PROGRAMME

Module	Title of course	Course content
1	Optics	History of lasers : ♦ Laser history, lasers in medicine, lasers in dentistry, lasers in science, … ♦ Optics data: - introduction - origins - optics in the 17th, 18th, 19th centuries and today - geometrical optics - the field concept - mathematical formulation of the electromagnetic phenomenon - diffraction, reflection, interference ♦ The quantum nature of the light: - black bodies radiation - the light wave/particle dualism - the photoelectric effect - absorption and emission • Medical statistics • Scientific literature • SAS workshop • Statistical methods • E-Learning
2	Physics of lasers	♦ The Fabry-Perot interferometer laser: the light amplifying physical properties of lasers ultra-short pulses production ♦ Dosimetry: irradiation parameters, emission mode profiles
3	Interaction laser-tissues	♦ Interaction laser-tissues : a physical point of view : - optical properties of biologic tissues - light absorption in water - light absorption in hydroxyapatite - linear and non-linear interaction processes: coagulation, vaporization, ablation, disruption, etc. ♦ Interaction laser-tissues in a biological point of view: - Light absorption in water - Light absorption in hydroxyapatite - Light absorption in melanin, hemoglobin, proteins, etc - Thermal side effects - Influence of some parameters on the laser efficiency
4	Laser safety and properties of lasers and their applications in dentistery	♦ Laser safety and law requirements ♦ Laser handling: - Light guidance principles - Transmissions systems and their diversity ♦ Construction, function, properties of laser ♦ Systems in dentistry and their clinical applications: - Er-YAG and Er-Cr: YSGG lasers (2940 and 2780 nm) - Nd-YAG laser (1064 nm) - Ho-YAG laser (2100 nm) - Nd-YAP laser - Alexandrite laser (755 nm) - He-Ne laser (632 nm) - Argon ion laser (488 and 514 nm) - CO2 laser (9600 and 10600 nm) - Diode lasers (808 and 980 nm)

5	Lasers conservative dentistery and Laser in caries prevention	♦ Lasers, caries diagnosis and prevention : - General aspects of caries diagnosis and prevention - State of the research - Laser, enamel, dentine and fluoride - Laser fluorescence, laser spectroscopy - How to choose the adapted wavelength ? ♦ Laser, cavity preparations, carious treatments : - General aspects and state of the art in the field of cavity preparations, - Enamel preparations, dentin preparations, - Adhesion to … ♦ Pulp capping - Treatment modalities - How to choose the adapted wavelength ? ♦ Lasers in dental laboratories ♦ Laser bleaching ♦ PAD (Photo Activated disinfection)
6	Lasers and endodontics	- General principles and state of the art on endodontic treatments, - Endodontic microbiology and lasers - Laser and smear layer - Laser, root canal filling, root canal re-treatment - How to choose the adapted wavelength ?
7	Laser in Oral Surgery and Periodontics and implantology	♦ Lasers and periodontics: - General aspects and state of the art in periodontology (diagnosis, treatments) - Periodontal microbiology - Lasers and periodontal treatments (soft tissues, hard tissues (cement, bone defects)) - Indications, contra indications - How to choose the adapted wavelength ? ♦ Lasers, oral pathology, oral surgery : - General aspects and state of the art (soft tissues, hard tissues) - Indications, contra indications on the use of lasers in oral surgery - How to choose the adapted wavelength ?
8	Low-level laser Therapy and Jurisprudence and Practice Management	♦ Low-level laser therapy : ♦ Biological response, diagnosis with non thermal laser, indications, contra indications, laser analgesia, laser acupuncture. ♦ Jurisprudence ♦ Ethics ♦ Practice management ♦ Practice marketing
9	Master Thesis	♦ Daw up of the master thesis ♦ Guideline analysis and discussion ♦ Literature research, selection and analysis ♦ Rules to be followed in a laboratory ♦ Research work ♦ Evaluation criteria ♦ Analysis ♦ Conclusion ♦ Presentation of the MT ♦ MT defense
10	Clinical training	♦ Clinical training on patients ♦ Sutdents must present six to ten clinical observations in different fields of oral lasers applications. Discussion is based on the clinical cases, the quality of the documents, the treatment plan, the methodology followed and the follow-up