

Semester - I		
Course Code	Course Title	Course Credit
18PICCE01	CEC-1 :Scientific Writing & Chem Draw Tools	2 Credits

Course Description:

Literature survey and problem finding is required for research work. The course contains literature search using various tools like NLIST, NPTEL science direct and other e-sources. Knowledge about articles, communications, review and patent is important for writing research papers. The course consisting topics about the chemistry structure drawing tools.

Course Purpose:

1. To understand the significance of Science direct search for data searching and mining.
2. To understand the NPTEL, NLIST search engine tools for scientific interest.
3. To be able to draw chemistry structures using chemdraw tools.
4. To be able to read and understand the patents.

Course Outcomes: Upon completion of this course, the learner will be able to

CO No.	CO Statement	Blooms taxonomy Level (K ₁ to K ₆)
CO ₁	Investigate literature search using NLIST, NPTEL, Science Direct and various E-resources.	K1, K2
CO ₂	Understand variance between various Full paper, article, patent, communication and review article.	K1, K2
CO ₃	Understand the IPR policy, patent filling, significance and Intellectual patent applications.	K1, K2
CO ₄	Competent to draw various chemical structure, various assembly, chrial compounds, laboratory apparatus using ChemBioDraw, Chem Sketch.	K3, K4
CO ₅	Understand the application of chembiodraw and chemsketch for drawing reactions in various scientific journals.	K3, K4

Course Content	Hours
Module-I : N-List & Science Direct search	4 hrs

<ul style="list-style-type: none"> • Introduction of NLIST website, available e-resources. • Access of e-books and research articles. • E-learning through NPTEL. • Introduction to publishing house, various journals formats. • Various search option, recent publication. • Citation index, impact factor, h index. 	
Module-II : Articles Review & Scientific writing	3 hrs
<ul style="list-style-type: none"> • Difference between Full article, letters, note, communication, mini review and review with case study. • Writing research article: Introduction, result & discussion, chemistry, Experimental section, acknowledgement & references. 	
Module-III : Patent	3 hrs
<ul style="list-style-type: none"> • Introduction to IPR (Intellectual property rights), Patent searching, downloading, reading and filling. • Difference between patent and provisional patent. • Significance of Patent. 	
Module-IV : Chemdraw Software-1	4 hrs
<ul style="list-style-type: none"> • Introduction of ChemDraw, Chem Sketch, Drawing chemical reaction, Structure drawing using templates, Structure to name and name to structure, Drawing mechanism of reaction, • Diagram of Distillation Assembly, Chiral Structure Draw. Drawing apparatus used in laboratory. Reproducing reaction scheme from given research paper. • Introduction of 3 D Chemdraw ultra, export chemical structure from 2D to 3D, run energy minimization of given molecule & other physicochemical parameters for given set of molecules. 	
Module-V : Chembiobdraw Software-2	2 hrs
<ul style="list-style-type: none"> • Introduction of 3 D Chemdraw ultra, export chemical structure from 2D to 3D, run energy minimization of given molecule, predicting logp value & other physicochemical parameters for given set of molecules. 	

Suggested laboratory experiments:
<ul style="list-style-type: none"> • Not applicable

Pedagogic tools:
<ul style="list-style-type: none"> • Chalk and Board
<ul style="list-style-type: none"> • LCD and Videos.
<ul style="list-style-type: none"> • Hands on training
<ul style="list-style-type: none"> • PPT presentation

Text books

1. F. J. Waller, Writing chemistry patents and intellectual property: A practical Guide, Wiley, 2002.

Laboratory Manual/ Book

1. American Chemical Society. Division of Chemical Information, American Chemical Society. Meeting, (1989), Chemical structure information systems: interfaces, communication, and standards *Volume 400 of ACS symposium series Chemical structure information systems: interfaces, communication, and standards*, American Chemical Society.

Suggested reading / E-resources

- NLIST
- NPTEL
- Science Direct journals

Suggested MOOCs

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Methods of assessing the Course Outcomes

The COs of the course will be assessed through

- CIE
- Assignment
- Seminar