**OUTLINE PENELITIAN TUGAS AKHIR**

**PROGRAM STUDI TEKNIK INDUSTRI – PROGRAM SARJANA**

**UNIVERSITAS ISLAM INDONESIA**

|  |  |
| --- | --- |
| **Judul**  | Pembentukan Sel Manufaktur dalam Lingkungan Just in Time dengan Memperhatikan Jadwal Produksi dan Perawatan Preventif |
| **MK Pilihan Pendukung** | PPP-1, PPP-2, Manajemen Perawatan |
| **Nama** |  |
| **NIM** |  |
| **Calon Pembimbing** | 1. (Nama Calon Pembimbing)
 | 1. ttd | 2. ttd |
| 1. (optional)
 |
| **Isi Penelitian** | **Jadwal Penelitian** |
| * **Latar belakang dan rumusan masalah:**
* Permasalahan yang dihadapi oleh PT. XYZ adalah fleksibilitas jenis dan jumlah produk yang masih rendah.
* Jadwal produksi yang tidak baik sehingga banyak produk yang selesai tidak tepat waktu
* Tidak ada jadwal perawatan mesin
 | * **Jadwal untuk pra-penelitian:**

Januari 2023 – Februari 2023* **Jadwal untuk pengumpulan data dan analisis:**

Februari 2023 – April 2023* **Jadwal untuk penulisan skripsi:**

Maret 2023 – Mei 2023 |
| * **Seberapa penting penelitian ini dilakukan:**
* Banyak pesanan terkustomisasi tertolak karena tidak mampu memproduksi
* Harga produk yang tinggi karena jumlah produksi yang rendah
* Pesanan selesai terlambat sehingga menimbulkan kekecewaan konsumen atau *penalty* dari konsumen.
* Banyak mesin yang rusak saat produksi.
 |
| * **Metode analisis dan alasan pemilihan:**
* Metode yang digunakan adalah Algoritma Genetik (AG) karena jumlah mesin dan part yang banyak, yang akan sangat rumit jika diselesaikan menggunakan metode konvensional.
* AG digunakan karena pembentukan sel manufaktur juga sekaligus memperhatikan jadwal mesin dan perawatan. Belum ada metode formal yang dapat digunakan untuk tujuan tersebut.
 |
| * **Data yang dibutuhkan dan metode pengambilan data:**
* Routing produksi setiap part, data diambil dengan observasi langsung.
* Waktu proses setiap part dalam setiap mesin, data diambil dengan observasi langsung.
* MTBF atau MTTF setiap mesin, data diambil dari departemen perawatan.
* Jenis perawatan, data diambil dari literatur.
 |
| * **Posisi Penelitian**

|  |  |  |
| --- | --- | --- |
| **Penulis** | **Obyek (Industri)** | **Metode** |
| **Otomotif** | **Makanan** | **… smp** **maks 5** |  **GA** | **Fuzzy** | **… smp maks 5** |
| **(Akl, dkk, 2022)** | **√** |  |  | **√** |  |  |
| **(Alimian, dkk, 2020)** |  | **√** |  | **√** |  | **√** |
| **…** | **√** |  |  | **√** |  | **√** |
| **Usulan** |  | **√** |  | **√** | **√** | **√** |

 |
| **Referensi (minimal 15)** |
| 1. Akl, A.M., El Sawah, S., Chakrabortty, R.K., & Turan, H.H. 2022. A joint optimization of strategic workforce planning and preventive maintenance scheduling: a simulation–optimization approach. *Reliability Engineering and System Safety*, 219: 1-18.
2. Alimian, M., Ghezavati, V., and Tavakkoli-Moghaddam, R. 2020. New integration of preventive maintenance and production planning with cell formation and group scheduling for dynamic cellular manufacturing systems. *Journal of Manufacturing Systems*, 56: 341-358.
3. Bortolini, M., Ferrari, E., Galizia, F.G., and Regattieri, A. 2021. An optimisation model for the dynamic management of cellular reconfigurable manufacturing systems under auxiliary module availability constraints. *Journal of Manufacturing Systems*, 58: 442-451.
4. Castillo, O., Melin, P., & Kacprzyk, J. 2020. *Intuitionistic and Type-2 Fuzzy Logic Enhancements in Neural and Optimization Algorithms: Theory and Applications*. Springer International Publishing.
5. Chen, Z., and Bidanda, B. 2019. Sustainable manufacturing production-inventory decision of multiple factories with JIT logistics, component recovery and emission control. *Transportation Research Part E*, 128: 356-383.
6. Chu, X., Gao, D., Cheng, S., Wu, L., Chen, J., Shi, Y., and Qin, Q. 2019. Worker assignment with learning-forgetting effect in cellular manufacturing system using adaptive memetic differential search algorithm. *Computers & Industrial Engineering*, 136: 381-396.
7. Dorigo, M., and Stutzle, T. 2004. *Ant Colony Optimization*. The MIT Press, England.
8. Forghani, K., and Ghomi, S.M.T.F. 2020. Joint cell formation, cell scheduling, and group layout problem in virtual and classical cellular manufacturing systems. *Applied Soft Computing Journal*, 97: 1-19.
9. Ghaleb, M., Taghipour, S., & Zolfagharinia, H. 2021. Real-time integrated production-scheduling and maintenance-planning in a flexible job shop with machine deterioration and condition-based maintenance. *Journal of Manufacturing Systems*, 61: 423-449.
10. Gonzales, P., Prado-Rodriguez, R., Gabor, A., Saez-Rodriguez, J., Banga, J.R., and Doallo, R. 2022. Parallel ant colony optimization for the training of cell signaling networks. *Expert Systems With Applications*, 208: 1-16.
11. Iqbal, T., Huq, F., and Bhutta, M.K.S. 2018. Agile manufacturing relationship building with TQM, JIT, and ﬁrm performance: An exploratory study in apparel export industry of Pakistan. *International Journal of Production Economics*, 203: 24-37.
12. Jr, K.W.G., Inman, R.A., Birou, L.M., and Whitten, D. 2014. Total JIT (T-JIT) and its impact on supply chain competency and organizational performance. *Int. J. Production Economics*, 147: 125-135.
13. Kim, S.C., and Shin, K.S. 2019. Negotiation Model for Optimal Replenishment Planning Considering Defects under the VMI and JIT Environment. *The Asian Journal of Shipping and Logistics*, 35(3): 147-153.
14. King, J.R. 1980. Machine-component grouping in production flow analysis: an approach using rank order clustering algorithm. *International Journal of Production Research*, 18(2): 213-232.
15. King, J.R., and Nakornchai, V. 1982. Machine-component group formation in group technology: review and extension. *International Journal of Production Research*, 20(2): 117-133.
16. Kumar, K., & Chen, S.M. 2022a. Group decision making based on advanced intuitionistic fuzzy weighted Heronian mean aggregation operator of intuitionistic fuzzy values. Information Sciences, 601: 306-322.
 |
| **Pengesahan** |
| **Pengusul**(……………………………………..)  | **Ketua Tim Review Outline TA** **Teknik Industri Program Sarjana**(………………………………………………………) |