IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

An Empirical Study Of Awareness Towards Semiconductor IC Piracy Protection Laws In Students Of Different Educational Streams

Shivangi Sharma*[1]

Research Scholar,

Faculty of Law, Rabindranath Tagore University, Bhopal, MP

Dr. Neelesh Sharma*[2]

Dean, Faculty of Law, RNTU, Bhopal, MP

ABSTRACT

Indian Digital Economy has emerged as the world's 3rd largest economy after China and the United States, according to the State of India's Digital Economy (SIDE) 2025 reports. The digital economy raises issues like digital piracy that can shake any country's digital economy abruptly. Semiconductor integrated circuits (ICs) or chips are the backbone of every electronic device, whether it is a mobile phone or a TV set. The unauthorised copying of the ICs design and the piracy of chip layouts discourage further innovation in this sector, as its Research and Development requires heavy investment. Considering this as a Global concern, the TRIPS Agreement in 1994 provided guidelines to all the WTO member countries related to the protection of semiconductor integrated circuit layout designs. Based on the guidelines, India enacted a law related to the protection of semiconductor integrated circuit layout designs, i.e. Semiconductor Integrated Circuit Layout Design Act (SICLDA), 2000. This act has emerged as a

[1] shivangi_au221935@rntu.ac.in

Research Scholar,

Faculty of Law, Rabindranath Tagore University, Bhopal, MP

[2] neelesh.sharma@aisectuniversity.ac.in

Dean, Faculty of Law, RNTU, Bhopal, MP

milestone for the Indian Digital Economy. Awareness of such specialised laws remains limited within the legal education system. The main purpose of this paper is to transcend the disciplinary boundaries and think beyond our own disciplines to innovate, research and explore.

Keywords: *Legal Education, IPR Awareness, SICLDA 2000, Chip Piracy, Interdisciplinary Learning, Higher Education.*

Introduction:

The rapid and difficult progress of the semiconductor industry has caused many new benefits, but not to be forgotten it has already brought in many other complex problems such as chip piracy and intellectual property rights (IPR) [1].The term chip piracy encompasses the unauthorized reproduction, or and counterfeiting of the semiconductor designs and integrated circuits (ICs). Among the numerous areas related to the production of these semiconductors, this problem is particularly problematic since the semiconductors are the backbone of devices from mobile phones to cars and medical equipment. There is a massive need to protect the designs of semiconductors not only to ensure fair competition and innovation but also to secure national security and maintain economic stability [2]

Intellectual Property Rights (IPR) assumes vital significance for the protection of manufacturers of semiconductor that are genuine. Intellectual Property Right is an umbrella term that covers multiple legal frameworks, which include copyrights, patent, trademarks, and also trade secrets, and which gives the owner an exclusive ownership right. The purpose of IPR is to secure the rights of innovators on the one hand and to protect the public on the other. The semiconductor industry relies heavily on the patent system in order to engage an exclusive right to the new chip design and manufacturing technologies. Also, the layout-design protection laws have a direct development that seeks to protect the property rights of the layout designer in the face of the constraints and the costs of network structures that involve the use of design materials by others [3].

The SICLD Act of 2000 is a landmark Indian legislation designed to protect the intellectual property rights associated with the original and unique layout designs of semiconductor integrated circuits (chips), thereby fulfilling India's obligations under international trade agreements like the TRIPS Agreement.[4]

U.S.A. provided the first-ever protection to semiconductor chips through the Semiconductor Chip Protection Act (SCPA) 1984, the impact of which was global. Japan introduced the Japanese Circuit Layout Rights Act (JCLRA) in 1985. Further, to push ahead the efforts offering protection to the semiconductors, a treaty in the year 1989 was formulated, i.e., Intellectual Property in Respect of Integrated Circuits (IPIC Treaty) under the aegis of World Intellectual Property Organisation (WIPO), which is an agency of United Nations, headquartered at Geneva, with a primary mission to promote and protect the Intellectual Property Rights worldwide [5]. The protection of intellectual Property rights (IPR) in developing countries has become a much-debated issue in recent years. This debate is often placed in a North-South framework, where the dominant view is that southern (developing) countries tend to lose out in protecting IPR. The reason for the static and partial balance for this disadvantage is that IPR

protection will strengthen the market power of firms that innovate in the north and raise prices in developing countries [6].

Dynamic and general equilibrium factors are taken into account, the South need not benefit from an increase in IPR [7].

Integrated circuits can be categorized into two types based on the nature of the input signal:

1. Linear or Analog ICs: In Analog signal types, they have continuously varying feedback. The linear function of the input is the output signal. They are widely used in amplifiers for radio frequency and audio frequency.

2. Digital IC: Digital input is specified at two levels and not for a continuous array of values. This includes logical gates with a 0 (low state) or 1 (high state) input signal. It was found on the computer. The layout design (topography) of an integrated circuit is a three-dimensional action of the components that frame an integrated circuit that is planned to be assembled.[8]

Distinctiveness in Circuit or Design:

Nowadays, a variety of new techniques, such as VLSI or triple layer buffering, or nanotechnology, are used in the manufacture or production of electronic elements, where thousands of components are designed on a layer and installed in an embedded style technology technique, resulting in significant changes in the creation of products that are distinct in both use and operation. For the purpose of registration, any style, its layout, or its overall appearance must meet the registration requirement of being distinctive. [9]

Types of Chip Piracy:-

Chip piracy occurs in several ways, each presenting a unique risk to innovation and economic development :

- **Counterfeiting:** It encompasses the production and distribution of counterfeit semiconductor chips, which are similar to the original but of inferior quality. Counterfeiting is a threat to safety not only of critical applications, such as the medical industry and the defence system but also of the aircraft industry. They are also the main cause of the loss of money to the real manufacturers, as they are disrupting the supply chain and diminishing the trust of consumers in the strong brands.
- **Reverse Engineering:** In this practice, illegal actors reverse-engineer and dissect a competitor's chip architecture in order to replicate it for free without authorization. While reverse engineering is at times used lawfully for analysis and innovation, it most times ends up amounting to an infringement of intellectual property laws once secret technologies are copied and implemented for financial gains. This process diminishes the colossal investment it takes in conducting semiconductor research and development, inhibiting innovation.

- **Cloning:** Cloning refers to the exact duplication of a source semiconductor chip's design and reselling it under a different label. This type of piracy is misleading to consumers, erodes brand name, and steals market share for the source creators. Cloned chips usually have inferior quality and result in device failure as well as an increased likelihood of failure in electronic systems.[10]

Historical Background of the Research Problem:

In the early 16th century, the notion of piracy jure gentium appeared in legal texts that were recognized by courts. Historically, pirates were seen as adversaries of humanity. An archaic legal word in admiralty law, Hostis humani generi, signifies that a pirate is not an enemy of the state, but rather an adversary of humanity itself. Hugo Grotius, the Dutch jurist, posited that a pirate forfeits the protection of any state. Consequently, he saw all nations as enemies of humanity, possessing the authority to exercise universal jurisdiction against suspected pirates. [11]

Piracy, a persistent menace that has afflicted maritime routes, is a multifaceted challenge to global security and economic stability in contemporary times. Piracy, defined by its elusive and adaptive nature, presents a continual danger to the safety of seafarers, the seamless operation of international commerce, and the security of coastal communities.[12]

Concerning intellectual property security, a significant issue for copyright holders is piracy, defined as the unlawful use of copyrighted materials. When a legitimate copyright is in effect, anybody seeking access to the original copyrighted work must provide the copyright owners with the requisite fee. When an individual gains access without payment, that person is seen to have committed an act of piracy.[13] Piracy affects all kinds of intellectual property and manifests in various ways based on the access method and intellectual property framework. [14]

The term piracy refers to the act of illegally reproducing, importing, or distributing works that are protected by copyright, whether they are major sections of works or the whole works themselves. The person who owns a work that is protected by copyright is entitled to certain exclusive rights about their inventions. Reproduction, publication, adoption, translation, and public performance are all included in this category of rights. It is up to the owner to decide whether or not to sell, transfer, license, or bequeath the copyright to another individual. Any person who participates in the aforementioned conduct involving a copyrighted property constitutes copyright infringement. The only exception to this rule is the owner of the copyright or their authorized agent acting on their behalf. In the same way that every other kind of theft results in a loss for the property owners, copyright infringement brings about the same effect. Piracy has a detrimental influence on the creative ability of a society to the extent that it deprives creators, such as authors and artists, of the remuneration that is rightfully theirs. This is in addition to the economic loss that it causes.[15]

Piracy is an international offense that is subject to the jurisdiction of all states according to customary international law. Universal jurisdiction grants every state the authority to prosecute and penalize piracy irrespective of the location of the offense. Due to universal jurisdiction, every state is obligated to prosecute pirates according to its domestic laws, regardless of the pirate's country, the ship's registration,

or the cargo's destination. Alongside multilateral treaties, many international organizations, such the International Chamber of Commerce's International Maritime Bureau (IMB) and the International Maritime Organization (IMO), aim to guarantee the secure passage of vessels. The IMB is a non-profit organization dedicated to combating maritime crime, including piracy. The IMB created its Piracy Reporting Centre in Kuala Lumpur, Malaysia, to monitor and advice on the escalating global piracy issue. The Piracy Reporting Centre is financed by voluntary donations. The Centre aims to provide a consolidated information hub about pirate assaults and to alert and warn shippers and dealers about high-risk regions. The IMB further provides investigative services and litigation assistance. [16]

Significance of IPR Education in Legal Curriculum at college/university level:

- **To improve knowledge about IPR laws :**

Law schools are also centres for legal research and policy analysis. IPR education included in the legal curriculum makes the students think through and analyze contemporary topics like copyright piracy in the modern era, protection of patents in artificial intelligence, and bioethical issues of biotechnology patents. This research is helpful for establishing stronger legal structures and policy proposals for governments and international organizations.

- **Bridging the Gap between Law and Innovation**

The convergence of law and technology has created sophisticated legal issues in fields like artificial intelligence, biotechnology, and digital content creation. An integrated IPR curriculum allows students to appreciate the legal complexities of safeguarding innovations in these fast-paced sectors. Through interdisciplinary learning, law schools can equip students to collaborate with scientists, engineers, and entrepreneurs effectively.

- **Encouraging Entrepreneurship and Startups**

IPR is essential for startups and entrepreneurs looking to safeguard their new products and ideas. Any graduates who possess IPR skills can serve as legal advisers to startups and ensure that they acquire patents, trademarks, and copyrights. Legal entrepreneurship is also possible for law graduates who know about IPR, as it allows them to give advisory services to new industry-based businesses.

- **Preparation for Judicial and Quasi-Judicial Positions**

Judges, arbitrators, and legal officers dealing with intellectual property disputes need expertise in IPR law. Legal education with a focus on IPR prepares students to work in judiciary, intellectual property appellate boards, and dispute resolution forums. Increased IPR litigation has led to the need for specialized knowledge in this area to make legal professionals more effective in settling complex disputes.

- **Understanding International Intellectual Property Law**

Globalization has given rise to closer cooperation in the protection of intellectual property through multilateral agreements like the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), the treaties of the World Intellectual Property Organization (WIPO), and regional treaties like the European Patent Convention. Law students need to have knowledge of these frameworks in order to practice international trade, diplomacy, and multinational corporations. [17]

Relevance of IPR Education in a Multidisciplinary Context:

a. **Law and Technology:** All the engineers and scientists who are engaged in research and development must understand the patent laws and design protection to safeguard their innovations from piracy.
b. **Law and Business:** All the entrepreneurs and managers rely on trademarks, trade secrets, and copyrights to create brand value which makes IPR literacy crucial in business schools.
c. **Law and Arts:** All the artists, authors, and designers must be aware of copyright and design rights to protect their creative works.
d. **Law and Medicine/Biotechnology:** The Intellectual Property Rights plays a central role in pharmaceutical patents, genetic research and medical device innovations.
e. **Law and Social Sciences/Humanities:** The researchers in economics, sociology, and policy can study and analyze the impact of IPR on innovation, competition, and development in their respective fields.

On reviewing the related published researches for this study, researcher found the following studies-

i. **Sunardi, D. I., & Hartono, A. (2024)** investigated the relationship between religious affiliation, ethical concerns, and the likelihood of engaging in digital goods piracy using a theory of planned behaviour synthesis. Software, music, movies, audiobooks, and other protected commodities may be illegally reproduced or downloaded; this practice is known as digital piracy. Digital piracy is a multifaceted behaviour characterized by interconnected motivations, perceptions, beliefs, and effects. The entities included websites and platforms such as Bolasiar.com, Spotify, Netflix, Video, Telegram, and similar services. This study employed primary data gathered via an online poll of 200 participants. This study used a purposive sampling method. The proposed hypotheses were evaluated via Structural Equation Modelling (SEM). This study demonstrates that factors such as attitude, subjective norms, perceived benefits, and intrinsic religiosity significantly influence the propensity to pirate digital products. Conversely, moral obligation exerts a detrimental effect.[18]

ii. **Belchior-Rocha et al., (2024)** explored the moral quandaries and decision-making processes linked to piracy, even among law-abiding people. In order to provide legislators, corporate stakeholders, and academics with insights into the difficulties presented by digital piracy, this research incorporates a variety of pertinent literature and ideas, including situation ethics theory. This research adds to the current conversation on how to lessen the negative effects of digital piracy on businesses, content producers, and cybersecurity by arguing for legitimate access to resources and investigating its root causes. Research on the causes and moral consequences of digital piracy is lacking, and there is also a great deal of conflicting evidence. By dissecting the factors that fuel this illegal practice, clarifying the complex dynamics at play, and shedding light on the causes of digital piracy. The findings of this research provide a foundation for people to tackle this pervasive problem in the digital era. In order to better comprehend the difficulties caused by this worldwide problem, this research delves into the moral quandaries and decision-making processes linked to digital piracy.[19]

iii. **Okta Wibowo, T. (2024)** investigated the role of online shopping platforms in facilitating the expansion of account-sharing programs for obtaining audiovisual content on streaming services. Such behaviours are challenging to categorize as acts of piracy as there has been no infringement of copyright on protected content or distribution of audiovisual material beyond the streaming platforms. Moreover, these behaviours represent a novel kind of the 'shadow economy' by permitting certain users to lease their streaming platform accounts and facilitating numerous users to access streaming services lawfully while violating the terms of service of the platforms. Account-sharing programs are distinct from pirate tactics involving peer-to-peer (P2P) networks or audiovisual streaming websites that facilitate the illicit distribution of video content. This study provides enhanced understanding of the distribution of audiovisual content via streaming platforms and contributes to the discourse on emerging forms of piracy.[20]

iv. **Kaushik, S. (2024)** attempted to contest this deeply ingrained modern concept of digital piracy. The study endeavours to identify the precise origins of the rhetoric surrounding piracy in copyright. It examined the legal suitability of correlating the notion of 'copyright infringement' with numerous offenses, including maritime piracy and theft. The study supports for "fair labelling" of copyright infringement, which incorporates a more thorough awareness of the extent and character of legal transgressions. This study makes an effort to include game theory in order to shed light on the phenomena of profitable piracy, which runs counter to the claims that have been made by the software industry. It is the purpose of this study to broaden the academic discourse on copyright infringement by taking into consideration the features of historical, behavioural, and legal settings that have been frequently overlooked. The purpose of this study was to provide a more comprehensive understanding of piracy that goes beyond the economic side of the crime.[21]

v. **Hammam, H. H., et al., (2024)** introduced an innovative anti-piracy security method for analogy and mixed-signal (AMS) circuits. The circuit is reconfigured by concealing transistors and capacitors with key-controlled variants. It obscures both the device geometries and their specifications, which delineate the maximum permissible current, voltage, and power dissipation. The circuit is engineered to operate properly just with a designated key. Loading any wrong key diminishes performance, and for the majority of these keys, the chip sustains damage due to electrical over-stress. This inhibits counterattacks utilizing a chip to identify the correct key. The process is illustrated using a low-dropout regulator (LDO) fabricated in the 22nm FDSOI technology by Global Foundries. Locking the LDO renders the entire chip inoperative until the LDO is subsequently unlocked. The secured LDO exhibits no performance degradation, and the area overhead is justified, remaining below 25%, while providing protection against all recognized countermeasures in the AMS domain.[22]

vi. An article discussing the intellectual property protection of integrated circuit (IC) layouts highlights the low number of prosecutions/applications under the Semiconductor Integrated Circuits Layout-Design Act, 2000 in India. It attributes this to a possible lack of awareness about these IP protections, especially among stakeholders like students or innovators in semiconductor hubs such as Bangalore. The article also explains the challenges in protecting IC layouts using traditional patents and the importance of specific semiconductor IC layout protections under Indian and international laws.[23]

vii. A study focusing on digital piracy behavior among multimedia students in Malaysia investigated factors like legal awareness, fear of legal consequences, and deterrence related to piracy behavior. The study highlights that fear of legal consequences and perceived likelihood of punishment has the strongest influence on piracy behavior, indicating the importance of awareness in curbing piracy.[24

viii. Research on Intellectual Property Rights relating to Integrated Circuit Layouts in Bangladesh discusses the current lack of sufficient IP law protection for IC layout designs there. It points out that the relatively immature legal framework leads to violations and piracy issues. The study stresses the need to promote strong protection policies and increase awareness to protect integrated circuit layout designs better.[25]

Methodology:

The present study was a sequential exploratory research design. Descriptive survey method was employed to collect the data from the samples among students of different universities and different disciplines. To collect the data a semi structured questionnaire was used and purposive sampling techniques applied to select the samples. To analyse the collected data, t-test was used.

Objective of the study:

To assess the status of awareness about Semiconductor Integrated Circuit (IC) or chip piracy protection laws i.e. SICLDA,2000 among students from different disciplines

Hypothesis of the study:

For the present study the following hypothesis was formulated as **"There will be no significant difference between the awareness towards chip piracy protection laws or SICLD Act, 2000 among the Students across disciplines".**

While analysing the collected data, researcher found the following-

Table 1.1 Analysis of Mean, SD and SEM regarding awareness towards chip piracy protection laws or SICLDA, Act among students of different fields of study

Discipline	Gender	Mean	SD	SEM
Law	Male	17.33	0.577	0.333
	Female	17.67	0.577	0.333
Engineering	Male	14.00	1.000	0.577
	Female	13.67	1.155	0.667
Management	Male	8.67	0.577	0.333
	Female	13.00	3.606	2.082
Science	Male	14.33	3.786	2.186
	Female	17.00	0.000	0.000
Arts/Design	Male	12.00	0.000	0.000
	Female	11.67	1.155	0.667

Table 1.2 t-test analysis regarding awareness towards chip piracy protection laws or SICLDA, 2000 among students of different fields of study

Discipline	t-test	p-value
Law	-0.707	0.519
Engineering	0.378	0.725
Management	-2.055	0.170
Science	-1.220	0.347
Arts/Design	0.500	0.667

Interpretation:

In the above **Table 1.1,** in Law discipline both male and female students have very high scores i.e. 17.33 and 17.67 that shows they have high knowledge of chip or IC protection laws. Also, their SD and SEM is quiet low which shows consistent knowledge across students. Therefore, There is no significant difference can be seen on the basis of gender. The t-test ($p = 0.52$) shows no significant gender difference. In Engineering discipline, the awareness of IC laws among engineering students is lesser than the law students. Male students have marginally higher mean scores than female students, but the difference (~0.33) is not statistically significant, especially considering the overlapping SDs. In Management discipline, Male mean is lower (8.67) than female mean (13), suggesting a trend where females are more

aware. However, high SD for females (3.606) suggests uneven awareness within the group. Male students demonstrate consistently low awareness (SD = 0.577).In Science, Female students achieved consistently high scores (Mean = 17.00; SD = 0), while male students show moderate mean scores (14.33) with high variability (SD). This indicates that female Science students are uniformly aware of IPR concepts, where as awareness among male students is inconsistent. In Arts, both genders show relatively low awareness, with males scoring slightly higher (12.00) than females (11.67). Male scores are perfectly consistent (SD = 0), while female scores show minor variation (SD = 1.155), indicating generally low exposure to IPR education in creative disciplines.

Hence, Based on the analysis of the data, the null hypothesis "Students across disciplines have limited awareness of chip piracy protection laws or SICLDA, 2000" is **accepted** as all p-values were greater than the 0.05 level of significance. This indicates that students across different disciplines have a uniformly limited awareness of chip piracy protection laws under SICLDA, 2000.

As we conclude in totality, researcher summarised it as-

- Gender does not significantly affect overall IPR/chip piracy laws awareness within disciplines.
- Discipline remains the primary factor, with Law students scoring highest and Management students lowest among males, though female Management students show higher variability.
- Curriculum focus seems to influence awareness more than gender.

Suggestions/Recommendations:

1. IPR laws knowledge should not remain confined to law curricula, they should be embedded in Arts, Management, Engineering and science discipline too.
2. National Law Universities or other law universities/colleges should work in collaboration with IITs, NITs and other engineering institutions to widen the scope of the IPR laws.
3. Universities should organise joint workshop/Conferences/seminars for law, engineering, science, management and art students.
4. Interdisciplinary student research cells on IPR can be established within universities to promote sustained interest.

References:

1. Knechtel, J., Patnaik, S., & Sinanoglu, O. (2019, May). Protect your chip design intellectual property: An overview. *Proceedings of the International Conference on Omni-Layer Intelligent Systems (COINS)* (pp. 211–216). IEEE. https://doi.org/10.1109/COINS.2019.8767057
2. Baumgarten, A. C. (2009). *Preventing integrated circuit piracy using reconfigurable logic barriers* (Doctoral dissertation, Iowa State University). Iowa State University Digital Repository. https://doi.org/10.31274/etd-180810-1633
3. Savale, S. K., & Savale, V. K. (2016). Intellectual property rights (IPR). *World Journal of Pharmacy and Pharmaceutical Sciences, 5*(6), 2529–2559.
4. Bindal, S. (2015). The Semiconductor Integrated Circuit Layout-Design Act 2000 (SICLDA) in India. *Journal of Intellectual Property Law & Practice, 10*(4), 289–297. https://doi.org/10.1093/jiplp/jpv028
5. Horn, P., Crawford, S., & Maxwell, E. (2004). *Promoting innovation and economic growth: The special problem of digital intellectual property*. Committee for Economic Development. https://files.eric.ed.gov/fulltext/ED485016.pdf
6. Agrawal, R. (2024). Integrating the law behind integrated circuits in India. *NLUA Journal of Intellectual Property Rights.*
7. Helpman, E. (1993). Innovation, imitation, and intellectual property rights. *Econometrica, 61*(6), 1247–1280. https://doi.org/10.2307/2951731
8. Priyana, Y. (2022). Intellectual property rights relating to integrated circuit layout design: India, Bangladesh, and United States perspectives. *The Easta Journal Law and Human Rights, 1*(1), 1–8. Universitas Djuanda. https://esj.eastasouth-institute.com/index.php/eslhr/article/view/15
9. Dash, P. (2021). Semiconductors: Critical analysis of Indian legal regime. International Journal of Law Management & Humanities (IJLMH). Retrieved from https://ijlmh.com/paper/semiconductors-critical-analysis-of-indian-legal-regime/
10. Bindal, S. (2015). The Semiconductor Integrated Circuit Layout-Design Act 2000 (SICLDA) in India. Journal of Intellectual Property Law & Practice, 10(4), 289–297. https://doi.org/10.1093/jiplp/jpv028
11. Khobragade, J. W., Kumar, A., Binti Abd Aziz, S. N., & Maurya, D. (2021). The anti-maritime piracy law in India and Malaysia: An analytical study. *Journal of International Maritime Safety, Environmental Affairs, and Shipping, 5*(4), 208–219. https://doi.org/10.1080/25725084.2021.1975076
12. Riaz, N., Khan, A., & Usman, M. (2022). Legal frameworks for combatting piracy under international law: Evolving strategies and challenges. *Asian Social Studies and Applied Research, 3*(1), 284–291.
13. The relationship between copyright software protection and piracy: Evidence from Europe. *European Journal of Law and Economics, 21*(1), 29–51. https://doi.org/10.1007/s10657-006-6439-4

14. Nwogu, M. I. O. (2015). Copyright law and the menace of piracy in Nigeria. Journal of Law, Policy & Globalization, 34, 113–123.
15. Nwogu, M. I. O. (2015). Copyright law and the menace of piracy in Nigeria. *Journal of Law, Policy & Globalization, 34,* 113–123.
16. Chang, D. (2010). Piracy laws and the effective prosecution of pirates. *Boston College International & Comparative Law Review, 33*(2), 273–300.
17. Verma, S., & Dey, S. (2023). Innovation and intellectual property rights in engineering curriculum: A pedagogy for higher educational institutes. In *Engineering pedagogy: A collection of articles in honor of Prof. Amitabha Ghosh* (pp. 113–125). Springer Nature. https://doi.org/10.1007/978-981-99-1205-2_9
18. Sunardi, D. I., & Hartono, A. (2024). *The influence of religious affiliation and ethical concerns on digital goods piracy: A theory of planned behavior approach*.
19. Belchior-Rocha, A.(2024). *Moral dilemmas and decision-making in digital piracy:Insights for policy and practice*.
20. Wibowo, T. O. (2024). *The role of online streaming platforms in account-sharing and emerging forms of digital piracy*.
21. Kaushik, S. (2024). *Re-examining digital piracy: Legal, historical, and behavioral perspectives on copyright infringement*.
22. Hammam, H. H., [Other authors if any]. (2024). *Key-controlled anti-piracy techniques for analogy and mixed-signal circuits: A case study on 22nm FDSOI LDO*.
23. Hsieh, Timothy T. "A Bridge Between Copyright and Patent Law: Towards a Modern-Day Reapplication of the Semiconductor Chip Protection Act." Fordham Intellectual Property, Media & Entertainment Law Journal, vol. 28, no. 4, 2018, pp. 729.
24. Kasch, Steven P. "THE SEMICONDUCTOR CHIP PROTECTION ACT: PAST, PRESENT, AND FUTURE." Boston College Technology & Intellectual Property Law Journal, vol. 7, 2015.
25. Gupta, A. "Integrated Circuits and Intellectual Property Rights in India," 2005. Discusses impact of the Semiconductor Chip Protection Act (SCPA) and IP protection mechanisms for semiconductor chips in India.