

# Curriculum Vitae



## Dr. Chander Prakash

### PERSONAL INFORMATION

Martial Status	Married
Date of Birth	4 <sup>th</sup> June, 1985
Permanent Address	354, Sector-7A, Chandigarh, 160019
Phone	+91-9878805672
E-mail	<a href="mailto:chander.mechengg@gmail.com">chander.mechengg@gmail.com</a> ; <a href="mailto:chander.mechengg@pu.ac.in">chander.mechengg@pu.ac.in</a> <a href="http://www.uiet.puchd.ac.in/FacultyInfo/cvs%20of%20Mechanical/Chander%20Prakash.pdf">http://www.uiet.puchd.ac.in/FacultyInfo/cvs%20of%20Mechanical/Chander%20Prakash.pdf</a>

### RESEARCH INTERESTS

- Surface modification and Experimental study of Bio-materials, materials, Ceramics and Alloy.
- Fabrication of Porous Implant for Medical applications
- Advanced Machining/Manufacturing Processes
- Modeling and Optimizing of Machining/Manufacturing Processes Using Artificial Intelligence Algorithms, Artificial Neural Network (ANN), Fuzzy Logic (FL), Neuro-Fuzzy Intelligence, Response Surface Methodology, Taguchi technique, Swarm Particle Optimization.
- Finite Element Modeling & Analysis of bone ingrowth, stress distribution and Thermal.

### AWARDS AND ACHIVEMENTS

2010 Silver Medal for achieving 2<sup>nd</sup> position in M. Tech. in Kurukshetra University of

Kuрукshetra.

2016 International Travel Support to attend International Conference on Innovative Design and Manufacturing (ICIDM), 2016 by Science and Engineering Research Board, DST Govt. of India

---

## EDUCATION

2012 - 2016 Ph.D in Mechanical Engineering, UIET, Panjab University, Chandigarh.  
Ph.D thesis title:-  
“Surface Modification of  $\beta$ -Phase Titanium Alloy by Powder Mixed EDM and Determination of Optimal Surface Texture for Medical Implants”

2008-2010 M.Tech in Mechanical Engineering, Kurukshetra University of Kurukshetra, Mechanical Engineering, Overall CGPA 7.9/10.  
Silver Medalist (2<sup>nd</sup> Rank at Institute Level)  
M. Tech thesis title:-  
“Optimization of Part Scheduling for Cellular Manufacturing System using Tabu Search Method”

2003-2007 B.Tech in Mechanical Engineering, Kurukshetra University of Kurukshetra, Mechanical Engineering, Overall % 67.22

2009 Gate in Mechanical, 86.13 percentile

---

## THESIS SUPERVISION

M. Tech Thesis (04) ----- Completed

2011 Mr. Rakesh Sharma, “*Analysis of MRR and SR using SiC POWDER MIX in Dielectric on Tungsten Carbide (WC) on Die Sinking EDM using Taguchi Technique*”, Submitted to Kurukshetra University of Kurukshetra.

2011 Mr. Suraj Choudhary, “*Analysis of MRR and SR with different electrode for SS-316 on Die-Sinking EDM using Taguchi techniques*” Submitted to Kurukshetra University of Kurukshetra.

2016 Mr. Achardeep Dheeman, “*Experimental Investigation on Surface Characteristics in Dry-Electric Discharge Machining of Ti-6Al-4V Alloy*”, Panjab University, Chandigarh

2016 Mr. Harmehar Singh, “*Experimental Investigation on Surface Finishing of Ti-6Al-4V Alloy by Using Rotatable Workpiece Abrasive Finishing Process (RW-MAF)*”, Panjab University, Chandigarh

## M. Tech Thesis (02) ----- Ongoing

Mr. Ramandeep Singh, “Fabrication of Ti-NB based porous biomaterial using microwave and Spark Plasma sintering process. Panjab University, Chandigarh

Mr. Navdeep Singh, “Surface Modification of Ti-6Al-4V Alloy using plasma spark deposition of composite coating of TiO<sub>2</sub>-HaP to enhance the corrosion resistance

## Ph.D Thesis (0)

NIL

---

## PROFESSIONAL SKILLS

### Cell Culture and Tissue Engineering

- Hand on Experience on cell culture and tissue engineering to evaluate the bioactivity of medical implants.
- MTT Assay
- Cytotoxicity

### Programming of Artificial Intelligence Modeling (Artificial Neural Network & Fuzzy Logic) and Swarm Particle Optimization

- Proficient in MATLAB
- Experienced in C

### Design of Experiment (DOE) Techniques

- Proficient in Minitab and Design Expert
- Proficient in Response Surface Methodology (RSM)
- Proficient in Taguchi Method

### CAD Software

- Proficient in Solid Works
- Experienced in Auto CAD

### Analysis Software - Finite Element Method (FEM)

- Experienced in ANSYS, APDL subroutine
- Experienced in NASTRAN-PATRAN

## PUBLICATIONS

### Journal Articles

1. **Chander Prakash**, H.K. Kansal, B.S. Pabla, Sanjeev Puri and Aditya Aggarwal, “Electric discharge machining – A potential choice for surface modification of metallic implants for orthopedic applications: A review”, *Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture*, 230(2), 231-253, 2016. [*SAGE, SCI INDEXED WITH IMPACT FACTOR 0.978*].
2. **Chander Prakash**, H.K. Kansal, B.S. Pabla, and Sanjeev Puri, “Processing and Characterization of Novel Biomimetic Nanoporous Bioceramic Surface on  $\beta$ -Ti Implant by Powder Mixed Electric Discharge Machining”, *Journal of Materials Engineering and Performance*, 24:3622–3633, 2015. [*SPRINGER, SCI-E INDEXED WITH IMPACT FACTOR 1.094*].
3. **Chander Prakash**, H.K. Kansal, B.S. Pabla, and Sanjeev Puri, “Experimental Investigations in Powder Mixed Electrical Discharge Machining of Ti-35Nb-7Ta-5Zr  $\beta$ -Ti Alloy”, *Material and Manufacturing Process*, accepted in April 2016, 10.1080/10426914.2016.1198018 (In-Press). [*TAYLOR & FRANCIS, SCI-E INDEXED WITH IMPACT FACTOR 1.629*].
4. **Chander Prakash**, H.K. Kansal, B.S. Pabla, and Sanjeev Puri, “Effect of Surface Nanoporosities Fabricated by Powder Mixed Electric Discharge Machining on Bone-Implant Interface: An Experimental and Finite Element Study” *Nanoscience and Nanotechnology Letters*, Vol. 8 (10), 815-826, 2016, Doi:10.1166/nnl.2016.2255. [*American Scientific Publication, SCI-E INDEXED IMPACT FACTOR 1.47*]
5. **Chander Prakash**, H.K. Kansal, B.S. Pabla, and Sanjeev Puri, “Multi-objective optimization of powder mixed electric discharge machining parameters for fabrication of biocompatible layer on  $\beta$ -Ti alloy using NSGA-II coupled with Taguchi based response surface methodology”, *Journal of Mechanical Science and Technology*, 30 (9), 4195–4204, 2016, DOI: 10.1007/s12206-016-0831-0. [*SPRINGER, SCI-E INDEXED WITH IMPACT FACTOR 0.838*].

6. **Chander Prakash**, H.K. Kansal, B.S. Pabla, and Sanjeev Puri, “Powder Mixed Electric Discharge Machining an Innovative Surface Modification Technique to Enhance Fatigue Performance and Bioactivity of  $\beta$ -Ti Implant for Orthopaedics Application”, *Journal of Computing and Information Science in Engineering*, 14(4), 1-9, 2016. DOI: 10.1115/1.4033901. [ASME, SCI INDEXED WITH IMPACT FACTOR 0.847].
7. **Chander Prakash**, H.K. Kansal, B.S. Pabla, and Sanjeev Puri, “Potential of Powder Mixed Electric Discharge Machining to Enhance the Wear and Tribological performance of  $\beta$ -Ti Implant for Orthopedic Applications”, *Journal of Nanoengineering and Nanomanufacturing*, 5(4), 261-269, 2015. [AMERICAN SCIENTIFIC PUBLICATION, SCOPUS INDEX].
8. **Chander Prakash**, H.K. Kansal, B.S. Pabla, and Sanjeev Puri, “On the Influence of Nanoporous Layer Fabricated by PMEDM on  $\beta$ -Ti Implant: Biological and Computational Evaluation of Bone- Implant Interface”, *Material Today: Proceeding*, accepted March 2016 (In-Press). [ELESVIER, PEER REVIEWED AND SCOPUS INDEX].
9. **Chander Prakash**, H.K. Kansal, B.S. Pabla, and Sanjeev Puri, “Potential of silicon powder-mixed electro spark alloying (SMP-ESA) for surface modification of  $\beta$ -phase titanium alloy for orthopedic applications”, *Material Today: Proceeding*, accepted March 2016 (In-Press). [ELESVIER, PEER REVIEWED AND SCOPUS INDEX].
10. **Chander Prakash** and P.L. Bali, “Optimization of Part Scheduling for Cellular Manufacturing System using Tabu Search Method” *International Journal of Applied Engineering and Research*, 6(8), 2011.
11. **Chander Prakash** and Sumit Bali, “Quality Management in Supply chain: A case study”, *International Journal of Science, Technology and Management*, 2(2), 86-102, 2011.

### Conference Proceedings

12. **Chander Prakash**, H.K. Kansal, B.S. Pabla, and Sanjeev Puri, “Numerical investigations of stress shielding and micromotions in  $\beta$ -phase titanium THR using finite element method”, 3rd International Conference on Biomedical Engineering and Assistive Technologies (BEATS-2014), 14-15 Feb., 2014, UIET, Panjab University, Chandigarh.

13. H.K. Kansal, **Chander Prakash**, B.S. Pabla, and Sanjeev Puri, “Static and Dynamic Analysis of Cementless Stem for Total Hip Arthroplasty: A Finite Element Study”, Indo-Brazil Bilateral International Conference on Advanced Materials and Manufacturing (ICAMM-2015), 26-27, March, 2015, Cape Institute of Technology Levenjipuram, India.
14. **Chander Prakash**, H.K. Kansal, B.S. Pabla, and Sanjeev Puri, “To optimize the surface roughness and microhardness of  $\beta$ -Ti alloy in PMEDM process using Non-dominated Sorting Genetic Algorithm-II”, IEEE sponsored 2<sup>nd</sup> International Conference on Recent Advances in Engineering & Computational Sciences (RAECS), 21, Dec., 2015, UIET, Panjab University, Chandigarh. [*PUBLISHED IN AIEEE EXLPORE DIGITAL LIBRARY*]
15. **Chander Prakash**, H.K. Kansal, B.S. Pabla, and Sanjeev Puri, “Research On The Formation Of Nano-Porous Biocompatible Layer On Ti-6Al-4V Implant By Powder Mixed Electric Discharge Machining For Biomedical Applications”, International Conference, NanoSciTech 2016, Panjab University, Chandigarh.
16. **Chander Prakash**, H.K. Kansal, B.S. Pabla, and Sanjeev Puri, “Study on the Surface Modification of  $\beta$ -Phase Ti alloy by Powder Mixed Electric Discharge Machining for Orthopedic Applications”, CHASCON, 2015, Panjab University.
17. **Chander Prakash**, H.K. Kansal, B.S. Pabla, and Sanjeev Puri, “Powder Mixed Electric Discharge Machining an Innovative Surface Modification Technique to Enhance Fatigue Performance and Bioactivity of  $\beta$ -Ti Implant for Orthopaedics Application”, International Conference on Innovative Design and Manufacturing (ICIDM-2016), 24-26<sup>th</sup> Jan. 2016, The University of Auckland, New Zealand. [*SELECTED IN BEST 15 PAPERS AND RECOMMENDED FOR PUBLICATION IN JOURNAL OF COMPUTING AND INFORMATION SCIENCE IN ENGINEERING*].
18. **Chander Prakash**, H.K. Kansal, B.S. Pabla, and Sanjeev Puri, “On the Influence of Nanoporous Layer Fabricated by PMEDM on  $\beta$ -Ti Implant: Biological and Computational Evaluation of Bone- Implant Interface”, 5th International Conference of Materials

Processing and Characterization (ICMPC-2016), 12-13 March, 2016. [*SELECTED FOR PUBLICATION IN JOURNAL OF MATERIALS TODAY: PROCEEDINGS*].

19. **Chander Prakash, H.K. Kansal, B.S. Pabla, and Sanjeev Puri**, “Potential of silicon powder-mixed electro spark alloying (SMP-ESA) for surface modification of  $\beta$ -phase titanium alloy for orthopedic applications”, International Conference On Recent Trends In Engineering And Material Sciences (ICEMS-2016), 17-19 March, 2016. [*SELECTED FOR PUBLICATION IN JOURNAL OF MATERIALS TODAY: PROCEEDINGS*].
20. **Harmehar Singh, Chander Prakash, and H.K. Kansal** “Technology and research developments in magnetic abrasive finishing (MAF): A review” 5th International Conference Advances in Materials & Manufacturing Technology AMMT-2015 October 16, 2015, pp. 67-72.
21. **Achardeep Dhiman, Chander Prakash, and H.K. Kansal** “Technology and research developments in Dry-EDM: A review”. 5th International Conference Advances in Materials & Manufacturing Technology AMMT-2015 October 16, 2015, pp. 73-77.
22. **Achardeep Dhiman, Chander Prakash, and H.K. Kansal** “Effect of Hydrocarbon oil, Soft water and N<sub>2</sub> on Surface Characteristics in Electric Discharge Machining of Ti-6Al-4V Alloy” Accepted for 6<sup>th</sup> International & 27<sup>th</sup> All India Manufacturing Technology, Design and Research Conference (AIMTDR-2016), December 16-18, 2016 at College of Engineering., Pune, Maharashtra, INDIA.
23. **Chander Prakash and P.L. Bali**, “Optimization of Part Scheduling for Cellular Manufacturing System using Tabu Search Method” International Conference (IETET-2011) attended at GIMT, Kanipala kurukshetra.
24. **Chander Prakash and P.L. Bali**, “Neural Network Approach for Predicting Material Removal Rate in Electric Discharge Machining for Tungsten Carbide” National Conference (PSAT-2012) attended at JMIT Raduar.

---

## TEACHING EXPERIENCE

### Academic (9 years)

- June 2007      Lecturer, in Mechanical Engineering Department, N.C. College of Engineering  
Israna-Panipat, Haryana, India
- 2010-2011      Assistant Professor in Mechanical Engineering Department, IIT&B, Sonapat,  
Haryana, India
- 2011-2012      Assistant Professor in Mechanical Engineering Department, Ambala College of  
Engineering & Applied Research, Ambala, Haryana, India
- 2012- Till      Assistant Professor (Temporary/Contract) in Mechanical Engineering Department,  
UIET, Panjab University, Chandigarh, India.

### For PG- Studies

"Advanced Machining Processes" in Ambala College of Engineering & Applied Research, Ambala,  
Mechanical Engineering Branch (For M. Tech Degree)

"Mechanism & Robotics" in Ambala College of Engineering & Applied Research, Ambala, Mechanical  
Engineering Branch (For M. Tech Degree)

"Mechtronics" in Ambala College of Engineering & Applied Research, Ambala, Mechanical  
Engineering Branch (For M. Tech Degree)

### For UG- Studies

"Machining Processes" in N.C. College of Engineering, Israna-Panipat, Mechanical Engineering  
Branch (For B. Tech Degree)

"Non-Conventional Methods of Machining" in Ambala College of Engineering & Applied Research,  
Ambala, Mechanical Engineering Branch (For B. Tech Degree)

"Machining Technology" in N.C. College of Engineering, Israna-Panipat, Mechanical Engineering  
Branch (For B. Tech Degree)

"Strength of Material" in I.I.T&B, Sonapat, Mechanical Engineering Branch (For B. Tech Degree)

Industrial Automation, in Mechanical Engineering Department, UIET, Panjab University,  
Chandigarh (For B. Tech Degree).

Operation Research, in Mechanical Engineering Department, UIET, Panjab University, Chandigarh



(For B. Tech Degree).

## WORKSHOP, SEMINAR & FACULTY DEVELOPMENT PROGRAMME ATTENDED

- 2007 National Level Seminar on Nano-Technology at NCCE Israna.
- 2010 Staff Development Program on Finite Element Analysis at NCCE Israna
- 2010 Entrepreneur Awareness Program at NCCE Israna
- 2011 One day workshop on welding Technology sponsored by Indian Institute of Welding at Shri Venkateshwara college of Engineering, Sonapat.
- 2011 International Conference (IETET-2011) attended at GIMT, Kanipala kurukshetra
- 2012 National Conference (PSAT-2012) attended at JMIT Raduar
- 2012 One day Workshop on MATLAB sponsored by Math's Work at Panjab University, 18<sup>th</sup> July, 2012.
- 2012 4<sup>th</sup> International & 25<sup>th</sup> All India Manufacturing Technology, Design & Research Conference (AIMTDR 2012)
- 2013 One week STTP on Advanced Engineering Optimization Techniques & Their Applications in Research, at UIET, Panjab Univesrity, Chandigarh.
- 2013 One Week National Short Term Training Program on Aspects and Applications of Research Methodology in Science and Engineering (AARMSE)
- 2013 One Week Faculty Development Program on New Horizons in Energy, Environment and Nanotechnology
- 2014 One Week winter Training Program on DOE Taguchi Method and Response Surface Methodology (RSM)
- 2014 One Week Handson Workshop on Human/Cancer Cell Culture Techniques and MTT Assay
- 2014 3<sup>rd</sup> International Conference on Biomedical Engineering and Assistive Technologies (BEATS-2014), 14-15 Feb., 2014, UIET, Panjab University, Chandigarh
- 2014 1 week short term training Program on Stem Cell and Tissue Engineering

- 2015 IEEE sponsored 2nd International Conference on Recent Advances in Engineering & Computational Sciences (RAECS), 21, Dec., 2015, UIET, Panjab University, Chandigarh
- 2015 10<sup>th</sup> Chandigarh Science Congress (CHASCON, 2015), Panjab University
- 2016 International Conference, NanoSciTech 2016, Panjab University, Chandigarh
- 2016 International Conference on Innovative Design and Manufacturing (ICIDM-2016), 24-26<sup>th</sup> Jan. 2016, The University of Auckland, New Zealand
- 2016 5th International Conference of Materials Processing and Characterization (ICMPC-2016), 12-13 March, 2016

## PROPOSED RESEARCH ACTIVITIES

The field of biomaterials has become a vital area, as these materials can enhance the quality and longevity of human life and the science and technology associated with this field has now led to multi-million dollar business. In the present research scenario, fabrication of porous implant is the subject of continuous research and development. Metallic materials have been widely used in orthopedics for many years, especially for high load-bearing applications, such as dental, maxillofacial, spinal, femur, and knee joints, and bone plates and screws. Ti and its alloys are of particular interest to researchers because of their relatively low density, high strength-to-elastic modulus ratio, outstanding corrosion resistance, and better biocompatibility. There are series of drawbacks in the use of full dense titanium alloy as implant. Firstly, titanium is typically surrounded by a thin film of fibrous tissue, which is related to many loosening events that leads to failure. Secondly, Young's modulus of titanium is higher than bone, which produces the stress-shielding phenomenon, increasing bone resorption around the implant. Therefore, Porous titanium and its alloys have received much more attention in recent years because Porous structure is helpful to decrease Young's modulus by tailoring porosity, which can efficiently reduce the “stress shielding” effect. Additionally, bone-like porous structure in titanium is favored to promote the bone ingrowth, which can effectively improve the bone/implant fixation. Up to now, there are large amount of studies on the fabrication of porous titanium and its alloys. Therefore, I have developed a new approach towards fabricating a bioactive and mechanically tunable porous  $\beta$ -Phase titanium alloy. The implants have porous structures with a porosity of

more than 50%. The densified porous Ti implants have good strength in spite of the low stiffness comparable to that of bone (3-20 GPa). Because of the coating layer, the bioactivity of the densified porous Ti was significantly improved. I have performed some trial experiments to fabricate the porous implant. I got success and made a few samples. There for a large number of studies need to investigated like In-Vitro, In-Vivo, fatigue, corrosion fatigue, (Low cycle fatigue test in simulated body fluid), Corrosion wear (tribological test in simulated body fluid) etc.

## PERSONAL TEACHING PHILOSOPHY & INTERSENT

I am fortunate to have a few numbers of years of teaching experience, which has enabled me to develop a 'teaching philosophy' of my own. I believe that it is my duty as a teacher to make students understand 'how to learn the subject matter' and not merely to deliver the class material. I avoid 'spoon feeding' the knowledge, but try to motivate and guide the students to learn more. I also believe personal touch is essential for a healthy teacher – student relationship. With the diversity of our community reflecting in our classroom, it is also critical to identify ways to reach out to each individual. I conduct my class with a personable approach and put adequate emphasis on out-of-the-class interaction with students. I believe students must be treated with respect and the classroom must be free from undue tension and anxiety. Openness, honesty and ability to maintain trust are highly conducive to effective learning.

I welcome feedback from students, which help me to organize my sequence of lectures. Particularly, for higher degree classes, I have found that, feedbacks from students about what knowledge they currently possess and problems they face with learning in the new system is essential to plan lecture material as students come with diverse level of back ground preparations. In order to stimulate student's desire to learn and effective knowledge transfer, it is essential to keep student's attention in the class. It is not unusual to see me moving around in the platform, varying pitch of my voice, scanning the whole class to maintain eye-to-eye contact while explaining a concept. My humors are sometimes celebrated, sometimes detested, but I apply them to keep students attention. In order to stimulate interest and to increase sense of participation, I challenge the students with occasional questions, preferably linking real life experience with the text. Before starting a class, I prefer to list out the 'objectives of today's class'. At the end of the class, I prefer to pose one or two 'open questions'. I have made use of Over Head Projectors as well as Power Point Slides for some of my presentations, but I still rely on Black Board for more than 30% of my contact hours in the class. I believe in continuous

evaluation, spread over components like Tutorials, Home assignments, Team works, Tests and Quizzes. While setting papers, I try to bring out how much a student know, not what he does not know! To judge a large class, questions should be formulated to cater to different level of preparedness. I detest lengthy question papers. I always display a fully worked out solution for the questions along with a marking scheme and stick to it. Although some students brand me 'very strict', feedback has shown that largely students are satisfied with my evaluation and awarded marks. Finally, as a committed teacher, I am aware of my obligations and responsibilities to uphold the reputation of the University I am working for. As a teacher, I 'preach' my students to adopt Engineering as a way of life and try to impart sense of responsibility towards the society and our nation.

I would like to teach Biomaterial, Finite element method, MATLAB, Design of experiment techniques, optimization techniques, Non-conventional, modern machining processes, and their usability in the modern machining methods.

---

## LANGUAGES

English **Fluent**

Hindi **Fluent**

*My Native Language*

---

## INTERESTS

Guitar I've been playing for 10 years

Cricket My lifelong sport

Book reading e-book reading of historical books is my newest hobby

Gardening Observer of nature, especially the plants and bugs life. I developed this quality from my father who is an avid gardener and lover of nature

---

## REFERENCES

- **Dr. Harmesh Kumar Kansal**, Professor & Head, Mechanical Engineering Department, UIET, Panjab University, Chandigarh, India (Ph.D Guide)

Tel:- +91-9417270363, E-mail:- shaarut@yahoo.com

- **Dr. Sanjeev Puri**, Professor & Head, Center for Stem Cell and tissue Engineering, Panjab University, Chandigarh, India. (Ph.D Guide)

Tel:- +91-9872580078, E-mail:- spuri\_1111@yahoo.com

- **Dr. B. S. Pabla**, Professor & Head, Mechanical Engineering Department, NITTTR, Chandigarh, India (Ph.D Guide)

Tel:- +91-9815951921, E-mail:- [bsp@nitttrchd.ac.in](mailto:bsp@nitttrchd.ac.in)

- **Dr. Harmesh Kumar Kansal**, Professor & Head, Mechanical Engineering Department, UIET, Panjab University, Chandigarh, India (Ph.D Guide)

Tel:- +91-9417270363, E-mail:- [shaarut@yahoo.com](mailto:shaarut@yahoo.com)

Chander Prakash