

Industry Advisory Board Meeting

Advanced Materials - Nanotechnology Certificate

Pasadena City College

Meeting Minutes

Division: Science

Department: Chemistry

Date: May 21, 2021

Time: 10:00 am

Advisors in Attendance:

- Ari Esters - Cardea Bio (Bio-electronics).
- Juan Flores Preciado - Space X (Aerospace).
- Jared Ashcroft – Pasadena City College (Education).
- Lynn Foster - Z-Field Technologies (Biotechnology); BPT Pharmaceuticals (BioPharmaceutical).
- Marco Curreli – Omni Nano (Nanotechnology Project Consultant and Education Technology Expert).
- Samad Ahadian - Terasaki Institute (Healthcare).
- Sapphire Lopez - Northrop Grumman Corporation (Aerospace and Defense).
- Fabian Villalobos - RAND Corporation (Technology Policies).

Prior to the meeting, every Board Member was provided with a copy of the Course Outline of Records (CORs) for CHEM 240, CHEM 241, and CHEM 242.

Agenda:

The meeting started promptly at 10:00 am on the Zoom platform, and it was moderated by Dr. Marco Curreli. The meeting agenda included:

- Welcome and overview.
- Round table introductions.
- Summary of the program, goals, motivation, courses taught, and skills to be learned in our program.
- Discussion about the technical knowledge, technical skills, and “soft skills” needed by the local “advanced materials” industry.
- Board’s feedback and recommendation on our certificate program.
- Conclusion.

Board's Recommendations:

Our certificate program should provide the following knowledge and skills:

Materials and Devices:

- Ability to process raw nanomaterials so they can incorporate into an intermediate or final product. Raw nanomaterials (graphene, nanoparticles, etc.) are often processed in a dispersion. Technicians should have the technical skills and knowledge to make these dispersions with an understanding of their long-term stability, fluid properties, and optical properties. These knowledge and skills are taught in CHEM 240.
- Principles of lithographic processes, handling wafers, manufacturing techniques, and device structure. These knowledge and skills are taught in CHEM 241.
- Principles of sensor structure and devices. These knowledge and skills are taught in CHEM 241.
- Prepare interfaces for the integration of biological material on inorganic surfaces, such as scaffolds, electronic devices, dispersed materials. These knowledge and skills are taught in CHEM 240.
- Knowledge of mechanical properties at the nanoscale and metal microstructure. These knowledge and skills are taught in CHEM 240.
- Working principles of energy storing devices, such as batteries and super-capacitors, material requirements, and cell structure. These knowledge and skills are taught in CHEM 241.

Instrumentation and Characterization:

- Working principles of techniques and instrumentations to characterize dispersions of nanomaterials, such as UV/Vis and particle size analyzers. Ability to process raw data into, present results, and interpret those results. These knowledge and skills are taught in CHEM 240 and CHEM 241.
- Sample preparation and testing of composite samples and metal samples via Scanning Electron Microscopy (SEM). Knowledge of SEM working principles and other imaging/characterization techniques. These knowledge and skills are taught in CHEM 240.
- Knowledge and testing of functional devices for energy storage. These knowledge and skills are taught in CHEM 241.
- Quality control on a variety of samples and functional devices. These knowledge and skills are taught in CHEM 240, CHEM 241, and CHEM 242.

Note: No additional instruments or equipment is required by Pasadena City College.

Good Lab Practice:

- General knowledge of “Environmental, Health, & Safety (EHS) related to nanomaterials and nanomanufacturing processes.
These knowledge and skills are taught in CHEM 242.
- Creation of proper documentation.
These knowledge and skills are taught in CHEM 242.

Soft skills:

- Ability to clearly communicate technical details, discuss results, and write technical reports following a specific format.
These knowledge and skills are taught throughout CHEM 240, CHEM 241, and CHEM 242.

Recommendations

- The Board unanimously felt this certificate program would provide graduate students with the technical knowledge and skills that are in demand by “emerging technology” companies in SoCal.
- The Board unanimously felt this certificate program is aligned with the needs of the local “advanced materials & nanotech” industry.

Conclusion

The meeting was adjourned at 11:00 am.