> <p>Narayanan P., <i>Intellectual Property Law</i>, Eastern Law House (ELH); India, 2017.</p>	<p>Assignment III Component</p>
<p>Dec 11– 15, 2023 (Day Order 2 to 6) 5hrs</p>	<p>Unit 2 Biosafety 2.1 Good Lab Practices, Good Manufacturing Practices (GMP), Introduction to Biological Safety Cabinets - Containments-Types, Basic Laboratory and Maximum Containment Laboratory</p>	<p>Power Point, Videos and Lecture</p>	<p>Fleming D O, <i>Biological Safety Principles and Practices 3rd Edition</i>, American Society For Microbiology, 2000.</p> <p>V Sreekrishna, <i>Bioethics and Biosafety in Biotechnology</i>, New Age International (P) Ltd., Publishers, 2017.</p>	<p>Quiz</p>

Dec 16 – 22, 2023 (Day Order 1 to 6) 5hrs	Unit 2 Biosafety 2.2 Biosafety - Biosafety Levels for Infectious Agents and Infected Animals, Guidelines for rDNA Research Activities, Biosafety Guidelines - Government of India	Power Point, Videos and Lecture	Fleming D O, <i>Biological Safety Principles and Practices 3rd Edition</i> , American Society For Microbiology, 2000. V Sreekrishna, <i>Bioethics and Biosafety in Biotechnology</i> , New Age International (P) Ltd., Publishers, 2017.	MCQ
Jan 3 – 6, 2024 (Day Order 1 to 4) 3hrs	Unit 2 Biosafety 2.3 Definition of LMOs, Cartagena Protocol	Power Point and Lecture	Butler Gerard M. and Harris Antony. <i>Bioethics guide to Pharmaceutical Manufacturers</i> . U.K.: Medicines Control Agency, 2002. Robert M. Veatch, <i>The Basics of Bioethics</i> , Routledge, Taylor & Francis India, 2017 V Sreekrishna, <i>Bioethics and Biosafety in Biotechnology</i> , New Age International (P) Ltd., Publishers, 2017.	Group Discussion
Jan 8 – 12, 2024	C.A. TEST - I			
Jan 13, 2024 (Day Order 1)	NO CLASS			

<p>Jan 18 - 20, 2024 (Day Order 4 to 6) 3hrs</p>	<p>Unit 3 Bioethics 3.1 Principles of Research Ethics; Ethical Issues in Clinical Trials</p>	<p>Power Point and Lecture</p>	<p>Butler Gerard M. and Harris Antony. <i>Bioethics guide to Pharmaceutical Manufacturers.</i> U.K.: Medicines Control Agency, 2002.</p> <p>Robert M. Veatch, <i>The Basics of Bioethics,</i> Routledge, Taylor & Francis India, 2017</p> <p>V Sreekrishna, <i>Bioethics and Biosafety in Biotechnology,</i> New Age International (P) Ltd., Publishers, 2017.</p>	<p>Case Studies</p>
<p>Jan 22 - 29, 2024 (Day Order 1 to 6) 5hrs</p>	<p>Unit 3 Bioethics 3.2 Introduction to Ethical Codes and Conduct; Introduction to Animal Ethics; Biopiracy</p>	<p>Power Point and Lecture</p>	<p>Butler Gerard M. and Harris Antony. <i>Bioethics guide to Pharmaceutical Manufacturers.</i> U.K.: Medicines Control Agency, 2002.</p> <p>Robert M. Veatch, <i>The Basics of Bioethics,</i> Routledge, Taylor & Francis India, 2017</p> <p>V Sreekrishna, <i>Bioethics and Biosafety in Biotechnology,</i> New Age International (P) Ltd., Publishers, 2017.</p>	<p>Group Discussion</p>

<p>Jan 30 – Feb 2, 2024 (Day Order 1 to 4) 3hrs</p>	<p>Unit 3 Bioethics 3.3 Ethical Implications - Prenatal Diagnosis, Research, GMOs</p>	<p>Power Point and Lecture</p>	<p>Butler Gerard M. and Harris Antony. <i>Bioethics guide to Pharmaceutical Manufacturers.</i> U.K.: Medicines Control Agency, 2002.</p> <p>Jeffery M. Smith. <i>Seeds of Deception</i> U.S.A :Chelsca Green, 2003.</p> <p>Verma and Agarwal. <i>Intellectual property Rights.</i> New Delhi: I. K. International, 1992.</p>	<p>Test III component</p>
<p>Feb 3, 2024 (Day Order 2) 1hr</p>	<p>Unit 3 Bioethics 3.3 Ethical Implications - Cloning, Gene Therapy</p>	<p>Power Point and Lecture</p>	<p>Butler Gerard M. and Harris Antony. <i>Bioethics guide to Pharmaceutical Manufacturers.</i> U.K.: Medicines Control Agency, 2002.</p> <p>Jeffery M. Smith. <i>Seeds of Deception</i> U.S.A :Chelsca Green, 2003.</p> <p>Verma and Agarwal. <i>Intellectual property Rights.</i> New Delhi: I. K. International, 1992.</p>	<p>Group Discussion</p>
<p>Feb 5- 6, 2024 (Day Order 5 to 6) 2hrs</p>	<p>Unit 3 Bioethics 3.3 Ethical Implications - Human Genome Project</p>	<p>Power Point and Lecture</p>	<p>Butler Gerard M. and Harris Antony. <i>Bioethics guide to Pharmaceutical Manufacturers.</i> U.K.: Medicines Control Agency, 2002.</p> <p>Jeffery M. Smith. <i>Seeds of Deception</i> U.S.A :Chelsca Green, 2003.</p> <p>Verma and Agarwal. <i>Intellectual property Rights.</i> New Delhi: I. K. International, 1992.</p>	<p>Debate</p>

<p>Feb 7 – 14, 2024 (Day Order 1 to 6) 5hrs</p>	<p>Unit 4 Entrepreneurship 4.1 Introduction, Types of Entrepreneurs, Project Identification, Selection and Financing</p>	<p>Power Point and Lecture</p>	<p>Damien Hine and John Kapeleris. <i>Innovations and Entrepreneurship –An international perspectives.</i> U.K.:</p> <p>Thomas Brenner and HolgerPatzelt. <i>Handbook of Bio- Entrepreneurship.</i> U.S.A.: Springer, 2008.</p> <p>Craig Shimasaki. <i>Biotechnology Entrepreneurship.</i> U.S.A.: Elsevier, 2014.</p>	<p>Group Discussion</p>
<p>Feb 15 – 22, 2024 (Day Order 1 to 6) 5hrs</p>	<p>Unit 4 Entrepreneurship 4.2 Project Report - Content and Significance, Planning Commission’s Guidelines for Formulating Project Reports</p>	<p>Power Point and Lecture</p>	<p>Damien Hine and John Kapeleris. <i>Innovations and Entrepreneurship –An international perspectives.</i> U.K.:</p> <p>Thomas Brenner and HolgerPatzelt. <i>Handbook of Bio- Entrepreneurship.</i> U.S.A.: Springer, 2008.</p> <p>Craig Shimasaki. <i>Biotechnology Entrepreneurship.</i> U.S.A.: Elsevier, 2014.</p>	<p>Group Discussion</p>

<p>Feb 23 – 24, 2024 (Day Order 1 & 5) 4hrs</p>	<p>Unit 4 Entrepreneurship 4.2 Methods of Project Appraisals</p>	<p>Power Point and Lecture</p>	<p>Damien Hine and John Kapeleris. <i>Innovations and Entrepreneurship –An international perspectives.</i> U.K.:</p> <p>Thomas Brenner and HolgerPatzelt. <i>Handbook of Bio-Entrepreneurship.</i> U.S.A.: Springer, 2008.</p> <p>Craig Shimasaki. <i>Biotechnology Entrepreneurship.</i> U.S.A.: Elsevier, 2014.</p>	<p>Group Discussion</p>
<p>Feb 26 – Mar 1, 2024 (Day Order 2 to 6) 5hrs</p>	<p>Unit 5 Entrepreneurship Strategies 5.1 Start-up of Biotechnology Company, New Product Development, Market Research, Sales</p>	<p>Power Point and Lecture</p>	<p>Damien Hine and John Kapeleris. <i>Innovations and Entrepreneurship –An international perspectives.</i> U.K.:</p> <p>Thomas Brenner and HolgerPatzelt. <i>Handbook of Bio-Entrepreneurship.</i> U.S.A.: Springer, 2008.</p> <p>Craig Shimasaki. <i>Biotechnology Entrepreneurship.</i> U.S.A.: Elsevier, 2014.</p>	<p>Group Play</p>
<p>Mar 2, 2024 (Day Order 1)</p>	<p>NO CLASS</p>			
<p>Mar 4 –8, 2024</p>	<p>C.A. TEST - II</p>			

Mar 9 – 16, 2024 (Day 6 & Day Order 1 to 6) 6hrs	Unit 5 Entrepreneurship Strategies 5.2 Funding of Biotech Business, MSME, DBT, BIRAC , Make in India; Technology Incubator	Power Point and Lecture	Nandan H , <i>Fundamentals of Entrepreneurship</i> , Prentice Hall India Learning Private Limited, Delhi, India, 2013. Craig Shimasaki. <i>Biotechnology Entrepreneurship</i> . U.S.A.: Elsevier, 2014.	Group Discussion
Mar 18 - 19, 2024 (Day Order 2 to 3) 2hrs	Unit 5 Entrepreneurship Strategies 5.3 Biotechnology Industries in India	Power Point and Lecture	Nandan H , <i>Fundamentals of Entrepreneurship</i> , Prentice Hall India Learning Private Limited, Delhi, India, 2013. Craig Shimasaki. <i>Biotechnology Entrepreneurship</i> . U.S.A.: Elsevier, 2014.	Group Discussion
Mar 20-22, 2024 (Day Order 4 to 6)	REVISION			

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: November 2023 - April 2024

Department : **Biotechnology**

Name of the Faculty : **Dr.K.Veena Gayathri**

Course Title : **Pharmaceutical Biotechnology**

Course Code : **19BY/PE/PB15**

Shift : **II**

Week & No. of hours	Units & Topics	Teaching Methodology	Text & References	Method of Evaluation
Nov 22 – 23, 2023 (Day Order 1 & 2) 1h	General Pharmacology 1.1. Introduction of Pharmacology	Lecture: PowerPoint presentation	BOOKS FOR STUDY Ashish Dixit Pawan	Questionnaire

			<p>Tiwari Vivekanand Kishan Chatap, Textbook of Pharmaceutical Biotechnology, Studium Press (India) Pvt. Ltd, 2015</p> <p>BOOKS FOR REFERENCE</p> <p>Crommelin, Daan J. A., Sindelar, Robert, Meibohm, Bernd. <i>Pharmaceutical Biotechnology.</i> U.S.A.: Springer, 2018</p>	
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<p>Nov 24-30, 2023 (Day Order 1 to 6) 5h</p>	<p>1.2. Sources of Drugs, Route of Administration</p>	<p>Lecture: power point presentation</p>	<p>BOOKS FOR STUDY Ashish Dixit Pawan Tiwari Vivekanand Kishan Chatap, Textbook of Pharmaceutical Biotechnology, Studium Press (India) Pvt. Ltd, 2015 BOOKS FOR REFERENCE Crommelin, Daan J. A., Sindelar, Robert, Meibohm, Bernd. <i>Pharmaceutical Biotechnology.</i> U.S.A.: Springer, 2018</p>	<p>Test</p>
<p>Dec 1-7, 2023 (Day Order 1 to 6) 5h</p>	<p>1.3. Pharmacokinetics - Absorption, Distribution, Metabolism, Excretion and Toxicology</p>	<p>Lecture: power point presentation</p>	<p>BOOKS FOR STUDY Ashish Dixit Pawan Tiwari Vivekanand Kishan Chatap, Textbook of Pharmaceutical Biotechnology, Studium Press (India) Pvt. Ltd, 2015 BOOKS FOR REFERENCE Crommelin, Daan J. A., Sindelar, Robert, Meibohm, Bernd.</p>	<p>Quiz</p>

			<i>Pharmaceutical Biotechnology.</i> U.S.A.: Springer, 2018	
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<p>Dec 8-9, 2023 (Day Order 1, 3) 1h</p>	<p>1.4. Pharmacodynamics – Drug action, Efficacy vs Potency, Therapeutic Window and Dosage Calculation</p>	<p>Lecture: power point presentation</p>	<p>BOOKS FOR STUDY Ashish Dixit Pawan Tiwari Vivekanand Kishan Chatap, Textbook of Pharmaceutical Biotechnology, Studium Press (India) Pvt. Ltd, 2015 BOOKS FOR REFERENCE Crommelin, Daan J. A., Sindelar, Robert, Meibohm, Bernd. <i>Pharmaceutical Biotechnology.</i> U.S.A.: Springer, 2018</p>	
<p>Dec 11-15, 2023 (Day Order 2 to 6) 5h</p>	<p>Unit 2 Drug Discovery and Delivery 2.1. Drug Discovery Process - Purpose, Main Steps Involved, Timelines, Advantages</p>	<p>Lecture: power point presentation</p>	<p>BOOKS FOR STUDY Ashish Dixit Pawan Tiwari Vivekanand Kishan Chatap, Textbook of Pharmaceutical Biotechnology, Studium Press (India) Pvt. Ltd, 2015 BOOKS FOR REFERENCE Crommelin, Daan J. A., Sindelar, Robert, Meibohm, Bernd.</p>	<p>Questionnaire</p>

			<i>Pharmaceutical Biotechnology.</i> U.S.A.: Springer, 2018	
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<p>Dec 16 – 22, 2023 (Day Order 1 to 6) 5h</p>	<p>Unit 2 Drug Discovery and Delivery 2.2. Various Dosage forms - Advantages and Disadvantages 2.3. Drug Delivery - Controlled and Sustained Drug Delivery Mechanism, Role of Biopolymers</p>	<p>Lecture: power point presentation</p>	<p>BOOKS FOR STUDY Ashish Dixit Pawan Tiwari Vivekanand Kishan Chatap, Textbook of Pharmaceutical Biotechnology, Studium Press (India) Pvt. Ltd, 2015 BOOKS FOR REFERENCE Crommelin, Daan J. A., Sindelar, Robert, Meibohm, Bernd. <i>Pharmaceutical Biotechnology</i>. U.S.A.: Springer, 2018</p>	<p>Test</p>
<p>Jan 3 – 6, 2024 (Day Order 1 to 4) 3h</p>	<p>Unit 2 Drug Discovery and Delivery 2.4. Futuristic Perspective on Bio-watches for Serological Analysis, Titration of Dose and Release of the Medication</p>	<p>Lecture: power point presentation</p>	<p>BOOKS FOR STUDY Ashish Dixit Pawan Tiwari Vivekanand Kishan Chatap, Textbook of Pharmaceutical Biotechnology, Studium Press (India) Pvt. Ltd, 2015 BOOKS FOR REFERENCE Crommelin, Daan J. A., Sindelar, Robert, Meibohm, Bernd.</p>	<p>Quiz</p>

			<i>Pharmaceutical Biotechnology.</i> U.S.A.: Springer, 2018	
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Jan 8 – 12, 2024	C.A. Test – I			
Jan 13, 2024 (Day Order 1)	No Class	No Class	No Class	No Class
Jan 18 -20, 2024 (Day Order 4 to 6) 3h	Unit 3 Formulation 3.1. Capsules – Requirements, Method of Capsule Filling, Importance of Base Absorption 3.2. Micro-encapsulation - Types of microcapsules, Importance of Microencapsulation in Pharmacy	Lecture: power point presentation	BOOKS FOR STUDY Ashish Dixit Pawan Tiwari Vivekanand Kishan Chatap, Textbook of Pharmaceutical Biotechnology, Studium Press (India) Pvt. Ltd, 2015 BOOKS FOR REFERENCE Crommelin, Daan J. A., Sindelar, Robert, Meibohm, Bernd. <i>Pharmaceutical Biotechnology</i> . U.S.A.: Springer, 2018	Quiz
Jan 22-29, 2024 (Day Order 1 to 6) 5h	Unit 3 Formulation 3.3. Tablets – Types, Granulation, Technology on large-scale, Coating on Tablets	Lecture: power point presentation	BOOKS FOR STUDY Ashish Dixit Pawan Tiwari Vivekanand Kishan Chatap, Textbook of Pharmaceutical Biotechnology, Studium Press (India) Pvt. Ltd, 2015	Test

			BOOKS FOR REFERENCE Crommelin, Daan J. A., Sindelar, Robert, Meibohm, Bernd. <i>Pharmaceutical Biotechnology</i> . U.S.A.: Springer, 2018	
Jan 30 – Feb 2, 2024 (Day Order 1 to 4) 2h	Unit 3 Formulation 3.4. Parenteral Products, Oral Liquids, Injections, Transdermal	Lecture: power point presentation	BOOKS FOR STUDY Ashish Dixit Pawan Tiwari Vivekanand Kishan Chatap, Textbook of Pharmaceutical Biotechnology, Studium Press (India) Pvt. Ltd, 2015 BOOKS FOR REFERENCE Crommelin, Daan J. A., Sindelar, Robert, Meibohm, Bernd. <i>Pharmaceutical Biotechnology</i> . U.S.A.: Springer, 2018	Seminar III component
Feb 3, 2024 (Day Order 2) 1h	Unit 4 Therapeutics 4.1. Antibiotics - Structure, Mechanism of Action 4.2 Production of Antibiotics –	Lecture: power point presentation	BOOKS FOR STUDY Ashish Dixit Pawan Tiwari Vivekanand Kishan Chatap, Textbook of Pharmaceutical Biotechnology,	Third Component Seminar

	Penicillin and Cephalosporins (Beta Lactam Antibiotics), Streptomycin, Amphotericin B and Mitomycin C		Studium Press (India) Pvt. Ltd, 2015 BOOKS FOR REFERENCE Crommelin, Daan J. A., Sindelar, Robert, Meibohm, Bernd. <i>Pharmaceutical Biotechnology.</i> U.S.A.: Springer, 2018	
Feb 5- 6, 2024 (Day Order 5 to 6) 2h	Unit 4 Therapeutics 4.3. Biotechnology Derived Therapeutic Product Production - Interferon, Interleukins (Regulatory Proteins), Erythropoietin (Blood Product),	Lecture: power point presentation	BOOKS FOR STUDY Ashish Dixit Pawan Tiwari Vivekanand Kishan Chatap, Textbook of Pharmaceutical Biotechnology, Studium Press (India) Pvt. Ltd, 2015 BOOKS FOR REFERENCE Crommelin, Daan J. A., Sindelar, Robert, Meibohm, Bernd. <i>Pharmaceutical Biotechnology.</i> U.S.A.: Springer, 2018	Third Component Seminar
Feb 7 – 14, 2024 (Day Order 1 to 6) 5h	Unit 4 Therapeutics 4.3 Insulin Hormone, Somatotropin,	Lecture: power point presentation	BOOKS FOR STUDY Ashish Dixit Pawan Tiwari Vivekanand Kishan Chatap,	Third Component Seminar

			<p>Textbook of Pharmaceutical Biotechnology, Studium Press (India) Pvt. Ltd, 2015</p> <p>BOOKS FOR REFERENCE</p> <p>Crommelin, Daan J. A., Sindelar, Robert, Meibohm, Bernd. <i>Pharmaceutical Biotechnology.</i> U.S.A.: Springer, 2018</p>	
<p>Feb 15 – 22, 2024 (Day Order 1 to 6) 5h</p>	<p>Unit 4 Therapeutics</p> <p>4.3 Human Growth Hormone, Somatostatin, Vaccines, Monoclonal Antibody Based Pharmaceutical</p>	<p>Lecture: PowerPoint presentation</p>	<p>BOOKS FOR STUDY</p> <p>Ashish Dixit Pawan Tiwari Vivekanand Kishan Chatap, Textbook of Pharmaceutical Biotechnology, Studium Press (India) Pvt. Ltd, 2015</p> <p>BOOKS FOR REFERENCE</p> <p>Crommelin, Daan J. A., Sindelar, Robert, Meibohm, Bernd. <i>Pharmaceutical Biotechnology.</i> U.S.A.: Springer, 2018</p>	<p>Third Component Seminar</p>
<p>Feb 23 – 24, 2024 (Day Order 1 & 5)</p>	<p>Unit 4 Therapeutics</p>	<p>Lecture: power point presentation</p>	<p>BOOKS FOR STUDY</p>	<p>Third Component</p>

1 h	<p>4.4.Recombinant Products - Anticoagulants, Hirudin, Antithrombin, Thrombolytic agents, Tissue plasminogen activator, Streptokinase, Human Deoxyribonuclease, Enzymes - α-Galactosidase, Superoxide dismutase, Debriding agents, Digestive aids</p>		<p>Ashish Dixit Pawan Tiwari Vivekanand Kishan Chatap, Textbook of Pharmaceutical Biotechnology, Studium Press (India) Pvt. Ltd, 2015</p> <p>BOOKS FOR REFERENCE</p> <p>Crommelin, Daan J. A., Sindelar, Robert, Meibohm, Bernd. <i>Pharmaceutical Biotechnology</i>. U.S.A.: Springer, 2018</p>	Seminar
<p>Feb 26 – Mar 1, 2024 (Day Order 2 to 6) 5h</p>	<p>Unit 5 Clinical Research and Toxicology</p> <p>5.1. Terminologies and Definitions Used in Clinical Research</p>	Lecture: power point presentation	<p>BOOKS FOR STUDY</p> <p>Ashish Dixit Pawan Tiwari Vivekanand Kishan Chatap, Textbook of Pharmaceutical Biotechnology, Studium Press (India) Pvt. Ltd, 2015</p> <p>BOOKS FOR REFERENCE</p> <p>Crommelin, Daan J. A., Sindelar, Robert, Meibohm, Bernd. <i>Pharmaceutical</i></p>	Test

			<i>Biotechnology.</i> U.S.A.: Springer, 2018	
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Mar 2, 2024 (Day Order 1)	No Class	No Class	No Class	No Class
Mar 4 –8, 2024	C.A. Test – II			
Mar 9 – 16, 2024 (Day 6 & Day Order 1 to 6) 1,5h	Unit 5 Clinical Research and Toxicology 5.2. Clinical Trials in India –The National Perspective 5.3. Pharmaceutical Industry – Global and Indian Perspective	Lecture: power point presentation	BOOKS FOR STUDY Ashish Dixit Pawan Tiwari Vivekanand Kishan Chatap, Textbook of Pharmaceutical Biotechnology, Studium Press (India) Pvt. Ltd, 2015 BOOKS FOR REFERENCE Crommelin, Daan J. A., Sindelar, Robert, Meibohm, Bernd. <i>Pharmaceutical Biotechnology</i> . U.S.A.: Springer, 2018	Group Discussion
Mar 18 - 19, 2024 (Day Order 2 to 3) 2h	5.4. Toxicology - General Principles, Systemic Toxicology (Single Dose and Repeat Dose Toxicity Studies), Carcinogenicity, Mutagenicity, Teratogenicity, Reproductive	Lecture: power point presentation	BOOKS FOR STUDY Ashish Dixit Pawan Tiwari Vivekanand Kishan Chatap, Textbook of Pharmaceutical Biotechnology, Studium Press (India) Pvt. Ltd, 2015	Test

	Toxicity		BOOKS FOR REFERENCE Crommelin, Daan J. A., Sindelar, Robert, Meibohm, Bernd. <i>Pharmaceutical Biotechnology.</i> U.S.A.: Springer, 2018	
Mar 20-22, 2024 (Day Order 4 to 6)	REVISION			