



# SRINIVAS UNIVERSITY

College of Engineering and Technology,  
Mukka, Mangalore-574146,  
Karnataka (India)

## RESEARCH CENTRE IN SURFACE ENGINEERING & COATINGS

### Dr. SUDHEENDRA P HEBBAR

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**AREAS OF SPECIALIZATION:** Materials Science – Experimental Techniques for characterization of materials – Surface Engineering – Thin film technology – Physical Vapour Deposition and Sputtering, Intermetallics – Titanium Aluminides, Mechanical Properties of Materials. Nanotechnology – Anodization of aluminum and titanium – growth of nano particles by LASER ablation and other chemical methods. X – RAY and Rietveld Analysis and Refinement, SEM Image Analysis, AFM Analysis for materials.

**RESEARCH EXPERIENCE:** Currently GUIDING 01 student for PhD in the area of Electrodeposition of Nickel – Cobalt System. Development of cost effective Agricultural Implements for mechanization of Agriculture.

### ABOUT THE CENTER:

The research station targets about the preparation of thin film coatings on various material systems. The purpose of the coating is to enhance the critical properties of the base materials. The coatings can be developed by PVD / Sputtering / Electrodeposition / Anodization routes. These methods can be well used to impart good knowledge for students about the surface properties and their enhancement. The developed coatings can be characterized by some of the well known methods:

- X – Ray Diffraction for the phase analysis followed by Rietveld analysis.
- S E M for the microstructural analysis.
- A F M for Atomistic investigation of the developed layers.
- Various heat treatment process and the effect of same on the coatings.
- Growth of selective nanoparticles by this method.

The centre targets about the utilization of the available facilities in our institute. This makes the equipment to be in working condition for longer time with proper maintenance. In this direction steps were initiated to use them on the charge basis service for surrounding technical institutes and a good response is shown by the students.

Apart from this centre is having interest in development of agricultural implements at low cost for the mechanization of Agriculture. In this direction an MoU was signed with ZARHS – Brahmavara and a project was worked out for the Multiple seed Drill – as an attachment for the tillers. A project titled “Power operated Paddy Thresher” is designed and fabricated for the Easy Life Enterprises an agriculture solution company.



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### PUBLICATION DETAILS:

1. Sudheendra P., A. O. Surendranathan, N. K. Udayashankar, and K. S. Choudhari, "Intermetallic titanium – aluminium thin films preparation by oblique angle unbalanced magnetron sputtering." Proceedings of 3rd Asian Symposium on Materials and Processing 2012 (ASMP-2012).
2. Sudheendra P., A. O. Surendranathan, N. K. Udayashankar, and K. S. Choudhari, "Titanium – Aluminium intermetallic thinfilms preparation by DC sputtering and their characterization." Proceedings of International Conference on Advanced Materials – 2011 (ICAM – 2011 Macmillan Publishers India Ltd.)
3. Choudhari KS, Jidesh P, Sudheendra P., and Kulkarni S D, "Quantification and Morphology studies of alumina membranes: A new algorithm for digital image processing." Epub: Vol. 19, Number 4, 24 May 2013.
4. K. S. Choudhari, Sudheendra P., and N. K. Udayashankar, "Fabrication and High-Temperature Structural Characterization Study of Porous Anodic Alumina Membranes." Journal of Porous Materials, Vol.19, Issue 6, December 2012.
5. Sudheendra P., A. O. Surendranathan, and N. K. Udayashankar, "Titanium – Aluminium Thin Films Preparation by Oblique Angle Sputtering and Their Characterization." International Journal of Engineering Research & Technology, Vol. 1 Issue 8, 1 – 5 October, 2012.
6. Sudheendra P., A. O. Surendranathan, N. K. Udayashankar and K. S. Choudhari, "Titanium – Aluminium Intermetallic Thinfilms Preparation by Dc Sputtering & Their Characterization." International Journal of Mechanical Engineering, Vol. 2 Issue 3, 12 – 17. March, 2012.
7. Anil Kumar H.C, N.K. Udayashankar, Sudheendra P., and H.S. Hebbar, "Microstructural and Tribological Characterization of TiN Coated Aluminum Alloy (Al6061)." International Journal of Mechanical Engineering, Vol. 1 Issue 1, 73 – 78. March, 2011.
8. Canute Sherwin, Suma Bhat and Sudheendra P Hebbar, "Brief Review on Electrodeposited Ni/Cr Coatings and Their Behaviour." International Journal for Engineering Technology, ISSN: 2231-5381, 2016, Pg: 288-291.
9. Sudheendra P., A. O. Surendranathan and N. K. Udayashankar, " Deposition of Ti-Al Intermetallic Composite by Reactive Thermal Evaporation" Procedia Materials Science 5, 2014, Pg. 962 – 968.

### Members:

1. Dr. Suma Bhat
2. Dr. Suresh D Kulakarni (AMP – MIT Manipal)
3. Prof. K. S. Choudhari (AMP – MIT Manipal)