Postgraduate Certificate in Biofabrication Fabrication

Biofabrication Ethics and Regulations

3D Bioprinting: A type of biofabrication that uses 3D printing technology to create complex living structures by depositing cells, growth factors, and biomaterials layer-by-layer. Related terms include: additive manufacturing, bioink, scaffold, and tissue engineering.

Additive Manufacturing: A process of creating three-dimensional objects by adding material layer-by-layer, based on a digital model. It is also known as 3D printing. Related terms include: fused deposition modeling (FDM), selective laser sintering (SLS), and stereolithography (SLA).

Bioactive Materials: Materials that have the ability to interact with biological systems, promoting specific cellular responses, such as adhesion, proliferation, and differentiation. Related terms include: biomaterial, scaffold, and extracellular matrix (ECM).

Biofabrication: The process of creating complex living structures in a controlled manner using cells, biomaterials, and engineering principles. Related terms include: 3D bioprinting, tissue engineering, and regenerative medicine.

Bioink: A mixture of cells, biomaterials, and growth factors used in 3D bioprinting to create living structures. Related terms include: biofabrication, bioprinting, and scaffold.

Biomanufacturing: The production of biological products using biotechnological methods, such as cell culture, gene editing, and fermentation. Related terms include: bioprocessing, bioproduction, and biopharmaceuticals.

Biomedical Engineering: An interdisciplinary field that combines engineering principles with medical and biological sciences to develop solutions for healthcare challenges. Related terms include: bioengineering, tissue engineering, and regenerative medicine.

Bioprinting: The use of 3D printing technology to create living structures by depositing cells, biomaterials, and growth factors in a precise and controlled manner. Related terms include: biofabrication, 3D bioprinting, and scaffold.

Biomaterial: A material that is used in a biological environment and can interact with living tissues. Related terms include: bioactive materials, scaffold, and extracellular matrix (ECM).

Cell Culture: The process of growing cells in a controlled environment outside of a living organism. Related terms include: cell seeding, tissue engineering, and bioreactor.

Cell Seeding: The process of introducing cells into a scaffold or 3D structure to create a living tissue. Related terms include: cell culture, tissue engineering, and bioprinting.

Extracellular Matrix (ECM): The non-cellular component of tissues that provides structural support and

biochemical signals to cells. Related terms include: biomaterial, scaffold, and bioactive materials.

Fused Deposition Modeling (FDM): A type of additive manufacturing that uses melted thermoplastic materials to create 3D objects layer-by-layer. Related terms include: 3D printing, additive manufacturing, and stereolithography (SLA).

Gene Editing: The process of making precise changes to the DNA of an organism using molecular tools, such as CRISPR-Cas9. Related terms include: genome engineering, genetic modification, and biotechnology.

Growth Factors: Signaling molecules that regulate cell behavior, such as proliferation, differentiation, and migration. Related terms include: bioink, scaffold, and tissue engineering.

Intellectual Property (IP): The legal rights that protect creations of the mind, such as inventions, literary and artistic works, and symbols, names, and images used in commerce. Related terms include: patents, trademarks, and copyrights.

Patent: A legal right that gives the inventor exclusive rights to make, use, and sell an invention for a certain period of time. Related terms include: intellectual property (IP), trademark, and copyright.

Regenerative Medicine: The branch of medicine that focuses on the repair or replacement of damaged or diseased cells, tissues, and organs using engineering principles and biological materials. Related terms include: tissue engineering, biofabrication, and 3D bioprinting.

Selective Laser Sintering (SLS): A type of additive manufacturing that uses a laser to fuse together particles of a powdered material, creating a 3D object layer-by-layer. Related terms include: 3D printing, additive manufacturing, and fused deposition modeling (FDM).

Scaffold: A 3D structure that provides support and guidance for the growth and organization of cells. Related terms include: biomaterial, extracellular matrix (ECM), and tissue engineering.

Stereolithography (SLA): A type of additive manufacturing that uses a laser to cure a liquid photopolymer resin, creating a 3D object layer-by-layer. Related terms include: 3D printing, additive manufacturing, and fused deposition modeling (FDM).

Tissue Engineering: The application of engineering principles and biological materials to develop functional substitutes for damaged or diseased tissues and organs. Related terms include: regenerative medicine, biofabrication, and 3D bioprinting.

Trademark: A recognizable sign, design, or expression that identifies products or services of a particular source and distinguishes them from those of others. Related terms include: intellectual property (IP), patent, and copyright.

Biosecurity: The practices and measures taken to protect biological materials and information from unauthorized access, theft, misuse, or release. Related terms include: biosafety, dual use research, and select agents.

Biosafety: The practices and measures taken to protect individuals, communities, and the environment from the potential risks associated with biological materials and processes. Related terms include: biosecurity, laboratory safety, and risk assessment.

Clinical Translation: The process of translating basic scientific discoveries into clinical applications, such as drugs, medical devices, or therapies. Related terms include: translational research, bench-to-bedside, and clinical trials.

Dual Use Research: Research that has the potential to be used for both beneficial and harmful purposes, such as bioterrorism or biowarfare. Related terms include: biosecurity, biosafety, and select agents.

Good Laboratory Practice (GLP): A set of principles and guidelines that ensure the quality and integrity of non-clinical laboratory studies, such as safety testing or research and development. Related terms include: quality control, validation, and compliance.

Good Manufacturing Practice (GMP): A set of principles and guidelines that ensure the quality and consistency of products, such as pharmaceuticals, medical devices, or food. Related terms include: quality control, validation, and compliance.

Regulatory Affairs: The management and navigation of regulatory processes and requirements for products, such as drugs, medical devices, or food. Related terms include: compliance, quality control, and validation.

Risk Assessment: The process of evaluating the potential risks associated with a biological material, process, or product, and determining the appropriate measures to mitigate or manage those risks. Related terms include: biosafety, biosecurity, and dual use research.

Select Agents: Biological agents and toxins that have the potential to pose a severe threat to public health and safety, and are therefore subject to strict regulations and controls. Related terms include: biosecurity, biosafety, and dual use research.

Stem Cells: Undifferentiated cells that have the ability to self-renew and differentiate into various cell types, making them useful for research and therapeutic applications. Related terms include: pluripotent, multipotent, and differentiation.

Translational Research: The process of translating basic scientific discoveries into clinical applications, such as drugs, medical devices, or therapies. Related terms include: clinical translation, bench-to-bedside, and clinical trials.

Validation: The process of demonstrating that a product, process