Proposal Code : PDF – PST -0001	
Title	Comparative study of plasma characteristics and Titanium Nitride (TIN) Thin film using DC and HIPIMS sputtering.
Abstract	In order to improve the performance of the hard coatings like Titanium Nitride (TiN) for tri-biological applications it is necessary to incorporate novel ion assisted deposition technology into the conventional magnetron sputtering coating. The better control over the energy of the species responsible for film formation is required during deposition process. In High Power Impulse Magnetron Sputtering (HIPIMS), some of the metal atoms sputtered from the target are themselves ionized. The ionised metal atoms help in improving quality of thin film. The main advantage of HIPIMS coatings are that they produce much denser, harder and smoother coatings compared to conventional thin film deposition techniques. These benefits arises due to the higher plasma density and ionization achieved with HiPIMS, leading to a more compact and defect-free coating structure. This PDF proposal is aimed to compare the TiN thin film properties deposited by DC and HiPIMS. The plasma properties during deposition by DC and HiPIMS will also be measured. The TiN film will be deposited at different power levels/ thickness using DC and HiPIMS. The film properties like hardness, corrosion resistance, residual stress in the film, surface roughness will be measured and compared. The ion to neutral ratio of titanium coming to the substrate during deposition in both DC and HiPIMS will be measured and compared.
Research Focus Areas	Previously, the TiN thin film on Stainless steel for HIP implant applications have been deposited using DC magnetron sputtering. However, the films deposited using HIPIMS have higher hardness and corrosion resistance. Hence this work is significant in terms of plasma based coating for biomedical applications.
Qualifications	Ph.D Physics / Chemistry
Desired Experience	Experience in Material Science is desirable
Other remarks	-