

SPECIALLY DESIGNED FOR WORKING PROFESSIONALS



The best part about getting to the top is seeing the next

PEAK TO CLIMB

PhD PROGRAM

IN ENGINEERING AND TECHNOLOGY SPECIALLY DESIGNED FOR WORKING PROFESSIONALS

Computer Science & Engineering Electronics & Communication Engineering Mechanical | Civil Engineering

Chitkara University offers an intellectually demanding doctoral program for high-potential applicants who already have a breadth of knowledge in the functional areas of Engineering and Technology along with having a strong interest in academic research.

Conducting research requires combining knowledge gained in the past Engineering degree with the ability to read and interpret the scientific literature, identify critical research gaps, structure complex problems, formulate and test hypotheses, analyse and interpret data, and present and discuss technical results.





STRONG ACADEMIC HERITAGE

Dr. MADHU CHITKARAPRO CHANCELLOR CHITKARA UNIVERSITY

Chitkara Education brings with it a reputation that has been earned through years of serving the career-needs of the student community. It has a reputation for excellence and innovation among coveted employers for preparing graduates who have the knowledge and skills they need for success in their workplace.

There are many reasons to choose Chitkara Business School. Our graduates go on to great careers, we're hands-on and responsive in our teaching, we provide a great environment to study and our research is world-class.



The learning environment at CHITKARA UNIVERSITY represents a unique blend of distinguished faculty, brilliant & intellectual students with a proactive collaboration with industry.







RECOGNISED FOR EXCELLENCE



Chitkara University in Punjab and Himachal Pradesh have once again been ranked among the Nation's Best in the NIRF Ranking 2020.



Chitkara University has been ranked in the Top 25 Universities of the country out of 500+ institutions in the prestigious ARIIA 2020.



Chitkara University is proud to be included in the QS World University Rankings: Asia for the first time ever in 20-21 edition.



We are the only Indian university shortlisted for 'Technological Innovation of the Year' in

'Times Higher Education Asia Awards 2020'.



Chitkara University makes it into top 200 in Clarivate Analytics' leading innovators list 2020.



Year after year, Chitkara University has been ranked among the Top 10 Universities of the country for filing maximum patents.



One of the largest University grants' recipient for the **European** Commission **Erasmus+ Programme**

Chitkara University has been ranked among the best in India by leading publications including:



















A few things we're proud of

THERE ARE SO MANY
REASONS TO CHOOSE
CHITKARA UNIVERSITY THAT
WE DIDN'T HAVE ENOUGH
SPACE TO COVER THEM ALL.
BUT HERE ARE A FEW
REASONS WHY WE THINK
YOU'LL LOVE US AND BE
PROUD TO JOIN US.

STRONG ACADEMIC HERITAGE

Chitkara University has been established by and is being managed by passionate academicians with the sole mission of making each and every student "Industry-ready".

INDUSTRY-LED COURSES



We maintain close links with leading blue-chip companies and professional associations to deliver our academic programs and ensure that our courses are relevant, practical and in tune with the industry demands, allowing our graduates to hit the ground running.



TOP 20

Chitkara University has been consistently ranked among the top 20 non-profit Private Universities of the country.

* * * * * 5 STARS

All our institutions and academic programs are recognised and approved by UGC and various regulators such as NAAC | AICTE | PCI | COA | NHMCT | INC.

LEARNING BY DOING

Our curriculum is based on the framework of strategic competitiveness, which teaches the concepts of creativity, entrepreneurship, innovation, sustainability, leadership and incisive decision making.



Our programs are consistently ranked among the top 50 in the country.



TOP SKILLS

There is an intensive focus on developing communication skills, team work and leadership for each and every student.

WORLD-CLASS RESEARCH EXCELLENCE



With more than 700 patents and project funding from leading organisations such as DST and HP, our researchers, staff and students work across disciplines to extend the boundaries of knowledge. We have been recognised nationally for pioneering research in nanotechnology, mobile learning, robotics, renewable energy and mechatronics.



MORE CEOs

More industry leaders from across all sectors have visited our campus and interacted with our faculty as well as student community grooming them for future leadership roles.

CAMPUS PLACEMENTS



Chitkara University has established an unassailable reputation for strong on-campus recruitments. Our students have gained employment in diverse professional roles and areas across the globe. From managing hotels to discovering new drugs to helping patients in hospital to analyzing the stock market, your Chitkara University degree can lead to varied and rewarding career paths.



LEADING INNOVATION

Chitkara Innovation Incubator helps turn students' business ideas into reality. Student ventures with scalable, commercial potential are given access to high tech, collaborative office space, paired with industry mentors to develop scalable business plans and market testable products and services.



Chitkara University has made huge investments in developing student facilities - giving our students access to state-of-the-art labs, design studios, libraries, sporting and social facilities.



With a high quality of living and vibrant student mix, Chandigarh is a city that comes under 'Times 15 Best Asian Spots'.



You'll work with some of the brightest and most inspiring academics, lecturers and researchers in the world.



At Chitkara University, we offer over 150 exchange destinations to consider.

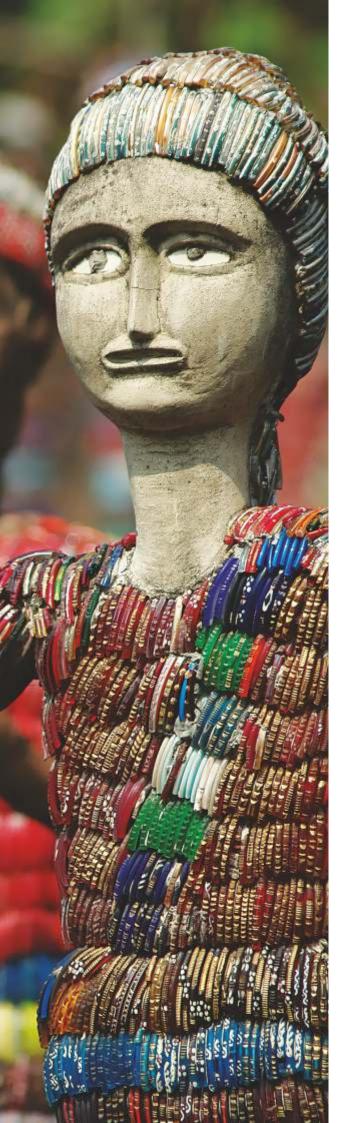


SAFE & SOUND

We take great pride in looking after our students.



The most beautiful city of India
Located in the foothills of the Shivalik
mountain ranges, Chandigarh is India's
best planned city and the maître
d'œuvre of the French architect Le
Corbusier, with world class
infrastructure, rich cultural heritage
and an unparalleled quality of life.





Equidistant from Chandigarh, both our Campuses are a mere 30 km from the City centre. Aptly christened as 'The City Beautiful', Chandigarh has projects designed by world renowned architects such as Le Corbusier, Pierre Jeanneret, Jane Drew and Maxwell Fry. The most liveable city of the country, Chandigarh boasts of stunning tourist attractions like the Rock Garden, Rose Garden, Sukhna Lake, Govt. Museum and Art Gallery, Open Hand Monument and Capitol Complex on one hand, and Elante Mall and other hip and buzzing multiplexes, malls, restaurants, on the other.

Chandigarh is a model urban showpiece, where the green spaces are intricately entwined with its urban design and construction plans, making this city the face of modern India. The city enjoys easy connectivity to all major cities across the country by road, rail and air. With a new International airport, Chandigarh is also now connected to the major cities of the world. This growing network has brought in a lot of industry from India and overseas, who view Chandigarh as a prime location to set up their operations, making it one of the best cities in the country for doing business.

Chandigarh Tricity, which includes the surrounding cities of Mohali and Panchkula, is on its way to become the North Indian hub for IT industry with major presence of companies such as Infosys Technologies, Tech Mahindra, Quark and Wipro. This city is fast emerging as India's entrepreneurship hub as well, attracting the service industry and a host of other companies who view it as their regional center for all North Indian states.

A prominent education hub, Chandigarh, is home to some leading education institutes of India. Each year, it witnesses a huge influx of students from across the country and overseas who come especially to this city seeking the diverse opportunities it presents amidst its beautiful architecture, youthful vibe and gorgeous landscape.



Chitkara University encourages to interact within and across the subject areas, providing a rich environment for innovative and collaborative research. Our university also promotes and encourages interdisciplinary research, in which case two or more departments and centers contribute to innovative and cross-boundary research.

Faculty members from various departments, centers and schools across the campus are exploring research areas that must involve extensive interaction of different traditional disciplines.

The Chitkara University PhD program is designed to produce a new generation of scholar-teacher-practitioners who precisely fit that description. If you're prepared to embark on a challenging, focused, and meaningful experience, we invite you to explore the possibilities in our PhD program.

ENGINEERING EDUCATION AHEAD OF ITS TIME.

Engineering programs at Chitkara University in Punjab and Himachal Pradesh do more than just develop world-class engineers and computer scientists. We help these bright minds develop into changemakers with the global perspective, technical prowess and leadership skills to make a difference in the world.

Get ready to chart your course to a career that is as meaningful as it is successful. Every possible path starts with a common engineering core curriculum for the first year and a half, which lets you explore your options and discover the discipline that's right for you.

There are many forces behind our strength: our academic reputation, top rankings, varied specialisations, small class sizes and 100% campus recruitment.

Come and Explore Your Potential at Chitkara University.

With strong industry sponsored research laboratories, state of the art incubation centre, excellent research infrastructure, collaboration with industries & research organizations both within and outside India and highly qualified faculty, the University aspires to transform the society by pursuing research-led, innovative and practical solutions. MOUs with well-reputed international universities shall be beneficial for Ph.D. research scholars as these MOUs are intended to enhance the quality of the Doctoral Research through joint supervision, utilization of research infrastructure and student exchange.

Able to Critically apply theories, methodologies and knowledge to address fundamental questions in their primary area of study.

Pursue research of significance in the discipline or an interdisciplinary project.

Manage complex ethical and professional issues and make informed judgments on ethical codes and practices.

Discover, interpret and communicate new knowledge through original research of publishable quality which satisfies peer review.

Work collaboratively with all stakeholders to create, develop, and exchange research knowledge to influence and benefit society and the economy (in sync with UNSDGs.)

CHITKARA Counted among the best





Our Engineering programs have once again been ranked among the Nation's Best in the 2020 NIRF Ranking.



Chitkara University has been ranked in the Top 25 Universities of the country out of 500+ institutions in the prestigious **ARIIA 2020**



Chitkara University is proud to be included in the QS World University Rankings: Asia for the first time ever in 20-21 edition.



We are the only Indian university shortlisted for 'Technological Innovation of the Year' in 'Times Higher Education Asia Awards 2020'.

Clarivate **Derwent**

Chitkara University makes it into top 200 in Clarivate Analytics' leading innovators list 2020



Chitkara Engineering is ranked in the top 30 Engineering programs.



Chitkara University ranked as the Top Engg. University in Punjab.

BW BUSINESSWORLD

Chitkara University rated in 'Top 50' of 2020 annual Engineering Rankings.

Awarded Outstanding **Engineering University** for 2020 for placements.

Chitkara Engineering ranked as one of the top Engineering programs of the country.

CAREERS

Chitkara University Engineering programs Rated 'AAA+'.

Consistently ranked Chitkara Engineering among the best in India.

Outlook

Chitkara University rated in 'Top 50' in the Engineering Rankings.



ENGINEERING PROGRAMS WITH A REAL-WORLD REPUTATION..

Join Engineering programs at Chitkara University and we will place you at the very heart of everything we do. We will equip you with all the skills necessary to make you employable, enterprising and entrepreneurial. Engineering graduates are some of the most sought-after across the world and we will do our utmost to prepare you for future success.

MEETING THE DEMANDS OF INDUSTRY

Whichever of our courses you choose, you can be certain that its content will be current and at the forefront of knowledge. Engineering is a rapidly advancing discipline and we want you to be ahead of the game.

FRIENDLY, KNOWLEDGEABLE FACULTY

As a Chitkara Engineering student, you'll learn from friendly, approachable teaching faculty with considerable knowledge and a genuine desire to help you achieve your full potential. Our tutors have considerable industry experience. Many of them are also heavily involved in providing consultancy and knowledge transfer for local and national companies. With extensive business links, they bring current thinking, expertise and innovation into their teaching. So not only will you gain an underpinning knowledge of your subject, you will also get plenty of hands-on experience solving real world Engineering challenges.

A REPUTATION FOR INNOVATION

Our academic expertise has given us an international reputation for innovation. Year after year, Chitkara University has been ranked among the Top 10 Universities of the country for filing maximum patents which speaks volumes about our research team, state-of-the-art infrastructure & intensive focus on new ideas & technologies.

HIGHLY RATED PROGRAMS

As a mark of their quality, our Engineering programs are endorsed by leading external accreditation bodies for their ability to equip you to meet the requirements of the modern engineering environment. These accreditations include: The Institution of Mechanical Engineers (IMechE) and The Institution of Engineering and Technology (IET).

GLOBAL ENGINEERING

Our Engineering graduates have the option to study the first 2 years of Engineering programs at Chitkara University campus and then complete their Degree at over 100+ partner Universities across the world.

100% CAMPUS RECRUITMENT

We have established an unassailable reputation for very strong on-campus recruitments by sheer virtue of our intensive focus on making all our graduates "industry ready". 500+ leading Blue Chip companies visit our campus for hiring our Engineering students.





HANDS-ON AND STATE OF THE ART

Turn what you learn in class into reality in more than 100+ cutting-edge labs. Get hands-on experience building everything from microprocessors to industrial robots, using the same generation of technology as leading industries across our region.

The focus is to generate new ideas, create innovative solutions and apply basic principles with an emphasis on using all this knowledge in developing industry-university Engineering centres.

We have collaborations with some world-class companies to include faculty development programs, soft-skills training workshops, industrial visits, technical competitions, live projects and guest lectures. Notably, our Engineering facilities include a number of instructional and research laboratories, including the Microsoft Innovation Centre, nVidia CUDA Teaching Centre, NXP Semiconductors Signal Lab and Dassault Systemes.

LABS & FACILITIES

Advanced Materials & Manufacturing Lab

Apple IOS Lab

ARM Research Lab

Artificial Intelligence Lab

Automation Lab

Building Energy Efficiency

Ergonomics Lab

CAD/CAM Lab

Cadence Microelectronics Lab

CISCO Networking Lab

Dassualt Systemes

Digital Communications Lab

Digital Signal Processing Lab

Electrical Engineering Design Lab

Design Lab

Electrical Engineering Lab

Electrodynamics Lab

Ergonomics Lab

Fluid Applications Lab

Fluid Dynamics Lab

Fiat Crysler Automobile Lab

Google Innovation Lab

Honda Design Lab

Integrated Circuit Design Lab

Internet of Things Lab

Lean Manufacturing Lab

Mahindra Rise Innovation Lab

Microsoft Innovation Lab

Mitsubishi Electric Lab

Metrology Lab

Microwaves &

Electromagnetics Lab

NewGen IEDC Innovation Lab

nxP Design Lab

Robotics & Mechatronics Lab

Plumbing Lab

Power Systems Lab

Rapid Prototyping Lab

Robotics and Intelligent

Systems Lab

SAP Innovation Lab

Schneider Electric Lab

Wittur Transportation Lab

Vibrations Lab

Virtusa Full Stack Lab



STRONG INDUSTRY COLLABORATIONS

Chitkara University has an intense focus on making each and every Engineering student industry ready. In order to make sure that our students have access to latest tools and technology, we have collaborated with industry majors ranging from software, semi conductor to automation and automotive sectors so that our curriculum and innovation labs are in sync with latest industry trends.



































































ACCELERATE YOUR CAREER WITH A DOCTORATE DEGREE

Specially Designed For Working Executives

PROGRAM VISION:

To be a globally recognized organization promoting academic excellence through interdisciplinary applied research and to expand realms of knowledge through innovation.

PROGRAM MISSION:

- To carry out the academic process for achieving excellence through active teacher-student-industry participation.
- To promote research, innovation and entrepreneurship in collaboration with industries and laboratories.
- To inculcate high moral, ethical and professional standards amongst our students.
- To contribute to building a skillful society.

EDUCATIONAL OBJECTIVES

- Capacity to devise, design and conduct research that has real academic weight, is targeted and shows integrity.
- Capacity for critical analysis, assessment and synthesis of new and complex ideas.
- Capacity to develop further the progress made in technological, social or cultural terms within an academic and professional context.

EARN THE IDEAL PhD FOR WORKING EXECUTIVES

The doctorate represents a transitional phase between a person's studies and their own research work and is a means of acquiring knowledge and skills relating to their own subject area as well as those that cut across other areas. It is also an opportunity to build networks within the academic community of their domain. It prepares a person for research-oriented work at either a university or in the outside world (wider society, finance, administration, etc.) and equips them to take on a wide variety of demanding professional duties and roles.



ONE of the greatest opportunities to enhance your professional expertise with academic rigour.

This blended part-time program is aimed at outstanding managers, who hold a Master's Degree, and want to enhance their professional practice combining academic rigour and managerial relevance.

The goal is to contribute to the knowledge in their chosen area of study through management research within current and future work settings.



EXCELLENT training by world-class faculty to develop the theoretical and methodological skills for conducting cutting-edge research on business challenges.

By incorporating the advantages of both co-located contemporary instruction and asynchronous distributed learning, this program delivers effective and efficient doctoral education. Seminars continue your learning beyond the classroom. Core courses will however be delivered at the University Campus.



CHITKARA UNIVERSITY

has been consistently ranked among the top universities which speaks volume about our faculty and teaching pedagogy. Students across the globe are attracted to Doctoral Program as it is designed keeping YOU in mind.

A thriving multicultural environment helps you enjoy every moment of your doctoral life at Chitkara University.



WHAT DO WE OFFER?

EXPERTISE ACROSS A WIDE RANGE OF DISCIPLINES

Applicants can choose from various academic areas in Engineering & Technology particularly in CSE, ECE, Mechanical, Civil and focus on individualized research agendas that are directly relevant to their profession.

RIGOROUS TRAINING

The inclusive curriculum provides students with the stateof-the-art methodologies needed to become intellectual leaders.

COMMITTED AND COLLABORATIVE **ENVIRONMENT**

Chitkara University is proud to be home to committed, expert Engineering faculty with unmatched experience across a wide range of disciplines and methodologies. During your PhD you will partner with your designated academic supervisors, who will mentor, inspire, and help you find your path in academia.

INVOLVEMENT IN RECOGNIZABLE AND HIGH-IMPACT RESEARCH

Chitkara University's proven track record highlights regular publications of faculty and doctoral students in top academic outlets. Students regularly present their research at leading international conferences.

Chitkara University is dedicated to support students in reaching to wider audiences and disseminating transformative ideas that advance engineering practice.

Research Experience of 5 years as a DST INSPIRE Fellow Member of Indian Liquid Crystal Society (ILCS) \ Member of American Chemical Society (ACS)

Chitkara University has provided the great research facilities at the campus, as the Chitkara University Research and Innovation Network (CURIN) is a locus of interdisciplinary collaborative work, pushing up the frontiers of knowledge forward is are involved in cutting edge research as well as work on new technologies to improve the country's infrastructure and safety. My Thesis title was "Preparation and Characterization of Normal and Reverse Mode Polymer Dispersed Liquid Crystals", which was very well appreciated in peer reviewed International Journals and Conferences as well as published in the 9 (SCI Journals), 7 (SCOPUS Journals) and 25 (International/National Conferences).



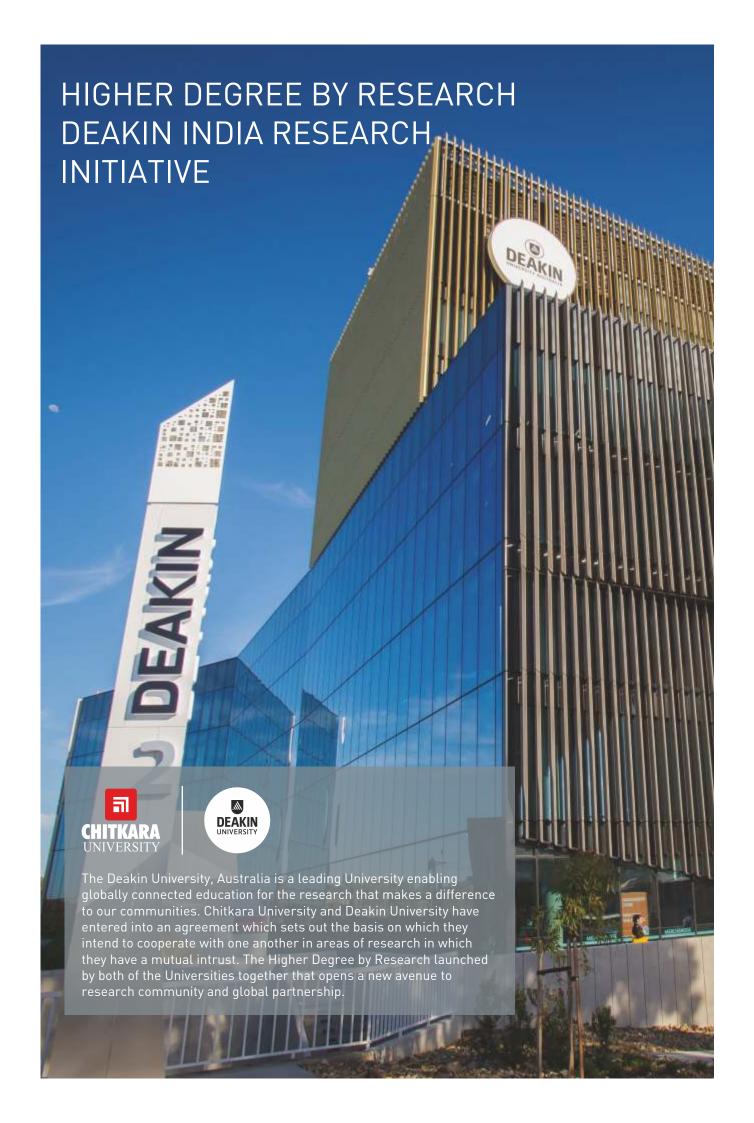


BENEFIT FROM THE UNIQUE DOCTORAL EXPERIENCE

Combining Research and Reality

This PhD uniquely fulfills the educational needs of active engineering professionals. Benefits of pursuing doctoral program are as follow:

- To acquire and apprehend thorough knowledge of the literature related to engineering field and a comprehensive understanding of methods and techniques applicable to their own research.
- To bridge the knowledge gap between industry and academia through research by applying knowledge and skills, discover solutions, generate new ideas.
- To link the research to policy and practice with higher practical experience.
- To develop self-direction and originality in tackling and solving research problems related to engineering and technology by following the principles of ethics in their research areas.
- To provide a thorough knowledge of the literature and a comprehensive understanding of scientific methods and techniques applicable to their own research.
- To develop the ability to critically evaluate current research and research techniques and methodologies.
- To promote interdisciplinary and multidisciplinary research.







Dr. Ramkumar Ketti Ramachandran *Life Member, Indian Society of Technical Education*

I am being the Lead Supervisor in India would mention that this is a new kind of opportunity to the Indian scholars who aspire to pursue their Ph.D program in a well reputed foreign University. Currently, I am guiding two Ph.D. Scholars under this program. The students are financially supported to complete their 6 months internship at Deakin University with the full waiver of tuition fee. In addition to that, the scholars are having the access of world-class facilities and international networks for sought-after innovations that improve the lives of

individuals, businesses and communities. We are currently working on the congestion control and emergency message dissemination of **Vehicle Ad hoc Networks** with the outcome of a good research profile in this area that is supported by good quality journal publications and simulator implementations.



Tarandeep Kaur Higher Degree by Research Scholar

Pursuing a Ph.D. degree from Deakin University, Geelong, VIC, Australia with Research Partner Chitkara University Institute of Engineering and Technology, Chitkara University, Punjab, India

under Higher Degree by Research Scholarshiphas been a highly rewarding experience. I am a Gold Medalist in my M. Tech, Computer Science & Engineering batch 2015-2017.

After my post-graduation, Chitkara university gave me a golden opportunity to start my Ph.D. with their research partner Deakin University. Currently, working on various simulators and tools such as NS-2, MATLAB, Omnet++, SUMO, VEINS for my research work.



Ravneet Kaur Higher Degree by Research Scholar

I am currently working in the area of Future intelligent vehicles, which are at the heart of high mobility networks, are increasingly equipped with multiple advanced onboard

sensors and keep generating large volumes of data. The emergency message dissemination in a live traffics is a challenging task which is currenty being dealt in my thesis work.

I have successfully completed 6 months intership at Deakin University and working towards submiting my final thesis.



SOME TESTIMONIALS



Dr Bhanu SharmaAdvisor, Ambey International Pvt.
Ltd., Ambala and active
researcher in the field of K12
education.

Having pursued my Ph.D. at Chitkara University has brought a metamorphic change into my knowledge and confidence. The journey was undoubtedly challenging but with the help of

my supervisor Dr. Archana Mantri, everything went smoothly. Words can only inadequately express my deep gratitude to my guide, for her meticulous care, kindness, and generosity.

My research area is Augmented Reality and Virtual Reality in k12 education. The field fancied me since it is miraculously transforming the world around us. Its many applications are contributing to our educational system and so I inclined myself to further explore it. Opportunities and support at Chitkara University have been a great encouragement. Advanced Labs equipped with the latest equipment were a big aid to propel my research work.



Dr. Neha TuliCo-founder, 6DOF Solutions,
Rajpura, Punjab.

In my journey towards this degree, I have found a teacher, a friend, an inspiration, a role model and a pillar of support in my Guide, Dr. Archana Mantri, Vice Chancellor, Chitkara University. With her constant support and trust in me, I not

only completed my PhD right on time but also got confidence and ability to start my own business in my research area. At present, I am working on live AR/VR projects, have various SCOPUS and SCI publications in my field and have delivered expert lectures in National/International platforms.

SOME TESTIMONIALS



Dr. Poonam Jindal14 years of experience as an educator and active researcher in the field of optics and embedded systems

One should keep in mind that doing a doctorate program is a marathon, not a sprint. One has to manage time and energy and be very mindful where attention is invested. 'I was privileged to

study at Chitkara University for four years as a parttime PhD student. My research was benefited immensely by the guidance and encouragement of my supervisor, Dr. Harsimranjit Kaur.

My thesis, titled- "Design and Performance Analysis of Tunable Power Splitter based on Photonic Crystal" was well accepted and helped me in good publications in reputed journals and a patent also got published on the same. I feel that the freedom and creativity to think outside the box have bettered me as a researcher and helped prepare me for my current position.



Dr. Vidhyotma Gandhi 28+ years of experience in academics and active researcher in the field of IoT and Machine Learning.

Getting a doctorate has expanded and grew me to a new capacity. The Chitkara University provides an excellent support system for research and innovation. The supervisors and faculty are very

knowledgable, helpful and understanding. Indeed, it helped me apply my engineering and technocrat skills to investigate and design tangible engineering solutions for society, especially in healthcare domain.

My thesis "Empirical Evaluation of Deployment Models for Enhancing the Performance of WBSN Based System" has led to some high-quality publications and I have also filed for a patent in this domain. My research has been very well received in academic circles and in the industry.



Dr. Gurjinder Singh14 years of experience in augmented reality and virtual reality.

The title of my PhD thesis is "Design of AR Learning System and analyze its effectiveness on Cognitive Load and Technical Skills of Engineering Students". Chitkara University provided me enormous support throughout

my PhD work. My supervisor Dr. Archana Mantri, guided and encouraged me at every step. She has been a source of wisdom that I drew upon to bring my research work to culmination and success. The laboratories, equipment at Chitkara University have been a great aid for carrying out research work.



Dr. Amanpreet Kaur5 years of experience in academics and active researcher in CSIR-CSIO, Chandigarh.

I have worked on the latest emerging technologies of Augmented Reality (AR), Virtual Reality (VR) and Gaming in my PhD. The title of my PhD thesis was "An Efficient Hybrid Tracking for Virtual and Augmented Reality

Applications". I have designed and developed AR and VR based "Military Shooting Tutors" to provide the initial level shooting training to novices in an ecofriendly environment at cheaper costs.

The novelty of my PhD work was justified when two of my patents were accepted and granted by Intellectual Property, Government of India (IPO) from my PhD work. During my PhD, I have grabbed an Erasmus Plus scholarship From European Union (EU) for a semester exchange in Middle East Technical University (METU) at Ankara, Turkey. It was a life changing and wonderful experience.



CAPITALIZE ON THE COMPREHENSIVE CURRICULUM

Imparting Rigorous Research Skills

STRUCTURE

The Doctor of Philosophy in Engineering & Technology curriculum consists of course work that includes five core courses followed by submission and approval of the research proposal. This is followed by periodic progress review seminars leading to the submission and defense of the final thesis.

The seminars track progress of the scholar as per the timelines mentioned in the approved research proposal. A minimum of three such seminars will be held in the University campus. The candidate with prior approval of his/her supervisor(s), will approach Dean (PhD programme) for a suitable schedule. An objective of these seminars is to track progress on the research. One such seminar must be held every six months after the approval of Research proposal.

Each Doctoral candidate is expected to publish a minimum of one research article in a domain specific refereed (UGC Care List/SCOPUS) journal during the entire research period. Progress seminars and mentoring by DRC are useful to prepare such articles.

CURRICULUM SUMMARY

		E				
Course Code	Name of course	Internal Exams (Marks)	End Term Exam (Marks)	Total (Marks)	Credits	
PRM-4101	Research Methodology	50	50	100	3	
PRM-4102	Advanced Research Methodology	50	50	100	3	
PRM-4103	Doctoral Foundation Seminar	100	-	100	3	
PRM-4104	Doctoral Concentration Seminar	100	-	100	3	
PRM-4105	Research and Publication Ethics	50	50	100	2	
Total		350	150	500	14	

ASSESSMENT OF COMPREHENSIVE CURRICULUM

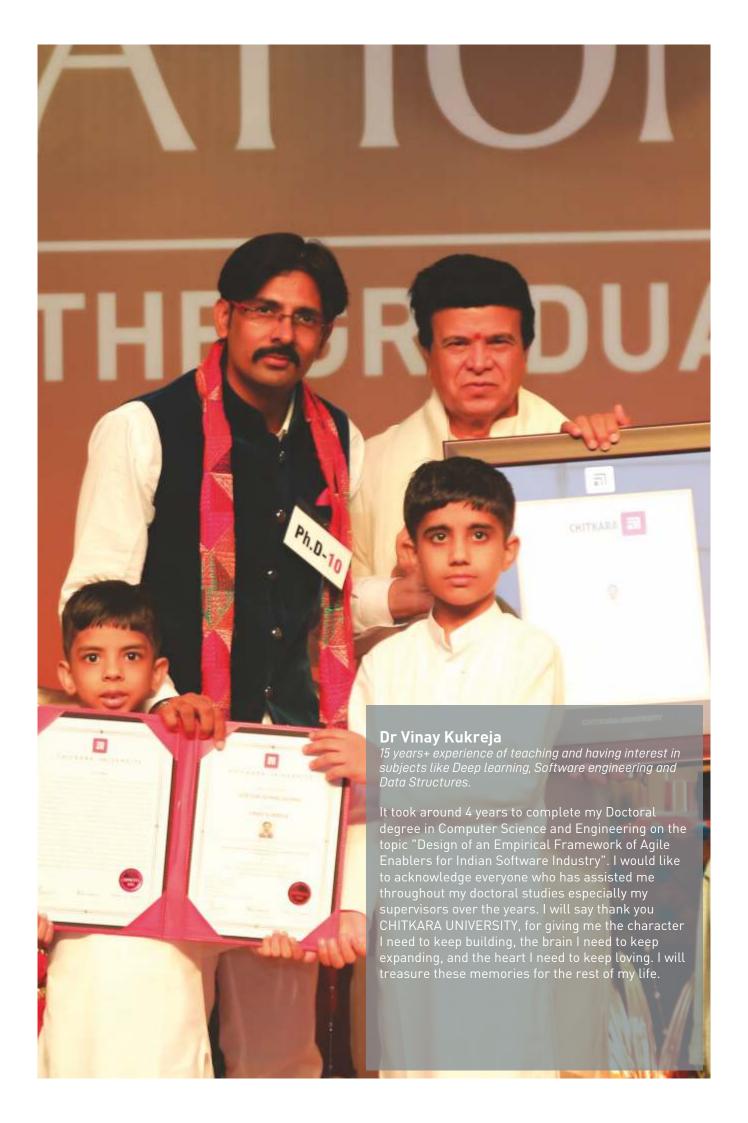
PEDAGOGICAL ASPECTS

Each credit will be equal to 15 hours. At least one week prior to the commencement of a particular course, the faculty member concerned or the course coordinator will circulate among the students the following pertaining to the course:

- The course outlines containing the syllabus along with text books, reference books and other study material.
- Day-to-day schedule to be followed detailing the pace, coverage, prior reading assignments, case studies, home assignments to be perused by the students etc.
- Various components of evaluation, such as presentations (announced or unannounced), group exercises, home assignments, tests/examinations, class participation, end term grading with relative weightage etc.
- Other matters found desirable and relevant.

ASSESSMENT AND EVALUATION

Subject Title	Subject Code	Internal Assessment (50 Marks)	External Assessment (50 Marks)	Minimum Pass Percentage
Research Methodology	PRM- 4101	Attendance (20) Class Performance (10)	Written Examination (50)	55 % or more- Pass
		Assignments (20)		Less than 55% - Fail
Advanced Research	PRM- 4102	Attendance (20) Class Performance (10)	Written Examination (50)	55 % or more- Pass
Methodology		Assignments (20)		Less than 55% - Fail
Doctoral Foundation	PRM-4103	Assignment/ Report/Presentation / MOOC write-up (100)	_	55 % or more- Pass
Seminar				Less than 55% - Fail
Doctoral Concentration	PRM-4104	Report and Presentation (100)		55 % or more- Pass
Seminar				Less than 55% - Fail
Research and Publication Ethics	PRM-4105	Attendance (20) Tutorials, Assignments, Quizzes and Group Discussions (30)	Written Examination (50)	55 % or more- Pass
				Less than 55% - Fail





FRAMEWORK FOR PhD PROGRAM

Designed exclusively for working executives

DELIVERABLE - 1

Submission of Application form Please fill out the attached application form

DELIVERABLE - 2

Acceptance by Chitkara Business School

After acceptance of the form, the admission process will be as follows

• Written test • Personal Interview
The syllabus of written test will be communicated to
you via e-mail.

DELIVERABLE - 3

Selection for Doctoral program

Once you are short-listed, after qualifying the written test and personal interview round, as per the merit for the PhD program at Chitkara University (Punjab, India), candidate would need to proceed towards registration and commencement of their course work.

DELIVERABLE - 4

Course work requirement (One Semester)

Every candidate should complete five courses before working on Doctoral Dissertation. Every course will be held twice in a year and will be scheduled on the weekends. Course work dates for the year will be announced ahead of schedule so that candidate can plan their break from his/her workplace.

DETAILS OF COURSES

DELIVERABLE 4(A)

Research Methodology

Upon completion of this course work, the candidate will be able to:

- Understand nature and functions of research
- Introduction to Systematic Literature Review.
- Gain knowledge about basics of research designs that include problem formation, hypotheses/question forming, research design, sampling techniques, data collection and analyse.
- How to formulate research framework and hypothesis empirically.
- To learn how to develop a manuscript.

• DELIVERABLE 4(B)

Advanced Research Methodology Upon completion of the course work, the candidate will be able to:

- Use statistical techniques for decision making.
- Develop skills in structuring and analyzing problems statistically.
- Formulate answers to common decision problems through statistical analysis.
- Utilize computer-based statistical software to perform mathematical calculation and thereby minimize time requirements.

• DELIVERABLE 4(C)

Doctoral Foundation Seminar

The course is thoroughly designed to enable and equipping scholars with required theory, related concepts, tools and technology in the different research areas. This course may preferably be taught in the online mode (MOOC).

DELIVERABLE 4(D)

Doctoral Concentration Seminar

The course will cover the following:

- Recent trends and contemporary issues in the candidate's chosen area.
- ▶ Theoretical and experimental framework.
- Identification of base papers.
- State of art (Important updated studies in the research area).
- Identification of research gaps.
- Identification of Tools/Technology for conducting proposed research.

DELIVERABLE 4 (E)

Research and Publication Ethics

The course will cover the following:

- Learn about the different types of research ethics and misconducts.
- Learn about the range of strategies to avoid research misconducts such as publishing research and plagiarism.
- Learn about the rights and obligations of the researchers, and develop the ethical research and publication environment.



DELIVERABLE - 5

Finalization of Research Proposal and Approval

This will commence immediately after a candidate successfully completes the course work

(i.e. Deliverable 4). A suitable research supervisor will be allotted to a candidate and the following process is followed for smooth:

- Extensive review of literature under guidance of the thesis guide
- Selection of a topic and alternative topic(s).
- Preparation of Research Proposal
- Presentation of Research Proposal to Doctoral Review committee (DRC)
- Approval of Research Proposal and commencement of research

DELIVERABLE - 6

Progress Review Seminars (Every Six Months)

A minimum of three such seminar presentations will be held in the University campus. The candidate with prior approval of supervisor will approach the Dean for a suitable schedule. An objective of these seminars is to track progress of the research. One such seminar may be held every six months after the approval of Research Proposal.

DELIVERABLE - 7

Pre-Thesis Seminar

A seminar delivered by the research scholar based on the research work conducted before the final thesis is submitted for evaluation.

DELIVERABLE - 8

Publishing Tutorials

Each doctoral candidate is expected to publish a minimum of one research article in a domain specific referred journal during the entire research period. Progress seminars and mentoring by DRC are useful to prepare such articles.

DELIVERABLE - 9

• DELIVERABLE 9(A)

Final Thesis Submission

Each candidate will submit three copies of thesis for examiners evaluation. These will be accompanied by abstract and summary of the thesis as per the schedule of defence.

• DELIVERABLE 9(B)

Defense of Thesis

In case the thesis is found to meet the university criteria and has been accepted by the examiners, candidates will be informed about the schedule for defense.

• DELIVERABLE 9(C)

Award of degree and convocation at the campus After successful thesis completion, the degree will be awarded.

AREAS

AREAS

KEY RESEARCH AREAS

COMPUTER SCIENCE & ENGINEERING

- Network Security
- Internet of Things
- Embedded systems
- Social Computing and Machine Learning
- Open MP and CUDA Programming
- Wireless sensor networks
- Network Application Programming
- Cloud Computing
- Data Analytics
- Digital Forensics
- Artificial Intelligence
- Design Analysis of Algorithm
- Big Data

ELECTRONICS & COMMUNICATION ENGINEERING

- Augmented and Virtual Reality
- Modeling and simulation of electronic devices
- Wireless communication (MIMO Systems and cognitive radio)
- Industrial Microwave/RF in food
- Nano-Photonics and Integrated Optics
- Radio-over-Fiber links
- VLSI design

- Hybrid Tracking
- Design of a Radio Frequency Low Noise Amplifier
- Digital Signal Processing for Wireless Channel Estimation
- Vision system implementation
- Optical Communication Systems
- Error control coding

MECHANICAL ENGINEERING

- Non-Conventional machining
- Material transfer
- Ergonomics
- Industrial Engineering
- Electrochemical storage of hydrogen
- Renewable and sustainable energy systems
- Surface roughness & micro-hardness
- Manufacturing
- Tribology
- Thermal Engineering
- Hydrogen Fuel Cell technologies
- Materials for energy storage
- Thermal engineering and fluid mechanics

CIVIL ENGINEERING

- Retrofitting of structures
- Road Pavements
- Environmental Engineering
- Transport Environment interaction
- Green Buildings and Sustainable construction Practices
- Industrial and Bio-Agri-wastes as alternate construction materials
- Highway Engineering
- Bituminous materials
- Industrial Pollution Control
- High Performance concrete
- Construction Technology & Management with highways & Structures
- Geotechnical Engineering



SPECIALISATION IN COMPUTER SCIENCE & ENGINEERING

PhD in Computer Science enables students to become experts in a technical subfield of computer science and advance the state of the art by contributing original research in that discipline. Most PhD students also gain practical experience in the classroom, as well as become visible members of the research community by publishing research and through oral presentations at conferences and research seminars. Upon completing the PhD program, students are able to set their own research direction, teach and advise students, and work at the forefront of cutting-edge research in academia or at an industrial laboratory.

The Doctor of Computer Science & Engineering degree program has been designed to help the research scholars to gain an in-depth understanding of a specialized subject related to computer science. This would allow them to predict developments and make contributions in area of expertise. PhD can take the research scholar much further afield of the classic image of a student working away in the lab, or sitting with a pile of books in the library. One may find oneself visiting archives or facilities to examine their data or look at rare source materials. One could even have the opportunity to spend an extended period at a research centre or other institution beyond one's university. The Ph.D. degree programme prepares the candidates for senior level leadership, consulting, and teaching positions within business, government, non-profit organizations, and higher education. The research scholars pursuing the Ph.D. degree are provided with an environment and facilities that help to develop analytic and research skills to define the research problems, to study advanced knowledge base to discover innovative solutions available till date. They are also provided with opportunities to practice consultation so as to facilitate innovative change in organizations, communities, and society.

DOCTORAL PROGRAM SPECIALISATION IN ELECTRONICS & COMMUNICATION ENGINEERING

Chitkara University's Doctor of Philosophy in Electronics & Communication Engineering also builds on the foundation of a Bachelor's/ Master's degree to train and prepare students for leadership in research and development and teaching positions in industry and academia. Our doctoral students are educated and trained thoroughly to find, understand, keenly observe and critically analyze a problem to explore various available solutions and provide the best one as per the given constraints. They are also trained and encouraged to write funding proposals and make presentations on their research/product ideas to various national/international, academic and industrial research funding organizations as per the chosen subject/area. On completion of the PhDs, students will be equipped to carry out their own independent research and train new researchers.

The PhD programme in electronics and communications thrusts upon but is not limited to the following main areas: Low power VLSI design, circuit and system design, microwave and antenna design, biomedical electronics and instrumentation engineering, FPGA based system design, signal processing, image processing, microwave in agricultural technology.

DOCTORAL PROGRAM SPECIALISATION IN MECHANICAL ENGINEERING

The Doctor of Philosophy (PhD) Degree in Mechanical Engineering is the highest degree awarded by the Mechanical Engineering Department and is recommended for students who are interested in leadership careers in academia (e.g., as a faculty member of a university), industry, or government. The objective of a doctoral program is for the student to develop analytical, experimental and/or computational abilities in order to work and conduct independent research in the field of mechanical engineering. Many of the skills cannot be learned in the classroom sitting, but instead must be developed in the laboratory, library, and conference room as the student actively interacts with faculty, other students, and researchers around the world. Independent, non-classroom based learning and problem solving is a core aspect of the PhD degree in Mechanical Engineering at Chitkara University. Upon completion of his/her dissertation the student should be an expert in one of specialized subjects of Mechanical Engineering and shall contribute to discover innovative solutions for the problems of organizations, communities and society.

DOCTORAL PROGRAM SPECIALISATION IN CIVIL ENGINEERING

PhD Civil Engineering is a course of study that deals with the design, construction, and maintenance of structures that are integral to the general public, like roads, dams, bridges, canals, and additionally railways, sewage systems, etc. While pursuing a PhD in civil engineering, students will have to choose a specialization area, like geoinformatics, geotechnical engineering, hydraulics, and water resources engineering, infrastructure engineering, etc to conduct research for their dissertation. Candidates wanting to pursue PhD Civil Engineering should fulfill the minimum eligibility criteria i.e, master's degree in civil/ environmental/ mechanical/ agricultural engineering or in a related engineering branch. The admissions are usually based on the entrance exams.

ADMISSION CRITERIA

Admission Eligibility

The candidates for the program must have one of the following qualifications obtained from any of the universities incorporated by an Act of the central or state legislature in India or other educational institutions established by an act of parliament or declared to be deemed as a university under Section 3 of the UGC Act, 1956, or possess an equivalent qualification recognized by the Ministry of HRD, Government of India, or an equivalent qualification from an institution approved by AICTE.

A Masters' degree or its equivalent in any discipline with minimum 55% aggregate marks (relaxation for reserved categories as per UGC norms)

Candidates who fulfill the eligibility criteria, are required to fill the admission form with evidences of all particulars to be attached. All application forms will be screened by a separate screening committee whose representatives will be from Doctoral Research Committee and Experts from the University in the respective areas. The candidates short-listed on the basis of their academic record and relevant experience will appear in a written test to be conducted by the University. Time-table & Curriculum will be intimated to the registered candidates. The candidates will then appear for a personal interview for the final selection.

PROGRAM FEES

Components	Fee
Enrollment Fee Course Work Fee 1	Rs.50000/- Rs.25000/-
Course Work Fee 2 Course Work Fee 3	Rs.25000/- Rs.25000/- Rs.25000/-
Doctoral Seminar on Specialisation	Rs.60000/-
Research Proposal Seminar Progress Review Seminars 1	Rs.60000/- Rs.20000/-
Progress Review Seminars 2 Progress Review Seminars 3 Pre-Thesis Seminar	Rs.20000/- Rs.20000/- Rs.40000/-
Thesis Submission & Defense	Rs.75000/-

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Admissions Helpline: +91 9501105633



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